Mahidol University
Faculty of Pharmacy

US-Thai
Pharmacy Consortium

ASEAN PharmNET

The Pharmacy Education Consortium of Thailand
PECT

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Abstract Book

The 4th ASEAN PharmNET 2024 & the 2024 US-Thai Pharmacy Consortium Conference: The 30th Anniversary Commemoration

Global Collaboration in Pharmacy Education, Practice & Research: Bridging Borders for Health Innovation

June 12-14, 2024

Eastin Grand Hotel Phayathai

Welcome Message

from

President of Pharmacy Education Consortium of Thailand (PECT)

Dean of the Faculty of Pharmacy, Mahidol University, Thailand

On behalf of Faculty of Pharmacy Mahidol University and Pharmacy Education Consortium of Thailand (PECT), I, Assoc. Prof. Surakit Nathisuwan, extend a heartfelt welcome to the 4th ASEAN PharmNET and the 2024 US-Thai Pharmacy Consortium Conference. This combined event celebrates not only the 30th Anniversary of the US-Thai Pharmacy Consortium but also the ongoing commitment to fostering global collaboration in pharmacy education, practice, and research.

Following the challenges of the recent pandemic, this gathering holds a special significance. It's especially gratifying to see us come together once more. This conference serves as a powerful testament to the enduring spirit of collaboration that transcends borders.

For three decades, the US-Thai Pharmacy Consortium has nurtured a dynamic exchange of knowledge and best practices between our two nations. Similarly, ASEAN PharmNET has facilitated groundbreaking research and knowledge dissemination across Southeast Asia. This combined conference signifies a fantastic opportunity to leverage the collective expertise of our diverse communities.

The theme, "Global Collaboration in Pharmacy Education, Practice & Research: Bridging Borders for Health Innovation," perfectly captures the essence of this gathering. Over the next few days, we'll delve into critical topics, share cutting-edge research, and forge connections that can propel our profession forward.

The program features renowned speakers from around the globe, offering a rich tapestry of perspectives on our shared goals. But this conference is much more than just a series of lectures. It's a space for vibrant discussions, exchange of ideas, and the building of lasting collaborations that will undoubtedly contribute to advancements in global health.

We encourage you to actively participate, network with your peers, and explore the exciting possibilities that emerge when passionate minds from around the world come together.

Welcome once again, and best wishes for a productive and inspiring conference

Assoc. Prof. Surakit Nathisuwan, PharmD

Dean, Faculty of Pharmacy, Mahidol University

President of Pharmacy Education Consortium of Thailand

Welcome Message

THE UNIVERSITY OF ARIZONA
R. Ken Coit College of Pharmacy

US-Thai Pharmacy Consortium

ASEAN PharmNET

ASEAN 10 COUNTRIES

BRUNEI THAILAND MYANMAR LAOS INDONESIA
MALAYSIA PHILIPPINES CAMBODIA SINGAPORE VIETNAM

June, 2024

On behalf of the Board of Directors of the US-Thai Pharmacy Consortium, the member US and Thai Schools, Colleges and Faculties of Pharmacy, I bring you the warmest of greetings and welcome to this historic combined meeting of the US-Thai Pharmacy Consortium and ASEAN PharmNet 2024! This meeting marks the 30th Anniversary of the US-Thai Pharmacy Consortium and the 4th meeting of ASEAN PharmNet. Your presence and participation is making history! The collaboration between American and Thai pharmacy schools has resulted in remarkable changes in pharmacy education, practice and research. This is mostly due to the hard work, dedication and creativity of our Thai colleagues, and the American partners have gained tremendously from our 30 years of collaboration. The work of the ASEAN PharmNet members is equally remarkable, supporting cutting edge research and dissemination of new knowledge throughout Southeast Asia and the world.

We are especially excited about the launch of the US-ASEAN Pharmacy Consortium at this meeting. Discussion about forming such a Consortium begin in 2016, and we are thrilled that we will have a formal mechanism for pharmacy educators, practitioners and researchers from the US and 10 ASEAN countries to work together to advance our profession and improve the lives of our patients.

The joining of the Consortium and ASEAN PharmNet conferences will allow us to share best practices in pharmacy education, practice and research. As you review the program, I'm sure you will agree that we have a program of highly relevant topics presented by world class speakers from Thailand, the US and other ASEAN countries. In addition to a great educational program and over 250 scientific posters, the meeting will allow ample time for networking, to share ideas, meet new colleagues, renew friendships and establish new relationships and collaborations.

While many people have taken part in planning this conference, I want to give special recognition to the tireless efforts of Dr. Jennis Meanwatthana and Dean Surakit Nathisuwan from Mahidol University.

Welcome to this historic conference, and thank you for your participation! I look forward to meeting you.

Michael Katz, PharmD

US-Thai Pharmacy Consortium Co-Chair

Professor and Director of International Programs.

R. Ken Coit University of Arizona College of Pharmacy

Committee

Organizing Committee

1.	Assoc. Prof. Surakit Nathisuwan	Chair
2.	Assoc. Prof. Dr. Mullika Chomnawang	Chairman for Scientific Committee
3.	Assoc. Prof. Dr. Krit Thirapanmethee	Chairman for Scientific Publication
4.	Assoc. Prof. Thanarat Suansanae	Chairman for Venue Management and Fund Raising
5.	Assoc. Prof. Dr. Montarat Thavorncharoensap	Chairman for Hospitality Management
6.	Assoc. Prof. Dr. Jiraphun Jittikoon	Chairman for Registration Management
7.	Assist. Prof. Jennis Meanwatthana	Chairman for Ceremony and Social Events
8.	Assist. Prof. Dr. Anchalee Jintapattanakit	Chairman for Treasurer and Procurement
9.	Assist. Prof. Dr. Brompoj Prutthiwanasan	Chairman for Information Technology and Digital Media
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11.	Assist. Prof. Dr. Bhanubong Bongcheewin	Committee
12.	Assist. Prof. Dr. Pattamapan Lomarat	Committee
13.	Assoc. Prof. Preecha Montakantikul	Committee
14.	Assist. Prof. Dr. Luerat Anuratpanich	Committee
15.	Assist. Prof. Dr. Wichit Nosoongnoen	Committee
16.	Assist. Prof. Dr. Nattawut Charoenthai	Committee
17.	Assist. Prof. Supatat Chumnumwat	Committee
18.	Assist. Prof. Dr. Jaturong Pratuangdejkul	Committee
19.	Assoc. Prof. Dr. Pramote Tragulpiankit	Committee
20.	Assoc. Prof. Dr. Kittisak Sripha	Committee
21.	Assist. Prof. Dr. Thanika Pathomwichaiwat	Committee
22.	Assoc. Prof. Dr. Vilasinee Hirunpanich Sato	Committee
23.	Assoc. Prof. Dr. Veena Satitpatipan	Committee
24.	Assoc. Prof. Dr. Waree Limwikrant	Committee
25.	Assist. Prof. Dr. Wasu Supharattanasitthi	Committee
26.	Assoc. Prof. Dr. Savita Chewchinda	Committee
27.	Ms. Phinnaphit Saengpao	Committee
28.	Assoc. Prof. Dr. Usa Chaikledkaew	Secretariat
29.	Assist. Prof. Sayamon Sukkha	Secretariat Assistant

30.	Dr. Saowalak Turongkaravee	Secretariat Assistant
31.	Dr. Amporn Songkasiri	Secretariat Assistant
32.	Ms. Supattra Kongkaew	Secretariat Assistant

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7.	Assoc. Prof. Dr. Vilasinee Hirunpanich Sato	Chairman for Pharmacology, Toxicology, and Physiology (PP)
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9.	Assist. Prof. Supatat Chumnumwat	Chairman for Clinical Pharmacy and Personalized Medicine (CP)
10.	Assist. Prof. Dr. Krisada Sakchaisri	Scientific Committee Secretariat
11.	Dr. Teerawat Songsichan	Scientific Committee Secretariat Assistant

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1. Prof. Alan Lau

   Director of International Clinical Pharmacy Education, College of Pharmacy, University of Illinois Chicago, USA,
   Pharmaceutical Education and Practice (PE)

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   Dean, Pharmaceutical Education and Practice (PE)

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   Director of International Professional Student Education, and Assistant Provost for Global Health Initiatives College of Pharmacy, University of Kentucky,
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9. Prof. Michael Katz

   Director of International Programs, the R. Ken Coit College of Pharmacy, University of Arizona, USA / Chairman, The US-Thai Pharmacy Consortium,
   Pharmaceutical Education and Practice (PE)

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    Dean, Social and Administrative Pharmacy (SP)
16. Prof. Thein May Saw
    Rector, Pharmacology, Toxicology, and Physiology (PP)

Scientific Program

The 4th ASEAN PharmNET 2024

(International Conference on Pharmacy Education and Research Network of ASEAN)

Held in Conjunction with

The US-THAI Pharmacy Consortium 2024: The 30th Anniversary Commemoration

Theme:

Global Collaboration in Pharmacy Education, Practice and Research: Bridging Borders for Health Innovation

Eastin Grand Phayathai Hotel
Bangkok, Thailand
June 12 – 14, 2024

Conference Program: June 12, 2024

DAY 1: Wednesday (June 12, 2024)	
08.00 – 09.00	Registration

09.00 – 09.45	**Opening Ceremony**
	(Phayathai Grand Ballroom 1-3)
	• Cultural Performance & ASEAN Flag Parade & Sing Along
	• Commemoration of the 30th Anniversary of the US-Thai Pharmacy Consortium Welcome Opening Remark
	  • **Assoc.Prof.Dr. Chutamanee Suthisisang, Ph.D.**
	  Founder of ASEAN Pharmnet, Acting for Director of ASEAN Institute for Health Development
	  Former Dean, Faculty of Pharmacy, Mahidol University, Thailand
	  • **Prof. Michael Katz, Pharm.D.**
	  Director of International Programs. The R. Ken Coit College of Pharmacy, University of Arizona, USA
	  Chairman, The US-Thai Pharmacy Consortium
	  • **Assoc.Prof. Surakit Nathisuwan, Pharm.D.**
	  President of Pharmacy Education Consortium of Thailand (PECT)
	  Dean, Faculty of Pharmacy, Mahidol University, Thailand
	• Group Photos

09.45 – 10.15	**Plenary Talk 1** **Advancement of Pharmacy Education Through International Collaboration: US-Thai Pharmacy Consortium** • **Prof. Michael Katz, Pharm.D**. Director of International Programs, the R. Ken Coit College of Pharmacy, University of Arizona, USA Chairman, The US-Thai Pharmacy Consortium • **Assoc.Prof. Surakit Nathisuwan, Pharm.D.** President of Pharmacy Education Consortium of Thailand (PECT) Dean, Faculty of Pharmacy, Mahidol University, Thailand
10.15 – 10.30	Coffee break & Exhibition (Pre-function area)

10.30 – 11.00	**Plenary Talk 2** **Fostering collaborative learning through integrated clinical services and pharmacy education** • **Prof. Edith A. Nutescu, Pharm.D., MS CTS, FCCP** College of Pharmacy, University of Illinois Chicago, USA					
11.00 – 11.30	**Plenary Talk 3** **Trends & Application of Disruptive Technology on Pharmaceutical Science Research** • **Prof.Dr. R. Kip Guy, Ph.D.** Dean, College of Pharmacy, University of Kentucky, USA					
11.30 – 12.00	**Plenary Talk 4** **Advancement of Pharmacy Practice: Global View** • **Prof. Alan Lau, Pharm.D.** Director of International Clinical Pharmacy Education, College of Pharmacy, University of Illinois Chicago, USA					
12.00 – 13.00	Lunch break					
Concurrent session						
13.00 – 15.00	**Symposium 1: Pharmacy Education and Practice** (Auditorium)	**Symposium 2: Biopharmaceutical Sciences and Pharmaceutical Biotechnology & Pharmacology, Toxicology, and Physiology** (Phayathai Grand Ballroom 1)	**Symposium 3: Pharmaceutical Technology and Drug Delivery** (Phayathai Grand Ballroom 2)	**Symposium 4: Pharmaceutical Chemistry** (Ari)	**Symposium 5: Phytopharmaceuticals and Nutraceuticals** (Sena)	**Symposium 6: Clinical Pharmacy and Personalized Medicine & Social Administrative Pharmacy** (Phayathai Grand Ballroom 3)

	Chair: Dr. Wannisa Dongtai Ubonratchathani University, Thailand Co-chair: Dr. Renukha Sellappans Taylor's University, Malaysia 13.00 – 13.30 ▪ Quality Assurance Measures in Pharmacy Education for ASEAN Assoc.Prof. Surakit Nathisuwan, Pharm.D. Faculty of Pharmacy, Mahidol University, Thailand Prof. Dr. Apt. Daryono Hadi Tjahjono Asian Association of Schools of Pharmacy, Indonesia	Chair: Asst.Prof. Czarina Dominique R. Delos Santos University of the Philippines Manila, Philippines Co-chair: Asst.Prof.Dr. Arnatchai Maiuthed Mahidol University, Thailand 13.00 – 13.30 ▪ Challenges and Recent Progress in Drug Discovery and Development for Tropical Diseases: The Role of Pharmacology Prof.Dr. Kesara Na-Bangchang President, Pharmacological and Therapeutic Societies of Thailand, Thailand	Chair: Prof.Dr. Yahdiana Harahap Universitas Indonesia, Indonesia Co-chair: Assoc.Prof.Dr.Jiraphong Suksiriworapong Mahidol University, Thailand 13.00 – 13.30 ▪ Innovations in Pharmaceutical Formulation Design for Aging Population Prof.Dr. Pornsak Sriamornsak Dean, Silpakorn University, Thailand	Chair: Assist.Prof.Dr. Satsawat Visansirikul Mahidol University, Thailand Co-chair: Dr. Chaiyawat Aonsri Mahidol University, Thailand 13.00 – 13.30 ▪ Exploring the Therapeutic Potential of Plant-Derived Polyphenols using Molecular Docking and Network Analysis Assoc.Prof.Dr. Pornchai Rojsitthisak Chulalongkorn University, Thailand	Chair: Prof.Dr. Triana Hertiani University Gadjah Mada, Indonesia Co-chair: Dr. Watchara Arthan Mahidol University, Thailand 13.00 – 13.30 ▪ *Eurycoma Longifolia* and *Eurycoma Harmandiana*: Phytochemical Contents, Biological Activities Evaluation and *in vitro* Culture Prof.Dr. Waraporn Putalun Khon Kaen University, Thailand	Chair: Assoc.Prof.Dr. Francis R. Capule University of the Philippines Manila, Philippines Co-chair: Dr. Mohd Shahezwan Abd Wahab Universiti Teknologi MARA, Malaysia 13.00 – 13.30 ▪ Empowering Pharmacists: The Evolving Role as Vaccinators in Thailand Asst.Prof.Dr. Supatat Chumnumwat Mahidol University, Thailand

	13.30 – 14.30 ▪ Tips & Best Practices in Designing New Curriculum: Experience from US and Thailand Prof.Dr. Paul W. Jungnickel, R.Ph. Auburn University, USA Asst. Prof. Thitima Doungngern Faculty of Pharmaceutical Science, Prince of Songkla University, Thailand	13.30 – 14.00 ▪ Network Pharmacology and Cell-Based Assessments for Potential Cancer Targets Assoc.Prof.Dr. Laddawan Senggunprai Khon Kaen University, Thailand	13.30 – 14.00 ▪ Tailoring Hydroxyappatite Scaffolds for Dual Action: Bone Regeneration and Sustained Delivery of Antibiotics Asst.Prof.Dr. Amaraporn Wongrakpanich Mahidol University, Thailand	13.30 – 14.00 ▪ Computational Drug Discovery and Development of Novel Tubulin and Phosphatidylcholine-Specific Phospholipase C Inhibitors as Potential Anticancer Drug Candidates Asst.Prof.Dr. Chatchakorn Eurtivong Mahidol University, Thailand	13.30 – 14.00 ▪ Hmong-Mien Cultural Uses of Exotic Medicinal Plants Asst.Prof.Dr. Methee Phumthum Mahidol University, Thailand	13.30 – 14.00 ▪ Roles of Pharmacist in the Emergency Department Prof.Dr. Dang Nguyen-Doan-Trang University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam
		14.00 – 14.30 ▪ Emerging Role of CAMSAP Family Proteins on Lung Cancer Metastasis Assoc.Prof.Dr. Varisa Pongrakhananon Chulalongkorn University, Thailand	14.00 – 14.30 ▪ Development of pH-sensitive Zerumbone-encapsulated Liposomes for Lung Fibrosis Assoc.Prof.Dr. Foo Jhi Biau Taylor's University, Malaysia	14.00 – 15.00 **Poster Presentation**	14.00 – 15.00 **Poster Presentation**	14.00 – 15.00 **Oral Presentation**
	14.30 – 15.00 ▪ Implementation of Interprofessional Education in Pharmacy Curriculum:	14.30 – 15.00 ▪ Toxic or Tonic? Understanding the Pharmacological Actions of Emerging	14.30 – 15.00 **Poster Presentation**			

	▪ Experience Sharing Prof.Dr. Paul W. Jungnickel, R.Ph. Auburn University, USA	New Psychoactive Substances Prof.Dr. Norazrina Azmi Universiti Kebangsaan, Malaysia				
15.00 – 15.15	Coffee break & Exhibition (Pre-function area)					
15.15 – 17.30	**Poster Presentation & Networking** (Phayathai Grand Ballroom 4)					

Conference Program: June 13, 2024

DAY 2: Thrusday (June 13, 2024)		
08.30 – 09.00	**Registration**	
09.00 – 09.45	**Country Status & Progress Report on Pharmacy Education & Practice** (Phayathai Grand Ballroom 1-2) **Moderator: Assist.Prof. Jennis Meanwatthana** Faculty of Pharmacy, Mahidol University **Pharmacy Education and Pharmacy Practice at UBD: Brunei Experience** **Dr. Nurolaini Pg Haji Muhd Kifli** PAPRSB Institute of Health Sciences, Universiti Brunei Darussalam,Brunei	**Theme: Drug Discovery and Development** (Phayathai Grand Ballroom 3-4) **Moderator: Assist.Prof.Dr. Satsawat Visansirikul** Faculty of Pharmacy, Mahidol University **Nanoparticles for Enhanced siRNA Delivery in Cancer Models** **Prof.Dr. Shirui Mao, Ph.D.** Shenyang Pharmaceutical University, China
09.45 – 10.15	**Transforming Pharmacy Education in the Philippines: A Strategic Framework for Roadmap Development** **Assoc.Prof.Dr. Margarita M. Gutierrez, Ph.D.** College of Pharmacy, University of the Philippines Manila, The Philippines	**The Key to Success in the Cannabinoid Drug Development Journey** **Prof.Dr. Hitoshi Sato, Ph.D.** School of Pharmacy, Showa University, Japan
10.15 – 10.30	Coffee break & Exhibition (Pre-function area)	
10.30 – 11.15	**Moderator: Dr. Thongtham Suksawat** Faculty of Pharmacy, Mahidol University **Cambodia, Myanmar, Laos PDR** **Dr. Chea Sin** Faculty of Pharmacy, University of Puthisastra, Cambodia **Prof. Dr. Thein May Saw** University of Pharmacy, Mandalay, Myanmar	**Navigating Pharmaceutical Impurity: Regulation Framework and Analytical Strategies** **Prof.Dr. Leena Suntornsuk** Faculty of Pharmacy, Mahidol University

	Dr. Phoutsathaphone Sibounheuang Faculty of Pharmacy, University of health Sciences, Lao PDR					
11.15 – 12.00	**Malaysia, Indonesia, Vietnam, Singapore, and Thailand** **Prof. Dr. Mohd Makmor Bakry** Faculty of Pharmacy, Universiti Kebangsaan Malaysia, Malaysia **Prof.Dr. Yandi Sukri** The Association of Indonesian Pharmacy Higher Education, Indonesia **Prof.Dr. Dinh Thi Thanh Hai** Hanoi University of Pharmacy, Vietnam **Prof.Dr. Paul John Gallaher** Department of Pharmacy and Pharmaceutical Sciences, National University of Singapore, Singapore **Assoc.Prof. Surakit Nathisuwan, Pharm.D.** Faculty of Pharmacy, Mahidol University, Thailand		**Exploring Metabolic Polymorphism of Antioxidant Phytochemicals in Plants** **Prof.Dr. Takayuki Tohge, Ph.D.** Nara Institute of Science and Technology, Japan			
12.00 – 13.00	Lunch break					
Concurrent session						
13.00 – 15.00	**Symposium 1: Pharmacy Education and Practice** (Auditorium)	**Symposium 2: Clinical Pharmacy and Personalized Medicine & Social Administrative Pharmacy** (Phayathai Grand Ballroom 4)	**Symposium 3: Phytopharmaceuticals and Nutraceuticals** (Phayathai Grand Ballroom 3)	**Symposium 4: Pharmaceutical Technology and Drug Delivery** (Ari)	**Symposium 5: Biopharmaceutical Sciences and Pharmaceutical Biotechnology & Pharmacology, Toxicology, and Physiology** (Phayathai Grand Ballroom 2)	**Symposium 6: Pharmaceutical Chemistry** (Phayathai Grand Ballroom 1)

	Chair: Prof. Gary M. Oderda University of Utah, USA Co-chair: Prof. Dr. Li-Jiuan (Rita) Shen Associate Dean for International Affairs, College of Medicine, National Taiwan University, Taiwan	Chair: Prof. Dang Nguyen-Doan-Trang University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam Co-chair: Assoc.Prof.Dr. Montarat Thavorncharoensap Mahidol University, Thailand	Chair: Assist.Prof.Dr. Somnuk Bunsupa Mahidol University, Thailand Co-chair: Dr. Nor Khaizan Anuar Universiti Teknologi MARA, Malaysia	Chair: Assoc.Prof.Dr. Foo Jhi Biau, Taylor's University, Malaysia Co-chair: Assoc.Prof.Dr. Waree Limwikrant Mahidol University, Thailand	Chair: Assoc.Prof.Dr. Wanvisa Udomsinprasert Mahidol University, Thailand Co-chair: Dr. Teerawit Audshasai Mahidol University, Thailand	Chair: Assoc.Prof.Dr. Chutima Phechkrajang Mahidol University, Thailand Co-chair: Dr. Salinthip Jarusintanakorn Mahidol University, Thailand
	13.00 – 13.30 ▪ Tips & Best Practices in Student Assessment: Experience Sharing Prof.Dr. Paul W. Jungnickel, R.Ph. Auburn University, USA	13.00 – 13.30 ▪ Application of Health Technology Assessment on Policy Decision Making for the Development of the Universal Health Coverage: Lesson Learnt from Thailand Assoc Prof.Dr. Usa Chaikledkaew Faculty of Pharmacy, Mahidol University, Thailand	13.00 – 13.30 ▪ Projecting Plantago Major as Phytopharmaceuticals for Diabetic Wound Prof.Dr. Triana Hertiani Universitas Gadjah Mada, Indonesia	13.00 – 13.30 ▪ Potential of cannabidiol as Nasal and Pulmonary Delivery Systems Prof.Dr. Teerapol Srichana Prince of Songkla University, Thailand	13.00 – 13.30 ▪ Pharmacogenomics of Drug Induced Liver Injury Assoc.Prof.Dr. Jiraphun Jittikoon Mahidol University, Thailand	13.00 – 13.30 ▪ Tailored Paper-based Devices through Surface Modification for Point-of-Need Applications Assoc.Prof.Dr. Nantana Nuchtavorn Mahidol University, Thailand

	13.30 – 14.00 ▪ Leadership essentials to Ensure Meaningful changes Prof. Donald E. Letendre, Dean, College of Pharmacy, University of Iowa, USA 14.00 – 15.00 ▪ Strategies & Best Practices in Preceptor Development: A Tale of Two Continents US and Thailand Prof. Monica L. Miller, Pharm.D. Purdue University, USA Assoc.Prof. Weerachai Chaijamorn, BCP, FACP Chulalongkorn University, Thailand	13.30 – 14.00 ▪ Social Administrative Pharmacy and Pharmaconomics in Viet Nam: Development and Future Challenges Dr. Pham Nu Hanh Van, Hanoi University of Pharmacy, Vietnam 14.00 – 15.00 **Oral Presentation**	13.30 – 14.00 ▪ Black Rice (*Oryza Sativa* L.) and its Anthocyanins: Mechanisms, Food Applications, and Clinical Insights for Postprandial Glycemic and Lipid Regulation Prof.Dr. Sirichai Adisakwattana Chulalongkorn University, Thailand 14.00 – 15.00 **Oral Presentation**	13.30 – 14.00 ▪ Bioequivalence Studies to Ensure the Quality of Generic Product Prof.Dr. Yahdiana Harahap Universitas Indonesia, Indonesia 14.00 – 15.00 **Oral Presentation**	13.30 – 14.00 ▪ Insight Out: The Gut Microbiome Impact on Disease and Wellness Asst.Prof.Dr. Pagakrong Wanapaisan Mahidol University, Thailand 14.00 – 14.30 ▪ Study on Bioactive Secondary Metabolites from Marine-derived Fungi Assoc.Prof.Dr. Elin Julianti Bandung Institute of Technology, Indonesia 14.30 – 15.00 **Oral Presentation**	13.30 – 14.00 ▪ Transitioning From Local Wisdom to Pioneering Green Chemical/ Pharmaceutical Analysis Assoc.Prof.Dr. Chalermpong Saenjum Chiang Mai University, Thailand 14.00 – 15.00 **Oral Presentation**

15.00 – 15.15	Coffee break & Exhibition (Pre-function area)
15.15 – 16.30	**Oral Presentation** **(Phayathai Grand Ballroom 1-4, Sena, Ari, Mo Chit)**
18.30 – 20.30	**Welcome Dinner Reception & Performance from ASEAN countries** (Phayathai Grand Ballroom 2-4) Hosted by Faculty of Pharmacy, Mahidol University

June 13, 2024	**Pharmacology, Toxicology, and Physiology (Mo Chit)**	**June 13, 2024**	**Clinical Pharmacy and Personalized Medicine and Pharmacy Education and Practice (Sena)**
14.00 – 16.45	Chair: Prof.Dr. Hitoshi Sato Showa University, Japan **Oral Presentation**	13.00 – 16.45	Chair**:** Asst.Prof.Dr. Supatat Chumnumwat Co-Chair: Asst.Prof.Dr. Yingrak boondam Chuayboon Mahidol University, Thailand **Oral Presentation**

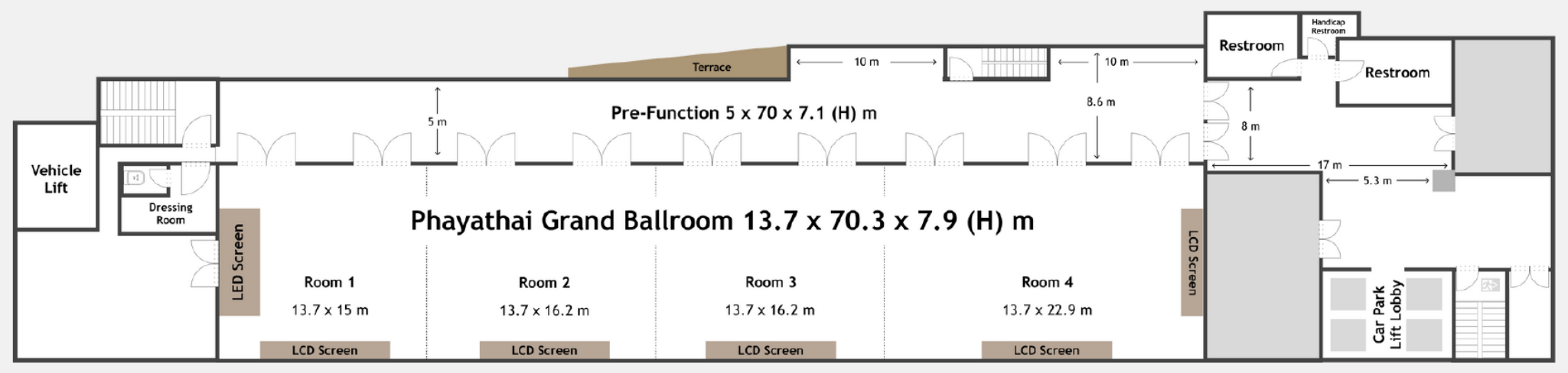
Conference Program: June 14, 2024

DAY 3: Friday (June 14, 2024)		
08.30 – 09.00	Registration	
09.00 – 09.30	**Theme: Bridging Boundaries: Optimizing Pharmacy Education for a Globalized Future** (Phayathai Grand Ballroom 1-2) **Moderator: Dr. Pemmarin Potisarach** Faculty of Pharmacy, Mahasarakham University **Integrating Teaching of Basic Science and Pharmacy Practice** **Prof. Melody Ryan, Pharm.D., MPH, BCGP, BCPS** Director of International Professional Student Education, and Assistant Provost for Global Health Initiatives College of Pharmacy, University of Kentucky, USA	**Theme: Personalized Medicine** (Phayathai Grand Ballroom 3-4) **Moderator: Dr. Pongpol Thanuphol** Faculty of Pharmacy, Mahidol University **Clinical Pharmacogenomics Implementation in Thailand: A Dream Comes True** **Prof.Dr. Chonlaphat Sukasem, Ph.D.** Faculty of Medicine Ramathibodi Hospital, Mahidol University, Thailand
09.30 – 10.00	**Foresight on Pharmacy Education in the Digital Age: Where do we go from here?** **Asst.Prof.Dr. Somchai Suriyakrai, Ph.D.** Faculty of Pharmaceutical Sciences, Khon Kaen University, Thailand	**From Bench to Bedside: Translating Research into Clinical Practice** **Prof.Dr. Jeremy J. Johnson, Pharm.D., Ph.D.** College of Pharmacy, University of Illinois Chicago, USA
10.00 – 10.15	Coffee break & Exhibition (Pre-function area)	
10.15 – 10.45	**Implementation and Experiences in Entrustable Professional Activities (EPA) for Pharmacy Education** **Prof. Ellen M. Schellhase, Pharm.D., FCCP** College of Pharmacy, Purdue University, USA	**Nutrigenomics: The Next Frontier in Personalized Nutrition** **Clinical Prof. Monica L. Miller, Pharm.D.** College of Pharmacy, Purdue University, USA

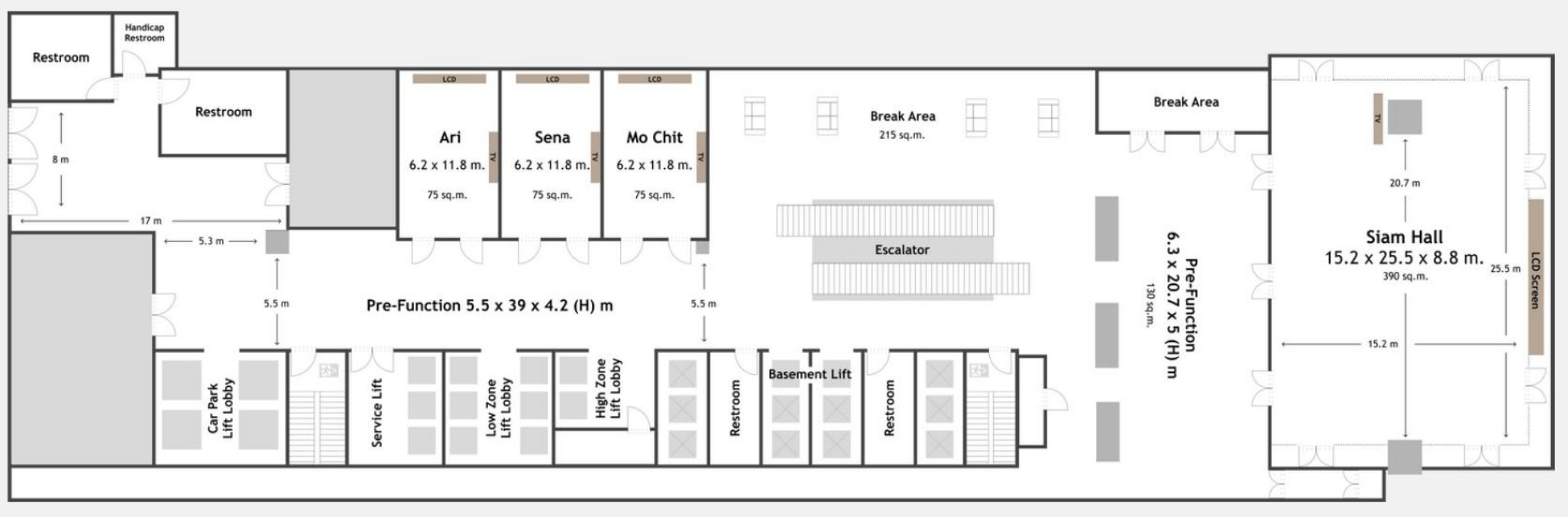
10.45 – 11.15	**Accreditation Council for Pharmacy Education (ACPE) Curriculum Standards & Quality Criteria** **Prof. Michael Katz, Pharm.D.** Director of International Programs, the R. Ken Coit College of Pharmacy, University of Arizona, USA Chairman, The US-Thai Pharmacy Consortium	**Structural and Physicochemical Evaluation of Nanomedicine** **Prof.Dr. Kunikazu Moribe, Ph.D.** Graduate School of Pharmaceutical Sciences, Chiba University, Japan
11.15 – 12.00	**Awards & Closing Ceremony** (Phayathai Grand Ballroom)	
12.00 – 14.00	Lunch break	

Conference Venue

Floor 6th: Phayathai Grand Ballroom 1-4



Floor 6th: Ari, Sena, Mo Chit Room



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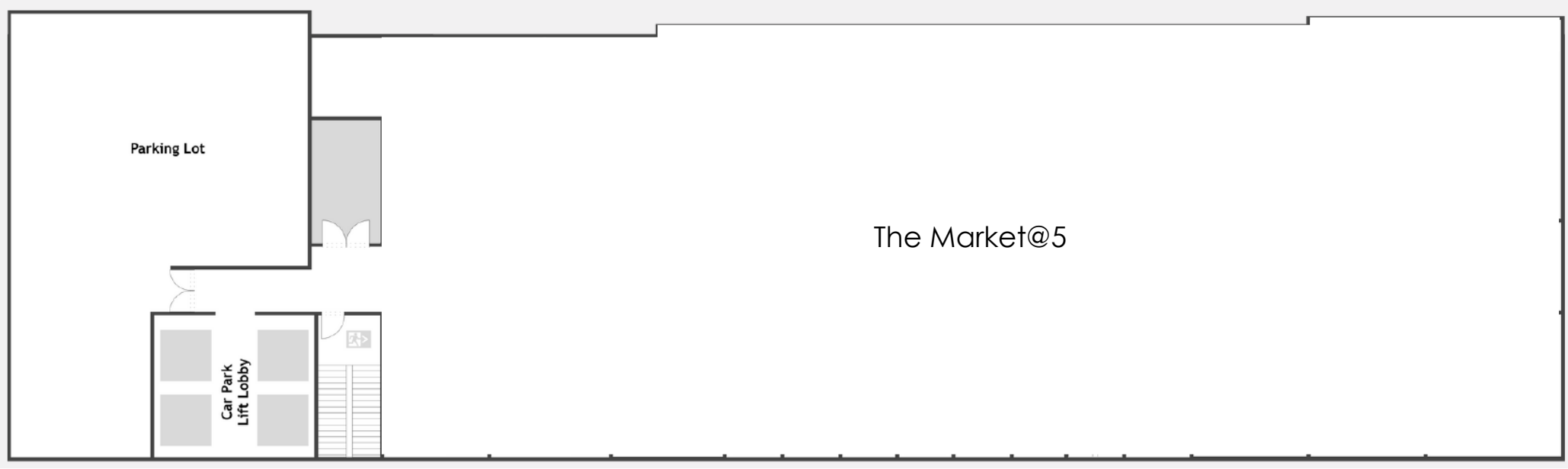
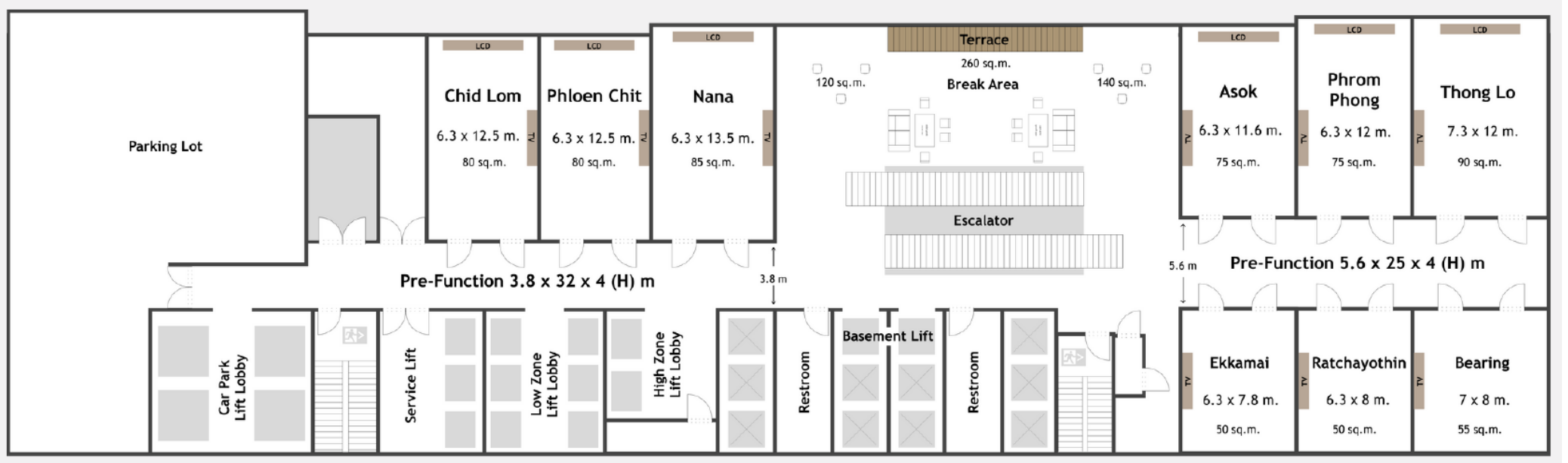


Floor 4th:

Chid Lom, Phloean Chit, Nana: Banquet

Ekkamai: Prayer room



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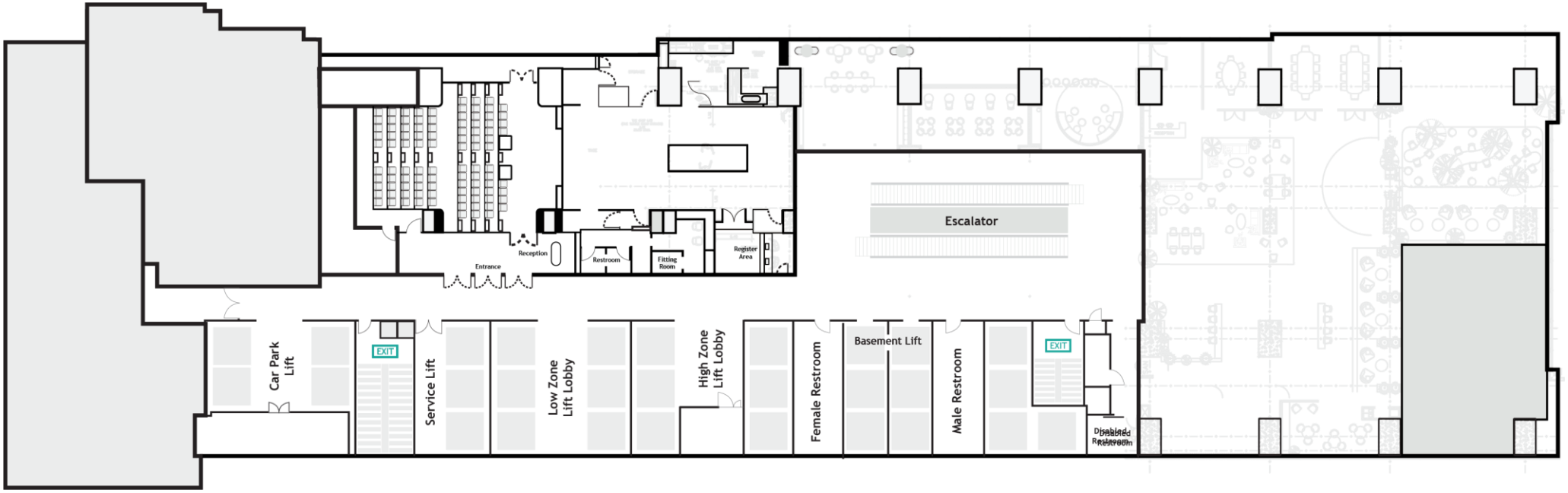

Contents

PLENARY TALK

PL-0001-O

Advancement of Pharmacy Education Through International Collaboration: US-Thai Pharmacy Consortium

Michael Katz

Department of Pharmacy Practice & Science, R. Ken Coit College of Pharmacy,
University of Arizona, Tucson Arizona, USA

ABSTRACT

The US-Thai Pharmacy Consortium started 30 years ago! While we have witnessed and participated in tremendous changes in pharmacy education, practice and research in Thailand, the relationship between the US member schools and the Thai schools has been tremendously important and beneficial for the US members. US schools have hosted Thai pharmacists in PhD and PharmD degree programs, and many Thai PharmD graduates have completed PGY1 and PGY2 residencies in partner institutions. The participation of our Thai colleagues in these training and education programs has enriched the diversity of our programs and increased the awareness of American learners and practitioners of global pharmacy issues. US members also have hosted Thai students, residents, pharmacists and researchers for short-term training programs. Thai schools have been very generous in hosting US students for clinical rotations and study abroad experiences and hosting US faculty for school visits. We look forward to the continued growth of our partnerships between US and Thai schools, and we are eager to establish similar relationships between US schools and schools in the other ASEAN countries.

KEYWORDS: Consortium; US-Thai; US-ASEAN; Collaboration

Biographical Sketch

Michael Katz, PharmD
Professor and Director of International Program
Director of Residency Programs

R. Ken Coit College of Pharmacy,
University of Arizona, USA

Dr. Katz is Professor at the University of Arizona College of Pharmacy Department of Pharmacy Practice & Science. He was selected in 2001 by the Arizona Health Sciences Center as a Dean's Teaching Scholar and has received numerous teaching awards. He is a Past-Chair of the American Society of Health-System Pharmacists (ASHP) Commission on Therapeutics. Dr. Katz has numerous publications and including Pharmacotherapy Principles and Practice Study Guide: A Case-Based Care Plan Approach, now in its 6th edition. Dr. Katz is the Internal Medicine PGY2 Residency Program Director and is Director of all residency-related activities for the College of Pharmacy. He has been involved in international education and practice for over 20 years and he serves as the College of Pharmacy's Director of International Programs. In 2010 he received the University of Arizona's prestigious Excellence in International Education Award. Dr. Katz is a member of the ACPE International Commission and served as its Chair in 2022. He has consulted and lectured extensively in Asia, the Middle East and many other countries regarding pharmacy education and clinical pharmacy practice He serves as the Co-Chair of the Board of Directors of the U.S.-Thai Pharmacy Consortium and with the Consortium has worked on developing a similar consortium among ASEAN countries.

PL-0002-O

Fostering Collaborative Learning Through Integrated Clinical Services and Pharmacy Education

Edith A. Nutescu, PharmD, MS CTS, FCCP

Michael Reese Endowed Professor of Cardiovascular Pharmacotherapy
Head, Department of Pharmacy Practice
University of Illinois Chicago, College of Pharmacy

ABSTRACTS

This presentation will focus on describing the University of Illinois Chicago, College of Pharmacy experience for integrating didactic and experiential pharmacy education with an extensive practice-based network of clinical pharmacy services and pharmacotherapeutic expertise.

Biographical Sketch

Edith A. Nutescu, PharmD, MS CTS, FCCP
Michael Reese Endowed Professor of Cardiovascular Pharmacotherapy

Head, Department of Pharmacy Practice
University of Illinois Chicago, College of Pharmacy

Dr. Edith A. Nutescu is Michael Reese Endowed Professor of Cardiovascular Pharmacotherapy, Head of the Department of Pharmacy Practice, and Affiliate Faculty in the Center for Pharmacoepidemiology and Pharmacoeconomic Research at University of Illinois Chicago (UIC) College of Pharmacy (COP).

Dr. Nutescu received her Pharm.D. from the UIC College of Pharmacy and her Master in Clinical and Translational Science from the UIC School of Public Health. She completed Pharmacy Practice and Specialty Residency (Primary Care with Cardiology Emphasis) training at Advocate Health Care, Lutheran General Hospital and UIC COP / UI Health, respectively.

Dr. Nutescu is a clinical pharmacist scientist with practice and research interests focused on comparative effectiveness and safety of cardiovascular pharmacotherapy and thromboembolic diseases. She has authored over 180 scientific articles and her work has been funded by the National Institutes of Health, National Heart Lung and Blood Institute (NHLBI), the Department of Health and Human Services, and the Agency for Healthcare Research and Quality, among others. She is a recipient of several national clinical practice and research awards such as the NHLBI Clinical Research Career Development Award, the ASHP Foundation Award for Excellence in Medication-Use Safety, the American College of Clinical Pharmacy's (ACCP) Clinical Practice Award, Cardiology PRN's Distinguished Researcher Award, the Therapeutic Frontiers Lecture Award, and the Russel R. Miller Award for her substantial contributions to the literature of clinical pharmacy.

Biographical Sketch

R. Kip Guy, Ph.D.,
Professor & Dean

College of Pharmacy,
University of Kentucky, USA

Dr. R. Kip Guy is the Dean of the College of Pharmacy at the University of Kentucky and a Professor in the Department of Pharmaceutical Sciences. Dr. Guy obtained his BA in chemistry from Reed College in Portland, OR in 1990. After college, he worked as a process development chemist in the Process Translation Unit at IBM-Almaden in San Jose, CA. In 1996, he received his PhD in Organic Chemistry based on the total synthesis of taxol from the Scripps Research Institute (TSRI) La Jolla, CA. While at Scripps he held an Office of Naval Research Graduate Research Fellowship, George Hewitt Medical Research Fellowship, and ACS Organic Division Fellowship. He also carried out additional training in Physiology at the Woods Hole Research Institute in Woods Hole, MA in 1995. From 1996 to 1998, he was a Helen Hay Whitney Postdoctoral Fellow in Cellular Biology focusing on the relationship between hedgehog signaling and sterol homeostasis with Drs. Brown and Goldstein at University of Texas Southwestern Medical Center, Dallas, TX. In 1998 he joined UCSF as an Assistant Professor with joint appointments in Pharmaceutical Chemistry and Cellular and Molecular Pharmacology. In 2005 he was promoted directly to Full Professor. In 2002 he founded the Center for Chemical Diversity at UCSF, which provided access to high throughput chemistry to the campus. In 2003 he founded the Bay Area Screening Center, a joint endeavor between UCSF and the Gallo Institute that provided high throughput screening. These were subsequently merged into the Small Molecule Discovery Center, which is still in operation at UCSF. In 2005 he was recruited to St Jude Children's Research Hospital, Memphis, TN, to found and chair the new department of Chemical Biology and Therapeutics where he was the Robert J. Ulrich Chair in Chemical Biology and Therapeutics. He has held adjunct academic positions at UCSF (Adjunct Professor of Pharmaceutical Chemistry), the University of Tennessee (Adjunct Professor of Pharmaceutical Sciences and Pathology), and Vanderbilt University (Adjunct Professor of Biochemistry). In 2016 he moved to UK as Dean of the College of Pharmacy and Professor of Pharmaceutical Sciences. In 2020, he was elected a Fellow of the American Association of the Advancement of Science and in 2023 he won the Phil Portoghese Award for Medicinal Chemistry from the ACS. His primary interests are in evidence-based practice, health disparities, pharmacy education, and drug discovery. His research is focused on the discovery and development of novel small molecules for orphan diseases, particularly small-morbidity oncology and protozoal infectious diseases. Most of his group's work falls into the areas of chemical validation of novel targets, lead discovery and optimization of novel chemical matter for validated disease targets, and use of non-targeted whole-cell strategies for lead discovery and optimization. He is the author of 202 papers and book chapters, and the inventor on 27 issued patents.

PL-0004-O

Advancement of Pharmacy Practice: Global View

Alan Lau, Pharm.D., FCCP, FNAP

University of Illinois Chicago

ABSTRACT

Pharmacy practice has been shifting its emphasis from products and dispensing towards rational pharmacotherapy aimed to attain the best patient outcomes. Comprehensive medication management is now conducted by pharmacists practicing in interdisciplinary healthcare teams. Pharmacists thus have diverse roles focusing on the patient pharmacotherapy in different patient care settings. Such a transformation in professional practice was started in the United States in 1960's and is now seen in many countries around the world.

There are several key elements necessary for successful professional transformation. A clear vision of professional practice that would impact patient care is needed along with robust standards guiding advancement. To assume these evolving responsibilities effectively, the competency of the global pharmacy workforce needs upgrading through curriculum that would prepare practice-ready graduates as well as continuous professional development to enhance the patient care and practice skills of pharmacists already in the workforce.

Pharmacy education in many countries have since been updated along with strategic plans to equip practice-focused faculty members and preceptors with the necessary teaching and practice skills. Additionally, attractive career ladders are in place to incentivize pharmacists to sustain their professional development and to provide benchmarks along the way. Pharmacists in leadership position have developed clear vision for advancement and provide nurturing environment for their staff to practice at the highest level while exploring new frontiers.

Transnational partnerships have been set up to meet the demand for well-trained faculty and preceptors and to lead off education and practice transformation. As an example, through the US-Thai Pharmacy Education Consortium, since 1994, >120 faculty members received Thai government scholarships to obtain doctoral degrees in US. Clinically faculty members also completed residencies and research fellowships. Alternately, individual institutions have set up collaboration with their own partners. Through these and other international partnerships, foreign experts conduct training programs in host countries while faculty preceptors come to the USA for clinical education. Different programs are offered for students, pharmacists, faculty members and pharmacy directors, providing them tools for practice as well as inspiration for education and professional development. Pharmacists in many countries have thus been empowered with newly acquired clinical and practice skills and became instrumental in transforming global education and practice.

Biographical Sketch

Prof. Alan Lau, Pharm.D.
Director of International Clinical Pharmacy Education,

College of Pharmacy,
University of Illinois Chicago, USA

Alan Lau, PharmD, FCCP, FNAP is Professor of Pharmacy Practice and Director of International Clinical Pharmacy Education at the University of Illinois at Chicago (UIC) College of Pharmacy. He obtained his Bachelor of Science in Pharmacy and Doctor of Pharmacy degrees at the State University of New York at Buffalo and then completed a clinical pharmacy residency at UIC. He pioneered the development of clinical pharmacy services for renal failure patients on dialysis. Dr. Lau had obtained many research grants for clinical and laboratory research in renal pharmacotherapeutics and clinical pharmacology, with focus on anemia and mineral and bone disorder in chronic kidney disease. He has published many research papers and book chapters, including chapters in the textbooks Pharmacotherapy, Applied Therapeutics - The Clinical Use of Drugs and Basic Skills in Interpreting Laboratory Data. Dr. Lau was one of the founding members of the Nephrology Practice and Research Network of the American College of Clinical Pharmacy. In addition, he had served on the Board of Director and as Chairman of the Renal Scientific Section in the American Society for Clinical Pharmacology and Therapeutics. Dr. Lau was elected to be vice-chairman of the Nephrology/Urology Expert Committee of United States Pharmacopeia (USP) in 2007. In 2010, he was elected as a Distinguished Practitioner to the National Academies of Practice in Pharmacy. Since 2011, Dr. Lau has been working with the American College of Clinical Pharmacy on international program development and is now the International Program Director. He has been appointed the Guest Editor for a themed issue of the Journal of the American College of Clinical Pharmacy and began serving on the editorial board in 2021. Dr. Lau has also been appointed guest professor/faculty at the National University of Singapore, National Taiwan University, University of Hong Kong, University of Malta and also the Harbin Medical University, Central South University in Changsha and The First Affiliated Hospital of Xi'an Jiaotong University. With a passion for advancing global pharmacy education and practice, he has been invited to give lectures on pharmacotherapy and clinical pharmacy service development in many conferences and institutions, including those in Japan, South Korea, China, Hong Kong, Taiwan, Thailand, Vietnam, Malaysia, Singapore, Philippines, Indonesia, Saudi Arabia, Turkey and Malta.

KEYNOTE SPEAKERS

KN-0001-O

Pharmacy Education and Pharmacy Practice at UBD: Brunei Experiences

Sheikh Shafqat Naeem, Rajan Rajabalaya, Goh Poh Hui, Nurolaini Kifli

PAPRSB Institute of Health Sciences, Universiti Brunei Darussalam,
Jalan Tungku Link, Gadong, Brunei Darussalam

ABSTRACT

Pharmacy education and practice in Brunei Darussalam have undergone significant developments in recent years, particularly within the context of Universiti Brunei Darussalam (UBD). Pharmacy education at UBD began in August 2016 and ever since then, 8 cohorts of students had enrolled into the Programme. It is a 4 years' degree programme whereby students will conduct research as well as experiential learning during their Discovery Year (DY) in Brunei or overseas. The curriculum is an outcome-based curriculum designed to reflect pharmaceutical knowledge, skills, and attitudes emphasizing UBD's commitment to preparing students for successful careers in pharmacy practice. It focuses on defining specific learning objectives aligned with international standards and local healthcare needs. The modules had been integrated with a Common Foundation Year whereby the students will be learning together with Medical and Dentistry students in Year 1. Experiential learning is a cornerstone of pharmacy education at UBD, with students participating in clinical placements, community pharmacy internships, and research projects. These hands-on experiences provide students with opportunities to apply theoretical knowledge in real-world settings, develop clinical reasoning skills, and engage with healthcare professionals and patients. UBD's pharmacy program also places a strong emphasis on research and innovation. Collaborations with Ministry of Health Brunei and international partners further enrich research endeavors and contribute to evidence-based practice. Once the pharmacy students graduated, they will join their one-year pre-registration training with the Brunei Darussalam Pharmacy Board. Graduates are well-equipped to pursue diverse career paths in areas such as hospital pharmacy, community pharmacy, pharmaceutical industry, academia, and regulatory agencies. This paper will also highlight some challenges faced during the process, such as human resources and students' retention to the programme. In conclusion, pharmacy education and practice in Brunei are characterized by a rigorous curriculum, experiential learning opportunities, research excellence, and a commitment to lifelong learning.

KEYWORDS: Pharmacy; Education; Pharmacy practice; UBD; Brunei Darussalam

Biographical Sketch

Nurolaini Kifli, Ph.D.

Deputy Dean (Undergraduate & Global Affairs) and Herbal Research Lead,

PAPRSB Institute of Health Sciences,
Universiti Brunei Darussalam, Jalan Tungku Link,
Gadong, Brunei Darussalam

Dr Nurolaini Kifli is a pharmacist by training and specialised into a Medicinal Chemist in 2003. She is a Senior Assistant Professor at her Faculty teaching Pharmacy undergraduate students as well as Medicine, Nursing and Biomedical Science Students. She has worked at UBD for 20 years. She is also holding administrative position, i.e. Deputy Dean (Undergraduate & Global Affairs) and Herbal Research Lead at the University. She was the former Pharmacy Programme Leader (Head) since July 2018 until July 2023 (5 years). Formerly she also holds a post as Deputy Dean (Academic, Research and Global Affairs) at the Institute from 2013 - 2015 and was the Deputy Dean (Undergraduate, Administration and Finance) in 2015-2016. She was also the former Deputy Director of Innovation at the Office of AVC (Innovation and Enterprise) at UBD from July 2017 – August 2018. She obtained her degree in the Bachelor of Pharmacy at the School of Pharmacy, Cardiff University in 1998 and then went on to do her pre-registration training as a Community Pharmacist at Chelmsford, UK in 1999. She then carried on to do her PhD training in Medicinal Chemistry from Cardiff University UK (2003). She had been appointed as a member of the National Board of Pharmacy in Brunei since 2014 until now and also a member of the Royal Pharmaceutical Society of Great Britain (UK) since 2003 until now. As an academic, she had supervised /co-supervised 10 Master students (MHSc in Clinical Sciences, Biomedical Sciences and Public Health) and 4 PhD students (1 on going). Dr Nurolaini had been involved in Curriculum design for Medicine, Dentistry as well as Pharmacy degree programme and thus her research interests in Medical/Pharmacy Education. She recently published a book chapter "Pharmacy Education, Practice, and Research in Brunei". Her other research area are Medicine Wastages, Traditional/Herbal Medicine and Natural Product and Herbal Research as well as Pharmacy Practices.

KN-0002-O

Transforming Pharmacy Education in the Philippines: A Strategic Framework for Roadmap Development

Margarita M. Gutierrez, Ph.D.

Department of Clinical, Social and Administrative Pharmacy, College of Pharmacy,
University of the Philippines, Manila, Philippines

ABSTRACT

The Philippines is undergoing substantial transformations in pharmaceutical and healthcare practices in an effort to attain a universal health care system. In response, efforts have been made to initiate reforms in pharmacy education across the nation. In pursuit of this objective, the commission of higher education initiated the development of a road map for pharmacy education that will function as a strategic blueprint to not only confront the evolving healthcare landscape within the borders of the country, but also to position the Filipino pharmacist as a health professional with global competitiveness in the region.

During this discourse, the speaker shall provide an overview of the framework, expound upon the activities that comprise the Philippine Pharmacy Education Roadmap project, and convey pertinent insights. The first part of the presentation will focus on the current state of the health system, pharmacy workforce, and pharmacy education in the country. The presenter will also discuss partial results of research findings and benchmarking activities. In the process, the speaker will pinpoint pivotal areas requiring intervention, and underscore challenges encountered throughout the program.

Participants will glean invaluable insights from the speaker's perspectives and experiences, empowering them to kickstart their roadmap activities within their respective countries. This dialogue serves as a platform for meaningful exchanges, underscoring the significance of collaborative efforts in driving progress. Ultimately, by arming participants with the necessary skills to actively engage in the enhancement of pharmacy education, we pave the way for the global success of Pharmacy graduates in the region.

KEYWORDS: Pharmacy education; Qualifications framework; Education roadmap

Biographical Sketch

Margarita M. Gutierrez, Ph.D.

Associate Professor, RPh, MHPEd

Department of Clinical, Social and Administrative Pharmacy, College of Pharmacy,

University of the Philippines, Manila, Philippines

Margarita M. Gutierrez, an Associate Professor at the University of the Philippines College of Pharmacy, holds a bachelor's degree in industrial pharmacy and a master's in health professions education. She earned her Ph.D. in Social and Administrative Pharmacy from Chulalongkorn University in Thailand and is pursuing her second Ph.D. in Health Sciences (Education) at UP Manila. She held significant roles such as president of the Young Pharmacists Group (YPG) Philippines and professional Team Development Officer for the FIP YPG Subcommittee. In 2019, she received the prestigious Ton Hoek Scholarship for Young Leaders from the International Pharmaceutical Federation (FIP). Amid the COVID-19 pandemic, she contributed by training and assessing core teams for the Immunizing Pharmacist Certification Program in the Philippines and Pharmacy Assistants through the TESDA (Technical Education and Skills Development Authority. Presently, she is involved as a preceptor for UP Manila's community health development program and serves as a team lead for the Pharmacy education roadmap commissioned by the Philippine Commission of Higher Education (CHED).

KN-0003-O

The Current Status of Pharmacy Education and Practice in Cambodia

Chea Sin, Ph.D.

Faculty of Pharmacy, University of Puthisastra, Cambodia

ABSTRACT

Despite progress, Cambodian pharmacy education and practice still lag behind counterparts in the ASEAN region. For nearly 17 years, pharmacy education has adhered to a traditional 5-year, content-based curriculum. However, a revised, competency-based curriculum is in its final stages of development, slated for implementation in the upcoming 2024-2025 school year. Both curricula aim to equip graduates for diverse pharmacy roles, yet practical skill acquisition remains limited.

The transition to new teaching methods and assessments poses challenges, exacerbated by a shortage of qualified educators. Presently, Cambodia hosts 7 pharmacy schools, of which 2 are public and the remainder private. Despite these educational institutions, the practical application of pharmacy skills, particularly in community, industrial, and medical biology settings, remains inadequate.

Pharmacy practice in Cambodia faces similar challenges, with pharmacists yet to fully integrate into clinical, hospital, and community pharmacy settings. While efforts to strengthen regulations are underway, many pharmacists still primarily engage in stock management and medication dispensing, lacking opportunities for comprehensive patient counseling and interventions.

In 2023, the Pharmacy Council of Cambodia introduced two frameworks—the Standard of Practice and the Scope of Practice for Cambodian Pharmacists—aimed at empowering pharmacists to assume more active roles in patient care. This initiative seeks to position pharmacists as essential healthcare partners, collaborating with other professionals to optimize patient outcomes and promote public health.

KEYWORDS: Cambodia; Pharmacy practice; Pharmacy education

Biographical Sketch

Chea Sin, Ph.D.

Dean & Professor,

Faculty of Pharmacy, University of Puthisastra, Cambodia

Prof. Chea Sin has got a Master of Public Health, a Master of Education and a Doctoral Degree from University of Mediterranean, France.

He has been in professional career in management and leadership since 2006 in community pharmacy, hospital pharmacy, clinical pharmacy, policy formulation, journals, R & D, and Pharmacy Education. He is now a Dean of Faculty of Pharmacy, Chair of Academic Integrity Board and Deputy Director of Research Committee for University of Puthisastra. He is also a member of Board of Directors for Asian Association of School of Pharmacy, a vice president of ASEAN Association of School of Medical Technology, a member of Board Director for the French Society of Clinical Pharmacy, a member of editorial board for Asian Journal of Pharmacognosy, a member of Editorial Advisory Board and an Editorial Board for The journal "Current Trends in Pharmaceutical Research'', a board member of Phnom Penh Pharmacy Council, and Vice President of Regional Pharmacy Council for region 1. He has been publishing 81 papers on natural products, public health, and education and received five awards: RHAC best performer, UP Excellence Performance, the Cambodian youth role model from Prime Minister Hun Sen, a gold medal form Prime Minister Hun Sen and the 2020 Global Pharmacy Champion.

KN-0004-O

The Evolution of Pharmacy Education in Myanmar

Thein May Saw, Ph.D.

University of Pharmacy, Mandalay, Myanmar

ABSTRACT

The evolution of pharmacy education in Myanmar began at Yangon General Hospital's Department of Pharmacy, part of the Institute of Paramedical Science, established in 1964. Initially offering a two-year course leading to a Diploma in Paramedical Science (DPMS) in Pharmacy, it was open to graduates with a Bachelor of Science in Chemistry and Biology. In response to evolving educational demands, separate Institutes of Pharmacy were inaugurated in Yangon and Mandalay in 1992 and 2000, respectively. These institutes transitioned to the University of Pharmacy Yangon and University of Pharmacy Mandalay in 2005, elevating the diploma to a four-year Bachelor of Pharmacy (B.Pharm.) degree. This comprehensive program, requiring high entrance exam scores for admission, spans four years, focusing on Pharmaceutics, Pharmacognosy, Pharmacology, and Pharmaceutical Chemistry in the latter three years. The curriculum incorporates Basic Sciences, Language (English, Myanmarsar), Behavioral Sciences, Physiology, Biochemistry, and Medical Microbiology across various years, alongside clinical training, study tours, and group research projects in the final year, culminating in a total of 145 credits. Each academic year concludes with a unified final examination across both universities, attracting approximately 200 and 150 enrollees in Yangon and Mandalay, respectively. Subsequent academic advancements included the introduction of a two-year M.Pharm. degree in 2003, followed by doctoral programs (Ph.D.) in Pharmaceutics, Pharmaceutical Chemistry, Pharmacognosy, and Clinical Pharmacy in 2014. The M.Pharm. program expanded in 2018 to offer specializations in Clinical Pharmacy over three years. Annually, 8 to 10 students enroll in the Master's programs, and 4 to 6 in the Ph.D. programs at each university. As of 2023, the Universities of Pharmacy Yangon and Mandalay have awarded degrees to a significant number of graduates: 2613 and 1598 with B.Pharm., 120 and 48 with M.Pharm., and 13 and 16 with Ph.D., respectively. These institutions aim to produce competent pharmacists capable of enhancing health outcomes and quality of life, with graduates qualified for diverse roles in academia, research, clinical settings, and the pharmaceutical industry. The mission of our universities concentrates on reducing medication errors and drug-related issues, promoting the use of effective medications, and providing responsible pharmaceutical care to improve patient outcomes and quality of life.

KEYWORDS: Pharmacy; Myanmar; Mandalay; Yangon; Graduates; Missions

Biographical Sketch

Thein May Saw, Ph.D.

Professor,

University of Pharmacy, Mandalay, Myanmar

Professor Thein May Saw is a distinguished figure in the field of pharmacology, with a prolific career that spans over three decades. She embarked on her academic journey in 1987, graduating with an MBBS, followed by a Master of Medical Science (M.Med.Sc) in Pharmacology in 1994, and a PhD in Pharmacology in 2003. Further enriching her expertise, she obtained a Diploma of Medical Education in 2004. Professor Saw's research interests are deeply rooted in pharmacokinetics and therapeutic drug monitoring, focusing on improving patient care through precision in medication management. She has led groundbreaking research on the pharmacokinetics of glibenclamide in diabetes mellitus patients, examining the influence of diltiazem and the interactions between ciprofloxacin, rifampicin, and theophylline. Her work in therapeutic drug monitoring of theophylline in bronchial asthma patients has contributed significantly to the field. Beginning her governmental service in 1989 as a demonstrator in the Department of Pharmacology at the University of Medicine 1 Yangon, Professor Saw has held several prestigious positions. From 2006 to 2018, she served as Professor and Head of the Department of Pharmacology at the University of Medicine in Magway and Mandalay, respectively. In 2018, she was appointed Rector of the University of Pharmacy in Mandalay, where she has been instrumental in supervising research and fostering a conducive environment for academic excellence. Throughout her career, Professor Saw has been committed to the management and administrative support of academic staff, technicians, and students, facilitating workshops, research, and training programs both locally and internationally. Her collaborative efforts with other universities underscore her dedication to the advancement of pharmacy education and research, making her a respected leader and mentor in Myanmar's medical and academic communities.

KN-0005-O

Pharmacy Education in Lao PDR

Phoutsathaphone Sibounheuang, Ph. D[1*]; Sounantha Souvanlasy, MSc.[1].

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[*] Corresponding author; Email: phoutsathaphone.s@uhs.edu.la

ABSTRACT

Lao PDR has only 1 faculty of pharmacy in the University of Health Sciences, located in Vientiane Capital, the capital city of Laos. The faculty consists 1 master program, 3 bachelor programs and 1 assistance pharmacy program. The number of students each year is around 30. The total number of students in the faculty is around 600 students. The faculty has several cooperation with national and international sectors including ASEAN and other region which gave the good opportunity to develop the capacity building in the faculty. The faculty is currently developing the human capacity, collaborative research with partners. In term of capacity building the faculty is now focus on preparing the human resources for university hospital especially the clinical pharmacy skill. The board of pharmacy is now established which play major role on pharmacy licensing, continue professional development and pharmaceutical law and regulation. This will be one of the facility to promote and develop the pharmacy profession in Lao PDR.

KEYWORDS: Faculty of pharmacy; Pharmacy education; Lao PDR

Biographical Sketch

Phoutsathaphone Sibounheuang, Ph.D.

Pharmacy Education in Lao PDR,

Faculty of Pharmacy, University of Health Sciences, Lao PDR

Phoutsathaphone Sibounheuang was born in 1987, in Vientiane Capital, Lao PDR. She is a pharmacist, she graduated Bachelor Degree in 2008 from the faculty of pharmacy, UHS, Lao PDR. In 2015, she graduated Master Degree of Pharmacokinetics in the faculty of pharmacy, Aix-Marseille University, France and in 2020 she graduated PhD of Pharmacy Practice in the faculty of pharmacy, Mahasarakham University, Thailand. Phoutsathaphone received the best thesis award from Mahasarakham University in academic year 2021. Her PhD thesis is "Outcomes of Pharmacist-led Diabetes Care Interventions in Lao PDR". Phoutsathaphone has special interested in clinical pharmacy which she used for patient care during her PhD thesis. Social pharmacy and pharmacy education is also her research interested. Phoutsathaphone is working as a faculty member and she is teaching pharmacotherapeutics of NCD to the pharmacy students. She aims to develop the role of clinical pharmacy to the Lao pharmacist by teaching this role to her students and by promoting this role to the hospital pharmacists in her country.

KN-0006-O

Update on Pharmacy Education, Training and Practices in Malaysia

Mohd Makmor-Bakry, Ph.D.

Faculty of Pharmacy, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia

ABSTRACT

Pharmacy service came into existence in Malaysia since 1951. The first school of pharmaceutical sciences was established in 1972 that offers bachelor degree. Currently, 21 universities offer the pharmacy degree in Malaysia and 6 of the universities are public funded. The pharmacy academic programmes are regulated by the Pharmacy Board of Malaysia, Malaysian Qualification Agency (MQA), and Ministry of Higher Education. Since early 2024, a new standard of competency based curricular for pharmacy programme was published and should be adhered by all schools of pharmacy. Previous academic programme standards follow the objective based education as suggested by the MQA. FIP early career for pharmacist competencies and Malaysian Qualification Framework Version 2.0 were the basis of the current standards. The students must undergo a 4-year university education which covered didactic, practical, and experiential learning courses. After the completion of the bachelor degree, prior to pre-registration pharmacist (PRP) training, the graduate should also pass the qualifying national pharmacy practice examination. The PRP training takes 12 months to complete. Those who successfully passed the training are eligible to be listed as registered pharmacist under the PBM. Malaysian pharmacists can work in various sector either government or private. The roles of pharmacists have significantly extended especially in the government sectors to fulfil the pharmaceutical care need of the people. Pharmacists can also specialised in various area through post-graduate programmes, credentialing and privileging exercise, subject matter expert, and professional certifications. Research in practice settings are encouraged to enhance the quality of services provided. Digital interventions and artificial intelligent are also considered as the new supporting elements for pharmacy practice. Overall, the progress of pharmacy practice in Malaysia is positive.

KEYWORDS: Competency; Education standard; Pharmacy practice; Malaysian pharmacist

Biographical Sketch

Mohd Makmor-Bakry, Ph.D.

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Professor Dr. Makmor-Bakry graduated with Bachelor Degree in Pharmacy from Universiti Kebangsaan Malaysia, Master of Clinical Pharmacy from University Science of Malaysia, and Doctor of Philosophy (Medicine & Therapeutics) from University of Glasgow, Scotland, United Kingdom. Research and educational expertise include pharmaceutical care, clinical pharmacy practice, clinical pharmacokinetics, pharmacogenomics, treatment optimisation through enhancement of medication adherence. Pioneer in clinical pharmacy simulation education and training in Malaysia. Recipient of the 2017 Malaysian National Academic Award for teaching excellent in health sciences, and Rethinking and Redesigning Higher Education Award by the Ministry of Higher Education. More than 100 journal articles were published related to the expertise. Delivered more than 60 invited talks as keynote, plenary and invited speaker in local and international conferences. Lead various research projects with total value of more than RM2 million. Supervised more than 70 master`s and PhD`s students in related field of interest. Members of significant national and international committees such as Pharmacy Board of Malaysia, Drug Control Authority, National Medicine Policy Committee and Council of Pharmacy Deans. Appointed as Visiting Professor and Adjunct Professor for various international universities.

KN-0007-O

Indonesian Pharmacy Higher Education: Efforts in Standardizing New Pharmacists

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ABSTRACT

The first pharmacy higher education in Indonesia was established in 1946, which held by the Department of Pharmacy, and had been managed under a faculty named *Faculteit voor Wiskunde and Natuurwetenschapen* (Faculty of Mathematics and Natural Sciences), or under the Faculty of Pharmacy. Since 2006 most pharmacy higher education institutions have changed to be Faculty/School of Pharmacy for more independence in academic management. Pharmacy higher education consists of diploma (3 years), bachelor (4 years), pharmacist (4+1 years), magister (2 years), and doctoral (3 years) programs. Since April 2015, all study programs in pharmacy or pharmaceutical sciences have been accredited by the Indonesian Accreditation Agency for Higher Education in Health.

The curricula of Indonesian pharmacy higher education are mainly product-oriented since it was first established in the 1940s, and the community pharmacy was the main pharmacy practice of Indonesian pharmacists. Since 2006, some schools/faculties as well as the Association of Indonesian Pharmacy Higher Education (APTFI) and the Association of Indonesian Pharmacists (IAI) have been showing a concern about how to strengthen clinical pharmacy in Indonesia. Some schools and faculties have been conducting bachelor programs in clinical (and community) pharmacy to support the competence of pharmacist candidates. Moreover, some schools and faculties have also established magister programs in clinical pharmacy.

In line with the global pharmacy education to produce competent pharmacists who should have a role in improving the safety and effectiveness of medication use, we are concerned with continuous curriculum reform, as well as practice development and scholarly activities. Since 2013, the national competence examination (CBT and OSCE) has been set up to standardize pharmacists. The progress of CBT and OSCE passing rates as well as the practice of Indonesian pharmacists will be discussed..

KEYWORDS: Indonesian pharmacy higher education; National competence examination; Pharmacy practice

KN-0008-O

Developing a Pharmacy Education Program in Vietnam, Meeting Vietnam's Pharmacist Competency Standards and In Harmony with Pharmacist Competence Standards of Countries in the Region

Dinh Thi Thanh Hai, Ph.D.

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ABSTRACT

In Vietnam, there are 43 public and private schools offering pharmacy degrees at various levels. The pharmacist training period is 5 years. Students will be awarded a Pharmacist degree. Currently, Vietnam has not yet organized a national exam to grant practicing certificates like many countries in the region and around the world. After graduating, they can be hired to work in many different positions without professional license. With 43 institutions offering pharmacy degree, the difference between input quality, facilities, training organization and school management greatly affects ensuring the quality of pharmacist training in Vietnam. During the integration period with the need to harmonize education with the Region and the world, Vietnam is required to have a new approach to develop a sustainable higher education system.

To meet the needs of deep regional and international integration, managers and employers need a set of tools to control, evaluate and standardize the quality of human resources. In Vietnam. Currently, the Pharmaceutical industry cannot control the output of schools and there is no exam for medical practice certificates. The basis for granting pharmacy practice certificates is only based on the number of years of experience. Therefore, general management agencies and training facilities and employers said. I especially see the need to have a standard training program according to the provisions of law, adapt to the new situation, take the goal of international integration as a common foundation for training institutions, and ensure training quality. create university-level pharmacists.

The new Standard Program in Pharmacy Education was developed based on national pharmacist competency standards and enhanced professional practice to meet the harmonization of education in the Region.

KEYWORDS: Professional practice; Vietnam's pharmacist competency standards; National registration exam; Proposed standard program in pharmacy education; Intergration

Biographical Sketch

Dinh Thi Thanh Hai, Ph.D.

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Asso. Prof. Dinh Thi Thanh Hai graduated from Hanoi University of Pharmacy in 1991, obtained Master of Pharmacy degree in 1996 and Doctor of Pharmacy degree in 2003 from Hanoi University of Pharmacy. She was a postdoc fellow of Kyoto University from 2005-2007. Asso. Prof. Dinh has been a lecturer at Hanoi University of Pharmacy since 1998, in 2003 became the Deputy Head of the Department of Organic Chemistry, in 2008 the Head of the Department of Organic Chemistry, in 2018-2022 was the Head of the Department of Organic Chemistry. Department of Pharmaceutical Industry. Her research involving organic synthesis, drug synthesis, asymmetric synthesis…with more than 60 publications, 6 books and many grand projects from MOET and MOH.

From 2017 until now, Asso. Prof. Dinh Thi Thanh Hai has been the Vice Rector in charge of Training and Education Quality Assurance of Hanoi University of Pharmacy.

Asso. Prof. Dinh is an experienced expert in developing programs in Pharmacy Education. She is also a key member of HUP joining the expert panel of MOH to develop national competency frame for Pharmacist in Vietnam (2019). Now, she is the Head of Council for Developing Standard Program in Pharmacy Education of HUP. The Proposed Standard Program in Pharmacy Education will be approved by the National Expert Panel and apply for Pharmacy Education in Viet Nam.

KN-0009-O

The Current Status of Pharmacy Education and Practice in Singapore

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ABSTRACT

The Department of Pharmacy and Pharmaceutical Sciences of the National University of Singapore is the sole-provider of pharmacy and pharmaceutical education for the Republic of Singapore. The Department offers a portfolio of competence-based education and training programme at both the undergraduate and post-graduate levels. All the professional programmes of the Department are aligned to the Developmental Framework of Pharmacists of the Ministry of Health of Singapore. This alignment ensures workforce readiness of our pharmacists at both foundational and advanced practice levels. This country report from the Deputy Head Clinical (Prof. Paul Gallagher) will examine the integrated B. Pharm. (Hons.) programme and the Master of Pharmacy (Clinical Pharmacy) Programme as exemplars of the instructional approaches of the Department.

KEYWORDS: Competence-based education; Workforce readiness; Foundation practice; Advanced practice; Instructional approaches

Biographical Sketch

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Professor,

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Paul Gallagher is Deputy Head-Clinical of the NUS Department of Pharmacy and Pharmaceutical Sciences which by discipline (Pharmacy and Pharmacology) was ranked 14 by QS (2024). Paul is leading as a PI on a clinical trial across Singapore which is evaluating clinical, humanistic, and economic outcomes of a pharmacist-centric collaborative care model. Paul was previously the Head of Pharmacy (2010-2018) of the RCSI University of Medicine and Health Sciences (Ireland) where he is now a Visiting Professor (June 2023-July 2026). Before Paul re-joined academia in 2005, he had established a pharmacy and medical centre in Dublin (Ireland). He is a graduate of Trinity College Dublin (Ireland) and University College London where he obtained his PhD and MBA post-graduate degrees respectively. In 2016, Utrecht University (Netherlands) and subsequently in 2019 the International Pharmaceutical Federation (FIP) recognised him for his contributions to academic pharmacy practice. Paul is a member of the FIP Academic Institutional Membership (Wester-Pacific region) and will take up position as Lead of the FIP-UNESCO UNITWIN Centre for Excellence (Western Pacific) from June 2024.

KN-0010-O

Quality Assurance Measures in Pharmacy Education for ASEAN

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ABSTRACT

Quality assurance in health education is crucial as it ensures the effectiveness and reliability of educational programs, ultimately leading to better health outcomes. By maintaining high standards, it ensures that health educators are well-equipped with accurate, evidence-based knowledge, and that the information disseminated is both relevant and practical. This process helps to build public trust, encourages continuous improvement, and addresses disparities in health literacy.

In ASEAN, pharmacy education system is diverse with 4-year bachelor, 5-year bachelor and 6-year Pharm.D. curriculum spread across ten countries. While every country has its own national system of quality assurance based on national qualifications framework, this tends to be generic. For specific pharmacy contents, some countries have a national organization that provide either a guidance or a mandate on certain aspects of pharmacy education to a different degree depending on different level of controls of each nation. For example, the Pharmacy Council of Thailand is currently the national body that plays an important role in quality assurance of pharmacy education in Thailand. The council mandates that all pharmacy program in the country has to be a 6-year program. The council also sets specific requirements such as proportion of content related to patient care vs pharmaceutical sciences, qualifications of academic staff, student-staff / student-preceptor ratio, required clerkship rotations and facilities for education.

For quality assurance in the ASEAN region, the current regional body that performs the task is the ASEAN University Network Quality Assurance (AUN-QA). AUN-QA aims to harmonize educational standards and continuously improve academic quality in ASEAN universities. Established since the year 2000, AUN-QA has conducted quality assessments for hundreds of programs. As of 2024, certain pharmacy programs in Indonesia, the Philippines, Thailand and Vietnam have undergone the AUN-QA accreditation processes. However, it is important to note that the AUN-QA criteria and standards are general, not specific to health or pharmacy. In Indonesia, the International Accreditation Agency for Higher Education in Health (IAAHEH) was established in 2014 by 7 health professional organizations and their respective association of schools including medicine, dentistry, nursing, midwifery, pharmacy, public health and nutrition. Originally aims to accredit all health study programs in Indonesia, IAAHEH has recently initiate international accreditation of health study programs. IAAHEH's vision is to become a globally acknowledged accreditation agency to facilitate quality higher education study programs in health.

For future prospect, through regional quality assurance and accreditation process, mutual recognition of degree can potentially be realized. This may set the first step toward mutual recognition agreements (MRAs) which facilitates the cross-border practice of healthcare professionals by acknowledging their qualifications and licenses across different countries. MRA can address healthcare workforce shortages, enhance patient care, and promote international collaboration since it allows mobility for healthcare professionals, improved access to healthcare services for patients, and the sharing of best practices and innovations in medical care regionally.

KEYWORDS: Quality assurance; Pharmacy education, ASEAN

Biographical Sketch

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Surakit Nathisuwan received a Bachelor of Science in Pharmacy from Mahidol University in 1994 and a Doctor of Pharmacy degree from the University of Florida in 1999. He later completed a Specialized Residency in Pharmacotherapy from the University of Texas Health Science Center at San Antonio and became a Board Certified Pharmacotherapy Specialist in the USA in 2000. He is currently working as an Associate Professor in Clinical Pharmacy at the Faculty of Pharmacy, Mahidol University, Thailand. His main area of teaching and research interest is cardiovascular pharmacotherapy. His teaching role covers undergraduate, post-graduate and residency/fellowship levels. His research works have been published in high impact journals such as the Lancet, Journal of Thrombosis & Haemostasis, International Journal of Cardiology, Chest, Clinical Pharmacology & Therapeutics, British Journal of Clinical Pharmacology and Drug Safety. In addition, he has been actively working with professional organizations and government to advance competency of Thai pharmacists toward patient-oriented care in cardiovascular disease area. Over the past 15 years, he and his colleagues have trained hundreds of hospital pharmacists under the Ministry of Public Health along with private hospitals which has led to a nation-wide development of pharmacy services for cardiac patients. He has served in various capacities in many organizations at both national and international levels related to drug policy, development of practice guidelines, and advancement of pharmacy education and practice.

KN-0011-O

Enhanced siRNA Delivery via Particle Engineering for Site-Specific Lung Cancer Therapy via Inhalation

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ABSTRACT

Faced with the threat of lung cancer-related deaths worldwide, small interfering RNA (siRNA) can silence tumor related messenger RNA (mRNA) to tackle the issue of drug resistance with enhanced anti-tumor effects. However, how to increase lung tumor targeting and penetration with enhanced gene silencing are the issues to be addressed. Thus, in this presentation the feasibility of designing non-viral siRNA vectors for enhanced lung tumor therapy via inhalation was introduced. Shell-core based polymer-lipid hybrid nanoparticles (HNPs) were prepared via microfluidics by coating PLGA on siRNA-loaded cationic liposomes (Lipoplexes). Transmission electron microscopy and energy dispersive spectroscopy study demonstrated that HNP consists of a PLGA shell and a lipid core. Atomic force microscopy study indicated that the rigidity of HNPs could be well tuned by changing thickness of the PLGA shell. The designed HNPs were muco-inert with increased stability in mucus and BALF, good safety, enhanced mucus penetration and cellular uptake. Crucially, HNP1 with the thinnest PLGA shell exhibited superior transfection efficiency in A549 cells, which was comparable to that of lipoplexes and Lipofectamine 2000, and its tumor permeability was 1.88 times that of lipoplexes in A549-3T3 tumor spheroids. After internalization of the HNPs, not only endosomal escape but also lysosomal exocytosis was observed. The transfection efficiency of HNP1 was 2.26 times that of lipoplexes in A549-3T3 tumor spheroids. Moreover, HNPs exhibited excellent stability during nebulization via soft mist inhaler. In summary, this study reveals the great potential of HNP1 in siRNA delivery for lung cancer therapy via inhalation and indicate the importance of particle engineering.

KEYWORDS: siRNA; Pulmonary delivery; Hybrid nanoparticles; Tumor penetration

Biographical Sketch

SHIRUI MAO

Professor

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Dr. Shirui Mao is a full Professor in Shenyang Pharmaceutical University, China, a Fellow of the College of Controlled Release Society (CRS), International Fellow of Japan Pharmaceutics Society, State Council special allowance expert. Dr. Mao obtained her BS and MS degrees from Shenyang Pharmaceutical University and her Ph.D. degree from Philipps University Marburg, Germany. Dr. Mao's research focuses on micro-/nano- technology based drug delivery system design using biodegradable polymers as the carrier; mucosal drug delivery system with a focus on pulmonary, intranasal and ophthalmic delivery; potential applications of intelligent biopolymers in controlled drug delivery systems and micromeritics related studies.

KN-0012-O

The Key to Success in the Cannabinoid Drug Development Journey

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ABSTRACT

The endocannabinoid system (ECS), in which anandamide and 2-arachidonoylglycerol (2-AG) function as endogenous ligands at cannabinoid 1 and 2 (CB1/CB2) receptors, has been recognized as an emerging target for pharmacotherapy since its discovery in 1988. The ECS regulates many functions such as learning and memory, emotional processing, sleep, pain, eating, and inflammatory and immune responses. Cannabinoid medicines include selective CB1/CB2 agonists and cannabinoid-degrading enzymes (FAAH/MAGL) inhibitors. For example, the actions of Δ9-tetrahydrocannabinol (THC) result from its partial agonist activity at CB1 (Ki = 40.7 nM) and CB2 (Ki = 36 nM) receptors. Cannabidiol (CBD) has very low affinity for either CB1/CB2 (Ki > 3,000 nM) but activates the ECS by increasing anandamide levels via inhibition of fatty acid amide hydrolase (FAAH) and anandamide membrane reuptake transporter (AMT). The cannabinoid medicines approved previously are as follows: Nabilone (Cesamet®), a synthetic cannabinoid similar to THC, was first approved in Canada in 1981 and later in other countries with therapeutic use for antiemetic analgesic effects. Dronabinol (Marinol®), which consists of synthesized THC, was approved by the US FDA in 1985, to treat nausea and emesis associated with cancer chemotherapy, as well as AIDS-related cachexia as an appetite stimulant. Nabiximols (Sativex®), consisting of cannabis plant-derived THC and CBD (1:1), was approved in the UK in 2010 for muscle spasticity due to multiple sclerosis. Epidiolex®, which predominantly contains CBD with very low levels of THC, was approved by the US FDA in 2018 for the treatment of seizures associated with Lennox-Gastaut syndrome, Dravet syndrome, or tuberous sclerosis complex. Other synthetic CB1/CB2 receptor agonists and FAAH inhibitors have been attempted in clinical trials, but most trials have failed at Phase II. Generally, cannabinoids with higher lipophilicity may show stronger affinity with their target molecules but are pharmacokinetically highly variable due to lower bioavailability. Moreover, at high doses, their expected effects may be downregulated, while some adverse effects may become more problematic. This lecture will discuss the key to success in cannabinoid drug development, considering their therapeutic possibilities and strategies to overcome some complexities for drug development such as the bell-shaped dose-response relationship, variable inter-individual bioavailability, and adverse effects.

KEYWORDS: Endocannabinoid system (ECS); Cannabinoids; Cannabinoid drug development; CB receptors; Fatty acid amide hydrolase (FAAH); Bell-shaped dose-response relationship

Biographical Sketch

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Professor Hitoshi Sato specializes in the academic fields of Pharmacodynamics and Pharmacokinetics, drug interaction, drug discovery, Drug Delivery System, and Cannabinoid Research for Clinical Development. He has been honored with prestigious awards such as the Young Research Fellow Award from the Pharmaceutical Society of Japan and the Excellent Research Award from the Japanese Society for the Study of Xenobiotics. His current research primarily focuses on pharmacokinetics and the development of drugs related to cannabidiol. Professor Sato holds key leadership positions as the Vice President of the Japan Clinical Association of Cannabinoids and the President of the Japan Industrial Hemp Association. He has contributed to numerous international research articles published in renowned journals.

KN-0013-O

Navigating Pharmaceutical Impurity: Regulation Framework and Analytical Strategies

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ABSTRACT

Pharmaceutical impurities are substances that are unintentionally present in drug substances and products. Ensuring the safety, quality and efficacy of pharmaceuticals requires comprehensive regulation and rigorous analytical techniques to identify, characterize and quantify the impurities. This presentation provides an overview of the regulatory landscape governing pharmaceutical impurities and highlights the analytical methods used for their detection and characterization.

The International Council for Harmonization of Technical Requirements for Pharmaceuticals for Human Use (ICH) has developed a set of guidelines aimed at harmonizing regulatory requirements for the pharmaceutical industry worldwide. These included the stringent guidelines and requirements for controlling impurities in drug substances (Q3A) and products (Q3B) and residual solvents (Q3C). These regulations encompass various aspects, covering permissible limits for impurities, requirements for impurity profiling, and guidelines for impurity qualification.

Analytical techniques play a pivotal role in addressing impurity-related concerns. High-performance liquid chromatography (HPLC), gas chromatography (GC), and mass spectrometry (MS) are among the primary analytical methods used for impurity analysis. These techniques offer high sensitivity and selectivity, enabling the detection and quantification of impurities at trace levels. Furthermore, advancements in analytical instrumentation, such as hyphenated techniques like LC-MS and GC-MS, facilitate comprehensive impurity profiling and identification of unknown impurities and degradation products. Spectroscopic techniques such as infrared (IR) spectroscopy and nuclear magnetic resonance (NMR) spectroscopy provide valuable structural information about impurities. Selected studies on pharmaceutical impurity analysis and profiling using these analytical techniques will also be illustrated in the presentation.

In conclusion, impurities in pharmaceutical products represent a critical aspect of drug quality and safety. By adhering to robust regulatory guidelines and employing advanced analytical strategies, stakeholders can effectively manage impurity-related risks and uphold the integrity of pharmaceutical products, ultimately safeguarding public health.

KEYWORDS: Pharmaceutical impurity; ICH guidelines; Degradation products; Residual solvents; Analytical techniques

Biographical Sketch

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Dr. Leena graduated with the first-degree honor (Silver Medal Award) from the Faculty of Pharmacy, Mahidol University in 1989. After that, she got the Royal Thai Government Scholarship to pursue MS and PhD. Degrees at the School of Pharmacy, Oregon State University, USA. She has joined the Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Mahidol University since March 1998. Currently, she is a full professor in the department. Apart from teaching, Dr. Leena has devoted herself to researches, especially on the method development for the regulation and quality control of pharmaceuticals and natural products. Up to now, Dr. Leena has taught thousands of undergraduates, supervised more than 25 graduate students both MS and PhD degrees, published 59 articles in international journals, 6 reviews and 5 books.

During the past years, Dr. Leena was appointed several administrative positions including Assistant Dean on Academic affair, Assistant Dean on Research and Head of Department of Pharmaceutical Chemistry. She also served as the program director for the master of science program in Regulatory science for Pharmaceutical and Health Products and the director for the Center for Analysis of Product Quality. Importantly, she was the program leader in Regulatory and Quality Assurance Landscape Analysis of South and Southeast Asian Nations. The project was conducted in collaboration with the United State Pharmacopeia (USP) and funded by the United State Agency for International Development (USAID).

Dr. Leena has received several awards, prizes and prestigious fellowship for her sustainable development researches including World's top 2% scientists 2023, 2022, Outstanding academic staff (research) Q1 (Top 10%) 2022, Research Quality Award 2017, Fulbright Visiting Scholar in 2014, TWAS-TWOS Scopus Young Woman Research Award in 2009, Alexander von Humboldt Fellowship (Germany) in 2019 and 2006, Nagai Award from Nagai Foundation, Japan in 2004 and Development Cooperation Prize from Development Cooperation Ministry, Belgium in 2003.

KN-0014-O

Exploring Metabolic Polymorphism of Antioxidant Phytochemicals in Plants

Takayuki Tohge

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ABSTRACT

To acclimate to environmental changes in environmental stress factors, plants produce such antioxidant compounds and pigments. Plant polyphenolic antioxidant compounds are widely diversified in their chemical structures, since during the long evolutionary period wherein plants have adapted to the environmental niches, several strategies such as gene duplication and convergent evolution of some key genes have contributed to the evolution of the plant metabolism. On the other hand, plant polyphenolics are also known as important major components within numerous many herbal plants and health-beneficial vegetables. Utilizing mass spectrometry (MS)-based global metabolomics integrated with genomics and transcriptomics, comprehensively elucidation of target metabolism across closely related species, aiding in productivity of target metabolites and the discovery of novel functional compounds, can be performed. Through MS-based metabolomics-assisted phytochemical surveys of wild plants and their relatives, we identified several metabolic polymorphisms within a class of polyphenolic antioxidants which have can confer greater antioxidant activity and UV absorption. We established a metabolomics-assisted functional genomics approach using model plant species, leading to the discovery of key genes involved in the diversification of metabolic polymorphisms in polyphenolics, and extend our approach to vegetable species as well as herbal plant species. Our findings present the importance of understanding plant polyphenolic metabolism for harnessing the full potential of these compounds in enhancing human health and addressing environmental challenges.

KEYWORDS: Plant metabolomics; Antioxidant phytochemicals; Integrative omics; Functional genomics; Model plants; Medicinal plants

Biographical Sketch

Takayuki Tohge, Ph.D.

Professor,

Nara Institute of Science and Technology (NAIST), Division of Biological Science, Ikoma, Japan

I interest the identification of key factors of natural chemical diversity and regulatory roles in plant secondary metabolism which enable genome wide metabolic cross-species comparison for metabolic engineering of beneficial compounds.

KN-0017-O

Implementation and Experiences in Entrustable Professional Activities (EPA) for Pharmacy Education

Ellen M. Schellhase

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ABSTRACT

This interactive session provides insights into the integration of Entrustable Professional Activities (EPAs) within pharmacy education. It addresses the significance of EPAs and their role in fostering student self-awareness, particularly focusing on the Interprofessional Team Member (ITM) Domain. Coursework and activity examples will allow participants to gain practical knowledge on designing curriculum to enhance student preparedness for Advanced Pharmacy Practice Experiences. The presentation emphasizes active learning approaches, focused on communication, to prepare students for pharmacy practice. Participants will gain insight into strategies to promote competency-based learning and the applied integration of EPAs.

KEYWORDS: Entrustable Professional Activities; Curriculum; Advanced pharmacy practice experiences

Biographical Sketch

Ellen M. Schellhase

Clinical Professor

Purdue University College of Pharmacy

Ellen Schellhase, PharmD, is a Clinical Professor of Pharmacy Practice and Director of International Engagement at Purdue University College of Pharmacy. She is the Program Coordinator for the Purdue Kenya Partnership (PKP) and the Purdue Associate Executive Director for AMPATH, the Academic Model Providing Access to Healthcare. Her research and engagement are focused on the AMPATH practice site in Eldoret, Kenya, global engagement and global health education. In addition to her work within AMPATH, she developed an internal medicine APPE at University of Antioquia in Medellin, Colombia and coordinates a clinical research APPE at St Bartholomew's Hospital, part of the Barts Health NHS Trust in London, England. She coordinates and teaches the elective courses Pharmaceutical Care in Developing Countries and International APPE Preparation. She has collaborated with students and community partners to build a robust service-learning program that coordinates with global engagement initiatives. Dr. Schellhase is certified to provide intercultural learning, training, and assessment and has incorporated that into her global pharmacy education and research. She has presented extensively on the impact of clinical pharmacy education and services in resource limited settings and the development of global health practice sites for pharmacy practice.

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KN-0018-O

Accreditation Council for Pharmacy Education (ACPE) Curriculum Standards and Quality Criteria

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ABSTRACT

While national accreditation agencies and their standards are responsible for assuring a minimum level of quality, voluntary international accreditation usually is focused on quality improvement. ACPE International Services Program has provided international accreditation services since 2011, with its mission to "promote, assure and advance the quality of pharmacy education internationally to improve patient care through safe and effective medication use". While US college and schools of pharmacy must be accredited by ACPE, International Accreditation is voluntary and demonstrates the faculty's commitment to quality improvement. The ACPE International Accreditation Quality Criteria (QC) are similar to the US ACPE Accreditation Standards. Revised US Standards will be implemented in 2025 with the International QC now undergoing revision. Development and delivery of the pharmacy curriculum is a major focus of any faculty accreditation, with the curriculum designed to prepare pharmacists for modern practice and meet the needs of their country. The curriculum must be based on measurable competencies and program learning outcomes (PLOs), reflecting the faculty's stated mission, vision and goals. In the US and some other countries the desired competencies are determined nationally with varying degrees of flexibility for faculties to design and deliver a curriculum to meet the competencies and PLOs.

KEYWORDS: Curriculum**;** ACPE; Accreditation; Competencies

KN-0019-O

Clinical Pharmacogenomics Implementation in Thailand: The Emerging Roles of Pharmacists in Clinical Setting

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ABSTRACT

This talk provides an overview of the current pharmacogenomics practices and research in Thailand, address the challenges and lessons learned from delivering pharmacogenomic services in clinical practices, emphasize the pharmacogenomics implementation issues that must be overcome, and identify the emerging roles of pharmacist to facilitate clinical implementation of pharmacogenomics in Thailand.

Ever since the pharmacogenomics (PGx) research began in 2004 in Thailand, a multitude of PGx variants associated with drug responses have been identified in the Thai population, such as *HLA-B*15:02* for carbamazepine and ox-carbazepine, *HLA-B*58:01* for allopurinol, *HLA-B*13:01* for dapsone and cotrimoxazole, *CYP2C19* for clopidogrel, *CYP2C9* for phenytoin and warfarin, *TPMT* and *NUDT15* for thiopurine drugs and *UGT1A1* for irinotecan, etc. After the genetic screening is proven to be cost-effective, a peer-reviewed guideline for the translation of pharmacogenomics test results is formulated to make clinical decisions. Finally, National Health Security Office (NHSO) take the potential of PGx tests to meet public health goals through the integration of pharmacogenomics into national policy. The pharmacogenetics profile guided therapy in clinical settings across Thailand appears promising because of the availability of evidence of clinical validity of the pharmacogenomics testing and support for reimbursement of pharmacogenomics testing. Undoubtedly, “Pharmacist” plays a major role to implement PGx and support health professional team for decision-making by precision medicine approach. A nationally commissioned “Genomic Medicine Service” is also gradually supporting PGx implementation by allowing pharmacists to take the leadership role in PGx implementation.

KEYWORDS: Pharmacogenomics; Thailand; Clinical decision support; Electronic health records (EHR); Precision medicine

Biographical Sketch

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Chonlaphat Sukasem is a Professor in Clinical Pathology and Pharmacogenomics at the Department of Pathology, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Thailand. He is Head of Division of Pharmacogenomics and Personalized Medicine and also serves as Chief of Laboratory for Pharmacogenomics, Somdech Phra Debaratana Medical Center (SDMC) since 2011. Prof. Sukasem is the Founder member and appointed as a Secretariat of Southeast Asian Pharmacogenomics Association (SEAPHARM). He has been appointed as Honorary Senior Lecturer, Department of Molecular and Clinical Pharmacology, Institution of Translational Medicine, University of Liverpool. He also serve as Chair of subcommittee for “Policy and Strategic Plan for pharmacogenomics and precision medicine, Pharmacy Council of Thailand.

He has a background in pharmacy and pharmacogenomics. Professor Sukasem has also published more than 180 peer-reviewed papers in the field of pharmacogenomics. His research has focused on pharmacogenomics and personalized medicine, clinical pharmacology and drug safety. His work has seen him at the forefront of translational pharmacogenomics researches into clinical practices including pharmacogenetic testing, TPMT enzyme activity and therapeutic drug monitoring for the precision medicine. He has contributed the international guidelines of The Clinical Pharmacogenetics Implementation Consortium for (1) HLA Genotype and Use of Carbamazepine and Oxcarbazepine and (2) CYP2B6 and Efavirenz-containing Antiretroviral Therapy.

KN-0022-O

Structural and Physicochemical Evaluation of Nanomedicine

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ABSTRACT

Many kinds of drug nanomedicine including drug delivery system (DDS) have been developed for clinical uses. Drug nanocrystal products produced by wet milling and high-pressure homogenization and DDS carrier such as liposomes, lipid nanoparticles (LNP), and self-emulsifying DDS (SEDDS) are the representative products. Many kinds of commercial products have been used, however, structure and the physicochemical properties are not always well characterized. Physicochemical characterization of nanomedicine including personalized one is to know how the drug nanoparticle can be formulated and formed in aqueous solution and how the drug and excipients exist in the nanoparticles. Because these properties affect drug stability, dissolution/release behavior and the subsequent absorption from membrane, morphological observation and molecular level characterization are important to ensure the product quality as well as the quality control. In this presentation, a few research topics are going to be introduced. First one is drug-rich nanodroplet formation due to liquid-liquid phase separation (LLPS) when amorphous solid dispersion is administered. After the introduction of LLPS, effect of drug-rich nanodroplet formation and effect of polymer on drug absorption from intestinal membrane are going to be presented. Second one is whether the LLPS phenomena is observed for the other formulations such as SEDDS and cyclodextrin solubilization system. It was evaluated by solution-state NMR and cryogenic transmission electron microscopy (cryo-TEM). Third one is morphological changes of doxorubicin (DOX)-loaded liposomes by atomic force microscopy (AFM) and cryo-TEM. Though the mean particle sizes were same independent of DOX-loading, the morphological changes were observed. Structural analytical method of siRNA-loaded LNP may be introduced at the end of the presentation.

KEYWORDS: Nanomedicine; LLPS; Amorphous solid dispersion; SEDDS; NMR; cryo-TEM

Biographical Sketch

Kunikazu Moribe

Professor, Vice-President, Vice-Dean

Graduate School of Pharmaceutical Sciences,

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Prof. Dr. Kunikazu Moribe focused on formulation and the physicochemical characterization research and published more than 180 peer-reviewed original papers.

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KN-0024-O

Tips & Best Practices in Designing New Curriculum: US Experience

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ABSTRACT

Proper development and implementation of a health professions curriculum requires careful and meticulous planning involving a community of key stakeholders. Program goals and outcomes must be established along with competencies that students must achieve prior to graduation. Following this, backward design processes can be used to create curricular structure, format, content, and assessment of learning. Choices must be made to assure content is kept to a reasonable level and that appropriate teaching and learning strategies are employed. Clear communication among faculty and staff members is necessary to assure coordination of all curricular components. Ongoing assessment and feedback are essential to guide the curricular team to identify necessary changes and corrections, resulting in ongoing improvement.

KEYWORDS: Curriculum; Backward design; Outcomes; Competencies

KN-0025-O

Implementation of Interprofessional Education in Pharmacy Curricula

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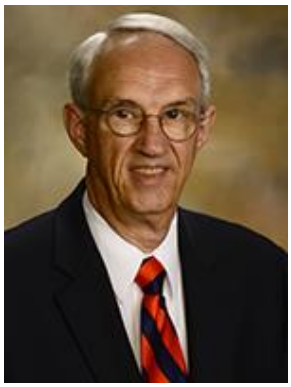
ABSTRACT

Interprofessional collaboration in the delivery of health care is of key importance for the providing of safe and effective health care to improve patient and population health outcomes. Thus, to prepare health professionals for interprofessional practice, health professions education programs must include interprofessional education components. In the United States, the Interprofessional Education Collaborative (IPEC) has developed Competencies for Interprofessional Collaborative Practice which have been adopted by accrediting agencies. In the case of pharmacy, the Accreditation Council for Pharmacy Education (ACPE) has incorporated the IPEC Competencies into its Accreditation Standards for Doctor of Pharmacy Programs. Thus, colleges and schools of pharmacy must include interprofessional education (IPE) as part of the didactic and experiential portions of their curricula. Developing IPE experiences requires deliberate planning from representatives for each health professions program that will be included. Activities must meet the needs of each program and must be scheduled to not conflict with required class or other activities of each program.

KEYWORDS: Interprofessional education; IPE; Accreditation; Competencies

Biographical Sketch



Paul W. Jungnickel, Ph.D., R.Ph.

Professor Emeritus,

Department of Pharmacy Practice, Harrison College of Pharmacy Auburn, Alabama, USA

Paul W. Jungnickel, Ph.D., R.Ph., Professor Emeritus of Pharmacy Practice in the Auburn University Harrison College of Pharmacy, received his Bachelor of Science Degree in Pharmacy from Oregon State University in 1972. In 1975, he completed a Residency and Master of Science Degree in Hospital Pharmacy from the University of Kansas. In 1993, Dr. Jungnickel completed a Doctor of Philosophy Degree in education from the University of Nebraska-Lincoln with emphasis in post-secondary administration.

Dr. Jungnickel practiced hospital pharmacy in Portland, Oregon from 1975 to 1983, and then joined the faculty of the University of Nebraska Medical Center College of Pharmacy. There he practiced and taught in the areas of adult internal medicine and gastroenterology, and served as Coordinator of Experiential Education.

He joined the faculty of the Harrison School (now College) of Pharmacy as Associate Dean and Associate Professor in 1997, and in 2002 was promoted to the rank of Professor. Dr. Jungnickel served as Academic Associate Dean until his retirement in January 2023. He has published and presented extensively on the pharmacotherapy of dyslipidemia and gastrointestinal diseases, as well as topics related to health professions education. He has published two referred articles and one book chapter with ASEAN colleagues.

Over his academic career, Dr. Jungnickel has been a very active member of the American Association of Colleges of Pharmacy (AACP), including service as Chair of the PEP-SIG (1992-1993) and the Student Services SIG (2004-2005). He has also served the Section of Teachers of Pharmacy Practice as Secretary (2000-2002), Chair-Elect (2006-2007), Chair (2007-2008), and Immediate Past-Chair (2008-2009). Dr. Jungnickel has also been actively involved in leadership roles within the Rho Chi Honor Society, having served as Rho Chi National Secretary (2005-2012), National President-Elect (2012-2014), National President (2014-2016) and Immediate Past President (2016-2018). Internationally, he has served on the Board of the US-Thai Consortium for the Advancement of Pharmacy Education in Thailand.

Dr. Jungnickel believes that one greatest joys of a career in academic pharmacy is playing an important role in developing the next generation of pharmacists. In 2010, he was recognized for his efforts in this area by being selected to receive the Harrison School of Pharmacy's Hargreaves Faculty Mentor Award. In 2018 he received the Faculty Member of the Year Award from the Alabama Pharmacy Association. He was honored twice in 2019 by AACP with the Administrative Services Section award for Sustained Contribution to Administrative Practice in Pharmacy Education and with the James Robertson, Jr. Leadership Excellence in Student Services Award. In 2023 he was presented the J. Wayne Staggs Distinguished Service Award by the Alabama Pharmacy Association and the Distinguished Service Award by the Auburn University Pharmacy Alumni Affiliate.

KN-0026-O

Challenges and Recent Progress in Drug Discovery and Development for Tropical Diseases: The Role of Pharmacology

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Director, Drug Discovery and Development Center, Thammasat University (Rangsit Campus), Pathumtanee, Thailand

ABSTRACT

Tropical diseases, including malaria and a group of infections termed neglected tropical diseases (NTDs), pose enormous threats to human health and well-being globally. The lack of safe, effective, and affordable medicines is a key contributing factor to the effective control of these diseases. There is an urgent need for new treatments that address therapeutic gaps and concerns associated with existing medications, including the emergence of resistance. Limited commercial incentives, particularly compared to products for diseases prevalent in high-income countries, have hindered several pharmaceutical companies from contributing their tremendous experiences and resources to research and development for drugs in tropical diseases.

The role of pharmacology in drug discovery and development is pivotal, serving as a cornerstone for the development of safe and effective medications. Proactive approaches and advanced technologies are urgently needed in drug innovation. Fortunately, drug discovery in tropical diseases has shifted from traditional to modern strategies, combining medicinal chemistry, phenotypic and molecular assays, multiparameter optimization, structural biology, and omics approaches. Structure- and ligand-based drug design have fostered discovery by enabling data-driven molecular optimization, expanding previously inaccessible chemical spaces, and building knowledge from biological data. These efforts have integrated parasite biology and medicinal chemistry to advance drug discovery in these diseases. Implementing multilateral collaborations, such as public-private partnerships (PPPs), leads to continued efforts and plays a crucial role in drug discovery. The presentation will discuss and highlight pharmacology's challenges and role, along with concerted efforts from other academic disciplines in recent developments, progress, and successes in discovering potential antimalarials and other drugs for tropical diseases with significant public health problems.

KEYWORDS: Drug discovery and development; Pharmacology; Topical diseases

Biographical Sketch

Kesara Na-Bangchang

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Pathumtanee, Thailand

Professor Na-Bangchang's academic fields are pharmacokinetics, biochemical pharmacology, drug discovery, and development (non-clinical and clinical). Her research focuses include systematic and integrative research in malaria and cholangiocarcinoma. She has published 420 international research articles. She has received several academic and research awards at both national and international levels, including "Outstanding Young Scientist, Foundation for the Promotion of Science and Technology under the Patronage of His Majesty the King (1995)", "Outstanding National Researcher in Chemistry and Pharmaceutical Sciences (2020)", and "Top 2% of World's Scientists, Stanford University (2020, 2021, 2022)".

KN-0027-O

Network Pharmacology and Cell-Based Assessments for Potential Cancer Targets

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ABSTRACT

Network pharmacology presents a strategy within drug development that merges systems biology with network analysis. This method stands as a potent instrument for exploring the molecular mechanisms and targets of an agent of interest. This study demonstrated the utilization of network pharmacology and experimental validation to explore the potential target of momordin Ic against cholangiocarcinoma (CCA). Firstly, the compound-disease targets were obtained using publicly available databases. The analysis revealed 37 possible targets of momordin Ic against CCA. Kyoto Encyclopedia of Genes and Genomes (KEGG) and Gene Ontology (GO) enrichment analyses were then performed. The KEGG analysis implied that the candidate targets were components of the pathways involved in apoptosis, PD-1 and PDL-1 signalling, and EGFR inhibitor resistance. In addition, GO analysis indicated that momordin Ic may be active against CCA due to its attribution to signaling molecules involved mainly in the regulation of epithelial cell migration and ligand-activated transcription factors. Protein-protein interaction construction was further carried out. The results pinpointed Src and FAK as key targets. Subsequently, cell-based assays, in accordance with FAK/Src-associated metastasis, were conducted, demonstrating the ability of momordin Ic to attenuate the metastatic behaviors and suppressed the epithelial-mesenchymal transition process of CCA cells. These effects were associated with inhibiting the FAK/Src pathway and its downstream proteins. Furthermore, molecular docking simulations also suggested that momordin Ic could interact with FAK and Src domains and restrain kinases from being activated by hindering ATP binding. In conclusion, this study employs a comprehensive approach encompassing network pharmacology analysis, cell-based assays, and molecular docking to unveil the mechanisms and targets of momordin Ic in CCA.

KEYWORDS: Network pharmacology; Potential target; Cholangiocarcinoma; Momordin Ic

Biographical Sketch

Assoc. Prof. Laddawan Senggunprai

Department of Pharmacology, Faculty of Medicine, Khon Kaen University

Laddawan Senggunprai graduated from Faculty of Pharmacy, Mahidol University, Thailand in 1997. She spent 5 years as a pharmacist at Buriram Hospital, Thailand. In 2004, she was appointed as Lecturer at Faculty of Medicine, Khon Kaen University, Thailand. She obtained Ph.D. from Graduate School of Pharmaceutical Sciences, Tohoku University, Japan in 2010. She is now Associate Professor at Department of Pharmacology, Faculty of Medicine, Khon Kaen University. Her major research interests include phytochemicals and their underlying molecular mechanisms in cancer prevention and therapy.

KN-0028-O

Emerging Role of CAMSAP3 in Regulating Lung Cancer Cell Metastasis

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Chulalongkorn University, Bangkok, Thailand

ABSTRACT

Introduction: Metastasis in lung cancer remains a major contributor to global mortality, especially in advanced stages where survival rates are below 5%. Understanding the intricate molecular mechanisms driving this process is crucial for identifying potential therapeutic targets. Among the numerous factors implicated in cancer, calmodulin-regulated spectrin-associated protein family member 3 (CAMSAP3), microtubule-associated proteins, has emerged as key players.

Methods: CAMSAP3 knockout was performed in lung cancer cell lines using CRISPR-Cas9 system, and its effect on various aspects of cancer progression, including in vitro cell migration, invasion, and angiogenesis, as well as in vivo metastatic potential were explored.

Results: In the absence of CAMSAP3, lung cancer cells exhibited high metastasis ability both in vitro and in vivo. Through proteomic analysis, we uncovered an interaction between CAMSAP3 and nucleolin, wherein CAMSAP3 acted to inhibit nucleolin's function as an mRNA stabilizer. This led to the degradation of HIF-1α mRNA, resulting in the suppression of downstream targets such as vascular endothelial growth factor (VEGF) and matrix metalloproteinases (MMPs).

Conclusions: Our study sheds light on the significant role of CAMSAP3 in cancer cell biology and its profound impact on metastasis-related processes.

KEYWORDS: CAMSAP3; Cancer metastasis; Lung cancer

Biographical Sketch

Varisa Pongrakhananon, Ph.D.

Associate Professor
Department of Pharmacology and Physiology, Faculty of Pharmaceutical Sciences, Chulalongkorn University, Bangkok, Thailand

Dr. Varisa Pongrakhananon is a distinguished researcher specializing in cancer biology and the pharmacological activities of natural compounds in cancer. Recognized for groundbreaking contributions, she has received prestigious awards such as the "Young Scientist Researcher Award in Health Sciences in 2019 " from the Ratchadapisek Sompote Endowment Fund at Chulalongkorn University and the "Research Award in Medical Sciences in 2023" from the National Research Council of Thailand. With an extensive publication record in reputable peer-reviewed journals, Dr. Varisa also serves on the editorial boards of numerous leading journals. In addition to her research endeavors, she is deeply committed to teaching and mentorship, nurturing the next generation of scientists and scholars. Currently holding the position of Associate Professor at the Faculty of Pharmaceutical Sciences, Chulalongkorn University, Dr. Varisa leads innovative research projects aimed at advancing our understanding of cancer biology to ultimately overcome this disease.

KN-0029-O

Toxic or Tonic? Understanding the Pharmacological Actions of Emerging New Psychoactive Substances

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ABSTRACT

New Psychoactive Substances (NPS), also known as "legal highs" are a range of drugs designed to mimic established illicit drugs. They are sold as legal alternatives to illicit drugs to circumvent the existing law. Statistics by the United Nations Office on Drugs and Crime (UNODC) have recorded an increase in the number of cases and users of NPS globally. NPS are claimed to alter the state of mind and have similar effects to the drugs of addiction such as amphetamine, ketamine, cannabinoids, and opioids. Even though there is not much understanding on the pharmacological and toxicological actions of NPS, a few cases of adverse reactions due to NPS intoxication in humans have been reported. Most NPS have no known or recorded therapeutic use. They are being used and abused for non-medical purposes in which some intoxication cases result in hospitalisation. Indeed, there has been minimal basic research on these drugs and their safety has not been extensively profiled in humans or animals. There is also scarce information on their mechanisms of action, and it is not known if they are addictive, whether there are any acute toxicities or overdose potentials. A multidisciplinary research approach is warranted to provide insights into the pharmacological properties and toxicity of NPS particularly on the brain, and other body systems in general. Better understanding of the addictive and toxic effects of NPS in animals and humans will add to the limited body of knowledge known so far on these substances and assist in highlighting their potential harm to human health.

KEYWORDS: New psychoactive substances; Safety; Addiction

Biographical Sketch

Norazrina Azmi

Associate Professor,

Universiti Kebangsaan Malaysia, Malaysia

Norazrina Azmi is an Associate Professor of Pharmacology at the Faculty of Pharmacy, Universiti Kebangsaan Malaysia (UKM). She obtained her BPharm degree from UKM in 2000. She received her PhD, specialising in the area of neuropharmacology, from the University of Nottingham, United Kingdom in 2005 under the supervision of the late Associate Professor Dr. Geoffrey W. Bennett. She has been holding a few administration posts in the faculty since 2008, assuming duties of the Coordinator for Undergraduate Programme, Head of Quality Assurance, Deputy Dean (Undergraduate, Alumni and International Affairs), Deputy Dean (Academic Affairs) and recently the Head of Industry & Community Linkages. In addition to various appointments at university and national levels, she is also an active member of the UKM Animal Ethics Committee since 2014 in which she has been appointed as the Vice Chairman in 2018. Current research in her laboratory emphasizes the use of animal behavioural tests or in vitro assays to: 1) assess the neuroprotective effects of drugs/phytochemicals; 2) study the mechanisms of neuroprotection; and 3) determine the effects of drugs/phytochemicals on positive reward behaviour and reversal of withdrawal symptoms. Her key research area focuses on plant-derived natural products that prevent neurodegeneration in which the underlying mechanisms that lead to neuroprotection are also investigated. Determination of neuroprotective effects of these natural products is done in view of their potential to be developed as supplements to maintain general wellness of the brain. Due to an increasing trend on the use of New Psychoactive Substances (NPS), she has expanded her research interest into studying the effects of these compounds on the central nervous system, exploring how these compounds alter various types of animal behaviour and the brain function.

KN-0030-O

Innovations in Pharmaceutical Formulation Design for Aging Population

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[2]Academy of Science, The Royal Society of Thailand, Bangkok, Thailand

ABSTRACT

Pharmaceutical development aimed at addressing the health challenges associated with aging is a critical area of research, necessitated by the global demographic shift towards an older population. The increase in the aging population is leading to a higher demand for medications that are specifically designed to manage and treat age-related health conditions. These conditions often require the management of multiple chronic diseases, necessitating the development of medications that can effectively treat these diseases while minimizing side effects. Innovations in pharmaceutical formulation design are crucial for this purpose. They involve the development of drugs that can simultaneously address several conditions without increasing the risk of adverse drug interactions. Furthermore, the aging population frequently faces issues related to polypharmacy, where managing multiple medications simultaneously increases the risk of drug interactions and complications. Developing novel drug delivery systems that can release medications in a controlled manner, improve adherence, and reduce the frequency of dosing can significantly benefit elderly patients. Personalized medicine, another significant trend in pharmaceutical development, customizes healthcare to the individual needs of the elderly, using genetic, environmental, and lifestyle factors. This customization enhances treatment efficacy and safety, aligning therapies with the unique health requirements of older adults, thus minimizing side effects and optimizing outcomes. In summary, the field of pharmaceutical development for the aging population is evolving rapidly, with a focus on creating medications that are effective, safe, and tailored to the needs of older adults. Research in this area is essential for enhancing the health and quality of life of the elderly, thereby addressing one of the most significant public health challenges of our time.

KEYWORDS: Aging population; Elderly; Pharmaceutical development; Personalized medicine

Biographical Sketch

Pornsak Sriamornsak, Ph.D.

Professor & Dean,

Faculty of Pharmacy, Silpakorn University, Thailand

Dr. Sriamornsak is a professor and dean at Faculty of Pharmacy, Silpakorn University; Vice President of Thai Industrial Pharmacist Association (TIPA); Associate Fellow at Academy of Science, The Royal Society of Thailand; Secretary General of College of Industrial Pharmacy of Thailand (CIPT); Vice President of Asian Federation for Pharmaceutical Sciences (AFPS); FAPA Section Chairperson (Industrial Pharmacy and Marketing Section) and Council Member at Federation of Asian Pharmaceutical Associations (FAPA); Distinguished Adjunct Professor at Saveetha Dental College, India; Affiliated Researcher at Faculty of Pharmaceutical Sciences, Chulalongkorn University. He got BSc and MSc degrees in pharmacy at Mahidol University, and a PhD degree in pharmaceutics at Charles Sturt University (Australia). His research interests are related to drug delivery system and dosage form design, pharmaceutical nanotechnology and 3D printing technology. He has authored more than 250 publications. He has organized various international conferences dealing with pharmaceutical sciences. He served as an editorial board member of several journals such as Asian Journal of Pharmaceutical Sciences, Current Drug Delivery, Heliyon, etc. He received many research awards, e.g., Nagai Award Thailand for Research, FAPA Ishidate Award for Pharmaceutical Research, Thailand Distinguished Polymer Scientist, National Distinguished Researcher Award. Recently, he is included in the world's top 2% of the most-cited scientists 2020-2023, in pharmacology and pharmacy, as ranked by Stanford University.

KN-0031-O

Tailoring Hydroxyapatite Scaffolds for Dual Action: Bone Regeneration and Sustained Delivery of Antibiotics

Amaraporn Wongrakpanich[1*], Atchara Khamkongkaeo[2], Saran Tantavisut[3,4], Jiraphong Suksiriworapong[1], Jiraporn Leapolchareanchai[1]

[1]Department of Pharmacy, Faculty of Pharmacy, Mahidol University, Bangkok, Thailand
[2]Department of Metallurgical Engineering, Faculty of Engineering, Chulalongkorn University, Bangkok, Thailand
[3]Department of Orthopaedics, Chulalongkorn University, Bangkok, Thailand
[4]Hip Fracture Research Unit, Department of Orthopaedics, Chulalongkorn University, Bangkok, Thailand

ABSTRACT

Despite significant advancements in orthopaedic and trauma care, orthopaedic infections remain a persistent and challenging complication. Treatment usually involves the removal of all infected and necrotic bone and soft tissue surrounding the infection area with thorough debridement. Afterward, local antibiotic(s) are generally included to increase antibiotic(s) concentration at the injury site in the form of bone cement beads. However, this traditional approach presents several limitations. The bone cement is not biodegradable, necessitating a second surgery for its removal. Incorporating antibiotic(s) into the bone cement can alter its mechanical properties. This approach results in an unpredictable and variable drug release profile, potentially leading to insufficient or excessive drug delivery.

Further complicating the scenario, orthopaedic infections often coincide with bone defects. This necessitates the use of biomaterials that can not only address infection but also promote bone regeneration. Hydroxyapatite (HAp) emerges as a promising candidate for such a biomaterial. Currently, commercially available HAp products are sourced through import, making them expensive. Research efforts in Thailand to develop domestic HAp alternatives from animal-waste products for orthopaedics are still in their early stages. HAp from fish bone and fish scale has emerged as an alternative source that is abundant, inexpensive, and with minimal risk of disease transmission.

Poly (lactic-co-glycolic) acid (PLGA) and poly (lactic acid) (PLA) are highly promising biocompatible and biodegradable polymers widely used in orthopaedic applications. Their compatibility with bone cells makes them suitable for coating scaffolds and implants.

Taking these considerations into account, the development of a novel HAp scaffold loaded with controlled-release antibiotics is proposed. This innovative scaffold has the potential to effectively inhibit bacterial growth and positively influence bone cells at the infected site. The antibiotic release profile can be tailored by varying several factors, such as the types and concentrations of polymers employed in the scaffold, the amount of antibiotic within the coating solution, and the shape of the scaffold core. Most importantly, this biodegradable scaffold eliminates the need for a second surgery associated with traditional bone cement removal. The proposed scaffold has the potential to replace antibiotic beads currently used in the clinical setting, offering a significant advancement in the treatment of orthopaedic infections, particularly when bone defects are also present.

KEYWORDS: Hydroxyapatite; Scaffold; Antibiotic; Controlled release; Bone regeneration

Biographical Sketch

Amaraporn Wongrakpanich PhD (Pharmaceutics)

Department of Pharmacy, Faculty of Pharmacy, Mahidol University, Thailand

Experience

Assistant Professor, Faculty of Pharmacy, Mahidol University, Thailand: (Dec 2017-Present)
Faculty member, Faculty of Pharmacy, Mahidol University, Thailand: (Aug 2015-Dec 2017)
PhD (Pharmaceutics), College of Pharmacy, University of Iowa, Iowa City, IA: (Aug 2010-July 2015)
PI: Aliasger K. Salem, Pharmaceutics and Translational Therapeutics, College of Pharmacy, University of Iowa

Fabricated and characterized various cationic polymer-pDNA polyplexes for gene delivery and polymeric particle-based delivery systems for small molecules, antigens, peptides.
Developed different sizes of PLGA and PLA particles encapsulating multiple molecules.
Developed controlled-delivery systems for implants and scaffolds
Evaluated the efficacy and toxicity of various micro- and nanoparticles in vitro.

Technical Skills

Formulation development and Drug delivery

Development of various formulations for pharmaceutics and cosmetics.
Development of controlled releasing PLGA pellets using hot melt extrusion.
Expertise in micro and nano-encapsulation technologies.

Characterization and testing

Particle characterization including size and zeta potential measurements.
Qualitative and qualitative study of APIs using UV/VIS and fluorescence spectroscopy especially in loading and release studies.
Electron microscopy techniques (SEM/TEM/Confocal) for pharmaceutical and biological samples.
Testing efficacy, the uptake and toxicity of the formulation by extensive studies using cell cultures.
Testing efficacy and safety of cosmetic products in vitro and in clinical settings.

KN-0032-O

Development of pH-sensitive Zerumbone-encapsulated Liposomes for Lung Fibrosis

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ABSTRACT

Zerumbone (ZER), a naturally occurring compound derived from the rhizome of *Zingiber Zerumbet* (L.) Smith, has garnered attention for its potential to mitigate inflammation. Nevertheless, the clinical application of ZER is hindered by its poor water solubility. While ZER's efficacy in addressing lung inflammation is well-documented, its potential in alleviating lung fibrosis remains unexplored. Given the acidic microenvironment associated with inflamed lungs, the need to encapsulate ZER within a pH-sensitive carrier becomes paramount to maximize the delivery of ZER within the inflamed lung tissue. We have successfully synthesized pH-sensitive ZER-encapsulated liposomes (ZER-liposomes) using a formulation of oleic acid, dipalmitoylphosphatidylcholine, and cholesterol, employing a sonication method. The optimization of ZER-liposomes was achieved through the application of a Box-Behnken design. ZER-liposomes were milky white, with an average particle diameter of 84.8 ± 3.5 nm, a polydispersity index of 0.17 ± 0.2, and a zeta potential of -24 ± 0.32 mV. The encapsulation efficiency and loading capacity of the ZER-liposomes were determined to be 96% and 13%, respectively. In vitro release studies indicated that the drug release of ZER followed zero-order kinetics and exhibited enhanced release in acidic environments. In cell culture experiments, ZER-liposomes exhibited an anti-fibrotic effect in TGF-β-treated lung fibrotic MRC-5 fibroblasts and epithelial A549 cells through the downregulation of fibrotic markers, including fibronectin, MMP-2, and α-SMA. The uptake of ZER-liposomes was found to be both concentration- and pH-dependent. Notably, the maximal uptake rate of ZER-liposomes was higher in MRC-5 cells compared to A549 cells. To develop ZER-liposome powder for pulmonary delivery, ZER-liposomes were lyophilized. The *in vitro* lung deposition study was conducted using an Anderson cascade impactor. The results demonstrated that the ZER-liposome powder was able to reach stage 7 of the cascade impactor, indicating effective delivery to both the deep and peripheral regions of the lungs. In conclusion, ZER-liposomes could be a potential therapeutic system for lung inflammation and fibrosis via the inhalation route.

KEYWORDS: Zerumbone; Liposome, pH-sensitive; Inhalation; Lung fibrosis

Biographical Sketch

Foo Jhi Biau, Ph.D.

Associate Professor,

School of Pharmacy, Faculty of Health & Medical Sciences
Taylors University, Malaysia

Dr. Foo's primary research interest lies in drug discovery for the treatment of cancer and lung diseases. By leveraging nanotechnology, his team formulates active compounds into targeted delivery systems to enhance therapeutic efficacy. Another key area of Dr. Foo's research is stem cell exosome research. His group has developed protocols for isolating and characterizing mesenchymal stem cell-derived exosomes. Dr. Foo's research group is establishing systems to utilize exosomes as drug-delivery vehicles for therapeutic applications. Dr. Foo has authored over 50 articles in academic journals and has an H-index of 23. Since 2022, he has been serving as the Programme Director of Postgraduate Studies at the School. He has also served as the treasurer for the Malaysian Association for Cancer Research since 2017. Furthermore, Dr. Foo acts as a consultant for a company, providing professional expertise in the development of stem cell-derived products.

KN-0033-O

Exploring the Therapeutic Potential of Plant-Derived Polyphenols using Molecular Docking and Network Analysis

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[2]Department of Food and Pharmaceutical Chemistry, Faculty of Pharmaceutical Sciences,
Chulalongkorn University, Bangkok 10330, Thailand

ABSTRACT

The landscape of drug discovery is undergoing a transformative shift through the integration of computational methods, specifically molecular docking and network pharmacology, representing a powerful synergy in drug development. This synergy leverages the strengths of each approach to enhance the identification and analysis of potential drug candidates. Molecular docking serves as a fundamental tool in the early phases, enabling the prediction of ligand-receptor interactions and the binding affinity of small molecules to target proteins. Complementarily, network pharmacology provides a holistic view of the intricate relationships and interactions within biological systems, shedding light on the complex molecular networks that underpin disease pathogenesis and drug action. This includes the analysis of genes, proteins, metabolites, and their interconnected pathways, aiding in the identification of new drug targets, predicting off-target effects, and supporting polypharmacology by revealing disease-relevant pathways and multiple target strategies.

The convergence of molecular docking and network pharmacology enhances our understanding of drug-target interactions, facilitating more efficient compound library screening, drug repurposing, and therapeutic regimen optimization. Our research leverages *in silico* tools, like molecular docking and network analysis, to study plant-derived compounds, prodrugs, and drug combinations, showcasing their application through case studies. For instance, the exploration of (−)-dendroparishiol for bacterial meningitis, where molecular docking indicated its affinity for iNOS and COX-2, and network pharmacology highlighted its role in oxidative stress and neuroinflammation pathways. Additionally, we investigated curcumin diethyl γ-aminobutyrate (Cur-2GE), suggesting its analgesic potential through $GABA_A$ receptor binding and the anti-inflammatory synergy between curcumin and metformin.

The reliability of our computational predictions, validated by in vitro and in vivo testing, underscores the benefit of integrating molecular docking and network pharmacology in drug discovery. This strategy not only speeds up the development process but also leads to safer, more effective treatments, marking significant progress in pharmacology and therapeutics.

KEYWORDS: Drug discovery; Molecular dynamics; Molecular docking; Network pharmacology; Computational approach; *In silico*

Biographical Sketch

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Department of Food and Pharmaceutical Chemistry,
Faculty of Pharmaceutical Sciences Chulalongkorn University, Thailand

Dr. Pornchai Rojsitthisak holds the position of Associate Professor at the Faculty of Pharmaceutical Sciences and is the head of the Center of Excellence in Natural Products for Ageing and Chronic Diseases at Chulalongkorn University, Bangkok, Thailand. Dr. Rojsitthisak completed his B.Sc. and M.Sc. degrees at Chulalongkorn University before pursuing his Ph.D. at the University of Southern California in 2002. The center's efforts under his leadership are dedicated to enhancing the efficacy and safety of drug candidates derived from natural products, leveraging prodrug design and nanoformulations. The team utilizes advanced in silico platforms such as molecular docking and network pharmacology, which are crucial in understanding potential drug candidates' mechanisms and interactions.

KN-0034-O

Computational Drug Discovery and Development of Novel Tubulin and Phosphatidylcholine-Specific Phospholipase C Inhibitors as Potential Anticancer Drug Candidates

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ABSTRACT

Introduction: Tubulin is the monomeric protein unit of microtubules. Microtubules contribute to the transportation of chromosomal segregation in mitosis. So far, only non-oral microtubule-modulating agents are clinically approved for cancer treatment with concerns over patient compliance and tumoural resistance. Phosphatidylcholine-specific phospholipase C (PC-PLC) is a novel drug target that regulates several pathogenic signaling pathways: cancer, inflammation, atherosclerosis and neuronal death. In the projects, we have identified novel inhibitors of the targets mentioned using virtual high throughput screening approaches followed by developments from synthesis, biological evaluation, and computational modelling.

Methods: A combination of in silico docking (GOLD software), similarity methods and biological testing (MTT assay, tubuin assay kits from Cytoskeleton, catalog no. BK011P, Muse Cell Cycle Assay kit, and Amplex Red assay) were used to identify novel actives from the Chembridge and InterBioscreen collections followed by a series of synthetic approaches. The Dragon 7.0 software and drug index values (Eurtivong et al., 2019) were used to predict the drug-like qualities of the molecules.

Results: Virtual screening of commercially available molecular entities using CDRUG, structure-based virtual screening, and similarity identified eight new 3-phenyl-1H-indole-2-carbohydrazides with potent antiproliferative activities. Subsequently, synthetic modifications of the most potent tubulin inhibitor, 27a, result in nine derivatives to give a preliminary structure-activity relationship (SAR). Identification of promising novel PC-PLC inhibitors from four different structural series that contain the molecular scaffolds of benzenesulphonamides (10), pyrido[3,4-b]indoles (22), morpholinobenzoic acid (84) and benzamidobenzoic acid (80). Subsequently, 164 structural analogues were either synthesised or identified by similarity were tested generated a preliminary SAR. The molecules were predicted to satisfy Lipinski's limits and acceptable drug-like index values.

Conclusions: Novel PC-PLC inhibitors, and new furanyl- and thiophenyl-3-phenyl-1H-indole-2-carbohydrazides were identified, synthesised and biologically evaluated, with prospects to be developed as orally acceptable anticancer drug candidates in the future.

KEYWORDS: Tubulin; Virtual screening; Synthesis; PC-PLC; Anticancer

Biographical Sketch

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In the past 6 years as a lecturer, Asst. Prof. Chatchakorn Eurtivong have been responsible in providing knowledge to students at undergraduate, masters and PhD levels in areas of medicinal chemistry. Moreover, opportunities were given to him to supervise master students in their thesis projects. His research interests mainly revolve around medicinal chemistry, anticancer chemotherapeutics, construction and application of computational tools and methods in drug discovery and development projects. So far, with the help of the most generous and capable colleagues, 37 publications and over 360 citations were rewarded. Currently, he is a team member of the Thailand Younger Chemist Network (TYCN), and an editorial board member for the journal, Frontiers in Natural Products.

KN-0035-O

Eurycoma longifolia and *Eurycoma harmandiana*: Phytochemical Contents, Biological Activities Evaluation and *in vitro* Culture

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ABSTRACT

The roots of *Eurycoma longifolia* (EL) and *Eurycoma harmandiana* (EH) were determined for their phytochemical content and potential biological activities via *in vitro* models. Quassinoids and canthin-6-one alkaloids were major compounds found in both EL and EH roots. Besides, their adventitious root cultures produced major compounds in the same manner as their authentic plants. The strategies to enhance the secondary metabolites in adventitious root cultures of EH, such as the pre-treatment process and elicitation, have succeeded in this study. The pre-treatment by simple grinding on fresh sample before drying affected the endogenous hydrolysis of canthin-6-one-9-O-*β*-glucopyranoside to its aglycone. The elicitation with yeast extract was suitable for enhancing quassinoid production, while tryptophan was preferred for canthin-6-one alkaloids production. Furthermore, the higher proportional content of quassinoids and canthin-6-one alkaloids resulted in superior anti-inflammatory activity via suppression of inflammatory gene expression. The phosphodiesterase-5 (PDE-5) inhibitory activity was observed by canthin-6-one compounds from the roots of EL and EH and the adventitious root of EH. Quassinoid compounds and intact roots of EL and EH showed anti-HCoV-OC43 and anti-SARS-CoV-2 activities. Besides, the toxicity profiles of EL and EH root extracts and their authentic compounds were confirmed as safe in mammalian cell lines representing organs (i.e., liver, kidney, intestine, and lung). Bioactive compounds that should be used as marker compounds for plant quality control in EL and EH roots are quassinoids and canthin-6-one alkaloids. The quassinoid was outstanding on anti-human coronaviruses (HCoV-OC43 and SARS-CoV-2), and the canthin-6-one alkaloid had strong PDE-5 inhibitory activity in treating erectile dysfunction. Our finding indicates that quassinoids and canthin-6-one alkaloids can be enhanced by suitable strategies in adventitious root culture and confirms their pharmacological activity in the intact roots according to Thai traditional remedies.

KEYWORDS: *Eurycoma longifolia*; *Eurycoma longifolia*; Phosphodiesterase-5 (PDE-5) inhibitory activity; Anti-human coronaviruses; Quassinoid; Canthin-6-one alkaloids

Biographical Sketch

Waraporn Putalun, Ph.D.

Professor of Pharmaceutical Sciences,

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Prof. Dr. Waraporn Putalun has been worked at Division of Pharmacognosy and Toxicology at the Faculty of Pharmaceutical Sciences, Khon Kaen University, Khon Kaen, Thailand since 1993. She received her PhD degree in Pharmaceutical Sciences from the Graduate School of Pharmaceutical Sciences, Kyushu University, Japan in 2001. She is currently engaged in research of immunoassay, monoclonal antibody, quality control of medicinal plants and medicinal plant tissue culture. She has 181 publications with more than 2600 citations (from Scopus, 16 May 2024) and an h-index of 24. Her main research areas include enhancement of bioactive compounds production using *in vitro* culture, monoclonal antibodies, recombinant antibodies, and polyclonal antibody production and immunological methods.

KN-0036-O

Hmong-Mien Cultural Uses of Exotic Medicinal Plants

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ABSTRACT

Introduction: Northern Thailand is home to multiple ethnic groups. The Hmong and Mien are major ethnic groups who originated from Southern China and migrated to settle in Northern Thailand centuries ago. These groups have fascinating traditional knowledge of using medicinal plants. This study aims to investigate the traditional knowledge of using medicinal plants in Hmong and Mien villages in Nan and Chiang Rai, Thailand.

Method: Three Hmong villages in Nan Province and three Mien villages in Chiang Rai Province were selected as study sites. Traditional healers from each village were asked to participate in the study. Traditional knowledge from each healer was extracted using semi-structured interviews along forest trails and in home gardens in their villages. Specimens of useful plant species were collected for identification. The Use Value (UV) was applied to evaluate important medicinal plant taxa.

Result: The investigation identified 72 plants from the Hmong villages and 77 plants from the Mien villages. The important plant families used were Asteraceae, Rubiaceae, Fabaceae, Zingiberaceae, Plantaginaceae, Acanthaceae, and Lamiaceae. These villages included many exotic medicinal plant species, such as Plantago major and Ricinus communis.

Conclusion: The Hmong and Mien people in Thailand still maintain their traditional knowledge of using plants. These two ethnic groups have adapted their traditional knowledge to the Thai floristic environment while still preserving their knowledge of the uses of exotic medicinal species.

KEYWORDS: Ethic groups; Ehnobotany; Thailand; Traditional knowledge

Biographical Sketch

Methee Phumthum, PhD

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Dr. Phumthum completed his PhD from the Section of Ecoinformatic and Biodiversity, Faculty of Science and Technology, Aarhus University, Denmark in June 2019. He started his academic position at the Faculty of Pharmacy, Mahidol University in August 2017. His main research interest focuses on a study of relationship between people and medicinal plants, traditional knowledge, medicinal plant diversity and conservation, and support well-being of ethnic minorities in Thailand. Currently, he is working with the relationship between ethnic people and plants in the Northern Thailand.

KN-0037-O

Empowering Pharmacists: The Evolving Role as Vaccinators in Thailand

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ABSTRACT

Immunization is a highly effective method for preventing severe infections. In Thailand, pharmacists have been involved in various immunization activities such as vaccine procurement, preparation, cold chain management, and patient education, but they have not been involved in vaccine administration. The National Immunization Program has successfully achieved high coverage rates for essential vaccines among Thai children, with figures ranging from 96% to 99%. However, other vaccines, like the influenza vaccine, have much lower coverage rates, below 30%, which is insufficient for achieving herd immunity.

To improve vaccination rates, engaging pharmacists in administering vaccines has been proposed as a potential solution. Implementing this initiative requires a systematic and evidence-based approach. A study conducted to assess the perspectives of Thai pharmacists on this new role revealed several notable findings, particularly regarding the attitudes and concerns of pharmacists who are willing and unwilling to become vaccinators, as well as their knowledge levels. This information can guide The Pharmacy Council of Thailand in prioritizing and developing targeted plans, including training programs, to support the expansion of pharmacists' roles to include vaccination administration.

KEYWORDS: Pharmacist; Immunization; Vaccination; Role expansion

Biographical Sketch

Supatat Chumnumwat

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Assistant Dean for Academic Affairs

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Supatat completed bachelor's degree in pharmacy at Faculty of Pharmacy Mahidol University in 2008 and Doctor of Pharmacy at University of Illinois at Chicago in 2013. He then continued to study at University of Illinois at Chicago for 2 more years in post-graduate programs, Pharmacy Residency Program, emphasizing on clinical pharmacy practice and pharmacogenomics implementation. Supatat is currently an Assistant Professor at Department of Pharmacy, and Assistant Dean for Academic Affairs at the Faculty of Pharmacy, Mahidol University, Thailand.

KN-0038-O

Roles of Pharmacist in the Emergency Department

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ABSTRACT

The extremely heavy workload at Emergency Departments (ED) significantly impacts on patient care and medication use, including the high prevalence of medication errors. Clinical pharmacists play in important role in the rational use of medicines through collaborating with other healthcare providers to ensure appropriate prescribing, avoid medication errors and increase patience adherence to therapy. However, the ED – based clinical pharmacy services are relatively rare due to the complexity of the ED including rapid patient turnover and the wide range of therapeutic areas. In Vietnam, ward-based activities have been undertaken by clinical pharmacists in many hospitals all over the country but very little involvement of clinical pharmacists at ED has been reported. This presentation aims at providing a thorough overview on the necessity of the presence of ED clinical pharmacists and the role of clinical pharmacists at ED, focusing on data and facts from University Medical Center Ho Chi Minh City.

KEYWORDS: Clinical pharmacists; Emergency department

Biographical Sketch

Dang Nguyen-Doan-Trang

Associate Professor,
Vice Head, Department of Clinical Pharmacy,
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Head, Department of Pharmacy, University Medical Center,
University of Medicine and Pharmacy at Ho Chi Minh City

Associate Professor Dang Nguyen Doan Trang got her PhD degree in Epidemiological Sciences at The University of Michigan, USA in 2012 and was appointed Asssociate Professor in 2018. Her major areas of reseach include pharmacokinetics of antibiotics, antibiotic resistance and clinical pharmacy interventions for rational use of medicines. She is the co-author and principal investigator of a variety of books, treatment guidelines and journal articles in the field of clinical pharmacy in Vietnam.

KN-0039-O

Tips & Best Practices in Student Assessment

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ABSTRACT

Assessment of student performance includes knowledge-based assessment using traditional examinations, assessment during practice experiences, and assessment of students during the skills development process. Assessment is particularly important as students develop and integrate skills into scenarios that model practice activities. Assessment processes often use trained actors who simulate patients, caregivers, or health professionals, allowing students to interact in practice scenarios. Formative assessment is done during the learning process to help students identify strengths and areas for improvement with summative assessment being used to determine whether learning outcomes have been achieved. It is essential that students have specific descriptions of the required performance and ample opportunities to practice and receive feedback. Feedback must be specific so that students understand skills in which they are proficient as well as those that require further development. Faculty members must intentionally design assessment processes to measure desired outcomes.

KEYWORDS: Assessment; Student performance; Formative; Summative; Outcomes

KN-0040-O

Leadership Essentials to Ensure Meaningful changes

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ABSTRACT

Leading meaningful change is a challenge. It requires clarity of purpose, patience, perseverance, and follow-through. Contrary to general perception, realizing impactful change involves delegation of responsibility so that leadership occurs at all levels of an organization not just at the 'top'. Like any other business enterprise, achieving change in pharmacy education or patient care delivery requires vision; a well-thought-out plan to achieve the stated vision; a clear articulation of the plan; team 'buy-in'; coordinated execution with clearly delineated roles and responsibilities; and timelines for completion. In short, realization of a vision or organizational goal requires a 'well-oiled' machine.

Essential elements to achieving success include, but are not limited to, effective communication (both written and verbal), a clear understanding that all members of the team have an important role in accomplishing the stated objective; empowerment (you are only as strong as your weakest link), and uniform accountability across all levels of the entire organization (not simply 'top-down').

Two examples of impactful change will be presented. The first involves curricular overhaul. How did a college of pharmacy successfully navigate a complete revision of its curriculum and attain full faculty buy-in? The second example is practice centered. How did a department of pharmaceutical services integrate clinical pharmacy in its standard practice of daily care given differences in the level of foundational education among staff?

A case will be made that an egalitarian mindset is fundamental to being a highly effective leader and such leaders exists at every level of an organization. The session is intended to be informative and highly engaging.

KEYWORDS: Leadership; Change; Essential; Impact; Effective; Responsibility

Biographical Sketch

Donald E. Letendre, Ph.D.

Dean & Professor,

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Dr. Letendre serves as Dean and Professor, University of Iowa College of Pharmacy and Chairman of the Board, University of Iowa Pharmaceuticals (UIP), an FDA-registered drug manufacturing enterprise. Following completion of his Doctorate in Pharmacy and clinical residency at the University of Kentucky, he served as Assistant Director and Assistant Professor of Pharmacy at the University of Kansas Medical Center; spent nearly two decades on the senior staff of the American Society of Health-System Pharmacists (ASHP) serving, for much of that time, as Director of Accreditation Services; and, was Dean and Professor, University of Rhode Island College of Pharmacy and Executive Secretary of the Rhode Island State Crime Laboratory Commission immediately prior to assuming his responsibilities at Iowa.

As a clinical practitioner, clinical scientist, educator, association staff member, and now academic administrator, Dr. Letendre has been at the vanguard of change in healthcare throughout his career. He has been privileged to serve countless students and postgraduate residents. Dr. Letendre actively lead the development and implementation of standards that have helped influence the implementation of safe medication-distribution and -use practices as well as direct patient care services in hundreds of hospitals and health-systems throughout North America. Moreover, his efforts helped shape pharmacy residency and technician training programs worldwide.

The eldest of eight children, son of a fifth-generation cabinet maker, first-generation collegiate, husband to his high-school sweetheart, father of four, and grandfather of eleven, Dr. Letendre is a native of Acushnet, Massachusetts. Among his many awards and special citations, Dr. Letendre was bestowed ‘Honorary’ residency graduate status by New York’s Montefiore Medical Center and the University of Wisconsin Hospital and Clinics. He was the recipient of the University of Kentucky’s prestigious Paul F. Parker Lecture Award (1998), received the Massachusetts College of Pharmacy’s Outstanding Alumni Achievement Award (1999), was awarded the American Pharmacists Association Academy of Student Pharmacists Outstanding Dean Award (2020), was named to the University of Kentucky College of Pharmacy Hall of Distinguished Alumni (2020) with a Lifetime Achievement Award, received the Iowa Pharmacy Association Distinguished Pharmacist Award (2022), and delivered the University of Kentucky College of Pharmacy Foster Lectureship Lecture (2024)..

KN-0041-O

Strategies & Best Practices in Preceptor Development: A Tale of Two Continents US and Thailand

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ABSTRACT

Pharmacy preceptors have crucial roles in pharmacy students' clinical education. To achieve the expected outcomes on clinical rotations, students must possess key clinical knowledge and critical thinking. However, skills provided by preceptors are also essential. Preceptors should be equipped with skills such as teaching on the run, giving constructive feedback, or improving communication, in order to enhance students' success. Over the past years, we emphasized these areas to Thai pharmacy preceptors via online and onsite national conferences for preceptors from both community and hospital pharmacies. In the ambulatory care setting or community pharmacy, teaching on the run was discussed in an online workshop. We encouraged preceptors to utilize the "one-minute-teacher" technique. This is to help preceptors formulate clinical questions for teaching and treatment plans for individualized patients. The preceptors were able to discuss take-home points and received feedback on what went well. They were then able to provide suggestions on what could have been improved regarding their precepting at practice sites.

Recently, preceptors are faced with challenges in dealing with sensitive students. Precepting students suffering from mental illness are not uncommon. Preceptors should have a proper feedback technique to appropriately handle delicate situations. We created national conferences for pharmacy preceptors and invited clinical experts such as psychologists, specialized pharmacists, and preceptors who have experiences of taking care of sensitive students to share tips and useful techniques to handle students in different scenarios.

Additionally, we collectively developed a standardized evaluation form for preceptors to evaluate students on clinical rotations. The forms are used nationally and were created based on "workplace-based assessment" theory.

In conclusion, skills such as giving feedback and teaching at a practice site are essential for pharmacy preceptors, especially when handling sensitive students or students with mental illness. We strive to develop and provide the best teaching methods for preceptors to ensure students' success.

Biographical Sketch

Weerachai Chaijamorn

Associate Professor,

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Weerachai Chaijamorn is a lecturer at Faculty of Pharmaceutical Sciences, Chulalongkorn University. He received his BS in Pharmaceutical Sciences from Chulalongkorn University and residency training in pharmacotherapy and nephrology pharmacotherapy from the College of Pharmacotherapy of Thailand, the Pharmacy Council of Thailand. He also completed his nephrology fellowship from the College of Pharmacotherapy of Thailand and critical care/nephrology fellowship from University of Michigan College of Pharmacy. He subsequently received a board-certified pharmacotherapy specialist (BCPS). He also certified as the Fellow of Asian College of Pharmacy (F.A.C.P.) from the Federation of Asian Pharmaceutical Associations College of Pharmacy (FAPA-CP) since 2012.

Dr. Chaijamorn was a clinical pharmacist at Clinical Pharmacy Unit, Pharmacy Department, Ramathibodi hospital after graduating from Faculty of Pharmaceutical Sciences, Chulalongkorn University. He then moved to academic carrer as an Associate Professor at Faculty of Pharmacy, Siam University since 2006. As mentoined earlier, he now serves as an Associate Professor at Faculty of Pharmaceutical Sciences, Chulalongkorn University.

Dr. Chiajamorn promotes pharmacy practice advancement in kidney diseases nationally and internationally. Nationally, he served as a founding president of the Thai Renal Pharmacists Group (TRPG) under the Association of Hospital Pharmacist (Thailand). At TRPG, he provides training and guidance for pharmacists interested in caring for kidney diseases patients. Over the past ten years, he has created multiple training programs and has trained many clinical pharmacists to care for patients suffering from kidney diseases.

Internationally, he has been prolific in clinical research and contributed extensively to the area of medication dosing in continuous renal replacement therapy (CRRT) and acute kidney injury (AKI). He has authored more than 20 peer-reviewed publications. Antibiotic dosing in AKI patients receiving CRRT is complicated. Dr. Chaijamorn has laid out the principle and has been a leading clinician scientist in Thailand in conducting several research studies and published in this area.

Dr. Chaijamorn maintains his clinical practice in a post- AKI survivors and post kidney transplant clinics at King Chulalongkorn Memorial hospital where he provides medication therapy management services to the AKI survivors and post kidney transplant patients. In addition to his practice in post-AKI clinic, Dr. Chaijamorn also provides pharmacotherapy services for adult chronic maintenance hemodialysis patients at Siriraj hospital. He has served as a therapeutic consultant for many teaching hospitals in Thailand and in the U.S.

KN-0042-O

Application of Health Technology Assessment on Policy Decision Making for the Development of the Universal Health Coverage: Lesson Learnt from Thailand

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[2]Mahidol University Health Technology Assessment (MUTA) Graduate Program, Mahidol University, Bangkok, Thailand

ABSTRACT

Currently the availability of high-cost health interventions, including pharmaceuticals and medical technologies has been continuously increasing. This has frequently led to an increase in public and patient expectations as well as a limited healthcare resource. Therefore, there is a need for evidence-based approach to assist policy makers to make decision on resource allocation under healthcare budget constraint. Health technology assessment (HTA) has been increasingly recognized as one of the most useful tools that can help inform health technology- or health intervention-related policymaking at individual, institutional, national, and international levels in both developed and developing countries. The objective of this lecture is to provide the overview and future challenges of HTA on policy decision making in ASEAN countries as well as lesson learnt about the potential application of HTA in policy decision-making in Thailand. A literature review and other related information was be gathered to summarize the contents of the presentation. HTA information has been increasingly used for making decision in ASEAN countries especially in the development of Universal Coverage Scheme (UCS). However, there are still challenges. Thailand has been used HTA as a tool to make decision whether drugs should be included in the National List of Essential Medicines (NLEM) as well as whether health intervention and technology should be added in the Health Benefit Package of UCS. Moreover, it has been recently applied for price negotiation, development of clinical practice guidelines, and communication with health professionals. There were future challenges toward the application of HTA in ASEAN countries to develop the UCS in the future.

KEYWORDS: Health technology assessment; Economic evaluation; Universal health coverage; Thailand; Policy decision making; Health economics

Biographical Sketch

Usa Chaikledkaew

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Usa Chaikledkaew received her bachelor's degree in Pharmacy with the first class honor and pursued her master degree in Economics and Ph.D. degree in Pharmaceutical Economics and Policy at the University of Southern California, USA. She is currently an Associate Professor at the Faculty of Pharmacy, Mahidol University. Since 2006, she has been a research consultant and one of the founders who established the Health Intervention and Technology Assessment Program (HITAP). Currently she is the Director of Postgraduate Program in Health Technology Assessment (HTA) at Mahidol University. Most of her health economics studies have been published in peer-reviewed international journals and used as the information to assist policy makers for making decisions on the development of National List of Essential Medicines (NLEM) and the benefit package of the Universal Health Coverage Scheme managed by the National Health Security Office. She had been a committee of health economics working group under the Subcommittee for the development of NLEM. Moreover, she was the editors of the 1st and 2nd HTA guidelines in Thailand.

KN-0043-O

Social Administrative Pharmacy and Pharmaconomics in Viet Nam: Development and Future Challenges

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ABSTRACT

In Vietnam, the field of Social Administration Pharmacy covers a broad range of areas, with a focus on pharmacoepidemiology, community pharmacy, drug supply management, and pharmacoeconomics. Recent research on pharmacoepidemiology has focused on managing antibiotic use in primary care and controlling the prescribing of antibiotics without a prescription, as well as improving the quality of adverse drug reaction reporting. Research on community pharmacies focuses on the knowledge and attitudes of drug sellers, as well as the quality of service provided at community pharmacies. The Faculty of Pharmaceutical Management and Pharmacoeconomics at Hanoi University of Pharmacy participated in writing a handbook on antibiotic use management for district hospitals that was issued in 2023 under the direction of the Ministry of Health. The research on drug supply aims to analyze the results of drug use in hospitals and access to essential drugs in the community. Lecturers practice weekly at hospitals to ensure optimal drug dispensing and storage. Given constraints in the health budget, health technology assessment (HTA) has become increasingly important. In 2018, the Ministry of Health issued Decision No. 5315/QD-BYT on the regulation for considering new drugs to be added to the list of drugs covered by the Vietnam health insurance scheme. Since then, HTA has been used as a tool for building a list of drugs covered by health insurance, conditions for health insurance payments and rate of payment. HTA has also been used as a basis for prioritizing, making evidence-based resource allocation decisions, and developing health insurance benefit packages to achieve universal healthcare coverage in Vietnam. The draft pharmacoeconomic evaluation guideline was developed 2 versions in 2019, 2024 by Hanoi University of Pharmacy, in collaboration with Hanoi University of Public Health, and Health Strategy and Policy Institute. Despite recent developments, there are still many challenges, including capacity shortages, incomplete data, and policies that are still being adjusted.

KEYWORDS: Social administration pharmacy; Pharmacoeconomics; Viet Nam

Biographical Sketch

Pham Nu Hanh Van, Ph.D.

Deputy dean

Faculty of Pharmaceutical Management and Pharmacoeconomics, Hanoi University of Pharmacy, Viet Nam

Dr. Pham Nu Hanh Van is an expert with 20 years of experience in medical technology assessment, pharmacoeconomics, pharmacoepidemiology, and evidence-based medicine. She specializes in various research areas such as cost-effectiveness analysis, budget impact analysis, cost analysis of drugs and health services, health system analysis, health policy analysis, access to drugs, drug supply management, and evidence-based medicine. Currently, she serves as the Deputy dean of the Faculty of Pharmaceutical Management and Pharmacoeconomics at Hanoi University of Pharmacy, Viet Nam. Dr. Van is also a member of the Pharmacoeconomics Subcommittee of the Vietnamese Ministry of Health, where she provides advice to develop health insurance policies related to pharmacoeconomics. She is also an experienced expert develops guidelines for conducting pharmacoeconomic research under the Department of Health Insurance of the Vietnamese Ministry of Health. She has worked as a consultant for various international organizations such as the World Bank, WHO, and Korean Health Insurance Evaluation and Assessment Service Agency. She has collaborated with colleagues from universities as the National University of Singapore (NUS), University of Groningen in the Netherlands in scientific projects. From 2019 to present, she has presented nearly 30 presentations for national level conferences on assessing health technology, implementing health insurance policies, and related fields. She has also extensive experience in working with multinational pharmaceutical companies such as J&J, GSK, MSD, Norvatis, Boehringer Ingelheim, Roche, Abbott, Eissai, and Batex.

KN-0044-O

Projecting *Plantago major* as Phytopharmaceuticals for Diabetic Wound

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ABSTRACT

Diabetes wound is a persistent inflammatory that may inhibit wound healing, lead to reduced quality of life, and may further cause mortality. Plantago major L. (Plantaginaceae) has been used empirically and proven scientifically to enhance wound healing. This herbaceous plant is widely distributed in Indonesia and is easy to cultivate, which supports its development as a raw material for phytopharmaceuticals. In order to provide standardized herbal medicine for diabetic wounds, we validated standardized extract analysis methods and optimized the extraction method assisted by ultrasonic waves. The chemometric approach with targeted UPHPLC-MS and antioxidant activity was used to optimize the extraction process, which further suggests the presence of bioactive phytoconstituents contributing to the diabetic wound healing mechanism.

Our study validates the comprehensive role of the phytoconstituents in all phases of the wound healing process, i.e., hemostasis, inflammation, proliferation, and remodeling. The network pharmacology study revealed the proposed molecular mechanism through the VEGF signaling pathway, HIF-1 signaling pathway, AGE-RAGE signaling pathway in diabetic complications, Toll-like receptor signaling pathway, Relaxin signaling pathway, Rap1 signaling pathway, MAPK signaling pathway, and PI3K-Akt signaling pathway. Result of the in vitro assays on the extract support the proposed mechanism through prominent activities as antioxidants, antibiofilm, anti-inflammatory on RAW 264.7 cells cultured in hyperglycemic media, as well as the angiogenesis effect on HUVEC. As an effort to project this potential plant as a phytopharmaceutical product for diabetic wound healing, the leaf hydroalcoholic extract prepared by ultrasound-assisted maceration was formulated as a nano hydrogel preparation to optimize the application of the healing process.

KEYWORDS: *Plantago major* L.; Wound healing; Diabetes; Mechanism of action; Phytoconstituents; Herbal medicines

Biographical Sketch

Triana Hertiani

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Triana Hertiani is a Professor at the Pharmaceutical Biology Department, Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia, and since 2023, she is also appointed as the Rector of Universitas Jenderal Achmad Yani Yogyakarta.

Prof. Triana was graduated as a pharmacist at 1997 and as a Master of Science in 2000 from the Faculty of Pharmacy, Universitas Gadjah Mada. She completed her Doctoral degree at the Pharmaceutical Biology and Biotechnology Department, University of Heinrich Heine, Duesseldorf, Germany in 2007.

Prof. Triana began her career as a lecturer at the Pharmaceutical Biology Department, Faculty of Pharmacy, Universitas Gadjah Mada in 1998 and in recent times serves also as a researcher at the Research Collaboration Centre Biofilm Indonesia and as the Board of Committee Indonesia Essential Oil Council. She dedicates her academic activities to explore Indonesian natural resources as a new anti-infective-related diseases and to provide scientific support for establishing Jamu as Indonesian traditional medicine.

KN-0045-O

Black Rice (*Oryza Sativa* L.) and its Anthocyanins: Mechanisms, Food Applications, and Clinical Insights for Postprandial Glycemic and Lipid Regulation

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ABSTRACT

Postprandial hyperglycemia and hyperlipidemia contribute to chronic metabolic issues, impacting cardiovascular diseases and diabetes. Current dietary interventions focus on controlling postprandial glucose and lipid levels while increasing antioxidant supply. Black rice cultivations have garnered attention for their resistant starch (RS) content and phytochemical compositions, particularly anthocyanins, renowned for their anti-diabetic and antioxidant effects. This review thoroughly explores the potential of black rice in regulating postprandial glycemic and lipid responses, with implications for the development of functional food products. Based on in vitro studies, polyphenol-rich black rice extract, along with its anthocyanins, delays postprandial glucose through the inhibition of carbohydrate digestive enzymes such as pancreatic α-amylase and α-glucosidase. In addition to delaying the key step of lipid digestion and absorption, they inhibit pancreatic lipase, bind to bile acids, disrupt cholesterol micellization, and inhibit cholesterol uptake in enterocytes. Moreover, the high proportions of RS in black rice result in a delayed rise in postprandial glucose by resisting digestion in the small intestine. The utilization of black rice flour and its polyphenol-rich extracts in food products, such as noodles, pasta, biscuits, bread, and yogurt, enhances health benefits by suppressing starch digestibility, reducing glucose release, and increasing phytochemical content and antioxidant capacity. Clinical studies support the potential of black rice and its food derivatives to effectively manage postprandial glycemic and lipidemic responses while increasing plasma antioxidant capacity. However, comprehensive, long-term investigations are crucial to delineate the optimal dosage and duration of black rice consumption and further elucidate its positive effects on metabolic responses.

Biographical Sketch

Sirichai Adisakwattana

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Work Experience

2006-2008 Lecturer Department of Nutrition and Dietetics,
Faculty of Allied Health Sciences, Chulalongkorn University
2008-2011 Assistant Professor (Nutrition and Dietetics)
2011-2018 Associate Professor (Nutrition and Dietetics)
2018-Present Professor (Nutrition)
2011-Present A Director M.S. and Ph.D. program in Food and Nutrition
(International program), Faculty of Allied Health Sciences
Chulalongkorn University

Research Experience

Extensive research focuses on bioactive phytochemical compounds derived from edible plants, fruits, and vegetables.

Specialized in clinical nutrition and human studies, with a specific focus on investigating the effects of fruits, vegetables, and their bioactive phytochemicals on enhancing nutrition and promoting optimal health.

Expertise in developing innovative food production techniques aimed at enriching plantbased products with phytochemicals to enhance their nutritional value.

Recognizing the importance of personalized nutrition approaches and considering individual variations in response to phytochemical interventions.

KN-0046-O

Potential of Cannabidiol Nasal and Pulmonary Delivery System

Teerapol Srichana, Ph.D.

Drug Delivery System Excellence Center and Department of Pharmaceutical Technology, Faculty of Pharmaceutical Sciences, Prince of Songkla University, Hat Yai, Songkla 90112, Thailand

ABSTRACT

Cannabis plant has long been used for its psycho-activity after smoking. In recent years, there is a growing interest and research on the potential medical use of cannabinoids for treating various diseases. The cannabis major components are cannabidiol (CBD) and tetrahydrocanna-binol (THC), the principal psychoactive constituent, along with other cannabinoids, terpenes and flavonoids. The focus has been on the non-psychoactive molecule, CBD, with effects on pain, inflammation, quality of sleep and various brain disorders. Due to the limited knowledge on the medical use of CBD, there are only a few approved cannabis medications. Current efforts are on the development of new delivery methods to increase the bioavailability of CBD, evaluate the potential treatment of CBD and develop evidence based cannabinoid medications for treating specific indications i.e. anti-inflammatory. This presentation will describe CBD with two formulations: metered dose inhaler and nasal spray and possible anti-inflammatory therapeutic effects of CBD in the respiratory airways.

KEYWORDS: Therapeutics; Cannabidiol; Nasal delivery; Pulmonary delivery; Inhaler

Biographical Sketch

Teerapol Srichana, Ph.D.

Professor,

Faculty of Pharmaceutical Sciences,
Prince of Songkla University, Hat Yai, Songkla, Thailand

Prof. Srichana received his Bachelor Degree in Pharmacy from Prince of Songkla University (PSU) in 1989, Thailand. After graduation, he went to do his master degree in Belgium and got his MPharm from Gent University in 1992. After that, he completed his PhD from King's College University of London in 1998. He gained his research experiences in Hebrew University and College of Pharmacy, University of Minnesota (2005 and 2006, respectively). He published over 200 papers in international journals. He contributed six book chapters in the area of biomaterials and pulmonary drug delivery (Elsevier, Springer, John Wiley and Sons and Elsevier). He has written "Dry Powder Inhaler: Formulation, device and characterization" under Nova Medical publisher. Prof. Srichana is actively involved in Aerosol Sciences and pulmonary drug delivery research. He has supervised more than 45 PhD and M.Sc. students. Currently he serves as Director for Research and Development Office and a director of drug delivery system excellence center at PSU.

KN-0047-O

Bioequivalence Studies to Ensure the Quality of Generic Product

Yahdiana Harahap, Ph.D.

Bioavailability/Bioequivalence Laboratory, Faculty of Pharmacy
Universitas Indonesia, Depok, Indonesia

ABSTRACT

Generic product is a pharmaceutical product which usually intended to be interchangeable with an innovator product. In general, a generic product is a product which has the same qualitative and quantitative composition in active substances as the reference medicinal product, the same pharmaceutical form as the reference medicinal product, and whose bioequivalence with the reference medicinal product has been demonstrated by appropriate bioequivalence studies. Bioavailability and bioequivalence studies play a key role in the drug development period for both new drug products and their generic equivalents. The purpose of establishing bioequivalence study is to demonstrate equivalence in biopharmaceutic quality between the generic product and a reference mebicinal product in order to allow bridging of clinical data associated with the reference medicinal product which is has similarity in terms of safety, quality, and efficacy. In bioequivalence studies, the plasma concentration time curve is used to assess the rate and extent of absorption. Meaningful pharmacokinetic parameters and preset acceptance limits allow the final decision on bioequivalence of the tested products. AUC, the area under the concentration time curve, reflects the extent to exposure. Cmax, the maximum plasma concentration or peak exposure, and the time to maximum plasma concentration, tmax, are parameters that are influenced by absorption rate. Bioequivalence study provide important information in the overall set of data that ensure the availability of safe and effective medicines to patients and practitioners. Bioavailabity and bioequivalence information has been determined to have practical and public health value for pharmaceutical sponsors, regulatory agencies, patients, and practitioners.

KEYWORDS: Bioequivalence, Bioavailability, Generic, Pharmacokinetic

Biographical Sketch

Yahdiana Harahap

Prof. Dr. apt, MS,

Faculty of Pharmacy, Universitas Indonesia, Depok, Indonesia

Yahdiana Harahap has completed her Ph.D. from Department of Pharmacy, Institute Technology Bandung, Indonesia. Since August 2020 She was the Dean of Faculty of Military Pharmacy, Republic of Indonesia Defense University, Indonesia. Prior to this position, she was the Head of Pharmacy Division of Indonesia Accreditation Agency for Higher Education in Health (IAAHEH/LAM-PTKes). Previously (2011-2013) she was the Dean of the Faculty of Pharmacy, Universitas Indonesia. Currently she is the Chair of Multi-Country Training Hub for Health Emergencies Operational Readiness (MULTHEOR), Collaboration of WHO with Ministry of Defense and Ministry of Health Republic of Indonesia and since January 2024 she is the Chair of the Center of Excellence for Biosafety and Biosecurity, Collaboration Republic of Indonesia Defense University with US-DTRA. She has published 119 papers in International Journals with Scopus index and has been invited to be a speaker at many international conferences, especially in the field of Bioavailability/Bioequivalence Studies and Bioanalysis techniques. She currently serves as an expert at the National Agency of Drug and Food Control Republic of Indonesia. Besides an academic experience, she is also involved in pharmaceutical associations such as the President of Asian Federation for Pharmaceutical Sciences (2020-2023) and Observer of Board of Director of Asian Association of School of Pharmacy (2020-present).

KN-0048-O

Pharmacogenomics of Drug-Induced Liver Injury

Jiraphun Jittikoon, Ph.D.

Department of Biochemistry, Faculty of Pharmacy, Mahidol University, Bangkok, Thailand

ABSTRACT

Tuberculosis (TB) is an infectious disease caused by the bacterium, also known as *Mycobacterium tuberculosis.* TB continues to cause ill health and deaths across many populations in the world. The first line anti-TB drugs, which are isoniazid, rifampicin, pyrazinamide, and ethambutol, are usually given to patients with TB as the recommended treatment regimens and generally considered as effective chemotherapeutic agents to treat TB. However, there has been increasing incidence of serious hepatotoxicity or liver injury related to the use of these drugs. This adverse drug reaction named antituberculosis drug-induced liver injury (ATDILI) is one of the most common adverse reactions to drugs used to treat TB, frequently resulting in the discontinued or interrupted use of drugs, and thus contributing to the socio-economic burden of the disease. Therefore, an improved understanding of the causes underlying hepatotoxicity induced by anti-TB drugs may result in the identification of novel markers and novel therapeutic targets for preventing and slowing the progression of DILI. Genetic factors have been proposed as a critical contributor to the pathogenesis of DILI. Thus, a focus has been placed on the potential influence of genetic factors in the development of ATDILI, in which a variety of genetic polymorphisms in pharmacogenes including N-acetyltransferase 2 (*NAT2*), cytochrome P450 family 2 subfamily E member 1 (*CYP2E1*) and glutathione S-transferases [glutathione S-transferase mu 1 *(GSTM1*) and glutathione S-transferase theta 1 (*GSTT1*)] have been reportedly associated with an increased risk of ATDILI. In views of the foregoing findings, these pharmacogenetic biomarkers could play an important role in the process of developing pharmacogenomic testing to avoid ATDILI in the near future.

KEYWORDS: Tuberculosis; Drug-induced liver injury; Genetic polymorphism; Pharmacogenes; Anti-tuberculosis drug; Hepatotoxicity

Biographical Sketch

Jiraphun Jittikoon

Associate Professor,

Department of Biochemistry. Faculty of Pharmacy, Mahidol University, Thailand

Jiraphun Jittikoon is currently an associate professor in Biochemistry and used to be a head of department at Department of Biochemistry, Faculty of Pharmacy, Mahidol University. She received her bachelor's degree in pharmacy and completed her master's degree in pharmacy with a major in Biochemistry from Faculty of Pharmacy, Mahidol University. She pursued her Ph.D. degree in Biochemistry at the University of Southampton, United Kingdom. Her research interests are in the field of Pharmaceutical Biochemistry including pharmacogenomics and precision medicine. After graduating doctoral degree, she received the Erasmus Mundus scholarship to perform her research in protein production at the Department of Pharmaceutical Sciences, Faculty of Pharmaceutical, Biomedical and Veterinary Sciences, University of Antwerp, Belgium. She was also granted to be trained in the field of pharmacogenomics at the UNC Institute for Pharmacogenomics and Individualized Therapy, The University of North Carolina at Chapel Hill, USA. She is a member of the Southeast Asian Pharmacogenomics Research Network (SEAPHARM) and Thai Society of Human Genetics. Her research has been performed under the collaboration between Genomic Medicine Centre, Department of Medical Sciences, Ministry of Public Health, Thailand and Genomic Medicine Center, Faculty of Medicine Ramathibodi Hospital, Mahidol University. Most research studies have been published in peer-reviewed international journals.

KN-0049-O

Insight Out: The Gut Microbiome's Impact on Disease and Wellness

Pagakrong Wanapaisan, Ph.D.

Department of Microbiology, Faculty of Pharmacy, Mahidol University, Bangkok, Thailand

ABSTRACT

The microbiota is increasingly recognized as a crucial component of host health, with various organs harboring distinct microbial communities. The composition of an individual's microbiota is influenced by factors such as diet, physical activity, age, and environment. The gut, hosting trillions of microbes, is the most densely populated area. Modern molecular techniques have elucidated the role of these microbes in numerous diseases. This study explores the relationship between gut microbiota and health among Thai individuals across two age groups. In children, we compared the gut microbiota of those with wheat allergies to healthy controls, finding significant differences in microbial diversity. Wheat-allergic children showed an enrichment of Firmicutes and *Verrucomicrobia*, while healthy children had higher levels of *Megamonas*, *Romboutsia*, *Fusobacterium*, *Clostridium* senso stricto 1, and *Turicibacter*. In older adults, we investigated the association between gut microbiota and cognitive impairment, including Mild Cognitive Impairment (MCI) and Alzheimer's Disease (AD). Our results indicated a significantly higher abundance of Clostridiales in the healthy group, whereas *Escherichia-Shigella* were the dominant genera in the AD group. Understanding the complex interactions between gut microbes and health can lead to new diagnostic and therapeutic strategies. This study adds to the growing knowledge of the microbiota's role in health and disease, suggesting potential clinical applications.

KEYWORDS: Gut microbiome; Wheat allergy; Mild Cognitive Impairment (MCI); Alzheimer's Disease (AD)

Biographical Sketch

Pagakrong Wanapaisan

Assistant Professor,

Department of Microbiology, Faculty of Pharmacy, Mahidol University, Thailand

Dr. Pagakrong Wanapaisan is a distinguished scientist and lecturer in the Department of Microbiology, Faculty of Pharmacy at Mahidol University. She graduated with a bachelor's degree in biotechnology with First Class Honors from King Mongkut's Institute of Technology Ladkrabang and earned her Ph.D. from the Faculty of Science at Mahidol University, specializing in biotechnology. Following her doctoral studies, Dr. Wanapaisan secured a postdoctoral position in the Department of Microbiology at the Faculty of Science, Chulalongkorn University. Dr. Wanapaisan's research interests are particularly focused on the dynamics of microbial communities in the human gut, food fermentation, and soil environments. She seeks to identify valuable microbes for applications in various fields. Her extensive research has resulted in numerous publications, highlighting the applications of microbial biotechnology across health, food, agriculture, and environmental sustainability. She is a highly sought-after consultant for food companies, leveraging her expertise to enhance food technology and safety.

KN-0050-O

Study on Bioactive Secondary Metabolites from Marine-derived Fungi

Elin Julianti, Ph.D.

Department of Pharmacochemistry, School of Pharmacy, Bandung Institute of Technology, Bandung, Indonesia

ABSTRACT

Marine microorganisms, particularly actinomycete bacteria, and fungi from diverse marine environments are prolific sources of structurally unique and biologically active metabolites. Hundreds of novel compounds are isolated from these organisms annually, and they have become an emerging source of novel natural products. These marine-derived microbial metabolites' bioactivities are highly diverse but focus on cytotoxic and antimicrobial activities.

In our search for bioactive compounds from marine-derived fungi, we isolated acremostrictin (1), a new compound from the culture broth of Acremonium strictum. Three new benzolactone metabolites, chrysoarticulins A–C (2–4), were isolated from the culture broth of Chrysosporium articulatum. The compounds 2-4 exhibited weak cytotoxicity against the K562 and A549 cell lines. Compound 4 was also moderately active against sortase A, a bacterial transpeptidase. Herqueiazole (5), herqueioxazole (6), and herqueidiketal (7), polyaromatic metabolites with a novel skeletal class, were isolated from the marine derived fungus Penicillium sp. Compound 7 exhibited moderate cytotoxicity and significant inhibitory activity against sortase A. Other six new phenalenones were isolated (8–13), along with five known compounds (14–18) of the herqueinone class. 4-Hydroxysclerodin (13) and an acetone adduct of a triketone (14) exhibited moderate anti-angiogenetic and anti-inflammatory activities, respectively, while ent-peniciherqueinone (8) and isoherqueinone (16) exhibited moderate abilities to induce adipogenesis without cytotoxicity. Our recent study has shown that the ethyl acetate extract of the cultured broth of strain Emericella sp. exhibited potent antiproliferative and inhibited luciferase activity on HT29 CD63 Nluc cancer cells. Bioassay-guided separation of the extract led to the isolation of 3′-deoxyadenosine, known as cordycepin (19).

KEYWORDS: Marine-derived fungi; Marine natural product; Marine-derived microbial metabolites; Antimicrobial; Cytotoxicity

Biographical Sketch

Elin Julianti

Associate Professor,

Department of Pharmacochemistry, School of Pharmacy, Bandung Institute of Technology, Bandung, Indonesia

I am an associate professor at the Department of Pharmacochemistry, School of Pharmacy, Bandung Institute of Technology, Bandung, Indonesia. I completed my undergraduate degree in Pharmacy (1998), Pharmacist Profession (2000), and my Master degree (2003) from Bandung Institute of Technology. I graduated as a Doctor of Philosophy (2012) from the College of Pharmacy, Seoul National University, South Korea. My research interest and courses focus on pharmaceutical microbiology as well as the exploration of bioactive metabolites from marine-derived microorganisms. Investigation of structurally novel and biologically active compounds from marine-derived microorganisms has become an important research area in drug discovery. I have published around 40 research articles, with more than 500 citations (H-index = 11).

KN-0051-O

Tailored Paper-based Devices through Surface Modification for Point-of-Need Applications

Nantana Nuchtavorn, Ph.D.

Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Mahidol University, Bangkok, Thailand

ABSTRACT

Paper-based devices, typically fabricated from standard cellulose filter paper, have attracted significant research interest owing to their unique properties, including portability, low-cost, ease of fabrication, minimal sample and solvent consumption, and versatile applications. Additionally, the paper surface can be easily modified or functionalized. With the need for selective and sensitive determination of analytes in complex matrices, such as biological fluids, foods, surface modification of paper using the molecularly imprinted polymers (MIPs) approach was investigated for selective microextraction. MIPs offer tailor-made selective binding sites in synthetic polymers. The addition of template molecules facilitates the formation of recognition sites during polymerization, which are removed prior to use. Consequently, MIPs were integrated with UV spectrophotometry or capillary electrophoresis for the detection of pesticides in foods or antiepileptics drug in dried blood spots, respectively. Furthermore, facile in-situ synthesis of QDs by simple reagent deposition on paper using thiol-containing precursors and irradiation by UV light could enable a rapid low-cost fabrication of QD–modified paper with various functionalities, such as enzymatic nanoreactors. The successful creation of immobilized fluorescent ZnCd QDs on paper was monitored by their intrinsic fluorescence while their peroxidase mimetic activity was evaluated activity and found comparable with a reference method. Notably, distance-based detection methods employed in microfluidic paper-based devices rely on the colorimetric reaction of water-insoluble chromogenic reagents along channels, resistant to being washed away by sample flow. Anion-exchange filter paper, modified with positively charged functional groups, extended the immobilization of water-soluble reagents. This replacement for standard cellulose filter paper exhibited strong retention of water-soluble anionic metallochromic reagents via ion-exchange interactions. These devices enabled accurate distance-based determination of various heavy metals with a clear detection endpoint. Tailoring paper surfaces through modifications of standard cellulose filter paper has broadened the scope of point-of-need applications across various fields.

KEYWORDS: Paper-based devices; Surface modification; Point-of-need; Cellulose

Biographical Sketch

Nantana Nuchtavorn

Associate Professor,

Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Mahidol University, Thailand

I received a PhD in pharmaceutical chemistry from Mahidol University. During my academic research career, I was awarded the prestigious Australian Endeavour Postdoctoral Research Fellowship, which I pursued at the Australian Centre for Research on Separation Science (ACROSS), University of Tasmania, focusing on the advancement of miniaturized analytical platforms. Additionally, I undertook a visiting researcher position at the Institute of Analytical Chemistry of the CAS in Brno, Czech Republic, where I gained expertise in bioanalytical methods. Later, I was awarded the APEC-Australia Women in Research Fellowship, which enabled me to foster collaborations and enhance my proficiency in microfluidics-based analytical systems at the Melbourne Centre for Nanofabrication and Monash Institute of Pharmaceutical Sciences. My research interest primarily lies in liquid phase separation methods, portable and miniaturized analytical systems, as well as green analytical techniques. Specifically, I focus on developing simple and cost-effective microfluidic platforms for applications in biomedical, food safety, and environmental fields. My research contributions have been acknowledged through publications in prestigious Q1 journals such as Trends in Analytical Chemistry, Analytica Chimica Acta, Chemical Engineering Journal, and Food Chemistry.

KN-0052-O

Transitioning From Local Wisdom to Pioneering Green Chemical/ Pharmaceutical Analysis

Chalermpong Saenjum[1,2], Sutasinee Apichai[1,2], Thanawat Pattanandecha[1,2], Kanokwan Kiwfo[1], Siripat Suteerapataranon[1], Kate Grudpan[2,3]

[1]Research Center for Innovation in Analytical Science and Technology for Biodiversity Based Economic and Society (I-ANALY-S-T_B.BES-CMU), Chiang Mai University, Chiang Mai, Thailand
[2]Department of Pharmaceutical Sciences, Faculty of Pharmacy, Chiang Mai University, Chiang Mai, Thailand
[3]Department of Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai, Thailand

ABSTRACT

The development of green chemical /pharmaceutical analysis is trending to environmental friendly and human health concerns via minimizing the potential negative impacts of chemicals and their production, as well as leading to sustainability towards UN SDGs. Various of the approaches involves the downscaling of analytical procedures and introducing natural reagents as alternative to the conventional harmful/toxic chemicals. The natural reagent assay kit for iron determination which was adapted from northern Thai local wisdom of testing water quality using guava leaves with a smartphone was used as a detector. Educators in six universities in Thailand implemented the kit in laboratories with modifications depending on their learning outcomes. The high average scores for all questions (> 4.00 of 5.00 points), with the average overall score of 4.53 ± 0.60, indicated satisfaction regarding in all aspects. Additionally, the lab at home approach was introduced during COVID-19 pandemic by using a natural reagent prepared from guava leaves. Furthermore, down scaling smartphone-based colorimetry using well-plate and paper-based platforms for active pharmaceutical ingredients such as ciprofloxacin, tetracycline, chlorhexidine, and benzalkonium chloride, were also developed for real world applications in pharmaceutical products quality control. Using a locally available bio-resources as natural reagents for green analysis in chemistry education supported sustainable education in Thailand, in terms of quality education (SDG 4) and reduced inequalities (SDG 10) and environmental sustainability (SDG 6; Clean water and sanitation, SDG 12; Responsible consumption and production, and SDG 14; Life be-low water).

KEYWORDS: Green chemical/pharmaceutical analysis; Local wisdom; Natural reagent; Smartphone-based colorimetry; Sustainability

Biographical Sketch

Chalermpong Saenjum

Associate Professor,

Faculty of Pharmacy, Chiang Mai University, Thailand

Dr. Chalermpong Saenjum is now working as an associate professor at the Department of Pharmaceutical Sciences, Faculty of Pharmacy, Chiang Mai University since 2012. He got his Ph.D. in 2012 from Chiang Mai University under Franco-Thai scholarship program. His present researches focus on green and down-scaling pharmaceutical analysis, natural reagent, and natural active pharmaceutical ingredients research and development. He serves now as a Director of Research Center for Innovation in Analytical Science and Technology for Biodiversity-Based Economic and Society (I-ANALY-S-T-B.BES-CMU), Chiang Mai University and the Secretary General of Society of Free Radical Research-Thai (SFRR-Thai).

ORAL PRESENTATION

ORAL PRESENTATION SCHEDULE
(Phayathai Grand Ballroom 1-4, Sena, Ari, Mo Chit)

To be eligible for awards, all presenters must be present during the designated presentation time. The oral presentaion file should be uploaded during 8:30 to 12:00 AM on the presentaion date at the scientific help desk.

No.	Presentation Code	Title	Contributors (Presenter)	Presentation date/ Time / Room	Country
1.	PP-0801001-O	Reversing escalated alcohol consumption and neurobehavioral deficits using romaine lettuce (*Lactuca sativa* var. *longifolia*) leaf methanolic extract in C57BL/6J mice model of alcohol use disorder	Borela JN, Cabral IB, Carballo CD, Casuga FP, Co JM, Corpuz PM*, Cueto JV, De Mesa JM	June 13, 2024 14.00-14.15 Mo Chit	Philippines
2.	PP-0805001-O	2,4′-Dihydroxybenzophenone inhibits lipopolysaccharide-induced inflammatory response by inhibiting toll-like receptor 4/myeloid differentiation factor 2-mediated mitochondrial reactive oxygen species production	Mirissa Hewage Dumindu K, Gi-young K*	June 13, 2024 14.15-14.30 Mo Chit	Republic of Korea
3.	PP-0805002-O	*Peperomia pellucida* extract ameliorates secondhand smoke exposure-induced lung fibrogenesis via regulation of matrix metalloproteinase, inflammatory, and fibrotic cytokines: A pre-clinical study	Kristijanto JF, Kusumaningtyas MJ, Agusaputra, Soetedjo FA*	June 13, 2024 14.30-14.45 Mo Chit	Indonesia
4.	PP-0805003-O	Increasing of endogenous antioxidant activity in hyperlipidemic rats treated by *Zingiber cassumunar* Roxb., *Cinnamomum burmanii* and *Glycine max* based functional powder beverage	Mahfudh N*, Argoyudhanto A, Zulfikar M, Salimah SD	June 13, 2024 14.45-15.00 Mo Chit	Indonesia
5.	PP-0806001-O	Fermented oyster extract promotes osteoblast differentiation and bone formation via Wnt/β-catenin signaling pathway	Jayasingha Arachchige Chathuranga Chanaka J, Ilandarage Menu Neelaka M, Gi-young K*	June 13, 2024 15.15-15.30 Mo Chit	Republic of Korea
6.	PP-0806002-O	Acertannin: A promising anti-inflammatory agent which attenuates LPS-induced Inflammation by disrupting the binding of LPS to the TLR4/MD2 receptor complex and activating Nrf2-mediated HO-1 activation	Jinkuk P, Ilandarage Menu Neelaka M, Gi-young K*	June 13, 2024 15.30-15.45 Mo Chit	Republic of Korea

No.	Presentation Code	Title	Contributors (Presenter)	Presentation date/ Time / Room	Country
7.	PP-0806003-O	Melanogenesis inhibitory activity of polyphenol enriched fraction from *Tagetes erecta* L. flower and its key components	Sobarathne Senel S, Gi-young K*	June 13, 2024 15.45-16.00 Mo Chit	Republic of Korea
8.	PP-0807001-O	Investigating the effect of pitavastatin on chemosensitive and 5-fluorouracil resistant colorectal cancer cell lines	Nguyen NH*, Huang C, Nguyen LT	June 13, 2024 16.00-16.15 Mo Chit	Vietnam
9.	PP-0807002-O	Characterization of the interaction between androgen receptor and the large subunit of general transcription factor IIF in prostate cancer	Le Ngoc K*, Øemig JS, Tompa P	June 13, 2024 16.15-16.30 Mo Chit	Vietnam
10.	PP-1002001-O	Evaluation of steroid hormone-induced changes in blood biochemical parameters in white mice	Nguyen MT*, Duong NT, Nguyen ND	June 13, 2024 16.30-16.45 Mo Chit	Vietnam
11.	BB-0602001-O	Association between shorter telomeres and risk of non-communicable diseases	Ngamtipakon P, Jittikoon J, Chaikledkeaw U, Udomsinprasert W*	June 13, 2024 14.30-14.45 (Phayathai Grand Ballroom 2)	Thailand
12.	BB-0602002-O	Distribution of *PTP1B* gene polymorphism (467T>C) of type 2 Diabetes mellitus patients in Indonesia	Fakhruzain N, Tuba S*, Suryanti MR	June 13, 2024 14.45-15.00 (Phayathai Grand Ballroom 2)	Indonesia
13.	BB-0704001-O	Unveiling of a large plasmid sequence in extensively drug-resistant *Acinetobacter baumannii* ST25 using hybrid genome assembly approach	Wiradiputra M, Khuntayaporn P, Thirapanmethee K, Wanapaisan P, Chomnawang MT*	June 13, 2024 15.15-15.30 (Phayathai Grand Ballroom 2)	Thailand
14.	BB-0704002-O	Investigation biofilm formation and heterogeneity resistance in *Acinetobacter baumannii* clinical strains through a single-cell approach	Nguyen TM, Do DM, Vo NN, Le TT, Nguyen AT*	June 13, 2024 15.30-15.45 (Phayathai Grand Ballroom 2)	Vietnam

No.	Presentation Code	Title	Contributors (Presenter)	Presentation date/ Time / Room	Country
15.	BB-0712001-O	Antifungal activity of ointment preparations containing Frankincense resin ethanol extract	Sianipar EA*, Susanto S, Narwati YT, Sagala RJ	June 13, 2024 15.45-16.00 (Phayathai Grand Ballroom 2)	Indonesia
16.	BB-0703001-O	Conditional antimicrobial peptide therapeutics	Ngambenjawong C, Chan LW, Bhatia SN*	June 13, 2024 16.00-16.15 (Phayathai Grand Ballroom 2)	Thailand
17.	PD-0102001-O	Effect of processing parameters on characteristics of biodegradable extended-release microspheres containing leuprolide acetate	Thong N, Ha B, Thuong B, Hai N, Yen T*	June 13, 2024 14.00-14.15 Ari	Vietnam
18.	PD-0102002-O	A two-step design of experiments approach to investigate the simultaneous effects of ion-pairing and chemical enhancers to improve the permeability of lornoxicam in a topical hydrogel patch	Nguyen C, Nguyen T*	June 13, 2024 14.15-14.30 Ari	Vietnam
19.	PD-0104001-O	Development of pH-sensitive zerumbone-encapsulated liposomes for lung fibrosis	Elsayed N, How CW, Foo JB*	June 13, 2024 14.30-14.45 Ari	Malaysia
20.	PD-0105001-O	Multifunctional single and double layered hydrogels: harnessing silver nanoparticles, dsirna, and lactoferrin for chronic wound treatment	Katas H.*, M. Fathil M.	June 13, 2024 14.45-15.00 Ari	Malaysia
21.	PD-0105002-O	Formulation of a novel floating *in situ* gelling system containing curcumin loaded self- nanoemulsifying drug delivery systems (SNEDDS)	Nguyen T, Huynh T*	June 13, 2024 15.15-15.30 Ari	Vietnam
22.	PD-0302001-O	Comparison of physicochemical characteristics, nutritional value and antioxidant activity of collagen extracted from fresh and dried white type jellyfish of Myanmar marine source	Aung NW, Thurein SM, Aung NN, Shwe AW*	June 13, 2024 15.30-15.45 Ari	Myanmar

No.	Presentation Code	Title	Contributors (Presenter)	Presentation date/ Time / Room	Country
23.	PD-0201001-O	Comparative evaluation on physicochemical properties of blackgram starch cultivated in Myanmar with official corn starch as pharmaceutical excipient	Min SY, Maung M, Thurein SM., Lwin WW*	June 13, 2024 15.45-16.00 Ari	Myanmar
24.	PD-0201002-O	*Hibiscus rosa*-sinensis mucilage as a functional polymer in pharmaceutical applications	Anuar NK, Saidin NM, Yahaya NA, Wong TW, Wan Engah WR	June 13, 2024 16.00-16.15 Ari	Malaysia
25.	PD-0102003-O	Enhancement of physical and mechanical properties of gelatin films crosslinked by tannic acid	Abu Samah N*, Ahmady A, Anuar N	June 13, 2024 16.15-16.30 Ari	Malaysia
26.	CP-1501001-O	Current status and clinical needs of drug interaction management in healthcare facilities: A national survey in Vietnam	Vu DT, Nguyen HM, Nguyen AH, Trinh N, Le DK, Vu HD*	June 12, 2024 14.00-14.15 Phayathai Grand Ballroom 3	Vietnam
27.	CP-1501002-O	The potential of 3 generative ai models in medication error assessment	Insuk S*	June 12, 2024 14.15-14.30 Phayathai Grand Ballroom 3	Thailand
28.	CP-1504001-O	Outcomes of diabetes care intervention led by pharmacist in Lao PDR	Sookaneknun Olsan P, Ploylearmseng C, Kittiboonyakun P, Vongvandy V, Sibounheuang P*	June 12, 2024 14.30-14.45 Phayathai Grand Ballroom 3	Lao PDR
29.	CP-1505001-O	Knowledge, perception and willingness to use telepharmacy services among the general population in Indonesia	Zairina E, Alfian SD, Kristina SA, Atmaja DS, Pradipta IS, Mutia DS, Hak E	June 12, 2024 14.45-15.00 Phayathai Grand Ballroom 3	Indonesia
30.	CP-1505002-O	Hypertension risk among middle-aged and older residents In Sen Monorum Town, Mondulkiri Province, Cambodia	Chea S, Chim K, Chum C, Chhe S, Pen K, Yearng D, Sor D, Chea S*	June 13, 2024 13.00-13.15 Sena	Cambodia

No.	Presentation Code	Title	Contributors (Presenter)	Presentation date/ Time / Room	Country
31.	CP-1505004-O	Exploring relationship between spirituality, religion and culture in influencing medication adherence: A qualitative study	Abdul Wahab N, Makmor Bakry M, Ahmad M, Mohamad Noor Z, Mhd Ali A*	June 13, 2024 13.15-13.30 Sena	Malaysia
32.	CP-1507001-O	High-dose amikacin regimen in *Klebsiella pneumoniae*-targeted empirical therapy: Insight from population pharmacokinetic and dosing simulation in critically ill patients	Le VD, Nguyen CT, Nguyen AH, Do LK, Nguyen NT, Nguyen TT, Trinh AT, Nguyen TC, Do SN, Pham NH, Nguyen AH, Vu HD*	June 13, 2024 13.30-13.45 Sena	Vietnam
33.	CP-1508001-O	Characteristics of statin-related myalgia based on statin-associated muscle symptom-clinical idex (SAMS-CI) in Indonesia dyslipidemia outpatients: A preliminary study	Putri ME, Arrang ST*, Notario D, Maslim Y	June 13, 2024 13.45-14.00 Sena	Indonesia
34.	CP-1510001-O	The relationship between demographics and quality of life scores in chronic disease patients in hospitals	Yusransyah Y*, Udin B, Guntaedi A, Hidayat MK, Insani N, Rindarwati AY	June 13, 2024 14.00-14.15 Sena	Indonesia
35.	CP-1602001-O	Effects of SGLT2 inhibitors compared with sulfonylureas on glycaemic control and cardiovascular risk reduction in Asia: Meta-analysis	Cokro F, Sauriasari R*, Tahapary DL, Setiawan H	June 13, 2024 14.15-14.30 Sena	Indonesia
36.	SP-1701001-O	Landscape analysis of international facilitated regulatory pathway for innovative medicine approval: recommendation for Thailand	Jenvutipanish J, Phechkrajang C, Suntornsuk L*	June 13, 2024 14.00-14.15 Phayathai Grand Ballroom 4	Thailand
37.	SP-1701002-O	Priority setting of preconception care interventions for Thailand	Kotirum S*, Sribundit N, Kapol N	June 13, 2024 14.15-14.30 Phayathai Grand Ballroom 4	Thailand
38.	SP-1702002-O	Health-related quality of life among type 2 diabetes patients with macrovascular and microvascular complications relative to a nationally representative sample of Vietnamese adults	Ngo UL, Tran NT, Dang NT, Nguyen YT, Vu MQ, Hoang MV, Nguyen NT*	June 13, 2024 14.30-14.45 Phayathai Grand Ballroom 4	Vietnam

No.	Presentation Code	Title	Contributors (Presenter)	Presentation date/ Time / Room	Country
39.	SP-1702003-O	Cost-utility analysis of adding empagliflozin to the standard of care for chronic kidney disease in Vietnam	Ngo NT, Turongkaravee S, Chaikledkaew U*	June 13, 2024 14.45-15.00 Phayathai Grand Ballroom 4	Thailand
40.	SP-1702004-O	Willingness-to-pay for colorectal cancer screening: A systematic review	Nabila AN, Kristina SA*	June 13, 2024 15.15-15.30 Phayathai Grand Ballroom 4	Indonesia
41.	SP-1703002-O	Analysis of factors affecting the engagement of pharmacists with the organization working in public health facilities: A quantitative study in Vietnam	Huong VT, Hung NP*, Minh NT, Minh TN, Duyen LT, Vinh NP, Chau TN, Anh NV, Quynh HT, Quoc LM	June 13, 2024 15.30-15.45 Phayathai Grand Ballroom 4	Vietnam
42.	SP-1705001-O	Exploring the impact of standardized logistics management information system implementation on logistics management activities among health facilities in Myanmar	Hlaing NN, Chanjaruporn F, Pumtong S*	June 13, 2024 15.45-16.00 Phayathai Grand Ballroom 4	Thailand
43.	SP-1705002-O	Insights into hormone replacement therapy usage: A survey of menopausal women in Kuala Lumpur, Malaysia	Gan MH, Farrukh MJ*, Long CM., Paneerselvam GS, Fatokun O, Kristina SA	June 13, 2024 16.00-16.15 Phayathai Grand Ballroom 4	Malaysia
44.	PN-1103001-O	The role of DNA super-barcodes in authentication of herbal medicine: Several case studies	Giang VN*, Vy TA, Yang T	June 13, 2024 14.00-14.15 Phayathai Grand Ballroom 3	Vietnam
45.	PN-1105001-O	Prevalence and decision making of medicinal plant use among people living in two communes in Krong Senmonorom, Mondulkiri Province	Ung H, So V, Heim M, Ly L, Pen K, Lim K, Lach K, Aing K, Chea S*	June 13, 2024 14.15-14.30 Phayathai Grand Ballroom 3	Cambodia

No.	Presentation Code	Title	Contributors (Presenter)	Presentation date/ Time / Room	Country
46.	PN-1106001-O	Converting single marker content into total flavonoids content in the assay of herbal drugs containing Passion flower herb dry extract (*Passiflora incarnata* L.) using UPLC and HPLC	Vinh VQ, Pham HT*	June 13, 2024 14.30-14.45 Phayathai Grand Ballroom 3	Vietnam
47.	PN-1106002-O	Quality evaluation of *Marantodes pumilum* (Blume) Kuntze varieties using high performance liquid chromatography–photo diode array detection combined with chemometrics	Jamal JA*, Ibrahim IS, Mohd Said M, Mohammad Zainoor N	June 13, 2024 14.45-15.00 Phayathai Grand Ballroom 3	Malaysia
48.	PN-1107001-O	Ultrasonic-assisted extraction of *Boesenbergia rotunda* (L.) Mansf. rhizome using hydrophobic deep eutectic solvents	Buakhao S, Pichetpongtorn P, Nakahashi R, Kitisripanya T*	June 13, 2024 15.15-15.30 Phayathai Grand Ballroom 3	Thailand
49.	PN-1107002-O	*In-vitro* acetylcholinesterase inhibition of *Chrysophyllum cainito* L. (star apple) leaf extract	Labador CL, Hernandez JR, Bueno SN, Malgapo MR, Lucero SR, Aninayon CM, Villalobos O, Corpuz M*	June 13, 2024 15.30-15.45 Phayathai Grand Ballroom 3	Philippines
50.	PN-1107003-O	Chemical composition and potential cytotoxic mechanisms of *Camellia flava* (pitard) sealy leaves	Nhut TM, My NH, Long PT, Tuan ND, Thuy NH*	June 13, 2024 15.45-16.00 Phayathai Grand Ballroom 3	Vietnam
51.	PN-1109001-O	Fibrinolytic activities of *Lumbricus rubellus* powder in combination with *Sonchus arvensis* L. leaf ethanolic extracts	Istikharah R*, Tamhid HA, Kusumawardani PW, Lidya D, Devona DV, Syukri Y	June 13, 2024 16.00-16.15 Phayathai Grand Ballroom 3	Indonesia
52.	PN-1110001-O	Natural product databases in herbal and integrative medicine: Bridging traditional knowledge to modern applications	Makambwa E, Putra MY, Yanuar A*	June 13, 2024 16.15-16.30 Phayathai Grand Ballroom 3	Indonesia

No.	Presentation Code	Title	Contributors (Presenter)	Presentation date/ Time / Room	Country
53.	PC-0401001-O	*In silico* and *in vitro* studies of potential novel vitamin K epoxide reductase (VKOR) inhibitors suggest an updated structure-activity relationship	Mortel S*, Macalino S, Tie J	June 13, 2024 14.00-14.15 Phayathai Grand Ballroom 1	Philippines
54.	PC-0401002-O	Design, synthesis and evaluation the bioactivities of novel 1,3-dimethyl-6-arylamino-1H-indazole derivatives as anticancer agents	Hoang HV, Nguyen TT, Truong MC, Le LT, Tran LH, Nguyen HT, Le TQ, Yoo H, Tran TP*	June 13, 2024 14.15-14.30 Phayathai Grand Ballroom 1	Vietnam
55.	PC-0501001-O	Determination of meropenem concentration in cerebrospinal fluid for therapeutic doses individualization in central nervous system infections	Hoanh TM, Lan DT*	June 13, 2024 14.30-14.45 Phayathai Grand Ballroom 1	Vietnam
56.	PC-0502001-O	Development and validation of bioanalytical method of dolutegravir in dried blood spot using high performance liquid chromatography – photodiode array	Dewi AR, Harahap Y, Rahmania TA*	June 13, 2024 14.45-15.00 Phayathai Grand Ballroom 1	Indonesia
57.	PC-0502002-O	Development and validation of glimepiride analysis methods in dried blood spots (dbs) using high performance liquid chromatography for national health security	Nusantara GB, Rahmania TA*, Ikhsan M	June 13, 2024 15.15-15.30 Phayathai Grand Ballroom 1	Indonesia
58.	PC-0502003-O	Monitoring 5-fluorouracil levels using the dried blood spot method in breast cancer patients	Hanifah M, Harahap Y*, Purwanto DJ	June 13, 2024 15.30-15.45 Phayathai Grand Ballroom 1	Indonesia
59.	PC-0502004-O	Development and validation of bioanalytical quantification method for amikacin in dried blood spot (dbs) using ultra high performance liquid chromatography-tandem mass spectrometry (LC-MS/MS)	Fionaldy AA, Harahap Y*, Maggadani BP	June 13, 2024 15.45-16.00 Phayathai Grand Ballroom 1	Indonesia

No.	Presentation Code	Title	Contributors (Presenter)	Presentation date/ Time / Room	Country
60.	PC-0502005-O	Effect of freeze-drying and spray-drying on the physicochemical composition of *Thunbergia laurifolia* leaf extract	Onsawang T, Sithisarn P, Phechkrajang C, Rojsanga P*	June 13, 2024 16.00-16.15 Phayathai Grand Ballroom 1	Thailand
61.	PC-0502006-O	Development of LC–MS/MS method for the simultaneous quantification of valproic acid and phenytoin in human plasma and application to study pharmacokinetic interaction in epilepsy patients	Sil NT, Minh LV, Tho DC*	June 13, 2024 16.15-16.30 Phayathai Grand Ballroom 1	Vietnam
62.	PE-1301001-O	Factors influencing the score of core competency examination for pharmacist licensure among Thai pharmacy students at Huachiew Chalermprakiet University	Chaivichacharn P, Weeraphon B, Thipunkeaw N*	June 13, 2024 14.30-14.45 Sena	Thailand
63.	PE-1301002-O	Pharmacy education in Myanmar: The past, the present, and the future	Saw MM, Anuratpanich L, Kapol N	June 13, 2024 14.45-15.00 Sena	Thailand
64.	PE-1301003-O	Evaluation of the first implementation of virtual reality program in clinical and community pharmacy courses: A single centre experience	Setiawan E*, Kesuma D, Setiadi AP, Irawati S, Aditama L, Halim SV, Presley B, Wibowo IM, Brata C, Rani KC, Putranti AR, Herawati F, Kirtishanti A	June 13, 2024 15.15-15.30 Sena	Indonesia
65.	PE-1301004-O	Investigation on the perception about professionalism of pharmacy students of University of Medicine and Pharmacy at Ho Chi Minh City	Nguyen HT*, Le CH	June 13, 2024 15.30-15.45 Sena	Vietnam
66.	PE-1301005-O	RxTIFIED: An educational game application to enhance student learning on clinical pharmacology among pharmacy students	Agmata JD, Amon BV, Beso SC, Pestaño MJ, Regala MT, Torio CM*, Pajimna RB	June 13, 2024 15.45-16.00 Sena	Philippines
67.	PE-1303001-O	Mental health issues, their associated factors and demand for mental health services among pharmacy students: A mixed-method study	Quan PB, Truong UU, Nguyen HT, Nguyen DL, Nguyen HQ*	June 13, 2024 16.00-16.15 Sena	Vietnam

No.	Presentation Code	Title	Contributors (Presenter)	Presentation date/ Time / Room	Country
68.	PE-1305001-O	Assessment of undergraduate pharmacy student learning styles using the VARK questionnaire	Jailani NE, Suratman S, Maniam S, Ali AA*	June 13, 2024 16.15-16.30 Sena	Malaysia
69.	PE-1401001-O	Developing international industrial pharmaceutical training in Thailand	Charoenchai L*, Sucontaphunt A, Monton C, Wunnakup T, Meksuriyen D	June 13, 2024 16.30-16.45 Sena	Thailand

PP-0801001-O

Reversing Escalated Alcohol Consumption and Neurobehavioral Deficits using Romaine Lettuce (*Lactuca sativa* var. *longifolia*) Leaf Methanolic Extract in C57BL/6J Mice Model of Alcohol Use Disorder

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ABSTRACT

Introduction:

Alcohol Use Disorder (AUD) globally afflicts millions as a treatment-resistant medical condition. The pervasive effects of incessant alcohol use extend beyond the incapacitating influences on an individual's well-being since the most efficacious treatment for alcoholism is abstinence.

Objectives:

The researchers investigated the dual orexin receptor antagonism mechanism, a novel mechanism of interest in developing pharmaceuticals for AUD, of *Lactuca sativa* var. *longifolia* Leaf Methanolic Extract (*Ls*LME) in C57BL/6J mice to determine its ability to reverse escalated consumption and neurobehavioral deficits upon alcohol exposure, dependence, and withdrawal.

Methods:

Leaves of *L. sativa* underwent methanolic extraction using a Soxhlet apparatus. Escalation of ethanol intake was induced in 30 male C57BL/6J mice via the two-bottle choice drinking sessions with chronic intermittent ethanol vapor exposure. The mice were divided into six groups, randomly selected as part of the ethanol-dependent or alcohol-naïve negative control, positive control (Lemborexant), or intervention group (*Ls*LME at 250, 500, and 750 mg/kg) administered orally five days per week. The effects of *Ls*LME in reducing blood ethanol concentration were measured using enzymatic oxidation of blood samples; oral ethanol intake was also quantified. The tail suspension and digging tests assessed behavioral incidences triggered by affective disturbance. Anxiety and nocifensive responses were also explored through elevated plus maze test and thermal pain screening.

Results:

A significant decrease ($p = 0.003$) was quantified in the ethanol intake and blood ethanol concentration after *Ls*LME treatment. Accordingly, all *Ls*LME concentrations also consistently improved the behavior of the mice compared to the effects of ethanol exposure and withdrawal in the negative and positive control groups.

Conclusions:

The results of this study suggest a marked reversal of ethanol dependence and improved behavioral and neurologic manifestations in mice. Such changes in behavior were assessed by considering indexes of withdrawal, locomotion, and anxiety-like behavior compared to the positive control. Overall, the study contributes a novel and natural treatment for AUD.

KEYWORDS: Alcohol use disorder; C57BL/6J mice; Dual orexin receptor antagonism; *Lactuca sativa* var. *longifolia*

PP-0805001-O

2,4′-Dihydroxybenzophenone Inhibits Lipopolysaccharide-Induced Inflammatory Response by Inhibiting Toll-like Receptor 4/Myeloid Differentiation Factor 2-Mediated Mitochondrial Reactive Oxygen Species Production

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ABSTRACT

Introduction:

2,4′-Dihydroxybenzophenone (DHP) is extracted from the herbs of *Garcinia xanthochymus*. However, its biochemical properties have not been extensively studied.

Objectives:

This study evaluated DHP's potential to mitigate lipopolysaccharide (LPS)-induced inflammatory responses and endotoxin shock in RAW 264.7 macrophages and zebrafish larvae.

Methods:

In this study, we used LPS microinjection in zebrafish larvae and evaluated whether DHP treatment could mitigate LPS-induced inflammatory response by evaluating the proinflammatory gene expressions, macrophage, and neutrophil recruitment to inflammatory sites. Furthermore, we used RAW 264.7 macrophages to assess the anti-inflammatory effect of DHP by evaluating the proinflammatory mediator production and gene expressions as well as the downregulation of Toll-like Receptor 4 (TLR4)/ myeloid differentiation factor 2 (MD2) signaling pathway in LPS-induced conditions. Moreover, we evaluated whether DHP could inhibit LPS-mediated mitochondrial reactive oxygen species (mtROS) production by inhibiting the TLR4/MD2 signaling pathway.

Results:

DHP significantly reduced mortality and morphological abnormalities in LPS-microinjected zebrafish larvae subjected to LPS-microinjection. Moreover, DHP significantly lowered the expression of proinflammatory genes such as inducible nitric oxide synthase (*iNOS*), tumor necrosis factor-α (*TNF-α*), and interleukin-12p35 (*IL-12p35*), as well as the migration of macrophages and neutrophils to inflammatory sites in LPS-microinjected zebrafish larvae. Further, we discovered that DHP suppressed the LPS-induced inflammatory response in RAW 264.7 macrophages by downregulating pro-inflammatory mediators. Molecular docking data suggested that DHP could bind to the hydrophobic pocket of MD2 and prevent TLR4 and MD2 dimerization. Therefore, we noticed that DHP downregulated the TLR4-mediated intracellular signaling pathway. Moreover, DHP mitigated mtROS production during LPS-induced inflammatory response in RAW 264.7 macrophages and zebrafish larvae while preserving mitochondrial membrane potential.

Conclusions:

These results revealed that DHP reduced LPS-induced inflammation and endotoxin shock *in vitro* and *in vivo* via binding to the TLR4/MD2 receptor complex, hence lowering mtROS generation.

KEYWORDS: 2,4′-Dihydroxybenzophenone; Endotoxic shock; TLR4/MD2; mtROS

PP-0805002-O

Peperomia pellucida Extract Ameliorates Secondhand Smoke Exposure-Induced Lung Fibrogenesis via Regulation of Matrix Metalloproteinase, Inflammatory, and Fibrotic Cytokines: A Pre-Clinical Study

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ABSTRACT

Introduction:

Secondhand smoke exposure (SHSE) induces inflammatory pulmonary disorders that lead to pulmonary fibrogenesis. This process involves dysregulation of matrix metalloproteinase, inflammatory, and fibrotic cytokines. *Peperomia pellucida*, an Indonesian herbal plant, has been reported to possess anti-inflammatory activity.

Objectives:

In this study, we aimed to evaluate the effect of *P. pellucida* extract on SHSE-induced pulmonary fibrogenesis.

Methods:

We utilized a post-test-only control group design and randomly divided 20 male Wistar rats into three groups (CON, SHS, and SHS+PP). Group CON was exposed to smoke-free room air. Group SHS and SHS+PP received daily SHSE (1 cigarette/rat/day) for four weeks. After cessation of SHSE, group SHS received normal saline, while group SHS+PP received daily doses of *P. pellucida* extract (400 mg/kg body weight [BW]/day, per oral) for four weeks. Finally, after eight weeks of interventions, the animals were euthanized, and the lung tissues were taken out. Matrix metalloproteinase-8 (MMP-8), tumor necrosis factor-alpha (TNF-α), transforming growth factor-beta1 (TGF-β1), and collagen-1 expression in the lung tissues were assessed using immunohistochemical techniques. The degree of SHSE-induced lung injury was evaluated using hematoxylin-eosin staining. Statistical analysis was carried out with a one-way analysis of variance (ANOVA) test, and a significant level of 0.05 was determined.

Results:

Increased MMP-8, TNF-α, TGF-β1, and collagen-1 expression in the group receiving SHSE were evidence of pulmonary fibrogenesis. Daily administration of *P. pellucida* extract at 400 mg/kg BW for four weeks led to a marked reduction in the above parameters compared with the SHSE-treated group ($p < 0.05$). Histomorphological analysis of the SHSE-received group showed a considerable lung injury with alveolar emphysema and wall thickening as well as infiltration in the alveoli, bronchioles, and vasculature. These alterations were alleviated with *P. pellucida* extract.

Conclusions:

This pre-clinical study showed that *P. pellucida* extract ameliorates SHSE-induced pulmonary fibrogenesis by regulating matrix metalloproteinase, inflammatory, and fibrotic cytokines.

KEYWORDS: *Peperomia pellucida*; Pulmonary fibrosis; Secondhand smoke

PP-0805003-O

Increasing of Endogenous Antioxidant Activity in Hyperlipidemic Rats Treated by *Zingiber cassumunar* Roxb., *Cinnamomum burmanii* and *Glycine max* Based Functional Powder Beverage

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ABSTRACT

Introduction:

Hyperlipidemia is a condition which lipids in the blood are present in a high level, causing a variety of other diseases. This condition also causes an increase in free radicals, resulting in oxidative stress and leading to degenerative disease. *Zingiber cassumunar* Roxb., *Cinnamomum burmanii*, and *Glycine max* were reported their potency in inhibiting oxidative stress. Formulating several herbs into drink form will provide the advantage of being easy to use, thereby increasing therapeutic effects.

Objectives:

The objective of studies is to formulate *Zingiber cassumunar* Roxb., *Cinnamomum burmanii*, and *Glycine max* in functional powdered beverages to prevent oxidative stress in high-fat diet rats.

Methods:

Functional powder beverage (FPB) consists of *Zingiber cassumunar* powder, *Cinnamomum burmanii,* and *Glycine max* (75:23 2). The studies were carried out using 30 Wistar rats divided into 6 groups including normal rats without any treatment; a negative control was induced with high-fat diet rats (HFD) and followed by normal feeding. The treated groups were induced by HFD and followed by FPB with doses of 1000, 1500, and 2000 mg/kg BW. The positive control was treated with commercial smoothie drink1 (CSD1). The HFD induction was carried out during the study for 28 days, and the treatment of FPB was started at day 15 after HFD induction for 14 days. After completion of treatment, the animal was sacrificed and the liver was homogenized to check the activity of endogenous antioxidants.

Results:

The study found that the activity of superoxide dismutase (SOD), catalase (Cat), and glutathione peroxidase (GSH-Px) increase significantly in group treatments compared to the negative control group ($p < 0.05$). The malondialdehyde (MDA) level, an oxidative metabolite was also found to decrease following treatment of FPB ($p < 0.05$).

Conclusions:

The results concluded that the formulation of three herbals including *Zingiber cassumunar* Roxb., *Cinnamomum burmanii,* and *Glycine max* produced a functional powdered beverage with antioxidative activities.

KEYWORDS: Catalase; *Cinnamomum burmanii*; Endogenous antioxidant; Glutathione peroxidase; *Glycine max*; Malondialdehyde; SOD; *Zingiber cassumunar* Roxb.

PP-0806001-O

Fermented Oyster Extract Promotes Osteoblast Differentiation and Bone Formation via Wnt/β-Catenin Signaling Pathway

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ABSTRACT

Introduction:

The Pacific oyster, *Crassostrea gigas*, is renowned for its nutritional value. In recent research, fermented extract of *Crassostrea gigas* (FO) was shown to hinder ovariectomy-induced osteoporosis by suppressing osteoclastogenesis. However, the understanding of FO's impact on osteogenesis remained unclear.

Objectives:

To address the FO's effect on osteogenesis, mouse pre-osteoblast MC3T3-E1 cells, human osteosarcoma MG-63 osteoblast-like cells, and zebrafish larvae were studied.

Methods:

The cell-related studies were followed by MTT activity assay, flow cytometry analysis, alkaline phosphatase activity (ALP), alizarin red staining RT-PCR, protein extraction, western blot analysis, immunostaining for RUNX2 and OSX, luciferase assay and zebrafish larva were subjected to bone mineralization. Finally, the adult zebrafish were checked with fin generation.

Results:

FO increased mitochondrial activity from days 1 to 7 but led to a gradual decrease in MC3T3-E1 cell count without altering viability, suggesting stimulation of differentiation. FO significantly (*** $p < 0.001$ versus untreated group (UT) elevated the expression of osteoblast marker genes, including runt-related transcription factor 2 (*mRUNX2*), alkaline phosphatase (*mALP*), collagen type I α1 (*mCol1α1*), osteocalcin (*mOCN*), osterix (*mOSX*), bone morphogenetic protein 2 (*mBMP2*), and *mBMP4* in MC3T3-E1 cells accompanied by a significant increase in ALP activity for 100 µg/mL of FO and positive control dexamethasone (DEX). FO also significantly (** $p < 0.01$ versus UT) enhanced the nuclear translocation of transcription factors, including RUNX2 and OSX in vitro, along with enhanced bone mineralization markers such as *zRUNX2a, zRUNX2b, zALP, zCol1a1, zOCN, zBMP2*, and *zBMP4* in zebrafish larvae for 100 µg/mL of FO and positive controlβ-glycerophosphate (GP). Furthermore, FO significantly promoted tail fin regeneration in adult zebrafish, respectively at 6 (*** $p < 0.001$ versus UT) and 12 post-day amputation (** $p < 0.01$ versus UT) and upregulated β-catenin expression and Wnt/β-catenin luciferase activity in a dose-dependent manner. Inhibition of the Wnt/β-catenin pathway attenuated FO-mediated bone mineralization in zebrafish larvae, indicating its dependence on this pathway.

Conclusions:

Altogether, the findings summarize that the supplementation of FO is a remedy for enhancing osteogenesis.

KEYWORDS: Bone formation; *Crassostrea gigas*; β-glycerophosphate; Oyster; Wnt/β-catenin

PP-0806002-O

Acertannin: A Promising Anti-inflammatory Agent which Attenuates LPS-Induced Inflammation by Disrupting the Binding of LPS to the TLR4/MD2 Receptor Complex and Activating Nrf2-Mediated HO-1 Activation

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ABSTRACT

Introduction:

Acertannin (ACTN), a polyphenol, is well-known for its antioxidant and anticancer properties. Nevertheless, the molecular-level anti-inflammatory activity of ACTN remains unexplored.

Objectives:

Therefore, this study endeavors to investigate whether ACTN mitigates the LPS-induced inflammatory response by inhibiting nuclear factor-kappa B (NF-κB) activation and ROS production.

Methods:

To evaluate anti-inflammatory effects of ACTN and its signaling pathway, the expression of proinflammatory markers was measured in LPS-stimulated RAW264.7 macrophages using NO assay, western blotting, reverse-transcription polymerase chain reaction (RT-PCR), and immunostaining. Moreover, in LPS-microinjected zebrafish, we investigated whether ACTN reduces nitric oxide and reactive oxygen species (ROS) production. Molecular docking was used to predict the binding site of ACTN to the TLR4/MD2 complex.

Results:

ACTN exerted significant attenuation of LPS-induced proinflammatory cytokines and mediators by inhibiting NF-κB activation. Additionally, it effectively reduced LPS-induced ROS production and activated nuclear factor E2-related factor 2 (Nrf2) along with heme oxygenase-1 (HO-1). Notably, the inhibition of HO-1 by zinc protoporphyrin markedly reversed ACTN's anti-inflammatory and antioxidant effects in LPS-stimulated zebrafish larvae. Molecular docking predictions further elucidated ACTN's mechanism, demonstrating its formation of a conventional hydrogen bond with LYS91 in myeloid differentiation factor-2 (MD2), thereby interrupting LPS binding to the Toll-like receptor 4 (TLR4)/MD2 complex. Moreover, ACTN established various non-covalent bonds, including π-π stacking, π-alkyl, unfavorable donor–donor, and van der Waals interactions with the TLR4/MD2 complex. This binding effectively hindered the recruitment of intracellular adaptor proteins, such as myeloid differentiation primary response 88 (MyD88) and interleukin-1 receptor-associated kinase 4 (IRAK4), consequently diminishing NF-κB-mediated inflammatory responses.

Conclusions:

ACTN inhibit the MyD88-IRAK4-NF-κB signaling pathway, resulting in pronounced anti-inflammatory effects. Furthermore, ACTN action extends to boosting Nrf2-HO-1 levels, thus reducing LPS-induced ROS production and inhibiting inflammatory responses.

KEYWORDS: Acertannin; Anti-inflammation; ROS; TLR4/MD2

PP-0806003-O

Melanogenesis Inhibitory Activity of Polyphenol Enriched Fraction from *Tagetes erecta* L. Flower and Its Key Components

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ABSTRACT

Introduction:

This research underscores *Tagetes erecta* L. (TE) potential as a natural product to regulate melanin biosynthesis, implications for treating hyper melanin pigmentation-related disorders, and its application in the cosmetics industry. TE contains key phenolic compounds: patulitrin, quercetagetin, kaempferol, patuletin, and isorhamnetin.

Objectives:

This study investigates the effect of TE as a prospective inhibitor of melanogenesis. *In vitro* (B16F10 melanoma cells) and *in vivo* (zebrafish) experiments evaluate TE's capacity to hinder α-melanocyte stimulating hormone (α-MSH)-triggered melanin synthesis.

Methods:

To evaluate anti-melanogenic potential of TE, α-MSH induced B16F10 cells and α-MSH stimulated zebrafish larvae were used briefly, B16F10 cells were stimulated with α-MSH (500 ng/mL) for 24 h and treated varying concentrations of TE (0 - 25 µg/mL) and evaluated melanin production and responsible gene and protein expressions after 48 h and 72 h respectively. In zebrafish model 3-day post (3 dpf) fertilized larvae depigmented and stimulated the pigmentation by treating α-MSH (1 µg/mL) for 24 h and treated the TE (0 - 40 µg/mL) for 72 h and evaluated the pigmentation. Further for each major components, 0 - 25 µM concentration series were used to evaluate melanin production *in vitro* and *in vivo*.

Results:

TE effectively suppresses extracellular and intracellular melanin biosynthesis by obstructing the cyclic adenosine monophosphate (cAMP)–cAMP response element-binding protein (CREB)–microphthalmia-associated transcription factor (MITF)–tyrosinase signaling pathway, a pivotal regulator of melanogenesis. Molecular docking demonstrates TE components' interaction with the melanocortin 1 receptor, suggesting their potential as melanin biosynthesis inhibitors. However, surprisingly direct binding activity of key components of TE is unable to bind with melanocortin 1 receptor (MC1R). Withing those key components patuletin shows significant inhibitory activity both *in in vitro* and *in vivo*.

Conclusions:

In conclusion, the study highlights TE's anti-melanogenic properties, emphasizing its potential as a safe and natural ingredient for skin-whitening, operating through the inhibition of the cAMP–CREB–MITF–tyrosinase intracellular signaling pathway, and advancing our understanding of managing hyperpigmentation-associated conditions.

KEYWORDS: α-MSH; Melanogenesis; Phenolic compounds; *Tagetes erecta* L.; Zebrafish larvae

PP-0807001-O

Investigating the Effect of Pitavastatin on Chemosensitive and 5-Fluorouracil Resistant Colorectal Cancer Cell Lines

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ABSTRACT

Introduction:

Colorectal cancer (CRC) is the third most commonly diagnosed cancer and is the second cause of cancer-related death worldwide. The overall response rate of CRC to 5-Fluorouracil (5-FU), the first-line chemotherapeutic drug for advanced CRC, is still very low due to the intrinsic or acquired chemoresistance in exposure to 5-FU. Accumulation of lipid and cholesterol are the prominent characteristics of tumors that play a role in carcinogenesis and malignant development of cancers. Due to the lipid and cholesterol-lowering properties, pitavastatin exhibits cytotoxic effect in decreasing cancer cell viability in breast cancer and glioblastoma.

Objectives:

In this study, the resistance of 5-FU in CRC cells was mimicked to assess whether pitavastatin reversed the resistance of CRC cells to 5-FU and compared this proliferation inhibitory effect to CRC chemosensitive cells. Besides, to further investigate the underlying synergistic mechanisms of the combined pitavastatin and 5-FU treatment, we examined their efficacy in inducing endoplasmic reticulum (ER) stress and apoptosis, along with triggering autophagic flux.

Methods:

The cytotoxic effect of pitavastatin and the combined therapy with 5-FU were investigated by SRB assay and clonogenic assay. Then, their effect on ER stress, apoptosis, and autophagy flux were analyzed using Western Blot to examine the protein expression levels of PERK, p-PERK, p-eIF2α, CHOP, PARP, BAX, p62, LCBA/B at varying concentrations of pitavastatin and 5-FU.

Results:

Our study has demonstrated that pitavastatin has could suppress both chemosensitive and 5-FU resistant colorectal cancer cells via triggering autophagy flux and the induction of both apoptosis and ER stress.

Conclusions:

Our findings position pitavastatin as a potential therapeutic option for advanced CRC cases especially those resistant to 5-FU, holding promise for future clinical applications.

KEYWORDS: Apoptosis; Autophagy; Colorectal cancer; 5-Fluorouracil resistance; Pitavastatin; Endoplasmic reticulum stress

PP-0807002-O

Characterization of the Interaction between Androgen Receptor and the Large Subunit of General Transcription Factor IIF in Prostate Cancer

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ABSTRACT

Introduction:

Prostate cancer is the most common male cancer worldwide, which involved the role of androgens and androgen receptor (AR). After an initial positive response to androgen deprivation therapy, most of the patients likely develop to a more severe stage termed castration-resistant prostate cancer (CRPC). In CRPC, the AR (a 110-kDa protein, member of the steroid receptor family) is constitutively active even in the low level of androgens. Studies showed that the AR activity in CRPC relies mainly on the interaction between its transactivation function 1 domain (AF1) and the large subunit of transcription factor IIF (RAP74), which is weak and transient. However, a triple serine motif ^{430}SSS^{432} on AF1, has the potential to be multiply phosphorylated and might exert a critical enhance on the interaction.

Objectives:

Our main objective is to investigate the effect of phosphorylation in the triple motif of AR on the interaction with the RAP74.

Methods:

AF1 and RAP74 were expressed and purified using different chromatography techniques, and secondary structures were characterized by circular dichroism. The interaction between the two proteins was characterized by fluorescence spectroscopy (FS), Bio-layer interferometry (BLI), MicroScale Thermophoresis (MST), and Nuclear magnetic resonance (NMR). The triple serine motif ^{430}SSS^{432} on AF1 were mutated to phosphomimetic residue and the interaction with RAP74 were compared to the wild-type protein to study the effect.

Results:

AF1 and RAP74 were successfully expressed in *E. coli* and purified using affinity, anion exchange, and size exclusion chromatography. Secondary structure studied by circular dichroism reveals that AF1 is a disordered protein while RAP74 exists in highly folded state. The result from FS and NMR confirmed the interaction between the two proteins, their binding site and affinity. Finally, if the triple serine motif ^{430}SSS^{432} on AF1 were mutated to phosphomimetic residue, the binding affinity was remarkably increased.

Conclusions:

Overall, the data suggest that phosphorylation might be a possible mechanism for regulation of AR activity in CRPC. Further studies are needed to confirm the exact mechanism and developing compounds which interfere with this interaction can be exploited as a novel treatment strategy in CRPC patients.

KEYWORDS: AF1-RAP74 interaction; Androgen receptor; Prostate cancer

PP-1002001-O

Evaluation of Steroid Hormone-Induced Changes in Blood Biochemical Parameters in White Mice

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ABSTRACT

Introduction:

Exogenous hormones through food may accumulate in edible tissues, potentially increasing the health hazard to consumers. Their effects on metabolic disorders at low concentrations are poorly known.

Objectives:

The aim of this study was to evaluate the effects of testosterone (TE), 17β-estradiol (E2) and melengestrol acetate (MGA) residues on some blood parameters to elucidate metabolic disorders in white mice.

Methods:

112 *Swiss Albino* mice were divided into 4 groups (16 female and 12 male mice/group) including control group, TE-group, E2-group, and MGA-group. Mice in TE, E2, and MGA groups were received orally 100 µg/kg of TE, 100 µg/kg of E2 and 50 µg/kg of MGA once daily, respectively. After 5 weeks, half of the mice were sacrificed, and the other half stopped receiving exogenous hormones for a week. Blood samples were collected at weeks 5 and 6 for biochemical parameters assessment.

Results:

After oral hormone administration for 5 weeks, plasma AST, cholesterol, triglycerides, and total protein increased, while HDL-cholesterol decreased in TE-group compared to the control group ($p < 0.05$). Cholesterol and triglycerides of TE-female group were different from TE-male group (cholesterol (mg/dL): 140.55 ± 9.11 *vs* 113.57 ± 2.69; triglycerides (mg/dL): 103.22 ± 6.91 *vs* 139.14 ± 11.64, $p < 0,05$). AST activity of E2-group and glucose of MGA-group increased compared to the control group (AST (U/L): 145.76 ± 8.71 *vs* 72.99 ± 3.82; glucose (mg/dL): 327.03 ± 9.65 *vs* 232.87 ± 7.57, $p < 0.05$). After stopping hormone for 1 week, cholesterol, triglycerides, and total protein continued to increase, while HDL-cholesterol decreased insignificantly in TE-group compared to the control group. AST activity of E2-group and glucose of MGA-group continued to increased compared to the control group ($p < 0.05$). HDL-cholesterol of MGA-female group were different from MGA-male group (53.60 ± 2.65 *vs* 65.58 ± 2.81 mg/dL, $p < 0.05$).

Conclusions:

The findings of this study may contribute to the warning that long-term exposure to oral steroid hormones at low concentrations can cause clinical metabolic disorders.

KEYWORDS: 17β-estradiol; Biochemical parameters; Melengestrol acetate; Swiss Albino; Testosterone

BB-0602001-O

Association Between Shorter Telomeres and Risk of Non-Communicable Diseases

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ABSTRACT

Introduction:

Non-communicable diseases (NCDs) are a significant contributor to global mortality and disability, accounting for 63% of total deaths worldwide. The diseases are characterized by an accelerated ageing phenotype, caused by various factors, especially loss of telomere capping. Leukocyte telomere length (LTL) is regarded as a reliable indicator for predicting age-related pathological conditions including cardio-metabolic diseases.

Objectives:

This study aimed to examine LTL in Thai patients with NCDs compared to age-matched healthy volunteers and determine whether LTL was associated with risks of NCDs.

Methods:

A total of 252 NCDs patients, diagnosed with 147 those with hypertension, 80 those with diabetes mellitus (DM), 18 those with cardiovascular diseases (CVDs), and 7 those with a wide range of cancers, and 20 age-matched healthy controls were recruited. Relative telomere length in blood leukocytes of NCDs patients and age-matched healthy controls were measured using quantitative real-time polymerase chain reaction. Based on the median distribution of LTL in healthy volunteers, study participants were further categorized into those with shorter LTL (<1.894, n=186) and those with longer LTL (≥1.894, n=86).

Results:

Compared to age-matched healthy controls, LTL was observed to be significantly shorter in patients with hypertension, DM, and CVDs (P=0.0007, P=0.0076, P=0.0134, respectively). In patients with cancers, LTL was found to be longer than that in age-matched healthy controls. However, the observed difference did not reach statistical significance. After adjustments for age and gender, individuals with shorter LTL exhibited a significantly greater risk of DM, with a 2.08-fold increase compared to those with longer LTL (OR=2.083, 95% CI: 1.038, 4.178, P=0.0390). Conversely, there were no significant associations between shorter LTL and risks of hypertension, CVDs, and cancers.

Conclusions:

Our findings uncovered a direct link between shorter telomeres in blood leukocytes and DM risk. LTL could serve as an ageing biomarker for predicting development of NCDs.

KEYWORDS: Telomere length; Ageing biomarker; Non-communicable diseases (NCDs); Diabetes mellitus (DM)

BB-0602002-O

Distribution of *PTB1B* Gene Polymorphism (467t>C) of Type 2 Diabetes Mellitus Patients in Indonesia

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ABSTRACT

Introduction:

Type 2 diabetes mellitus is a metabolic disease that causes hyperglycemia, while insulin target cells experience a decrease in the amount of glucose so that disrupting cell performance and function. Protein tyrosine phosphatase-1B (*PTP1B*) inhibits insulin signaling when *PTP1B* overexpressed and plays a role in insulin resistance. PCR-RFLP test can detect *PTP1B* gene polymorphism distribution.

Objectives:

To determine the impact of the *PTP1B* gene Single Nucleotide Polymorphism (SNP) 467T>C on type 2 diabetes mellitus therapy by analyzing the distribution of the *PTP1B* gene polymorphism (467T>C) in type 2 diabetes mellitus patients.

Methods:

The study was experimental study using 35 Indonesian samples for single study with inclusion criteria positive type 2 diabetes mellitus and 18-75 aged. We are isolate and purifying genomic DNA patients with type 2 diabetes mellitus patients from venous fresh blood sample. *PTP1B* gene SNP (467T>C) the genotyping was performed using PCR-RFLP with AvaI retriction enzyme and visualized using gel electrophoresis. The data performed using Chi-Square analysis and Hardy-Weinberg Equilibrium.

Results:

There is no association between genotype frequency of the *PTP1B* variant with the population and 467T>*CPTP1B* variants displayed a non-significant (P>0,05) correlation with type 2 diabetes mellitus. The absence of the *PTP1B* gene polymorphism 467T>C in type 2 diabetes mellitus patients is not linked to the condition.

Conclusions:

The absence of significant association *PTP1B* gene polymorphism (467T>C) in type 2 diabetes mellitus sufferers due to only one population in Indonesian. There needs to be research in a wide community and difference population with a large sample of type 2 diabetes mellitus patients.

KEYWORDS: Type 2 diabetes mellitus; *PTP1B*; Polymorphism; PCR-RFLP

BB-0704001-O

Unveiling of a Large Plasmid Sequence in Extensively Drug-Resistant *Acinetobacter baumannii* ST25 Using Hybrid Genome Assembly Approach

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ABSTRACT

Introduction:

Mobile genetic elements (MGEs) play a key role in spreading resistance genes in carbapenem-resistant *Acinetobacter baumannii* (CRAB), a critical pathogen with alarming rates of antimicrobial resistance. However, there is still limited knowledge about the plasmids in clinical isolates carrying resistance genes. Isolates of sequence type 25 (ST25) often contain large plasmids, some of which harbor resistance genes. Several isolates in this lineage have also been identified in Thailand. One such isolate, MTC0619, had its genome previously analyzed using short-read sequencing, which detected a plasmid fragment.

Objectives:

In this study, we used a hybrid assembly method to fully sequence the plasmid from isolate MTC0619.

Methods:

Whole-genome sequencing was performed using NovaSeq (Illumina®) and MinION (Oxford Nanopore Technologies®) sequencers, achieving approximately 250-fold and 40-fold coverage, respectively. Both the short-read and long-read sequence data were utilized for hybrid de novo assembly, and the resulting whole-genome sequence was employed for downstream bioinformatics analyses.

Results:

Two circular contigs were generated from hybrid genome assembly, representing the chromosome (4,064,032 bp) and a plasmid (161,653 bp). The plasmid (pMTC0619) harbored genes encoding resistance to tetracyclines (*tetB*) and sulfonamides (*sul2*), along with several aminoglycosides modifying enzymes. Majority of these resistance genes were clustered within a region associated with transposons Tn6172 and Tn6183, previously identified in *A. baumannii* plasmids. Sequence analysis revealed a high similarity between the plasmid backbone of pMTC0619 and that of the previously reported pCl107, albeit with some missing regions and variations in a few insertion sequence types. Additionally, pMTC0619 carried a type IV secretion system and the *higA/higB* toxin-antitoxin system, indicating its potential for conjugative transfer and plasmid maintenance.

Conclusions:

The analysis of pMTC0619 sequence highlights its potential role in spreading resistance genes among CRAB isolates. Further investigation could elucidate its clinical significance, including any additional functions it might offer for bacterial survival and evolution of resistance phenotype.

KEYWORDS: Antimicrobial resistance; *Acinetobacter baumannii*; ST25; Hybrid assembly; Plasmid

BB-0704002-O

Investigation Biofilm Formation and Heterogeneity Resistance in *Acinetobacter baumannii* Clinical Strains through a Single-Cell Approach

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ABSTRACT

Introduction:

Acinetobacter baumannii is a commensal and opportunistic pathogen that has emerged as a problematic hospital pathogen due to its multiple antibiotic resistances. Biofilm-associated strains and overexpression of efflux pumps that extrude antibiotics have been described as an essential mechanism causing antibiotic resistance in most clinical isolates.

Objectives:

Our study aimed to investigate the biofilm-formation capability and efflux pump activity at the phenotypic and single-cell levels under non-induced and induced antibiotic conditions among 65 clinical isolates.

Methods:

We developed a protocol-based flow cytometry (FC) to monitor the bacterial growth rate to determine the MIC values of 6 antibiotics, and micro dilution was used as the reference method. Phenotypic change of planktonic and biofilm phases under treatment exposures on glass beads was analyzed by FC using propidium iodide (PI) as a membrane permeability proxy. Accumulation and efflux of Ethidium bromide (EtBr), as efflux pump subtract, were studied at the subpopulation level under limiting energy supply and in the presence of the efflux pump inhibitor, carbonyl cyanide m-chlorophenyl hydrazone (CCCP).

Results:

The most effective antibiotics against *A. baumannii* were tetracycline and cefoperazone-sulbactam, with 45 % and 50 % resistance rates, respectively. Meanwhile, the highest resistance rate was observed in ciprofloxacin at 85 %. The rates of antibiotics cefipime, meropenem, and amikacin were 75 %, 80 %, and 80 %, respectively. The fraction of higher PI subpopulation significantly increased in tetracycline-resistant strains after four cycles of antibiotic treatment. Thirty-five strains removed more than 60% of the preloaded EtBr, 26 removed 30-60%, and four removed less than 30%. We observed heterogeneity efflux pump activity in 17 strains. Ciprofloxacin slightly enhanced (from 5.66 to 11.66%) the efflux pump activity but strongly reduced (9 times) the coefficient of variation of accumulated EtBr between cells in the population.

Conclusions:

These results suggest that a single-cell approach is a promising method for rapidly assessing drug pump efflux activity, screening efflux pump inhibitors and anti-biofilm agents, and studying the causes of heteroresistance.

KEYWORDS: *Acinetobacter baumannii*; Single-cell; Efflux pump; Biofilm; Heteroresistance; Antibiotic resistance

BB-0712001-O

Antifungal Activity of Ointment Preparations Containing Frankincense Resin Ethanol Extract

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ABSTRACT

Introduction:

Candidiasis infection by *Candida albicans* remains a serious health issue, potentially leading to fatal systemic infections. Investigations into the bioactive compounds found in frankincense resin have revealed promising attributes as antimicrobial, antioxidant, anti-inflammatory, and antiseptic agents. However, there remains a scarcity of studies focusing on its antifungal properties and formulation development. Ointment preparations are commonly used as antifungal agents, including for candidiasis infections. Besides their ease of application, ointments are also more commercially economical and stable in storage. Therefore, this study developed an optimal and effective commercial antifungal ointment preparation against *Candida albicans*.

Objectives:

This study aims to obtain an optimal formula for antifungal ointment utilizing frankincense resin ethanol extract (FREE) and evaluate its efficacy against *Candida albicans*.

Methods:

Frankincense resin was macerated in 96% ethanol (1:1 w/v). Optimization and determination of the optimal formula were conducted using the Simplex Lattice Design (SLD) method based on variations in the vaseline-to-paraffin ratio. The antifungal potency of FREE and the optimal ointment were evaluated using the disc diffusion method to establish the minimum inhibitory concentration (MIC) and the macro dilution method to ascertain the minimum bactericidal concentration (MBC).

Results:

MIC and MBC values for the FREE were identified as 25 mg/ml and 33.33 mg/ml, respectively. Physical and stability evaluations of the ointment formulations revealed that the F1 formula comprising a vaseline-to-paraffin ratio of 8:1 was the optimal formula, with the values of spread ability (5.12 ± 0.05 cm), adhesion (4 seconds), pH (5.5) and viscosity (11.943 ± 383 cPs). The optimal ointment formulation with FREE concentrations of 25 mg/mL, 125 mg/mL, and 250 mg/mL resulted in inhibition zone diameters of 1.91 ± 0.03 cm, 2.34 ± 0.04 cm, and 2.44 ± 0.05 cm, respectively.

Conclusions:

The optimal ointment formulation containing FREE, with a Vaseline: paraffin ratio of (8:1), effectively inhibited *Candida albicans* growth.

KEYWORDS: Antifungal; *Candida albicans*; Candidiasis; Frankincense; Ointment; Formula

BB-0703001-O

Conditional Antimicrobial Peptide Therapeutics

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ABSTRACT

Introduction:

Antimicrobial resistance represents a global threat that calls for development of new antibiotics and alternatives. Antimicrobial peptides (AMPs) represent a promising alternative to antibiotics with diverse mechanisms of action including bacterial membrane lysis, biofilm disruption, and immunomodulation. However, systemic application of AMPs is hampered by short circulation time and toxicity, limiting their application to topical formulation.

Objectives:

We aimed to develop a conditional therapeutic for formulation of AMPs to address the issues of short circulation time and toxicity with systemic administration.

Methods:

We formulated an albumin-binding domain (ABD)-AMP conjugate as a long-circulating conditional AMP therapeutic with a masked activity that can be conditionally activated by proteases specific to the site of bacterial infection. To synthesize the conjugate, ABD carrier domain was recombinantly expressed in *E. coli.* BL21(DE3) and conjugated to chemically synthesized AMP. *In vivo* conjugate activation was evaluated in a murine PAO1 lung infection model. In brief, fluorescently labeled ABD-AMP conjugate was intravenously administered to the infected mice 6 h post infection. The mice were euthanized 2 h after to collect and homogenize organs for quantification by SDS-PAGE analysis. Toxicity of the conjugate was assessed based on serum analysis and histology of organs harvested from non-infected mice treated with the conjugate for 24 h.

Results:

In the lung infection model, we demonstrated that our ABD-AMP conjugate delivered more active AMP to the infected lungs compared to the free AMP treatment. In addition, the ABD-AMP conjugate minimally released active AMP in other off-target organs (liver, spleen, and kidney) leading to improved safety profile of the conjugate over the free AMP.

Conclusions:

Our report on ABD-AMP conjugate and its optimization pipeline provides a framework for development of conditional therapeutics to treat infection as well as other diseases.

KEYWORDS: Nanomedicine; Conditional therapeutic; Antimicrobial peptide; Protease; Albumin

PD-0102001-O

Effect of Processing Parameters on Characteristics of Biodegradable Extended-Release Microspheres Containing Leuprolide Acetate

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ABSTRACT

Introduction:

Biodegradable microsphere containing leuprolide acetate, a novel drug delivery system using PLGA polymer as a carrier, is used for the treatment of endometriosis, prostate cancer, central precocious puberty, and uterine fibroids. Previous studies in the world have proven that: a small modification in technical parameters of the preparation could result in significant differences in the physicochemical properties of PLGA microspheres (i.e., particle size, particle size distribution, loading capacity, and drug release).These changes directly lead to the failure of the pharmaceutical equivalence and bioequivalence trials between test and reference products.

Objectives:

Poly(lactic-co-glycolic acid) microsphere containing leuprolide acetate - an extended-release drug delivery system whose characteristics (i.e. loading capacity, particle size and initial burst phase) depend on processing parameters.

Methods:

Microspheres were prepared by water/oil/water double-emulsion solvent evaporation method; drug content in microspheres was determined by high-performance liquid chromatography (HPLC); peptide concentration in the release medium was measured by fluorescence spectrometer; particle size and particle size distribution were measured by laser diffraction method; interaction between poly(lactic-co-glycolic acid) (PLGA) and leuprolide acetate (LA) was determined by differential scanning calorimetry (DSC) and Fourier-transform infrared spectroscopy (FTIR).The surface morphology of microspheres was observed by ultra-high resolution scanning electron microscope (SEM).

Results:

DSC curves and assay results proved LA adsorption ability of PLGA film. FTIR spectra proved ionic interactions between positive charged LA molecules and negative charged PLGA chains in phosphate buffer pH 7.4. Ten process parameters including LA concentration (mg/mL), PLGA concentration (mg/mL), W1/O ratio (v/v), the first homogenization time (min), the first homogenization speed (rpm), O/W2 ratio (v/v), PVA concentration of W2 phase (mg/ml), the second homogenization time (s), the volume of diluted solution (ml) and nitrogen aeration time (min) have impacts on loading capacity, particle size and initial burst phase of microspheres.

Conclusions:

Process parameter modification contributes to small microspheres with high loading capacity and controlled initial burst phase.

Keywords: Biodegradable extended-release microspheres; Double emulsion solvent evaporation; Accelerated release; Initial burst phase, Leuprolide acetate; Poly (lactic-co-glycolic acid) (PLGA)

PD-0102002-O

A Two-Step Design of Experiments Approach to Investigate the Simultaneous Effects of Ion-Pairing and Chemical Enhancers to Improve the Permeability of Lornoxicam in a Topical Hydrogel Patch

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ABSTRACT

Introduction:

A two-step experimental design was used to develop a lornoxicam (LOR)-loaded topical hydrogel patch.

Objectives:

We specifically focused on the simultaneous effect of the ion pair formation agent (triethanolamine [TEA]) and the chemical enhancer (cremophor RH40 [RH40]) on flux and conducted physicochemical studies and skin physiology assessments to obtain further information.

Methods:

Drug-in-adhesive patches were fabricated using a micrometer-adjustable film applicator. The applied Design of Experiments (DoE) approach consisted of the Fractional Factorial Resolution V+design and the Central Composite Face design established by the MODDE® 12.0 software. Molecular-level drug-excipient interactions were investigated using infrared (IR) and proton nuclear magnetic resonance (^{1}H NMR) spectroscopy. The effects on skin physiological function was assessed using DermaLab Combo.

Results:

DoE results revealed that TEA enhanced flux by 3.14-fold, whereas RH40 reduced it by 4.62-fold. The addition of RH40 resulted in the disappearance of the proton peak within the region of 12–13 ppm, suggesting competition for hydrogen bonding with LOR between TEA and RH40. The optimized formulation (4% TEA, 0% RH40, and 0.2% $Al(OH)_3$) increased skin hydration by 6.20-fold. Opposing effects of TEA and RH40 on skin elasticity were observed.

Conclusions:

Expected flux and adhesion strength for the optimized formulation were 7.18 $\mu g \cdot cm^{-2} \cdot h^{-1}$ and 11.79 mJ, respectively. Our understanding of the conflicting effects of TEA and RH40 has been advanced. The integrated use of the two-step DoE, physicochemical studies, and skin physiology assessments was proven to be effective in elucidating the simultaneous effects of different permeation-modifying strategies on patches, thus having substantial value for the successful execution of future research endeavors.

Keywords: Lornoxicam; Ion-pair; Chemical enhancer; Topical patch; Two-step design of experiments

PD-0104001-O

Development of pH-sensitive Zerumbone-encapsulated Liposomes for Lung Fibrosis

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ABSTRACT

Introduction:

Zerumbone (ZER), a naturally occurring compound derived from the rhizome of *Zingiber Zerumbet* (L.) Smith, has garnered attention for its potential to mitigate inflammation. Nevertheless, the clinical utility of ZER is hindered by its poor water solubility. While ZER's efficacy in addressing lung inflammation is well-documented, its potential in alleviating lung fibrosis remains unexplored. Given the acidic microenvironment associated with inflamed lungs, the need to encapsulate ZER within a pH-sensitive carrier becomes paramount to maximize the delivery of ZER within the inflamed lung tissue.

Objectives:

To encapsulate ZER within pH-sensitive liposomes and assess its effectiveness in mitigating lung fibrosis.

Methods:

ZER-liposomes were produced using oleic acid, dipalmitoylphosphatidylcholine and cholesterol. The formulation's physicochemical and drug release were characterized. The effectiveness of ZER-liposomes in reducing fibrosis was assessed in TGF-β-treated lung fibrotic MRC-5 and epithelial A549 cells. ZER-liposomes powder was produced by freeze-drying. The in vitro lung deposition study was evaluated using Anderson-cascade impactor and HPLC.

Results:

ZER-liposomes were optimized using Box-Behnken design with good physicochemical properties and stability. ZER-Liposome was milky white with an average diameter of 84.8 ± 3.5 nm, polydispersity index of 0.17 ± 0.2, and zeta potential of -24 ± 0.32 mV. The drug release of ZER from the carrier followed zero-order kinetics and showed higher release in acidic settings. ZER-liposomes reduced cell migration and exhibited an anti-fibrotic effect in MRC-5 and A549 cells by downregulating fibrotic markers including fibronectin, MMP-2 and α-SMA. The uptake of ZER-liposomes was concentration- and pH-dependent (favoring acidic conditions), higher maximal uptake rate in MRC-5 cells than in A549. The use of cascade impactor and HPLC analysis showed that ZER-liposomes powder was able to reach stage 7, indicating effective delivery to both the deep and peripheral regions of the lungs

Conclusions:

pH-sensitive ZER-liposomes could be a potential therapeutic system for lung inflammation and fibrosis via the inhalation route.

Keywords: Inhalation; Liposome; Lung fibrosis; pH-sensitive; Zerumbone

PD-0105001-O

Multifunctional Single and Double Layered Hydrogels: Harnessing Silver Nanoparticles, DsiRNA, and Lactoferrin for Chronic Wound Treatment

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ABSTRACT

Introduction:

Currently, antimicrobial resistance and biofilm formation in diabetic foot infections have exacerbated, leading to an increased number of amputations.

Objectives:

To address this critical issue, our study aimed to create a wound dressing that could effectively promote wound healing and prevent bacterial infections.

Methods:

The dressing combines the action of antibacterial and anti-biofilm effects from silver nanoparticles (AgNPs) and lactoferrin (LTF), respectively. DsiRNA was later complexed with AgNPs and LTF (AgLTF-DsiRNA) for its wound-healing effects. In this study, AgNPs were synthesized using an aqueous extract of tiger milk mushroom (*Lignosus rhinocerotis*) and chitosan as the reducing and stabilizing agents, respectively.

Results:

The resulting AgLTF-DsiRNA complexes were crystalline, as confirmed by X-ray diffraction analysis and later formulated into two distinct hydrogel types; single-layered hydrogel (SL) and double-layered hydrogel (DL). Morphological observations using a scanning electron microscope revealed the 3-dimensional structure of the hydrogels, with an average pore size of 46.67 ± 10.33 µm. Remarkably, the hydrogels exhibited a maximum swelling capacity of 1668% after 24 hours of immersion in solution. Furthermore, Franz cell diffusion studies demonstrated that the release rates of AgNP, LTF, and DsiRNA from the DL hydrogels were slower than those from the SL hydrogels. The DL exhibited reduced migration rates in comparison to the SL. However, both hydrogel formulations containing DsiRNA and LTF displayed significantly enhanced pro-migratory effects when compared to the control group. Importantly, our hydrogels displayed positive antibacterial and anti-biofilm effects against selected gram-positive and gram-negative bacteria. Notably, the hydrogel containing AgLTF at a dose of 125 µg/mL showed no cytotoxicity against HaCaT cells.

Conclusions:

In summary, these dual-action hydrogels hold promise for diabetic wound management, offering a multifaceted approach to enhance healing and combat infections. These results enhance our understanding and insights into creating multifaceted AgNP structures incorporating DsiRNA and LTF,holding promise for future chronic wound treatments.

Keywords: Gene silencing; Hydrogels; Nanoparticles; Wound delivery

PD-0105002-O

Formulation of a Novel Floating *In Situ* Gelling System Containing Curcumin Loaded Self- Nanoemulsifying Drug Delivery Systems (SNEDDS)

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ABSTRACT

Introduction:

Curcumin, a natural polyphenol derived from the turmeric plant, has gained significant attention for its therapeutic potent on anti-inflammatory, anticancer, antibaterial effect, wound healing effects and activity on gastric disorders. However, application of group 4-BCS substance is limited owing to its poor aqueous solubility and low bioavailability, hence improving the solubility and stability of CUR is still a great demand.

Objectives:

A floating *in situ* gelling system containing a curcumin loaded self- nanoemulsifying drug delivery systems could bean approach to enhance solubility and stability of CUR and sustain the floating properties to control gastric disorders.

Methods:

Firstly, a SNEDDS containing CUR (SNEDDS-CUR) was formulated and evaluated for appearance, stability upon dilution and different pH media, thermodynamic properties such as centrifugation, heating-cooling cycles, freeze thaw cycles, droplet size, zeta potential and drug assay by a validated HPLC method.Then secondly, various excipients were investigated for formulation of a floating *in situ* gelling system containing SNEDDS-CUR, which were studied for floating lag time, total floating time and *in vitro* release.

Results:

The SNEDDS – CUR formulation consisting propylene glycol monocaprylate, polyethylene glycol-40 hydrogenated castor oil and polyethylene glycol 400 loaded up of 4 % (w/w) curcumin. The SNEDDS-CUR has aclear, bright yellow appearance. When being diluted 100 fold, the system coud form nanoemulsion having a mean droplet size of 18.12 nm, a PDI of 0.111 and a zeta potential of -16,2 mV. The method of assay by HPLC has been successfully validated. The SNEDDS-CUR maintained its appearance, good thermodynamic properties and formed a type A nanoemulsion having a mean droplet size<20 nm, a narrow single distribution, low polydispersity index (<0.2) and a negative zeta potential after 3 months under both normal and accelerated conditions. The floating *in situ* gelling system containing sodium alginate, calcium carbonate and sodium citrate showed good gelling and floating properties, with floating lag time below 2 minutes, total floating time of 12 hours and could sustained the drug release in pH 1.2 until 12 hours.

Conclusions:

This study has achieved the goal and could be served as a premise for novel dosage forms for curcumin.

Keywords: Curcumin; Floating *in situ* gelling system; Nanoemulsion; Self-nanoemulsifying drug delivery system; SNEDDS

PD-0302001-O

Comparison of Physicochemical Characteristics, Nutritional Value and Antioxidant Activity of Collagen Extracted from Fresh and Dried White Type Jellyfish of Myanmar Marine Source

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ABSTRACT

Introduction:

Nowadays, collagen is one of the most popular active ingredients in cosmeceutical products, and marine collagen is an attractive alternative source because it is metabolically compatible, water-soluble, lacks religious constraints, and is free of harmful pathogens. Collagen is the major protein of jellyfish, which is rich in protein.

Objectives:

This study was aimed at extracting collagen from fresh and dried white-type jellyfish, *Lobonemoides gracilis* Light from Myanmar marine source then comparing their properties for use in cosmeceutical products.

Methods:

The acid hydrolysis method was used for collagen extraction then evaluated *in vitro* and compared for their yield percentage, solubility, pH, viscosity, moisture content, and ash content of both extracted collagens. Moreover, Ultraviolet absorption and Fourier Transformation Infrared spectrophotometry were also used for the identification of their chemical properties. The Association of Analytical Chemists method and 1,1-diphenyl-2-picrylhydrazyl radical scavenging assay method were used for nutritional value and antioxidant activity evaluation.

Results:

The yield percentages were 1.231±0.0056 % from fresh jellyfish and 0.859±0.00058 % from dried jellyfish. The viscosity of both extracted collagen behaved in a pseudoplastic nature when tested with different shear rates. Ultraviolet absorption spectra showed the same maximum absorption at 232 nm because of the presence of hydroxyproline, proline, and glycine amino acids. For nutritional value, protein content percentages were 95.69 %and 66.93 % respectively. Antioxidant activities were expressed in 50% radical scavenging activity, which was 5.30818±0.06630 µg/mL for fresh jellyfish and 5.82609±0.03177 µg/mL for dried jellyfish.

Conclusions:

In vitro results showed that collagen from both jellyfish has antioxidant activity due to the presence of hydroxyproline, proline, and glycine amino acids. However, the protein content of collagen from fresh jellyfish was higher than that of collagen from dried jellyfish. This study proved that jellyfish collagen can be used in cosmeceutical products as a bioactive ingredient for antioxidant activity and skin nourishment.

Keywords: Antioxidant; Collagen; Cosmeceutical products; Jellyfish; *Lobonemoides gracilis* Light; Myanmar marine source

PD-0201001-O

Comparative Evaluation on Physicochemical Properties of Blackgram Starch Cultivated in Myanmar with Official Corn Starch as Pharmaceutical Excipient

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ABSTRACT

Introduction:

Pharmaceutical excipients are growing interest today because pharmaceutical dosage forms both internal and external use cannot be manufactured without excipients. Starch both native and modified forms are extensively used as tablet disintegrant, lubricant, filler and binder depending upon the purpose of application as well as swelling agent, gel-forming agent, cosmetic excipient, film former and in novel drug delivery systems and other site-specific delivery systems.

Objectives:

The aim of this study is to extract native starch from *Vigna mungo* L. (Hepper), Blackgram seeds, to evaluate its physicochemical properties and to compare its properties with the official corn starch.

Methods:

Blackgram seeds were collected and extracted by wet milling process and their physicochemical properties were evaluated such as appearance, solubility, moisture content, pH, swelling power, amylose content, and micrometric properties. Also, the FTIR spectra of both starch samples were taken.

Results:

According to the findings, it was found that starch extracted from blackgram seeds was white, fine powders with no characteristic odour and practically insoluble in cold water. The moisture content was 7.10% w/v and 99.5% passed through 200 mesh sieve. The pH of 20% w/v starch suspension was found to be 7.3. The determination of amylose content showed 35.5% and swelling power was 10.5 at 60°C.

Conclusions:

The results of all physicochemical properties comply with the test criteria and comparison with official corn starch showed that native starch extracted from blackgram seeds can be used as a substitute of official starches as excipient in pharmaceutical industries.

Keywords: Blackgram; Excipient; Starch; Vigna mungo

PD-0201002-O

Hibiscus Rosa-Sinensis Mucilage as a Functional Polymer in Pharmaceutical Applications

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ABSTRACT

Introduction:

The essentiality of drug administration for disease treatment is undeniable. However, for drugs to be efficacious, they must effectively reach their designated sites. Incorporating excipients, like polymers, into drug formulations is common practice to ensure optimal delivery of therapeutic effects.

Objectives:

This study investigates the potential of Hibiscus rosa-sinensis (HRS) leaves mucilage, a novel natural polymer source, in modifying the skin barrier for transdermal drug delivery.

Methods:

Dried powdered mucilage was obtained from fresh HRS leaves. Three concentrations of HRS mucilage gels—1%(w/w) (CL1), 1.5%(w/w) (CL1.5), and 2%(w/w) (CL2)—were prepared using caffeine as a model drug. In-vitro drug release and permeation profiles of caffeine were assessed using vertical diffusion cells. Physicochemical properties of HRS mucilage were characterized, and the morphological and structural features of skin samples were analyzed using scanning electron microscopy, attenuated total reflectance Fourier transform infrared spectroscopy, and differential scanning calorimetry.

Results:

The HRS gel at 2%(w/w) concentration (CL2) exhibited significantly higher drug permeation compared to caffeine solution, CL1, and CL1.5 (ANOVA: $p < 0.05$). HRS mucilage gel temporarily altered the skin barrier and permeability by perturbing lipid and protein structures, affecting helical keratin filaments, and engaging in O–H and/or N–H interactions. Consequently, this reduced diffusional resistance for drug transport and increased drug permeation.

Conclusions:

HRS mucilage has demonstrated efficacy in modulating the skin barrier for transdermal drug delivery. Specifically, the optimal concentration of HRS mucilage at 2% (w/w), has been shown to effectively facilitate the transdermal delivery of caffeine.

Keywords: Hibiscus rosa-sinensis; Polymer; Mucilage; Drug formulation; Transdermal drug delivery

PD-0102003-O

Enhancement of Physical and Mechanical Properties of Gelatin Films Crosslinked by Tannic Acid

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ABSTRACT

Introduction:
Thin films are increasingly popular as a convenient, self-administered delivery system for the sustained release of pharmaceuticals into the buccal cavity, aiming to achieve systemic or local therapeutic effects.

Objectives:
This study evaluates the suitability of gelatin crosslinked with tannic acid (GelTA) as a film matrix for buccal mucoadhesive drug delivery systems.

Methods:
Gelatin crosslinked with oxidized tannic acid was fabricated into films using the conventional solvent casting method. Two variables were examined, including the origin of gelatin (bovine gelatin, bloom number 225, type B; and cold-water fish skin gelatin) and the concentration of tannic acid (0.5–10% w/w) used during film preparation. For each variable, the films were evaluated on their physical, mechanical (tensile strength and elongation at break) and functional (dissolution times, water uptake and adhesion strength) properties.

Results:
Upon contact with isotonic phosphate buffer (pH 6.8), GelTA films showed rapid fluid uptake within the first 5 min, followed by slower swelling until equilibrium. Noncrosslinked gelatin films from bovine and fish sources dissolved completely in 6 and 2.8 min, respectively. Crosslinking gelatin with tannic acid significantly prolonged the dissolution times of the films, with 8 and 2-fold increases for GelTA films derived from bovine and fish sources containing 0.5% w/w tannic acid, respectively. This extended dissolution time was even more pronounced in GelTA films with higher tannic acid concentrations (2–10% w/w). Furthermore, tannic acid generally enhanced the tensile strength and reduced the elongation percentage of the gelatin films. The adhesion strength (207.2–233.7 g) of bovine GelTA films to mucin gels (mucous membrane model) was comparable to that of the noncrosslinked bovine gelatin film (239.6 g), while fish-derived GelTA films demonstrated weaker adhesion strength (94.7–59.4 g) compared to their noncrosslinked counterpart (168.6 g)

Conclusions:
Bovine GelTA films exhibited superior properties compared to fish GelTA films in terms of handling, film-forming capacity, and mechanical and adhesive properties, making them potentially suitable as mucoadhesive film matrices. These films exhibited improved mechanical properties, reduced solubility, and significant swelling.

Keywords: Gelatin; Tannic acid; Crosslinking; Film; Mucoadhesive

CP-1501001-O

Current Status and Clinical Needs of Drug Interaction Management in Healthcare Facilities: A National Survey in Vietnam

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ABSTRACT

Introduction:

Many healthcare facilities initially implemented drug interaction (DI) management activities with the development of clinical pharmacy in Vietnam.

Objectives:

This is the first study to evaluate the situation, demand, and associated factors of DI management in healthcare facilities.

Methods:

A nation-wide survey using a self-administered, structured questionnaire was conducted from July to August 2021. Responses were collected using electronic form, e-mail, or postal mail. We selected one representative response per healthcare facility. Healthcare facilities were categorized using hospital grades defined by the regulations of the Vietnam Ministry of Health. Multivariable logistic regression was performed to investigate factors associated with DI management activities.

Results:

Eligible responses were obtained from 749 healthcare facilities from 62/63 provinces and cities in Vietnam. More than half of those facilities (59.4%) of those facilities implemented clinical pharmacy activities to manage DIs. Three common activities included training on DIs, checking DIs, and deploying DI alerting tools. Larger hospitals were more likely to implement these activities. The most used DI information source was package inserts (96.1%), followed by printed books or e-books in Vietnamese (95.9%). Materials in foreign languages were mostly utilized in high-grade hospitals. The proportions of facilities that developed a short-list of clinically relevant DIs and integrated DI alerts into prescribing software were 38.7% and 15.5%, respectively. The deployment of DI management activities was associated with hospital grades, the number of clinical pharmacists, and the availability of linkage between the hospital pharmacy computers and the prescription system. Most facilities had demand for integrating DI alerts into prescribing software (98.3%) despite concerns about time investment, loss of clinical autonomy, and alert-caused fatigue.

Conclusions:

DI management activities have been initiated in many healthcare facilities. However, the capacity to implement these activities varied among facilities. Further professional and technical improvements and resource enhancement are needed to promote DI management.

KEYWORDS: Drug interaction; Drug interaction management; National survey; Vietnam

CP-1501002-O

The Potential of 3 Generative AI Models in Medication Error Assessment

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ABSTRACT

Introduction:

Medication errors represent a critical challenge in healthcare settings, leading to negative patient outcomes and increased costs. Existing error detection systems often depend on manual processes and rule-based approaches, which can be inefficient and susceptible to human error. Generative artificial intelligence (AI) has the potential to transform the way we identify medication errors.

Objectives:

This study aims to investigate the viability of using three generative AI models, ChatGPT-4, Gemini Advanced, and Claude 3 Opus, to assess medication errors.

Methods:

Thirty-six simulated cases that contain different levels of medication errors were created. The generative AI models were prompted to assess these simulated cases. The models' performance was assessed in terms of their accuracy in detecting potential errors, with particular attention to their ability to identify errors that might be overlooked by conventional systems. Errors were categorized using the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) assessment criteria.

Results:

Our findings demonstrate that Gemini Advanced and Claude 3 Opus had slightly higher correlation coefficients with the reference dataset in comparison to ChatGPT-4, implying greater proficiency in spotting potential errors.

Conclusions:

This research underscores the potential of generative AI for medication error classification. The results suggest that Gemini Advanced and Claude 3 Opus may be particularly well-equipped for this application. Further studies are warranted to investigate real-world implementation of these models with the goal of improving medication safety, lessening the burden on healthcare providers, and taking proactive measures to safeguard patients from errors.

KEYWORDS: Medication errors; Generative AI; Large language models; ChatGPT-4, Gemini Advanced; Claude 3 Opus

CP-1504001-O

Outcomes of Diabetes Care Intervention led by Pharmacist in Lao PDR

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ABSTRACT

Introduction:

Diabetes care in Laos has been provided by doctors, nurses and nutritionists, without the involvement of pharmacists.

Objectives:

This study aimed to evaluate the outcomes of pharmacists' interventions in diabetes care in Lao PDR.

Methods:

Patients were randomized by permuted block. Primary outcomes measurements were HbA1c and FPG. Secondary outcomes measurements were blood pressure, lipid profiles, GFR, ASCVD 10 years' risk score, scores of PSQ and D-39. Primary and secondary outcomes of patients of both groups were measured at month 0 (pre-test), month 3 (post-test 1) and 6 (post-test 2) except for HbA1c which was measured only at month 0 and 6. Independent t-test and Mann-Whitney U test were used to test the differences between two groups. Pair t-test and Wilcoxon Signed Rank tests were used to test the differences within the group. Subgroup analysis was performed in diabetes with hypertensive patients.

Results:

Seventy-three diabetes patients were randomly allocated to the intervention group. Seventy-one patients were allocated to the control group. Thirteen patients of the intervention group (17.8%) and 20 patients of the control group (28.2%) were lost during follow-up. Sixty patients of the intervention group and 51 patients of the control group were analyzed. There was no significant difference between the groups for HbA1c, FPG, lipid profiles. There was a significant difference in systolic blood pressure between the groups for Month 6 (post-test). Both groups had well-controlled of HbA1c when comparing the mean of month 0 (pre-test) and month 6 (post-test), p-value < 0.001. The intervention group had well-controlled total cholesterol and the LDL-cholesterol when comparing the mean of month 0 (pre-test) and month 6 (post-test), p-value <0.001, and 0.001 respectively.

Conclusions:

Patients who received diabetes care interventions led by a pharmacist tend to have better control of HbA1c and LDL-cholesterol. However, patients in the intervention group had poor blood pressure control.

KEYWORDS: Pharmacist intervention; Diabetes care; Patient satisfaction; Quality of life

CP-1505001-O

Knowledge, Perception and Willingness to Use Telepharmacy Services Among the General Population in Indonesia

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ABSTRACT

Introduction:

Telepharmacy is recommended as one of the adaptable methods of providing pharmaceutical care to patients by reducing patient mobility and increasing exposure to health services. A better understanding of people's knowledge and perceptions of telepharmacy, as well as their willingness to use it, can help reduce the failure rate of telepharmacy implementation. However, evidence on telepharmacy knowledge and perception, as well as willingness to use telepharmacy services, is still limited for telepharmacy implementation in Indonesia.

Objectives:

The purpose of this study was to determine the Indonesian community's knowledge, perception, and willingness to use telepharmacy services as the first step in developing a framework for telepharmacy implementation.

Methods:

This was a multicenter, cross-sectional study. Online questionnaires were collected on sociodemographic characteristics, knowledge and perception of telepharmacy services, and willingness to use them. Data were collected from participants who met the inclusion criteria between June and December 2022. The data was analyzed with descriptive statistics in SPSS version 26, Spearman's rank and Mann-Whitney U tests were used.

Results:

Approximately 370 respondents indicated a need for more telepharmacy knowledge. Over 90% of respondents had a favorable opinion of telepharmacy. The majority of respondents (84%) were willing to use telepharmacy services. There was a significant correlation between respondents' knowledge of, perception of, and willingness to use telepharmacy services. The educational level of the respondents was significantly related to their knowledge of telepharmacy. There was no statistically significant association between respondents' sociodemographic characteristics, perception of, and willingness to use telepharmacy services.

Conclusions:

Despite having limited knowledge of telepharmacy, respondents had a positive perception and willingness to use telepharmacy services. The respondents' telepharmacy knowledge and educational levels were significantly related. Furthermore, there were no significant relationships between

respondents' perceptions of and willingness to use telepharmacy services and sociodemographic characteristics. Interventions in telepharmacy services are recommended to improve Indonesians' knowledge of telepharmacy services.

KEYWORDS: Knowledge; Perception; Willingness; Telepharmacy; General population

CP-1505002-O

Hypertension Risk among Middle-Aged and Older Residents in Sen Monorum Town, Mondulkiri province, Cambodia

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ABSTRACT

Introduction:

Hypertension is a medical condition, which increases the risk of heart, brain, kidney, and other diseases. Approximately, one in four men and one in five women have hypertension. In Cambodia, hypertension prevalence represented 23.50% among adults aged 40-69 in 2016. This study aimed to estimate 3, 6, and 9-year risk incidents of hypertension, and describe its risk factors among residents in Sen Monorum town, Mondulkiri province.

Objectives:

This study aimed to estimate 3, 6, and 9-year risk incidents of hypertension and its risk factors among residents in Sen Monorum town, Mondulkiri province, Cambodia.

Methods:

This study was conducted as a cross-sectional study design using convenient sampling. All participants stayed at home, aged over 18 and volunteered to join the process were invited. The study data was analyzed by Stata MP Version 17 using frequency and percentage.

Results:

Among 282 participants, the average age is 38.08 ± 18.77 years old. Of all the participants, 64.54% (182) were women and 35.46% (100) were men. Most of them were businessmen/women 43.26% (122). Participants having BMI of below 25, 25-29, 30-39, and above 40 accounted for 60.28% (170), 30.14% (85), 7.45% (21) and 2.13% (6), respectively. 31.21% (88) of the participants had systolic blood pressure between 110-114 mmHg and 50% (141) had diastolic blood pressure between 70-79 mmHg. The study found that the average of total hypertension risk score was 7.51± 4.45. In 3 years, 6 years, and 9 years' time, participants potentially developed the hypertension risk of 8.91%, 17.94% and 28.92% respectively. Descriptive statistics showed some more risk factors as follows. 13.12% (37) of the participants smoked cigarette. Half of the participants 52.48% (148) did physical exercise more than 30 minutes a day. 36.52% (103) and 6.38% (18) of the participants had family member with hypertension, and diabetes, respectively.

Conclusions:

Residents living in Sen Monorum developed elevated risk of hypertension from smoking, insufficient exercises, and high BMI. Keeping healthy weight, being physically active and avoiding smoking should be promoted.

KEYWORDS: Hypertension; Incidence; Risk factor; Sen Monorum; Mondulkiri province; Cambodia

CP-1505004-P

Exploring Relationship between Spirituality, Religion and Culture in Influencing Medication Adherence: A Qualitative Study

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ABSTRACT

Introduction:

Non-communicable diseases (NCDs) have posed a significant challenge to society. Studies have shown, among patients prescribed with antihypertensive medications, 10–55% of them failed to take their medications accordingly and this may lead to risk of complications. Previous findings noted that spirituality, religion and culture have been associated with certain health behaviour.

Objectives:

Therefore this study aim to explore the roles of spirituality, religion and culture in influencing medication adherence among special group of population in Malaysia.

Methods:

A semi-structured qualitative interview was used to explore factors affecting medication adherence among chronic disease patient residing in one of the state in Malaysia. Participants who were diagnosed with hypertension and on antihypertensive medications were invited to participate in this study. Interview transcriptions were coded inductively and analysed thematically. Codes generated were verified by researcher who were not involved in transcribing process.

Results:

23 participants were enrolled in this study. It was found that elements of spirituality remains unclear in this special group of population. Religion was linked to increased motivation to take medication. However, religious misconception about healing and treatment contributed towards medication non-adherence. Culture related to societal and communication norms were related to non-adherence. The societal norms related to ignorance, belief in testimony and anything natural is safe negatively affect medication adherence.

Conclusions:

Culture and religion were found to be an important element in influencing medication adherence in this special group of the population. This finding would be useful to provide essential information for linking adherence assessment to the interventions that specifically address causes of medication non-adherence.

KEYWORDS: Spirituality; Religion; Culture; Medication adherence

CP-1507001-O

High-Dose Amikacin Regimen in *Klebsiella Pneumoniae*-Targeted Empirical Therapy: Insight from Population Pharmacokinetic and Dosing Simulation in Critically Ill Patients

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ABSTRACT

Introduction:

Amikacin is widely used as a component of empirical antibiotic therapy in Intensive Care Units. Recent studies suggest that high-dose regimens exceeding 20 mg/kg per day are vital to achieving the pharmacokinetic/pharmacodynamic (PK/PD) target of amikacin in severe infections.

Objectives:

This study aimed to determine the population pharmacokinetic (popPK) of amikacin and assess the suitability of high-dose regimens in treating multidrug-resistant *K. pneumoniae* in critically ill patients.

Methods:

A prospective study was conducted involving critically ill patients receiving high-dose regimens of amikacin. PopPK modeling was performed using NONMEM® 7.5, considering the effects of 13 pre-selected covariates on drug exposure. Monte Carlo simulations were utilized to evaluate high-dose amikacin regimens from 20 to 35 mg/kg regarding the probability of target attainment of PK/PD (maximum concentration of drug [C_{peak}]/MIC ratio of ≥ 8) and cumulative fraction of response (CFR) with the local MIC distribution of *K. pneumoniae*.

Results:

A total of 251 patients with 488 amikacin concentrations were included in the study. The PK data of amikacin was best described by a two-compartment model with first-order elimination. Two factors significantly influencing PK parameters were: Cockcroft–Gault creatinine clearance (ClCr) on amikacin clearance and adjusted body weight (ABW) on central volume of distribution. Typical estimates for clearance, intercompartmental clearance, central and peripheral volumes of distribution were 3.32 liters/h, 2.19 liters/h, 17.1 liters, and 8.83 liters, respectively. Monte Carlo simulation indicated that the target of C_{peak}/MIC ≥ 8 could be achieved with ABW-based doses ranging from 20 to 35 mg/kg for susceptible pathogens (MIC $\leq$ 8 mg/L). The utilization of high-dose amikacin regimens as empirical treatment could reach an average CFR of 61%for the general *K. pneumoniae* population and93% for the susceptible subpopulation.

Conclusions:

Given the escalating antibiotic resistance patterns observed in *K. pneumoniae*, high-dose amikacin regimens at 20 to 35 mg/kg should be recommended for critically ill patients only after antimicrobial susceptibility testing results indicate susceptibility of this pathogen to amikacin.

KEYWORDS: High-dose amikacin; Critically ill patients; Population pharmacokinetic

CP-1508001-O

Characteristics of Statin-Related Myalgia Based on Statin-Associated Muscle Symptom-Clinical Index (SAMS-CI) in Indonesia Dyslipidemia Outpatients: A Preliminary Study

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ABSTRACT

Introduction:

Statins are often associated with muscle pain (myalgia) and/or cramps in muscles that arise symmetrically in the lower extremity muscles such as hip/thigh flexor muscles and calves. The symptom is called as Statin-Associated Muscle Symptom (SAMS). Previous studies stated that 7-29% of patients taking statins experienced SAMS. There has been no research in Indonesia regarding myalgia symptoms using Statin-Associated Muscle Symptom-Clinical Index (SAMS-CI).

Objectives:

The study was conducted to determine the location, pattern, and onset of statin-related myalgia symptoms based on SAMS-CI in dyslipidemia outpatients of Atma Jaya Hospital in June 2023.

Methods:

This study is cross-sectional study conducted on dyslipidemia outpatients using the SAMS-CI questionnaire. The Statistical analysis using the logistic regression method with Stata 15 software.

Results:

The total respondents were 66 patients. A total of 62.1% of respondents complained of experiencing muscle pain. The majority of muscle pain /cramps were located in the calf muscles (39.4%), symmetrical pattern (54.6%), and symptoms occurred with onset 4-12 weeks after taking statin agent (40.9%). Age and gender have not statistically significant correlation with myalgia symptom (p-value >0.05).

Conclusions:

The location, pattern, and onset of statin-associated myalgia can be analyzed using the SAMS-CI questionnaire and it was found that the majority of respondents experienced myalgia located in the calf muscle, with a symmetrical pattern and the onset of myalgia was 4-12 weeks after taking statin.

KEYWORDS: Myalgia; Statin; Statin-associated muscle symptom-clinical index; SAMS-CI

CP-1510001-O

The Relationship between Demographics and Quality of Life Scores in Chronic Disease Patients in Hospitals

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ABSTRACT

Introduction:

Chronic diseases are still a health problem in Indonesia. Hypertension and type 2 diabetes mellitus are among the most common chronic diseases. The large number of symptoms and complications that arise can cause a decrease in the quality of life in hypertensive patients and type 2 diabetes mellitus patients.

Objectives:

This research aims to determine the relationship between demographics and the quality of life of hypertensive patients and type 2 diabetes mellitus patients at the Regional General Hospital of Banten Province.

Methods:

This research is an observational study with a cross-sectional approach. The sample for this study was all hypertensive patients and type 2 diabetes mellitus patients who met the inclusion and exclusion criteria. The instrument used to measure quality of life is the European Quality of Life-5 Dimensions-5 Levels.

Results:

The research results show that the quality of life of hypertensive patients and type 2 diabetes mellitus patients has problems in all dimensions. The chi-square test results, namely a significant value of less than 0.05 in all analyses of the relationship between demographics and the quality of life of hypertensive patients and type 2 diabetes mellitus patients. This shows that all demographic aspects have a significant relationship with the quality of life of hypertensive patients and type 2 diabetes mellitus patients.

Conclusions:

There is a significant relationship between demographics and the quality of life of hypertensive patients and type 2 diabetes mellitus patients.

KEYWORDS: EQ-5D-5L; Hypertension; Diabetes mellitus type 2; Demographics; Quality of life

CP-1602001-O

Effects of SGLT2 Inhibitors Compared with Sulfonylureas on Glycaemic Control and Cardiovascular Risk Reduction in Asia: Meta-Analysis

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ABSTRACT

Introduction:

International guidelines recommend using Sodium-Glucose Transporter Protein 2 (SGLT2) Inhibitors for Type 2 Diabetes Mellitus (T2DM) patients. However, there are possible disparities in glycaemic control outcomes among various races and ethnicities. Meanwhile, sulfonylureas are often administered as oral antidiabetic medications in Asia.

Objectives:

This study examines the glycaemic control and cardiovascular risk components of SGLT2 inhibitors and sulfonylurea in Asian adults with T2DM.

Methods:

Protocol CRD420234480943 is registered with Prospero. Until February 15, 2024, PubMed, CENTRAL, and EMBASE were searched for pertinent papers. The primary outcome of this Asian T2DM study is the reduction of HbA1c. Secondary outcomes include fasting plasma glucose, blood pressure, cholesterol profile, and anthropometric measurements. The RoB2 tool assessed bias risk, and Review Manager 5.3 synthesized data. The GRADE framework assessed certainty.

Results:

Seven articles containing 890 participants were chosen for inclusion. The data analysis showed no statistically significant difference in the primary outcome of HbA1c between SGLT2Is and sulfonylureas (MD = 0.06%; 95%CI = -0.13%-0.24%), with low certainty. The subgroup analysis of HbA1c showed a preference for dapagliflozin (MD = -0.36%; 95%CI = -0.63 to -0.08%). Secondary outcomes analysis indicates that SGLT2Is have a more favorable effect on improving blood pressure, all anthropometric measurements, and High-Density Lipoprotein (HDL) level.

Conclusions:

Glycaemic control shows no difference between SGLT2Is and sulfonylureas. However, SGLT2Is can enhance cardiovascular risk reduction. To address the low level of certainty in the data, more research is needed on SGLT2I dosage, type, and duration, especially in Asia.

KEYWORDS: Asia; Cardiovascular risk; Glycaemic control; Meta-analysis; SGLT2 inhibitors; Sulfonylureas

SP-1701001-O

Landscape Analysis of International Facilitated Regulatory Pathway for Innovative Medicine Approval: Recommendation for Thailand

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ABSTRACT

Introduction:

Timely access to innovative medicine is the ultimate goal of pharmaceutical companies, regulators, and patients. Innovative medicines have long development and complex manufacturing processes. In addition, the regulation process is still the bottleneck that leads to prolonged marketing authorization approval. National regulatory authorities (NRAs) established facilitated regulatory pathways (FRPs) to expedite drug development and approval in the shortest possible time. The Thai Food and Drug Administration (Thai FDA) is also in the process of developing FRPs for innovative medicines.

Objectives:

This study aimed to identify the key characteristics of the FRPs by the NRAs in the United States, European Union (EU), Japan, and Australia.

Methods:

This was conducted by a systematic review of the guidelines and literature. Results from this study will lead to the recommendation regulatory pathway for innovative medicine approval in Thailand.

Results:

The United States, the EU, Japan, and Australia are innovative initiators. They have the pathway to encourage drug development, especially unmet medical needs, and serious diseases by increasing the opportunities for regulator-sponsor interaction and scientific advice. They have the pathway to approve medicine before available confirmatory studies. Moreover, they have expedited pathways to speed up and reduce the timeline by prioritizing essential medicine. Additionally, Australia has a pathway to avoid duplication by using the reports of the listed authorities for referring the evaluation results.

Conclusions:

Adapting and providing a regulatory framework that maximizes the benefit of patients and sponsors but remains aligned with the government's strategic goals is recommended for the Thai FDA. They should support local researchers to approve innovative medicine through scientific or regulatory consultation, and rolling submission. While importing innovative medicines that have been approved by NRAs, the Thai FDA should refer to their evaluation results and focus on pharmacovigilance activity. These are consistent with good regulatory practices of WHO recommendation.

KEYWORDS: Regulatory pathway; Facilitated regulatory pathway; Expedited regulatory pathway; Accelerated regulatory pathway; Accelerated approval; Accelerated review

SP-1701002-O

Priority Setting of Preconception Care Interventions for Thailand

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ABSTRACT

Introduction:

Implementing effective preconception cares to improve maternal and child health outcomes is recommended. Previous data suggest that antenatal care is not sufficient; therefore, preconception cares are promising for decreasing the cases of congenital anomalies.

Objectives:

This exploratory study aimed to conduct a priority setting of preconception cares and to formulate the proper package of those interventions under Thailand's context.

Methods:

Mixed methods were adopted to prioritize preconception care interventions using both quantitative and qualitative approaches. Purposive sampling was applied to identify relevant stakeholders including obstetric-gynecologists, health professionals, and lay people. The online survey using the validated questionnaire was conducted; gathered data were electronic-recorded and analyzed using descriptive statistics.

Results:

Out of 100 identified stakeholders, 45 (45.0%) respondents were completed. Major proportion of respondents selected all 9 criteria to use for priority setting of preconception care interventions, for example, disease burden criterion that 44 respondents (97.8%) have agreed, effectiveness of intervention (97.8%) and Quality of life (95.6%), with assigning equal weights to all proposed criteria. The most important interventions before conception found are diabetes mellitus management, thalassemia prevention, HIV prevention, syphilis cure and depression management, respectively.

Conclusions:

Participated stakeholders prioritized diabetes management during preconception period is the most important intervention. Study findings revealed those important preconception care interventions, which can serve as one of evidence for implementing preconception care services under domestic context.

KEYWORDS: Priority setting; Preconception care; Survey

SP-1702002-O

Health-Related Quality of Life among Type 2 Diabetes Patients with Macrovascular and Microvascular Complications Relative to a Nationally Representative Sample of Vietnamese Adults

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ABSTRACT

Introduction:

Diabetes mellitus is a chronic and potentially dangerous condition. Type 2 Diabetes (T2D) can lead to various complications causing significant damage and affecting one's health, particularly to the nervous system, blood vessels

Objectives:

This study aimed to compare the quality of life of T2D patients with macrovascular complications (MCV), microvascular complications (mcv) in two hospitals in Ho Chi Minh City to a nationally representative sample of Vietnamese adults.

Methods:

A cross-sectional descriptive study was conducted to collect data on demographic, pathological characteristics, as well as quality of life data of T2D patients with MCV, mcv in Thong Nhat Hospital and Nguyen Tri Phuong Hospital (2023). Complications included 4 groups of MCV (neurological, retinal, renal, and foot complications) and 3 groups of mcv (coronary artery disease, cerebrovascular disease, peripheral vascular disease). Propensity score matching method (nearest neighbor matching with replacement) was employed to match by age, sex this sample with data on a nationally representative sample of Vietnamese adults.

Results:

The study included 566 T2D patients (163 with MCV, 277 with mcv, 126 without complications). The results showed that having complications reduced the quality of life scores with the EQ-5D-5L (and VAS) scores of patients without complications, patients with mcv, patients with MCV were 0.88 (77.13); 0.85 (72.44); 0.79 (64.26), respectively. Factors that affected the quality of life of T2D patients were age, marital status, comorbidities, complications, income, hospitalization, health insurance, exercise. The EQ-5D-5L and VAS scores of T2D patients were lower than the national sample with respective reductions of 0.126 ($p<0.001$) and 12.877 ($p<0.001$) for patients with MCV; 0.069 ($p<0.001$) and 5.529 ($p=0.005$) for patients with mcv; 0.047 ($p=0.001$) and 1.672 ($p=0.387$) for patients without complication.

Conclusions:

Research results showed that patients with T2D, especially those with complications (both MCV and mcv) had significantly lower quality of life than the normal population.

KEYWORDS: Diabetes; Macrovascular complications; Microvascular complications; Quality of life

SP-1702003-O

Cost-Utility Analysis of Adding Empagliflozin to the Standard of Care for Chronic Kidney Disease in Vietnam

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ABSTRACT

Introduction:

Chronic kidney disease (CKD) is a global public health issue that has garnered widespread attention. In Vietnam, CKD is among the top ten leading causes of death, affecting 8.74 million patients and causing financial hardship for both patients and society. Empagliflozin has been shown to have positive effects on renal protection.

Objectives:

This study aims to estimate the cost-utility of incorporating empagliflozin into the current standard of care (SoC) for CKD treatment in Vietnam.

Methods:

Cost-utility analysis using Markov model with one-year cycle length was conducted based on Vietnam's healthcare system perspective during a lifetime horizon. Data for transitional probabilities, direct medical costs, and utilities for each health state were obtained from the EMPA-KIDNEY trial, published studies, and Vietnam database. Costs and health outcomes were discounted by 3% annually, following WHO's guidelines. The results were presented as life-year (LY) gained, quality-adjusted life year (QALY) gained, and incremental cost-effectiveness ratio (ICER) and compared against a cost-effectiveness threshold of one to three times Vietnam's Gross Domestic Product (GDP) per capita in 2023 (i.e., VND 101,900,000 [USD 4,021]). One-way and probability sensitivity analyses were conducted to test the robustness of the results.

Results:

Adding empagliflozin to SoC for CKD patients in Vietnam was found to be cost-effective. Compared to SoC alone, empagliflozin could increase 1.298 LYs and 1.263 QALYs with an incremental cost was VND 95,312,006 (USD 3,761). The mean ICER was VND 75,492,590 (USD 2,979) per QALY gained which was less than the cost-effectiveness threshold in Vietnam. Results from the probability sensitivity analysis showed that empagliflozin had a 68.7% to 97.2% probability of being cost-effective under the threshold of one to three times Vietnam's GDP per capita in 2023, respectively.

Conclusions:

Adding empagliflozin to the current SoC would likely be cost-effective in CKD treatment in Vietnam.

KEYWORDS: Empagliflozin; CKD; Cost-Utility Analysis; Vietnam

SP-1702004-O

Willingness-To-Pay for Colorectal Cancer Screening: A Systematic Review

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ABSTRACT

Introduction:

Colorectal cancer (CRC) has been one of the most cancer cases and become one of the top five contributors to the overall economic burden globally. It is predicted that the cases will increase approximately 1.66 times higher from 2020 to 2040. Given the enormous financial burden of CRC, preventive measures must be implemented through CRC screening.

Objectives:

The purpose of this study is to examine studies on assessing Willingness to Pay (WTP) for colorectal cancer screening and to investigate any potential variables influencing WTP.

Methods:

A systematic review was conducted through PubMed, Science Direct, and Scopus in accordance with PRISMA guideline. The study included 10 English-language studies that evaluated WTP for CRC screening. All WTP values extracted were converted to 2023 USD for comparability. The WTP value is classified based on the type of examination. The study assessed how much participants were willing to pay for the assumed test cost by calculating the proportion of their WTP value.

Results:

This study showed that the WTP value for CRC screening varied from USD 11.07 to USD 658.65. The co-payment rate ranged from 0.15 to 83.73. The factors influencing WTP value include sociodemographic factors and the screening test attributes.

Conclusions:

Our study revealed the variative relationship between sociodemographic parameters and test features in influencing individuals' decisions about CRC screenings. This comprehension creates the basis for targeted interventions meant to promote CRC screening program and its public policy development.

KEYWORDS: Willingness-to-pay; Colorectal cancer; Screening, Health economic; Systematic review

SP-1703002-O

Analysis of Factors Affecting the Engagement of Pharmacists with the Organization Working in Public Health Facilities: A Quantitative Study in Vietnam

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ABSTRACT

Introduction:

Pharmacists are among the most crucial resources, playing a pivotal role in the establishment and growth of any medical organization.

Objectives:

The study aims to analyze the factors affecting the engagement of pharmacists working in public health facilities in the Mekong Delta with their organizations from 2023 to 2024

Methods:

Interviews conducted with groups operating in public health facilities provided the data for this study. A pre-designed set of questions was used to gather information.

Results:

A total of 1500 participants who met the research criteria were included in the study. Data gleaned from interviews with pharmacists underwent scrutiny with the Cronbach's Alpha test, resulting in the exclusion of 3/40 variables. KMO coefficients (ranging from 0.91 to 0.972) validated the data's significance for Exploratory Factor Analysis. Meeting set criteria, results unveiled the positive impact of working conditions, development opportunities, promotion and pay-rate on retention ($p<0.05$). CFA and SEM aligned with market dynamics.

Conclusions:

According to the survey, public medical facilities consistently prioritize the well-being and needs of pharmacists, fostering conditions related to salaries, legal policies, work benefits, etc., to make them feel more integrated into their organization.

KEYWORDS: Hospital pharmacist; Public health facilities; Engagement; Influencing factors; Mekong Delta; Working policies

SP-1705001-O

Exploring the Impact of Standardized Logistics Management Information System Implementation on Logistics Management Activities among Health Facilities in Myanmar

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ABSTRACT

Introduction:

Proper implementation of the standardized logistics management information system (LMIS) in the supply chain would facilitate access to essential products. It also prevents wastage at health facilities by enhancing inventory management.

Objectives:

This study aimed to explore the implementation of standardized LMIS influences logistics management practices, as well as to investigate barriers and facilitators of its implementation.

Methods:

In July 2023, semi-structured interviews were conducted with 14 health facilities staff who dealt with LMIS in health facilities providing services for HIV and RH programs to the targeted communities in four regions and two states of Myanmar.

Results:

All staff agreed that the implementation of the standardized LMIS has positively impacted logistics management practices, leading to more efficient and systematic operations and better inventory management. However, the majority expressed dissatisfaction with current ordering and reporting practice, perceiving it as an unnecessary duplication of efforts. Results showed that implementation of LMIS had an effect on capacity of health staff. All supply chain focal persons revealed that their inventory management skills noticeably improved after completion of in-person comprehensive supply chain management training, enabling them to manage products more efficiently. Most mentioned in-person training sessions, monitoring and evaluation visits, and regular physical counting process as key factors for implementation of LMIS. Barriers to implementation highlighted were online training sessions provided during COVID-19 pandemic, internet connectivity issues, technical proficiency concerns, and software limitations for managing batches.

Conclusions:

It found that logistics management activities such as ordering, and stock reporting were not performed as designed due to program-related barriers and the need for staff competence in some facilities and these challenges had to be rectified by central level and stakeholders together with health facilities. Therefore, some issues are needed to be invested such as capacity-building program, and software customization to enhance the supply chain performance of health facilities.

KEYWORDS: Logistics management information system; LMIS; Process evaluation; Myanmar

SP-1705002-O

Insights into Hormone Replacement Therapy Usage: A Survey of Menopausal Women in Kuala Lumpur, Malaysia

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ABSTRACT

Introduction:

Many women may lack awareness of Hormone Replacement Therapy (HRT), including its benefits and potential drawbacks. Additionally, there is limited information available about the treatment of menopausal symptoms among women in Kuala Lumpur, Malaysia.

Objectives:

To assess the prevalence, knowledge, attitude, and practice (KAP) related to HRT among menopausal women in the Malaysian population and to explore socio-demographic factors associated with HRT awareness and utilization.

Methods:

A cross-sectional study was conducted among menopausal women (n=404) living in Kuala Lumpur, Malaysia. Data was collected using convenient sampling. This research consists of 5 major parts which are (A) Socio-demographic characteristics of participants, (B) HRT knowledge among respondents, (C) Attitudes towards HRT, (D) Practice of HRT, and (E) Menopausal symptoms. All appropriate data from the project was analyzed using IBM SPSS Statistics Version 26.

Results:

A total of 404 participants were recruited in this survey. it was found that overall, participants demonstrated good knowledge (62.9%) but held a negative attitude (52.7%) towards Hormone Replacement Therapy (HRT). Interestingly, the majority (83.4%) had never used HRT. Common menopausal symptoms reported by the participants included hot flashes (35.4%), irritability/mood swings (31.9%), and night sweats (29.2%). Notably, there was a significant association between knowledge about menopause and HRT and participants' attitude towards HRT use. Specifically, those with poor knowledge (68.7%, n=103) exhibited a negative attitude towards HRT ($p<0.01$).

Conclusions:

Overall, the prevalence of HRT use among the respondents is low. 83.4% of them have never taken HRT before. There was a positive correlation between knowledge and attitude towards HRT use. Healthcare systems should educate the public using various educational tools and social media.

KEYWORDS: Hormone replacement therapy; Menopausal women; Knowledge attitude practice; Hot flashes; Mood swings; Night sweats

PN-1103001-O

The Role of DNA Super-barcodes in Authentication of Herbal Medicine: Several Case Studies

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ABSTRACT

Introduction:

Genetic methods, like DNA barcoding, are more precise than morphological approaches for identifying plant species. With the affordability of NGS approaches, the number of complete plastomes and 45S rDNA sequences of plant species have rapidly expanded. They might beutilized as super-barcodes with numerous single nucleotide polymorphism (SNP) sites that can serve as species-specific DNA barcodes to identify plant species with great resolution. The medicinal properties of plants from Araliaceae family, *Astragalus* genus, and *Crocus* genus are well known. As economically motivated adulteration (EMA) targets certain plant species, DNA super-barcodes are necessary to combat it.

Objectives:

Super-barcodes based on the complete plastomes of 26 genera of Araliaceae, Astragalus genus, and Crocus genus were analyzed to establish species-specific barcodes for the plant species that are of interest.

Methods:

The whole plastomes of 26 genera of Araliaceae, *Astragalus* genus, and *Crocus* genus were subjected to phylogenetic analysis using the maximum likelihood and neighbour-joining methods. The nucleotide diversity of the studied species was examined by analyzing the alignment data using the R package. SNP loci that met the dCAPS and KASP assay criteria were collected to convert into species-specific markers.

Results:

We analyzed species-specific SNPsin protein-coding genes in the plastomes and converted them into dCAPS and KASP markers.A total of 18 dCAPS markers and over 30 KASP markers were effectively used to distinguish 10 species belonging to Araliaceae family. Additionally, 8 dCAPS markers were established for *Astragalus membranaceus* and another 8 for *Crocus sativus*.

Conclusions:

DNA super-barcode-generated phylogenetic trees were backbones to characterize the diversity of plant species. Comparing sequencing divergences across plastomes of genera of Araliaceae, *Astragalus* genus, and *Crocus* genus revealed species-specific SNPs that could conver to dCAPS and KASP markers for accurate species identification. It will advantages in terms of protecting consumer health, providing pre-selling warnings, managing medicinal plant cultivation properly, and protecting the plants from overharvesting or habitat destruction.

KEYWORDS: dCAPS markers; KASP markers; Plastome; Species-specific barcodes; Super-barcodes

PN-1105001-O

Prevalence and Decision Making of Medicinal Plant Use among People Living in Two Communes in Krong Senmonorom, Mondulkiri Province

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ABSTRACT

Introduction:

Medicinal plants are widely used by people around the world for various health purposes, especially in developing countries where access to conventional medicine is limited. However, the prevalence of plant use, the decision behind the use of these medicinal plants, and the common diseases that are treated by medicinal plants are not well documented.

Objectives:

This study aims to determine the prevalence of medicinal plant use and decision-making for medicinal plant use among people living in two communes (Spean Mean Chey and Romnea District) in Krong Senmonorom, Mondulkiri province.

Methods:

A cross-sectional survey was conducted among people living in two communes in Krong Senmonorom. 458 people stayed at home and aged over 18 were invited to join the interview. A semi-structured questionnaire was used for face-to-face interviews. Descriptive statistics were analyzed by using IBM SPSS, version 26.

Results:

The majority of the participants were female with an average age of 43.8 ± 13 years old, single, and the sellers. 144 (31.4%) people have experienced using medicinal plants for less than one year and 133 (29.00%) people have used more than 10 years. The majority of family plants belong to mix-herbal (n=156, 34.06%), Zingiberaceae (n= 139, 30.34%), and Poaceae (n=49, 10.70%). Most of plants were used to treat gastrointestinal disease (n=95, 20.74%) and flu (n=37, 8.08%). Preparation of medicinal plant uses via oral (n=339, 74.02%) and from the market (n=173, 37.77%). It is found that their decision-making is mostly from family ancestors (n=213, 46.51%), close relatives (n=68, 14.85%), their own (n=67, 14.63%), and social media (n=57, 12.45).

Conclusions:

Medicinal plants are still widely used and a significant source of income for locals living in rural areas. People in Mondulkiri should therefore be made aware of safe usage and practices. More scientific evidence should be conducted to support the rational use of these medicinal plants.

KEYWORDS: Decision making; Medicinal plant; Mondulkiri Province; Prevalence

PN-1106001-O

Converting Single Marker Content into Total Flavonoids Content in the Assay of Herbal Drugs Containing Passion Flower Herb Dry Extract (*Passiflora incarnata* L.) Using UPLC and HPLC

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ABSTRACT

Introduction:

The contemporaneous tense lifestyle is responsible for the wide use of anxiolytic substances with many associated side effects. Therefore, the use and acceptance of herbal medicines for these purposes, including *Passiflora* species, have been growing among doctors and patients. For products containing *Passiflora incarnata* L., according to European pharmacopoeia (Ph. Eur.), the assay of total flavonoid content was done using UPLC method with peaks identification based on relative retention time.

Objectives:

In this study, an HPLC method was developed for the assay of finished product, where isovitexin content was converted into total flavonoid content, based on Ph. Eur. UPLC method.

Methods:

The Ph. Eur. UPLC method used on a C18 column (2.1 x 100 mm, 1.8 µm) using a gradient mobile phase composed of formic acid aqueous solution, acetonitrile and methanol at 50°C, and the detection wavelength was 338 nm. The HPLC method used a C18 column (4.6 x 100 mm, 2.7 µm) with a modified gradient of the mobile phase.

Results:

An HPLC method was developed and valideted according to ICH guidelines. With this method, isovitexin was fully separated from other flavonoid peaks. Isovitexin was determined in the finished drug product by HPLC method, and this content was converted into total flavonoid content using the conversion ratio obtained by UPLC analysis of starting material. The assay method was proposed for the specification of two finished product (tablet and capsule), and successfully applied on real batch samples.

Conclusions:

An HPLC quantitative method was proposed for the assay of drug finished products containing *Passiflora incarnata* L. dry extract where the total flavonoid content was obtained through a conversion from single marker isovitexin content obtained in HPLC analysis of the finished product, and conversion ratio obtained from UPLC analysis of the starting material.

KEYWORDS: Herbal medicines; HPLC; *Passiflora incarnata* L; Total flavonoids content; UPLC

PN-1106002-O

Quality Evaluation of *Marantodes pumilum* (Blume) Kuntze Varieties Using High Performance Liquid Chromatography–Photo Diode Array Detection Combined with Chemometrics

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ABSTRACT

Introduction:

Currently, there are 267 registered herbal products containing *Marantodes pumilum* (synonym: *Labisia pumila, L. pothoina*), formulated as traditional medicines in Malaysia but none of the herbal products specify which variety is used. According to our earlier research, only the aqueous extract of *M. pumilum* var. *alata* leaves has been shown to significantly modulate MCF-7 proliferation in vitro, protect against osteoporosis in vivo, and contain phytochemical compounds that may have oestrogenic-like properties.

Objectives:

Thus, the objective of this study was to establish a High-Performance Liquid Chromatography-Photo Diode Array (HPLC-PDA) method to discriminate between the *alata* and *pumila* varieties, as well as between the leaves and roots, for the purpose of raw material quality control.

Methods:

A total of sixteen specimens of *M. pumilum* var. *alata* and var. *pumila* were gathered from six different locations in the Peninsular Malaysia. The ethanol (80%) extracts were analysed using a validated HPLC-PDA system. Gallic acid (GA) and demethylbelamcandaquinone B (DmcqB) were used as the chemical markers. The chromatographic profiles were obtained and preprocessed prior to Principal Component Analysis (PCA) and Hierarchical Clustering Analysis (HCA) using multivariate statistical tools, Unscrambler X and XLSTAT-Pro (2017) software.

Results:

The established HPLC-PDA method demonstrated good specificity, precision, repeatability, linearity, limit of detection and limit of quantitation. Chemometric analysis utilising HPLC fingerprint profiles successfully distinguished between the *alata* and *pumila* varieties, as well as between the leaves and roots of a species.The PCA bi-plot showed that the *pumila* variety had a greater concentration of GA and DmcqB.HCA clearly discriminated between the two closely related varieties of *M. pumilum* var. *alata* and var. *pumila*.

Conclusions:

In summary, the combination of HPLC-PDA with chemometric analysis offers a reliable approach for assessing the quality of *M. pumilum* herbal materials.

KEYWORDS: Chemometrics; High-performance liquid chromatography-photo diode array; *Marantodes pumilum*

PN-1107001-O

Ultrasonic-assisted Extraction of *Boesenbergia rotunda* (L.) Mansf. Rhizome Using Hydrophobic Deep Eutectic Solvents

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ABSTRACT

Introduction:

Boesenbergia rotunda (L.) Mansf., a plant well-known for its culinary and medicinal value, contains panduratin A and pinostrobin, active compounds found in its rhizomes. These compounds exhibit anti-inflammatory, antioxidant, and anticancer properties. The readily-to-use extracts derived from this plant could be utilized in a variety of health products. Recently, deep eutectic solvents (DES) have emerged as environmentally sustainable options for extracting phytochemicals due to their low cost, safety, and biodegradability. Among them, hydrophobic DES, with its higher hydrophobicity, serves as an optional solvent for extracting moderately to highly hydrophobic compounds.

Objectives:

This study aims to investigate the effectiveness of six hydrophobic DES in extracting panduratin A and pinostrobin from *B. rotunda* rhizomes.

Methods:

Six hydrophobic DES were formulated using various combinations of thymol or menthol with hexanoic acid or octanoic acid at different molar ratios. Ultrasonic-assisted extraction was employed to extract *B. rotunda* rhizome powder with these DES. High-performance liquid chromatography was used to quantify panduratin A and pinostrobin content in each extract. The significant difference in extraction efficiency between the six hydrophobic DES and methanol, a conventional solvent, was analyzed using One-way ANOVA and post hoc (Duncan) test at a significance level of $p < 0.05$ with IBM SPSS Statistics software.

Results:

Among the hydrophobic DES formulations, thymol: octanoic acid at a 1:2 molar ratio using ultrasonic-assisted extraction at 40 kHz for 15 minutes, yielded the highest concentrations of pinostrobin and panduratin A from *B. rotunda* rhizomes (11.76 ± 1.06 and 15.73 ± 1.24 mg/g dry weight, respectively), comparable to methanol extraction.

Conclusions:

Hydrophobic DES demonstrates potential as a viable substitute for methanol in extracting panduratin A and pinostrobin from *B. rotunda* rhizomes. This solvent is a safer and more environmentally friendly option. Further research is needed to explore the stability, compatibility in pre-formulation, and bioactivities of readily-to-use extracts derived from this solvent.

KEYWORDS: *Boesenbergia rotunda*; Hydrophobic deep eutectic solvent; Panduratin A; Pinostrobin; DES; Ultrasonic-assisted extraction

PN-1107002-O

In-vitro Acetylcholinesterase Inhibition of *Chrysophyllum cainito* L. (Star Apple) Leaf Extract

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ABSTRACT

Introduction:

Acetylcholinesterase (AChE) is an essential cholinergic enzyme in the hydrolysis of Acetylcholine (ACh), a neurotransmitter implicated in neuronal conditions such as Alzheimer's disease and dementia. As AChE-related illnesses rise, investigations into natural sources with a repository of bioactives, such as *Chrysophyllum cainito,* are of value.

Objectives:

This research focuses on determining the *in vitro* acetylcholinesterase inhibition of different sub-fractions of the methanolic leaf extract of *C. cainito* utilizing Ellman's method. Also, total phenolic content, total flavonoid content, scavenging activity, and reducing power were analyzed.

Methods:

The *C. cainito* methanolic leaf extract was kupchan-partitioned using hexane, chloroform, ethyl acetate, and methanol. TPC was evaluated using the Folin-Ciocalteu method, and TFC was also performed using the aluminum chloride method. The antioxidant activities were assessed using DPPH and FRAP assays for each fraction of *C. cainito.* The AChE inhibition was measured using Ellman's colorimetric assay.

Results:

Among the four sub-fractions of the methanolic leaf extract, ethyl acetate has the highest phenolic and flavonoid content, 140.438±15.007 µg Gallic Acid Equivalents[GAE]/mL and 100.009 ± 12.675 µg Quercetin Equivalent [QE]/mL, respectively. Ethyl acetate also showed significant DPPH scavenging activity with an inhibition value of 3.18 ± 2.53 ug/mL (p-value=0.9793 vs. standard ascorbic acid) and ferric reducing power of 134.1 ± 0.1 ug/mL. Interestingly, ethyl acetate (743.03 ± 232.98 ug/mL) showed no significant anti-AChE activity when compared to the standard drug, rivastigmine (384.43 ± 89.18 ug/mL) (p-value=0.0675).

Conclusions:

This study demonstrates the Ethyl Acetate fraction of *C. cainito* leaf extract exhibits the most potent biological activity. Furthermore, this study suggests that *C. cainito* leaf extracts show comparable results with the standard Rivastigmine as an effective natural source of AChE inhibitors.

Keywords: Antioxidant; *Chrysophyllum cainito*; Ellman's colorimetric assay; Total flavonoids; Total phenolics

PN-1107003-O

Chemical Composition and Potential Cytotoxic Mechanisms of *Camellia flava* (Pitard) Sealy leaves

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ABSTRACT

Introduction:

Golden camellia is a group of herbal materials belonging to the *Camellia* genus which was utilized as a refreshing and heat-clearing beverage, for treating diarrhea, and as a supportive treatment for cancer. In this current study, we aimed to analyze the chemical composition of *Camellia flava* (Pitard) Sealy and evaluate its cytotoxic effects.

Objectives:

Exploring the chemcial constituents of ethyl acetate leaf extract of *Camellia flava* (Pitard) Sealy (CFLEA) and its cytotoxic activity via *in vitro* and *in silico* studies.

Methods:

Camellia flava leaf was extracted exhaustedly with 70% ethanol. The total ethanolic extract was then partitioned with ethyl acetate to obtain ethyl acetate extract (CFLEA). The chemical composition of CFLEA were analyzed using GC-MS method. Next, the network pharmacological studies were conducted to investigate the anti-cancer mechanisms. Finally, cytotoxic activity was evaluated using the MTT straining method.

Results:

A total of 16 phytochemical compounds in CFLEA were found by GC-MS analysis. The molecular docking results indicated that PRCKB and MAPK9 were the two proteins with the strongest binding affinity to the compounds 3,4-divanillyltetrahydrofuran (-7.7 và -8.2 kcal/mol) và (*E*)-3,3'-dimethoxy-4,4'-dihydroxystilbene (-7.5 và -7.5 kcal/mol). The primary anti-cancer pathways of CFLEA may be the JNK and p38 MAP kinase pathway, the classical MAP kinase pathway, and the calcium signaling pathway. Finally, CFLEA exhibited cytotoxicity on breast and liver cancer cells in a dose-dependent manner, with IC_{50} values of 318.92 ± 12.27 and 291.69 ± 19.97 µg/mL, respectively.

Conclusions:

A total of 16 plant-derived compounds in CFLEA were identified and their structures were determined using GC-MS. The JNK and p38 MAP kinase pathway, classical MAP kinase pathway, and calcium signaling pathway could be the main pathways through which CFLEA exerted its inhibitory effects on cancer cell growth. Lastly, CFLEA demonstrated significant cytotoxicity and exhibited potent inhibitory effects.

KEYWORDS: *Camellia flava* (Pitard) Sealy; Chemcial composition; Cytotoxic effect; GC-MS; Network pharmacology

PN-1109001-O

Fibrinolytic Activities of *Lumbricus rubellus* Powder in Combination with *Sonchus arvensis* L. Leaf Ethanolic Extracts

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ABSTRACT

Introduction:

Current research reported lumbrokinase, an enzyme in earthworms (*Lumbricus rubellus*), has fibrinolytic activities. In addition, *Sonchus arvensis* is an antihypertensive and diuretic. It also contains flavonoids, one of the important substances as an antioxidant. Combining both substances might be beneficial in treating atherosclerosis due to the synergistic effect of fibrinolytic and antihypertensive activities.

Objectives:

This research aimed to characterize the enzyme activities in earthworm powders and observe their fibrinolytic activities, either alone or in combination with ethanolic extract of *S. arvensis* leaves.

Methods:

Sonchus arvensis leaves were dried, powdered, and macerated with ethanol 70%. The extracts were then tested: the organoleptic test, the distillation method for measuring the water content, and the Shinoda flavonoid test. Meanwhile, the molecular weight test of lumbrokinase was identified using the SDS-PAGE technique. Also, lumbrokinase was characterized by its activities with casein as substrate in different pH, temperature, substrate levels, and inhibitory tests. The zymogram method and fibrin plate test were utilized to analyze the fibrinolytic activities of both earthworm powder and a mixture of earthworm powder and *S. arvensis* leaf extracts.

Results:

The extracts identification showed that the *S. arvensis* leaf extracts meet the requirements of Indonesia Herbal Pharmacopeia and contain flavonoids, while lumbrokinase in the earthworm powder has a molecular weight range of 24-32 kDa and has optimum activities at pH 7 and temperature 37ºC. When case in was used as the substrate, lumbrokinase displayed Km 0.066 and Vmax 0.224. Furthermore, the addition of *S. arvensis* extract did not affect the Km value (0.068) and slightly decreased the Vmax (0.197). The zymogram and fibrin plate test showed that earthworms alone or in combination with *S. arvensis* extracts showed activities as a fibrinolytic agent.

Conclusions:

It can be inferred that the fibrinolytic activity of lumbrokinase and *S. arvensis* leaf extracts can be combined into a single dosage form.

KEYWORDS: Antioxidant; Fibrin plate; Flavonoid; Lumbrokinase; Zymogram

PN-1110001-O

Natural Product Databases in Herbal and Integrative Medicine: Bridging Traditional Knowledge to Modern Applications

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ABSTRACT

Introduction:

Herbal medicine, comprising traditional, complementary, and integrative approaches, utilizes plants for medicinal purposes. Natural product databases (NPDBs) have emerged alongside increasing scientific studies in herbal medicine, facilitating the transition of traditional knowledge to modern applications. While NPDBs aid drug discovery campaigns with comprehensive information, their structures require enhancement to foster scientific community engagement and prolong their lifespan.

Objectives:

This review aims to assess NPDB usage in research, pinpoint shortcomings, and propose improvements to support herbal medicinal practices and virtual screening for drug discovery.

Methods:

A literature search of the relevant terms to this review was used to identify the data used in this review as well as the databases. All databases were accessed from February-April 2024.

Results:

Literature searches identified 27 databases, evaluated for descriptions, search parameters, features, and accessibility. General NPDBs like COCONUT (COlleCtion of Open Natural ProdUcTs) serve referencing and screening, while smaller ones like ETM-DB (Ethiopian Traditional Medicine Database) provide relational and geographical data. Databases are well referenced and most of them have user friendly search parameters. Neglected features including full database downloading, maintenance details, and data statistics were observed. Despite good referencing and search parameters, enhancements like navigation videos could boost user engagement.

Conclusions:

NPDBs facilitate the convergence of traditional and modern medicine by providing essential data on compound structures and disease relationships, but improvements in database structures and approaches are necessary for increased user engagement. To enhance engagement, databases could offer submission pipelines, feature requests, bug reporting systems, and user communities.

KEYWORDS: Herbal database; Herbal medicine; Natural product; Traditional medicine; Virtual screening

PC-0401001-O

In silico and *in vitro* Studies of Potential Novel Vitamin K Epoxide Reductase (VKOR) Inhibitors Suggest an Updated Structure-activity Relationship

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ABSTRACT

Introduction:

Vitamin K epoxide reductase (VKOR) is an enzyme that contributes to the synthesis of several clotting factors and its inhibition is a well-known mechanism of anticoagulant action. Though the VKOR inhibitor warfarin remains essential and popular today, its adverse effects still make it a high-risk medication.

Objectives:

This study intends to identify novel compounds with predicted VKOR inhibition and pharmacokinetic stability as well as explain the mechanistic basis of their action.

Methods:

Pharmacophore modeling, drug likeness prediction, and molecular docking techniques were employed to find hits from existing compound libraries. Cell-based VKOR inhibition using the FIXgla-PC chimera reporter protein was then done to determine the most potent hits. The docked complexes of the top hits were subjected to molecular dynamics simulations to obtain protein-ligand interaction information at the atomic level.

Results:

Fourteen *in silico* hits were tested and showed *in vitro* activity at the micromolar level, led by compound A116 (IC_{50} = 6.6 μM). Trajectory data of the top hits show high hydrogen bonding occupancies with Asn80, Cys135, and Tyr139, while ligand binding free energies were most significant at residues Phe55 to Phe63, Leu120 to Leu128, and Cys135. Root-mean-square deviation (RMSD) measures suggest that VKOR inhibitors stabilize the luminal loop while root-mean-square fluctuation (RMSF) measures and network analyses add that inhibitors also reduce loop flexibility.

Conclusions:

The combined *in silico* and *in vitro* data suggest that VKOR inhibitors must have a bicyclic nucleus to elicit hydrophobic forces with residues 55 to 63 and 120 to 128 as well as extensively hydrogen bond with Asn80 and Tyr139 or Cys135. A side chain, preferably a ring, is required to interact with residues Phe83 to Phe87. An extra side chain, like warfarin's alkyl ketone, may not be essential. This proposed structure-activity relationship can serve as a useful guide for designing improved and novel VKOR inhibitors in the future.

KEYWORDS: Anticoagulants; Drug discovery; Molecular dynamics; Structure-activity relationship; Vitamin K; Warfarin

PC-0401002-O

Design, Synthesis and Evaluation the Bioactivities of Novel 1,3-Dimethyl-6-arylamino-1*H*-indazole Derivatives as Anticancer Agents

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ABSTRACT

Introduction:

The overexpression of indoleamine 2,3-dioxygenase 1 (IDO1), which catalyzes the cleavage and depletion of tryptophan in kynurenine pathway, has been reported to be associated with the prognosis and outcome prediction of the head and neck squamous cell carcinoma (HNSCC).

Objectives:

New 1,3-dimethyl-6-arylamino-1*H*-indazole compounds as IDO1 inhibitors were designed, synthesized and investigated the anticancer mechanisms of the most potential compound.

Methods:

Designed, and synthesized novel 1,3-dimethyl-6-arylamino-1H-indazole derivatives as IDO1 inhibitors based on the structure of IDO1 active site. Examined their anticancer activity on hypopharyngeal carcinoma cells (FaDu), squamous cell carcinoma of the oral tongue (YD-15), breast cancer cells (MCF7), and human dental pulp stem cells (HDPSC). Investigated the suppression of IDO1 expression of synthesized compounds. Performed docking studies; analyzed the possible anticancer mechanisms of the IDO1 inhibitors on the hypopharyngeal squamous cells via apoptosis inducing, and activated extracellular signal-regulated kinases (ERK) in mitogen-activated protein kinase (MAPK) pathways. Finally, investigated the cell mobility inhibition in wound healing assay downregulating MMP9, MMP2 in the metalloproteinase family.

Results:

Six IDO1 inhibitors, and anticancer agents having 1,3-dimethyl-6-arylamino-indazole structure were synthesized through only three simple steps with high yield (ranging from 42.8% to 49.8%). Three out of six compounds showed a significant cytotoxic effects on FaDu cell selectivity in hypopharyngeal cancer (HPC) (ranging from 1.87µM to 50µM). Particularly, compound 7 showed remarkably high toxic effect on FaDu cells with an IC_{50} value of 1.87 ± 0.08 µM. Moreover, compound 7 induced apoptosis by activation of cleaved caspase-3, cleaved poly (ADP-ribose) polymerase (PARP); and activated p-p42/44 in mitogen-activated protein kinase (MAPK) pathways; suppressed cell migration in wound healing assay and the expression of matrix metalloproteinase MMP9 and MMP2.

Conclusions:

Compound 7 is a potential IDO1 inhibitor that may be used for the treatment of hypopharyngeal carcinoma, and will become a good lead compound for further anticancer drug design and development projects.

KEYWORDS: Apoptosis; Cytotoxicity; 1,3-Dimethyl-6-amino-1*H*-indazole; FaDu; Hypopharyngeal carcinoma; IDO1

PC-0501001-O

Determination of Meropenem Concentration in Cerebrospinal Fluid for Therapeutic Doses Individualization in Central Nervous System Infections

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ABSTRACT

Introduction:

Meropenem is a carbapenem antibiotic commonly used in the treatment of central nervous system (CNS) infections. To limit antibiotic resistance as well as improve treatment effectiveness, especially in cases of severe CNS infections, it is necessary to monitor the drug concentration in cerebrospinal fluid (CSF), to promptly adjust the dose for patients. However, many factors can influence the pharmacokinetic of meropenem in CFS. Therefore, it is important to conduct a population pharmacokinetic modelling study of meropenem in order to build a correlation between meropenem concentrations in CSF and in human plasma. In this study, a quantitative method was developed using HPLC for the determination of meropenem in CSF.

Objectives:

Monitor the drug concentration in cerebrospinal fluid (CSF), to promptly adjust the dose for patients.

Methods:

The chosen analytical conditions included the use of C18 column (4.6 mm x 150 mm, 5 µm), mobile phase consisting of 0.01M phosphate buffer (pH 7.4) and methanol (25:75, v/v) at room temperature (25°C), UV detection at 298 nm. Cefuroxime sodium was used as internal standard.

Results:

With the chosen conditions, meropenem can be determined in CFS at concentrations ranging from 0.1 to 50 ppm within 12 minute runtime. The analytical method validation was done according to FDA guidelines. Results showed good specificity, precision and accuracy with a relative standard deviation of 2.46% -14.97% and a recovery of 86% - 111%. It was interesting to find out that meropenem can be unstable in acetonitrile as well as methanol. The sample preparation steps was optimised accordingly to obtain the stability of meropenem in analytical sample.

Conclusions:

The developed quantitative method for meropenem was proved compatible for application in population pharmacokinetic modelling study. The correlations between the applied dosage and CSF concentration as well as plasma concentration will enable therapeutic dose individulization in CNS infections.

KEYWORDS: Cerebrospinal fluid; Determination; High-performance liquid chromatography; Meropenem

PC-0502001-O

Development and Validation of Bioanalytical Method of Dolutegravir in Dried Blood Spot using High Performance Liquid Chromatography – Photodiode Array

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ABSTRACT

Introduction:

Dolutegravir (DTG) based antiretroviral therapy is a first-line regimen that recommended by WHO since 2019 for people living with HIV. However, the emergence of DTG-resistant HIV can significantly reduce the efficacy of current DTG-containing antiretroviral regimen. Although the level of dolutegravir resistance is still lower than resistance to NNRTI antiretrovirals, this number may continue to increase along with the potential for widespread transmission of DTG-resistant HIV. Therefore, it is necessary to monitor drug levels in patient who receive DTG-containing antiretroviral regimen to ensure that drug levels in the blood are in line with the therapeutic effect obtained so that treatment goals can be achieved and resistance can be detected early. Prior to monitor the drug level, development and validation of the bioanalytical method was needed.

Objectives:

The aim of this study was to obtain an optimum sample preparation and analysis condition of DTG in dried blood spot (DBS) using high performance liquid chromatography–photodiode array (HPLC-PDA) that validated based on the FDA guidelines (2018) and EMA guidelines (2022).

Methods:

Twenty LAB strains were isolated from fermented foods and identified based on morphological characteristics, Gram staining, and catalase reaction. Acid tolerance (pH 2 and pH 3), bile tolerance (0.3% w/v bile salts), auto-aggregation, and co-aggregation assays were used as restrictive criteria to evaluate the probiotic potential of LAB. The antagonistic activity of LAB against *H. pylori* ATCC 43504 was assessed by using a disc diffusion assay and the 96-well plate co-culture assay urease activity of LAB with *H. pylori* by red phenol method.

Results:

DBS sample preparation was carried out by protein precipitation method than added by carbamazepine as internal standard (IS) and extracted by methanol. The extract evaporated to dryness at 60°C and reconstituted with acetonitrile-phosphate buffer (45:55) as mobile phase. The quantification analysis was performed using HPLC-PDA with C18 column (Waters, Sunfire™ 5µm; 250 x 4.6mm) at 25°C. Twenty µL of sample was injected using autosampler, eluted by isocratic flow at 0.8 mL/min using mobile phase, and detected at 257 nm.

Conclusions:

The microsampling using dried blood spot could quantify dolutegravir with carbamazepine as IS and the application of this simple and sensitive method will then simplify the therapeutic drug monitoring activities while preventing the spread of DTG-resistant HIV.

KEYWORDS: Carbamazepine; Dolutegravir; Dried blood spot; High performance liquid chromatography; HIV; Therapeutic drug monitoring

PC-0502002-O

Development and Validation of Glimepiride Analysis Methods in Dried Blood Spots (DBS) using High Performance Liquid Chromatography for National Health Security

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ABSTRACT

Introduction:

Diabetes poses a health risk to the country. Glimepiride is one of oral antidiabetic to address national health threats. The dried blood spot (DBS) technique for analysis of glimepiride has beneficial for therapeutic drug monitoring because it is minimally invasive, less volume and simple collection method. Simultaneously, analysis using high performance liquid chromatography (HPLC) aims to obtain optimal conditions and validated analytical methods.

Objectives:

Glimepiride analysis using the DBS technique approach and the HPLC-UV system to get optimal conditions for method validation data with glipizide as a standard.

Methods:

Glimepiride analyses were performed using HPLC with C18 Shimadzu column 5 µm; 150 x 4.6 mm. The matrix sample used is DBS and glipizide as the internal standard. Optimum analytical conditions were obtained on a mobile phase using acetonitrile – buffer natrium dihydrogen phosphate 8 mM pH 4.0 (50:50, v/v) solution with a flow rate of 1.0 mL/min, and detected at wavelength of 228 nm.

Results:

The calibration curve ranged from 0.1 to 50 µg/mL, and the lower limit of quantification (LLOQ) achieved was 0.1 µg/mL. Sensitivity, selectivity, linearity, carry-over, stability, recovery, and %diff value of accuracy test for LLOQ, QCL, QCM, and QCH concentrations: 10.38% - 13.27%; 8.09% - 13.46%; 11.34% - 14.71%; 10.35% - 14.86%, respectively and %CV of precision test: 1.05%; 2.04%; 1.28%; and 1.53%, respectively. %diff value of test accuracy between-run concentrations of LLOQ, QCL, QCM, and QCH: 5.49% - 13.62%; 10.07% - 10.99%; 10.82% - 1450%; 14.16% - 14.91%, respectively and %CV of precision: 3.18%; 0.32%; 1.55%; and 0.25%, respectively were found to be within the suitable limits and fully validated by the guidelines from the United State Food and Drug Administration 2018.

Conclusions:

The method developed successfully passed all of the U.S. FDA's 2018 full validation guidelines, with the LLOQ achieved for glimepiride was 0.1 µg/mL.

KEYWORDS: Dried blood spot; Glimepiride; Glipizide; HPLC; National health security

PC-0502003-O

Monitoring 5-Fluorouracil Levels Using the Dried Blood Spot Method in Breast Cancer Patients

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ABSTRACT

Introduction:

5-Fluorouracil (5-FU) is a chemotherapy drug used in the treatment of solid tumors, including breast cancer. Monitoring 5-fluorouracil levels in blood is essential due to its narrow therapeutic range, high individual variability, non-linear pharmacokinetics, dosage calculations based on body surface area, and susceptibility to toxicity influenced by individual factors such as enzyme polymorphism. We conducted an observational study to analyze the concentration of 5-FU through microsampling and its associated adverse events in breast cancer patients.

Objectives:

This study was conducted to monitor 5-Fluorouracil blood levels in breast cancer patients using dried blood spots as a biosampling method and to correlate them with adverse events experienced by patients.

Methods:

There were 2 groups of patients in this study: patients receiving intravenous chemotherapy of 5-FU and oral chemotherapy with capecitabine as 5-FU prodrug. Sample from DBS was analyzed to obtain concentration of 5-FU using LC-MSMS method with propylthiouracil as internal standard. This method has been fully validated by Amarta et.al in their research. All patients were also interviewed to find out adverse events experienced during 5-FU treatment. Those adverse events were evaluated based on Common Terminology Criteria for Adverse Events version 5.0. Correlation between 5-FU concentration and adverse events encountered by the patients was determined.

Results:

The concentrations of 5-FU from oral chemotherapy were consistently lower than those from intravenous chemotherapy. There was a correlation between 5-FU concentrations from intravenous chemotherapy and the occurrence of adverse events. The most common adverse events observed in intravenous chemotherapy were diarrhea or constipation, fatigue, and alopecia. Hand-foot syndrome was the most frequently occurring and significantly correlated toxicity in patients receiving oral chemotherapy.

Conclusions:

This validated DBS method can be applied for therapeutic drug monitoring of 5-FU and may be a reference for clinicians regarding adverse events that appear in patients.

KEYWORDS: Adverse event; Breast cancer; Drug monitoring; 5-Fluorouracil

PC-0502004-O

Development and Validation of Bioanalytical Quantification Method for Amikacin in Dried Blood Spot (DBS) using Ultra High Performance Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS)

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ABSTRACT

Introduction:

Amikacin (AMK) as an aminoglycoside antibiotic is known to have irreversible side effects including nephrotoxicity and ototoxicity particularly in pediatric and geriatrics. Study shows that AMK should not exceed 10 µg/mL in the blood. It is highly recommended to assess drug levels of AMK through therapeutic drug monitoring (TDM) for prevention by adjusting the dosage. Previous studied methods of TDM for AMK is through plasma using LC-MS/MS, which requires a large volume of blood considering neonates are the most prescribed group.

Objectives:

This study aims to develop an optimum, validated bioanalytical and preparation method for analyzing AMK levels in the blood using kanamycin as internal standard, emphasizing the reduction of blood volumes required for analysis.

Methods:

Spiked blood sample was spotted on DBS cards (Whatman 903®) and prepared with protein precipitation using 200 µl acetonitrile with added 5% ammonia solution. The extract was evaporated with nitrogen for 20 minutes in 65ºC, then the residue was reconstituted with the mobile phase and analyzed using LC-MS/MS (Waters) with C18 column (Acquity® 2.1 x 100 mm; 1.7 µm) in 30ºC. The sample was auto sampled with the injection volume of 10 µl. The elution process was conducted in 0.1 mL/min flow rate with acetonitrile (ACN)-formic acid 0.1% (15:85) as the mobile phase. Kanamycin was used as an internal standard.

Results:

The optimum chromatography condition was already studied and chosen to be used in this study. Acetonitrile with added 5% ammonia solution was found to be the most optimum method for preparation. The presented method meets the validation parameters regulated by US FDA and EMA.

Conclusions:

This study developed and validated the method to analyze AMK using LC-MS/MS. Amikacin was optimally extracted from DBS using acetonitrile with addition of 5% ammonia solution and analyzed with achieved LLOQ of 0.5 µg/mL.

KEYWORDS: Amikacin; Chromatography; DBS; Kanamycin; LC-MS/MS; TDM

PC-0502005-O

Effect of Freeze-Drying and Spray-Drying on the Physicochemical Composition of *Thunbergia laurifolia* Leaf Extract

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ABSTRACT

Introduction:

Thunbergia laurifolia leaves are used in Thai traditional medicine for the treatments of fever and mouth ulcers. Among various processing methods, drying techniques play a crucial role in determining the physicochemical properties and chemical composition of plant extract.

Objectives:

This study aims to compare the physicochemical properties and chemical composition of *T. laurifolia* leaf extracts obtained from two drying methods: freeze-drying and spray-drying.

Methods:

The dried *T. laurifolia* leaves were boiled in water at 95 °C for 2 hours, then filtered and dried on water bath to obtain a concentrated extract. The concentrated extract was separately dried using two drying methods: freeze-drying and spray-drying. For spray-drying, maltodextrin was used as an absorbent while freeze-drying was conducted without any additive. The physical characteristics including color, odor, and physical state of both extracts were manually observed. The solubilities were evaluated by shake flask method. The chemical characteristics and compositions of both extracts were examined using ultraviolet (UV) spectroscopy, attenuated total reflectance Fourier transform infrared (FT-IR), thin-layer chromatography (TLC), and high-performance liquid chromatography (HPLC).

Results:

Extracts obtained from freeze-drying and spray-drying showed no difference for water solubility at 37 °C. Their UV spectra at 200-400 nm, TLC and HPLC fingerprints, and chemical marker contents showed no significant difference. Rosmarinic acid was found to be a major marker in both extracts. IR spectra of both extracts showed similar general fingerprints region, however, the extract obtained from spray-drying showed additional peaks that corresponded to maltodextrin.

Conclusions:

Extracts from freeze-drying and spray-drying methods had similar physical and chemical properties. Further investigation is required for biological activity testing to support these findings.

KEYWORDS: Chemical composition; Freeze-drying; Physicochemical properties; Rosmarinic acid; Spray-drying; *Thunbergia laurifolia*

PC-0502006-O

Development of LC–MS/MS Method for the Simultaneous Quantification of Valproic Acid and Phenytoin in Human Plasma and Application to Study Pharmacokinetic Interaction in Epilepsy Patients

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ABSTRACT

Introduction:

Therapeutic drug monitoring of valproic acid and phenytoin concentrations in patient plasma is extremely beneficial for improving clinical choices, avoiding adverse reactions, and optimizing treatment for individual patients.

Objectives:

A rapid and sensitive liquid chromatographic tandem mass spectrometer (LC-MS/MS) method was developed and validated for the simultaneous quantitative determination of valproic acid and phenytoin in human plasma to provide a strong tool for prospective bioequivalence studies and therapeutic drug monitoring.

Methods:

Negative electron spray ionization mode with selective ion recording was employed to determine m/z 142.98 and m/z 250.93 for valproic acid and phenytoin, respectively. Betamethasone was selected as an internal standard for valproic acid analysis because it shares structural similarities, stability, availability, and compatibility with analytical techniques. The protein precipitation method was applied as a simple, cheap, and fast method. The separation was performed using a Phenomenex Synergi Hydro-RP (4 µm, 250 x 4.6 mm) with an isocratic mobile phase consisting of acetonitrile-water (75:25) at a flow rate of 0.8 mL/min.

Results:

The bioanalytical method was successfully validated according to US-FDA guidelines with the lower limit of quantification for valproic acid and phenytoin being 3.60 µg/mL and 0.72 µg/mL, respectively, resulting in a recovery of over 85% for most analytes. The calibration curves for valproic acid and phenytoin in spiked human plasma were linear over the ranges 3.60-144 µg/mL, and 0.72-28.80 µg/mL, respectively, with correlation coefficients greater than 0.98 for both analytes, which is compatible with their therapeutic range in human plasma and allows quantification at various sample periods and medications. This assay was successful in evaluating the levels of these analytes in human plasma from 105 epileptic patients.

Conclusions:

Successfully developed an LC-MS/MS methodology renowned for its remarkable accuracy, robust reproducibility, heightened sensitivity, and specificity, holding promise for pharmacokinetic investigations of valproic acid and phenytoin and routine monitoring in epileptic patients.

KEYWORDS: Epilepsy; Human plasma; LC/MS-MS; Phenytoin; Valproic acid

PE-1301001-O

Factors Influencing the Score of Core Competency Examination for Pharmacist Licensure Among Thai Pharmacy Students at Huachiew Chalermprakiet University

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ABSTRACT

Introduction:

Since 2014, a pharmacist licensure examination in Thailand has been necessary to pass both the core competency exam at the end of the 4th year and the specific competency exam at the end of the 6th year. The Pharmacy Licensure Examination Core Competency 1 (PLE-CC1) is one of the core competency exams. The unpassed PLE-CC1 led to being unable to examine the specific competency exam.

Objectives:

This study aims to investigate the factors affecting the PLE-CC1 score and establish a predictive model predicting the PLE-CC1 score of Thai pharmacy students at Huachiew Chalermprakiet University (HCU), which is important for pharmacy students and faculty to plan and prepare for PLE-CC1.

Methods:

This is an analytical study collecting all the data of the students passing PLE-CC1 from the database of the faculty of pharmacy at HCU. Factors including gender, age, grade point average (GPAX), grade point average of the pharmacy program (GPA-PP), and frequency of PLE-CC1 were analyzed. Statistical analysis was performed by STATA software using descriptive statistics and regression. This study protocol was approved by the Ethic Committee of HCU (No.HCU-EC1380/2566).

Results:

The PLE-CC1 score of 106 students had the median [interquartile], minimum, and maximum of 67 [9], 60, and 83 scores, respectively. The GPAX, GPA-PP, and frequency of PLE-CC1 had significant relationships with PLE-CC1 scores (P-value < 0.05 for all). For the multiple regression analysis, GPA-PP was only a factor significantly influencing the PLE-CC1 scores. The predictive equation was: PLE-CC1 = (8.94 x GPA-PP) + 41.6. Although the minimal GPA-PP is 2.00, which is the graduation requirement, there is a chance of being unable to pass PLE-CC1.

Conclusions:

The improvement of GPA-PP was the potential key to achieving the pharmacist licensure examination for students to prepare for an examination and for faculty to promote and support their students via the policy.

KEYWORDS: Core competency examination; Grade point average; Pharmacist licensure; Pharmacy students; Thai

PE-1301002-O

Pharmacy Education in Myanmar: The Past, the Present, and the Future

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ABSTRACT

Introduction:

Myanmar, a developing country and one of the ASEAN countries, is located in Southeast Asia. There are only two universities offering undergraduate and postgraduate pharmacy programs in Myanmar.

Objectives:

This article aimed to describe an overview of pharmacy education, including the challenges and barriers to pharmacy education in Myanmar.

Methods:

A narrative review was carried out to describe the overview containing the past, the present, and the future of pharmacy education in Myanmar. The challenges and barriers to understanding the situation were also described as supporting the transformation of pharmacy education in Myanmar.

Results:

Pharmacy education in Myanmar is a content-based education system. Courses in undergraduate professional subjects in the curriculum are related only to pharmaceutical sciences, but those related to clinical sciences and social and administrative sciences are not met. Clinical pharmacy is implemented in postgraduate programs, but it is not well-developed in Myanmar. The updating of the curriculum and the establishment of the pharmacy council are the challenges. The limited budget, the fact that the right people are not assigned to the right places in some pharmacy areas in pharmacy schools, and the requirements of some specialized academic staff, especially in clinical pharmacy and social and administrative pharmacy areas, are barriers to the transformation of pharmacy education in Myanmar.

Conclusions:

The rapid and ongoing change in pharmacy around the world forces pharmacy education in Myanmar to adapt to patients' safety and efficiency in drug utilization. It is concluded that a four-year pharmacy program should be revised to accomplish the challenges worldwide. The efforts of academic leaders and policymakers are essential, and they are highly responsible and accountable stakeholders for the transformation of pharmacy education in Myanmar.

KEYWORDS: Barriers; Challenges; Curriculum; Myanmar; Pharmacy education

PE-1301003-O

Evaluation of the First Implementation of Virtual Reality Program in Clinical and Community Pharmacy Courses: A Single Centre Experience

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ABSTRACT

Introduction:

Due to the limited capacity of stakeholders to facilitate experiential learning for bachelor's students, an effort has been made by the Pharmacy Faculty of the University of Surabaya by implementing virtual reality technology (VRT) for the very first time. Concerns about the attainment of fundamental aspects of experiential learning, particularly the sense of immersion and situated learning, have been raised in our institution.

Objectives:

This study aims to describe the students' perception towards the fundamental aspects of VRT implementation.

Methods:

Nine cases in VRT were implemented in the integrated courses of respiratory and infection disorder (IC, third year course), responding to symptoms (RS, third year course), and prescription services (PS, fourth year course). Students could only access the VRT at a predetermined time. A questionnaire consisting of 16 closed-ended questions (with 7-Likert scale response) and two open-ended questions was distributed and verbal consents were obtained before students completed the questionnaire. The closed-ended questions were distributed in eight domains, including ease to use, enjoyment, general attitude, intention to use in the future, sense of immersion, experiential learning, situated learning, and constructivism.

Results:

A total of 395 responses were received (response rate 56.27%). The Cronbach's Alpha for all domains ranged from 0.836-0.941. Not more than 5% of total responses indicated disagreement (Likert scale <4) towards all questions. Moreover, no domains with average score below 5 was found. Among the three groups of cohorts, the lowest score in all domains was found in PS group, and this could be related to frequencies of using VRT. Internet connection was acknowledged as the main limitation to implement VRT.

Conclusions:

The VRT was well received by students without compromising the attainment of the fundamental aspects of experiential learning. Efforts to improve the speed of internet connection should be made to further enhance an optimal VRT implementation.

KEYWORDS: Experiential learning; Pharmacy education; Sense of Immersion; Situated Learning; Virtual Reality

PE-1301004-O

Investigation on the Perception about Professionalism of Pharmacy Students of University of Medicine and Pharmacy at Ho Chi Minh City

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ABSTRACT

Introduction:

Professionalism is one of the required competencies according to the Basic Competency Standards of Vietnamese Pharmacists. However, this subject has not been integrated in pharmacy curriculum in Vietnam.

Objectives:

This study aims to investigate the perception of pharmacy students of the University of Medicine and Pharmacy at Ho Chi Minh City (UMP) about professionalism.

Methods:

The Pharmacy Professionalism Instrument (PPI), consisting of 18 items with scores given on a 5-point Likert scale, was translated into Vietnamese using Beaton's guidance. The Vietnamese version was tested internal reliability with an accepted Cronbach's alpha (α) at least 0.6. The questionnaire with acceptable reliability was then used to survey pharmacy students from year 1 to year 5 at the Faculty of Pharmacy of UMP during May 2023 to examine the students' attitude about professionalism.

Results:

The final Vietnamese version of 18-item PPI questionnaire had good internal reliability with α=0.811 (n=73 students). The results of survey on 424 students showed good level of professionalism perception of pharmacy students of UMP with 13/18 questions (72.2%) having average score greater than 4. The average perceived scores of each domain of professionalism were as follows: "Altruism" (12.2±1.8), "Accountability" (7.9±1.4), "Duty" (7.9±1.5), "Excellence" (21.6±2.3), "Honor and integrity" (7.8±1.6) and "Respect for others" (18.0 ± 2.0). Except "Respect for others" domain, each of the 5 remaining domains had one item with lower score. There was no difference in the professionalism scores between pharmacy students from year 1 to year 5 ($p>0.05$).

Conclusions:

Pharmacy students of UMP had good perceptions about professionalism in general, which did not differ between years. Problems related to 5 items with lower scores should be additionally educated during pharmacy training time at university.

KEYWORDS: Perception; Pharmacy; Professionalism

PE-1301005-O

RxTIFIED: An Educational Game Application to Enhance Student Learning on Clinical Pharmacology Among Pharmacy Students

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ABSTRACT

Introduction:

The unprecedented challenges of the COVID-19 pandemic compelled the students and teachers to adopt remote and hybrid learning environments, causing a disruption in the conventional learning and teaching modes. The sudden transition introduced effects such as reduced attention, focus, time management and critical thinking and slowed learning progress. This may have also hindered the learning capacity in mastering complex and information-loaded subjects like Pharmacology, which is imperative in guaranteeing the optimal treatment of patients. Pharmacy students and graduates affirmed the necessity of improving current teaching methods and incorporating other approaches. One strategy is the integration of Game-Based Learning (GBL) in the academe, a method with limited research and rarely utilized in the Philippines.

Objectives:

Hence, this study explores the potential in learning pharmacology concepts among pharmacy students using the game application, RxTIFIED, developed by the researchers.

Methods:

The usability, interactivity, functionality, acceptability and the students' perceptions and attitude to the game were determined through an explanatory sequential design using a survey questionnaire distributed to 4th year pharmacy students after using the application. It consists of single-choice, closed-ended questions for the quantitative phase and open-ended response questions for the qualitative phase that were. Data gathered from the quantitative and qualitative phases were analyzed by correlating and identifying emerging themes.

Results:

Results revealed that the respondents perceived RxTIFIED as beneficial to their Pharmacology learning experience, evidenced by high Likert scale mean scores of 4.93, 4.58, 5.45, 5.46, for usability, interactivity, functionality, and acceptability, respectively. The qualitative data shows that accessing RxTIFIED could be affected by intrinsic and extrinsic factors, while it also has considerable strengths and weaknesses which contribute to overall utility of the game.

Conclusions:

Ultimately, RxTIFIED as an innovative educational game application possesses high potential in facilitating Pharmacology learning among pharmacy students in the Philippines. It leverages against traditional learning methods in providing a more enjoyable approach in preparing the students for real-world professional challenges in the healthcare industry.

KEYWORDS: Educational game application; Game-based learning; Gamification; Pharmacology; Serious gaming; Traditional learning

PE-1303001-O

Mental Health Issues, Their Associated Factors and Demand for Mental Health Services Among Pharmacy Students: A Mixed-Method Study

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ABSTRACT

Introduction:

The increasing prevalence of mental health issues among students has led to unpredictable consequences. In Vietnam, most of the research primarily focuses on medical students, with limited attention given to pharmacy students.

Objectives:

This research aimed to identify the prevalence of mental health issues, determine associated factors, and explore the demand for developing a mental health support program among pharmacy students at the University of Medicine and Pharmacy at Ho Chi Minh City (UMP).

Methods:

A mixed-method study was conducted from October to December 2023, comprising a cross-sectional anonymous online survey with a DASS-21 questionnaire (Phase 1), and a qualitative approach using semi-structured interviews (Phase 2) with students from UMP. After Phase 1, the Bayesian Model Averaging method was used for data analysis to identify potential factors related to the students' mental health issues; in Phase 2, participants' perspectives were transcribed verbatim and content analysis was used to identify main themes related to mental health issues and demand for mental health services.

Results:

Results from 803 survey responses and 24 interviews revealed that over 50% of students experience at least one of the three mental health issues: stress, anxiety, and depression. Furthermore, up to 95.1% of students acknowledged the necessity of implementing a mental health support program. In addition, the research identified four primary categories of factors influencing pharmacy students' mental health: personal, social, environmental, and academic factors.

Conclusions:

The concerning mental health status of pharmacy students underscored the necessity of developing mental support measures tailored to this group.

KEYWORDS: Associated factors; Mental health; Mental health support; Pharmacy student

PE-1305001-O

Assessment of Undergraduate Pharmacy Student Learning Styles Using the VARK Questionnaire

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ABSTRACT

Introduction:
Learners can be divided into many learning style categories using a range of terminologies and methodologies. Understanding individual learning styles is crucial for enhancing academic achievement.

Objectives:
This study aimed to identify the preferred learning styles among undergraduate pharmacy students at the Faculty of Pharmacy, Universiti Teknologi MARA (UiTM) Selangor Puncak Alam Campus, and investigate the correlation between these preferences and gender, year of study, and academic performance.

Methods:
A total of 258 respondents were sampled using simple random sampling across four cohorts (84.1% female and 15.9% male). The Visual, Aural, Reading/writing, and Kinesthetic (VARK) Questionnaire was employed to assess learning styles.

Results:
217 female and 41 male students participated with 93% of them have CGPA more than 3. Results indicated that 65.1% of respondents preferred unimodal learning, with 34.9% favoring multimodal approaches and 6.2% chose trimodal as their most preferred learning style. Kinesthetic (K) learning was the most preferred (37.6%), while Reading/writing (R) was the least preferred (33.7%). The Chi-square test of independence revealed that there was a significant correlation between gender and the preferred learning style ($p = 0.002$). However, no correlations were observed with year of study ($p = 0.877$) or academic performance ($p = 0.989$) suggesting that academic performance does not differ between the multimodal and unimodal learning approaches.

Conclusions:
Overall, the majority of pharmacy students exhibited unimodal learning preferences, with kinesthetic learning being predominant and reading/writing being less favored. The presence of multimodal learners underscores the importance of employing diverse teaching techniques to accommodate varied learning styles among pharmacy students.

KEYWORDS: Academic performance; Learning style; Pharmacy students; VARK

PE-1401001-O

Developing International Industrial Pharmaceutical Training in Thailand

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ABSTRACT

Introduction:

College of Pharmacy, University of Hawaii at Hilo and College of Pharmacy, Rangsit University had signed the agreement to collaborate research and pharmacy education. International industrial pharmaceutical training was developed and encourages students to participate.

Objectives:

This is a report of training journey as a preceptor. The training aimed to develop pharmaceutical industry competency for pharmacy students.

Methods:

Six weeks training was organized and planned. The learning activities were scientific knowledge including pharmaceutics, pharmaceutical technology, quality control, and analytical techniques. Students and preceptors discuss and plan for learning activities to fulfil students' expectations.

Results:

From 2016 to 2024, there were eleven US pharmacy students engaged in this program. The activities guided students to develop require competency for pharmaceutical industry, for example, project management, teamwork, problem solving and communication skills. In addition, manufacturing visits were arranged for the students. By the end of training students gained laboratory skills and experience in formulation development and evaluation. Assessment was performed both for students and preceptor through web-based evaluation form.

Conclusions:

The training program also expand viewpoints in pharmacy areas for students and teaching and coaching skills for preceptor.

KEYWORDS: Advance pharmacy practice experience; International industrial pharmaceutical experience; Pharmacy competency

POSTER PRESENTATION

POSTER PRESENTATION SCHEDULE
(Phayathai Grand Ballroom 4)

To be eligible for awards, all presenters must be present at their posters during the designated presentation time. Posters (A0 size) should be displayed from 8:30 AM to 5:00 PM and must be removed by 5:30 PM on June 12, 2024.

Board No.	Presentation Code	Title	Contributors (Presenter)	Presentation date/time	Country
1.	PP-0801101-P	*In silico* Evaluation of the anti-angiogenic potential of uvaol	Simpauco JL, Billones JB, Vasquez RD., Castillo AL*	June 12, 2024 15.15-16.15	Philippines
2.	PP-0801102-P	Evaluate the acute, subchronic toxicity, and protective effect of *Butea superba* Roxb. extract in the sodium valproate-induced hypogonadism in Swiss albino male mice	Nguyen H, Nguyen B, Khuu M, Nguyen D, Phan N, Truong M, Nguyen M, Nguyen T., Mai H*	June 12, 2024 15.15-16.15	Vietnam
3.	PP-0805101-P	Characterization of neuroprotective mechanism of several marine pigments against cell death pathways in HT-22 cells	Nguyen DT*, Serive B, Ruchaud S, Bach S	June 12, 2024 15.15-16.15	Vietnam
4.	PP-0805102-P	Anti-allergy effect of the methanolic flower extract of red *Ixora siamensis* Wall ex. G. Don on dinitrofluorobenzene-induced allergic contact dermatitis in mice	Natividad M*, Cornista V, Pichay J, Regoso S, Silos P, Tabisola J, Corpuz M.*, Mitra I	June 12, 2024 15.15-16.15	Philippines
5.	PP-0805103-P	*In vitro* determination of the antiproliferative and apoptotic activity of the Philippine spider venom fractions against breast cancer cell lines (MCF-7)	Caringal MC, Gutierrez ZM, Parilla FT, Devanadera MP, Guevarra LA, Santiago-bautista M, Daya ML*	June 12, 2024 15.15-16.15	Philippines
6.	PP-0805104-P	Design, synthesis and evaluation the bioactivities of novel 1,3-dimethyl-6-[(4-substituted) benzylamino]-1H-indazole derivatives as anticancer agents	Hoang V, Nguyen TT, Truong MC, Le LT, Tran LH, Nguyen HT, Le TQ, Yoo H, Tran P*	June 12, 2024 15.15-16.15	Vietnam
7.	PP-0805105-P	*in vitro* and *in vivo* Antihyperglycemic potential of santol (*Sandoricum koetjape* (Burm.f.) Merr.) methanolic leaf extract	Sison C, Sotto A, Torres B, Valdez J, Villareal A, Villalobos O, Vasquez R*	June 12, 2024 15.15-16.15	Philippines
8.	PP-0805106-P	Investigating anti-inflammatory potential of clove oil and mangosteen extract in synergistic manner with lipopolysaccharide-stimulated RAW 264.7 macrophages	Madardam J, Auranwiwat C, Muangman T, Thong-on P, Dangmanee N-, Kaewiad K-*	June 12, 2024 15.15-16.15	Thailand
9.	PP-0806101-P	GSK-3β-Targeting fisetin promotes melanogenesis in B16F10 melanoma cells and zebrafish larvae through β-catenin activation	Nayeong K, Ilandarage Menu Neelaka M, Gi-young K*	June 12, 2024 15.15-16.15	Republic of Korea

Board No.	Presentation Code	Title	Contributors (Presenter)	Presentation date/time	Country
10.	PP-0806103-P	Isolation and identification of the active compound in *Streptomyces* sp. GMY01 bacteria as anti breast cancer agent by *in vitro* study	Febriansah R*, Mustofa M	June 12, 2024 15.15-16.15	Indonesia
11.	PP-0807101-P	*Morus alba* L. extract suppression of cell proliferation in SH-SY5Y human neuroblastoma cells	Diah SH*, Lim SS, Naim N	June 12, 2024 15.15-16.15	Brunei
12.	PP-0807102-P	Novel 2-oxoindoline-based acetohydrazides: design, synthesis, and bioevaluation as antitumor agents	Phan Thi Phuong D*, Duong Tien A, Nguyen Hai N	June 12, 2024 15.15-16.15	Vietnam
13.	PP-0807103-P	The effects of finger root extract on the genes expression that related to hepatocellular carcinoma after induced by hepatitis B x antigen	Ngarmsom P, Kohkayasit W, Sa-ngiamsuntorn K	June 12, 2024 15.15-16.15	Thailand
14.	PP-0807104-P	Assessment of the cytotoxicity, cell migration effect, and apoptotic modulation of acteoside and plantamajoside on human breast adenocarcinoma (MCF-7)	Cabatit KC, Carandang LH, Saragpon DP, Minalang KG, Paulin JP, Devanadera MP, Daya ML*	June 12, 2024 15.15-16.15	Philippines
15.	PP-0807105-P	Establishment of an intracranial xenograft model from colorectal cancer in irradiated mice	Nguyen ST, Tran TT, Nham LT, Pham C, Tran LP, Do CQ, Nguyen VA, Nguyen NN, Nguyen LT, Bozko P, Nguyen TL, Nguyen LT*, Bui CK	June 12, 2024 15.15-16.15	Vietnam
16.	PP-0812101-P	Isolation of phytochemical compounds from *Crinum latifolium* and network-pharmacology investigation of the potential mechanism on benign prostatic hyperplasia	Thuy NH, Binh V, Dat TV, Minh LN, Dang N, Sabet C, Nhi LH, Nhut TM, Tu VL*	June 12, 2024 15.15-16.15	Vietnam
17.	PP-0904101-P	Rutin: A potential therapeutic agent in countering lung fibrosis induced by bleomycin via TGF-β receptor inhibition	Wisurumuni Arachchilage Hasitha Maduranga K, Gi-young K*	June 12, 2024 15.15-16.15	Korea
18.	PP-0906101-P	Overview of blood pressure, supplement consumption habits, and lifestyle of runner at University of Indonesia	Larasati AL, Sauriasari R.*, Yanuar A.	June 12, 2024 15.15-16.15	Indonesia
19.	PP-0908102-P	Relationships between body mass index and children's stool at a preschool in northern Vietnam	Vu HT, Anh NN*, Le HT, Ngan LT, Linh DD	June 12, 2024 15.15-16.15	Vietnam
20.	PP-1002101-P	Growth characteristics and morphology of frozen-thawed porcine oviductal epithelial cells and their application in cytotoxicity tests of kratom leaf juice using MTT assay	Wiphatkrut P, Tubtaing C, Malithong U, Kamlangpat N, Chuen-im T*	June 12, 2024 15.15-16.15	Thailand
21.	PP-1002102-P	*in vitro* activities of leaf and root extracts of *Catharanthus roseus* (L.) G. Don. on human peripheral blood mononuclear cells	Nguyen TT*, Luong VT.	June 12, 2024 15.15-16.15	Vietnam

Board No.	Presentation Code	Title	Contributors (Presenter)	Presentation date/time	Country
22.	PP-1004101-P	Exploring the biosafety of extracts from the aerial parts of *Polygonum minus*	Deng X, Chan K, Ismail N, Abu Bakar M*	June 12, 2024 15.15-16.15	Malaysia
23.	PP-1005101-P	Assessing the chronic effects of pharmaceutical pollutants on the survivability, regenerative ability, and behavioral changes of Malaysian polychaetes	Razali SM, Wan Ismail WI, Idris I, Husain N, Abdul Hamid H*	June 12, 2024 15.15-16.15	Malaysia
24.	BB-0602101-P	Genetic polymorphism of PPAR-γ and its impact on the response to anti-diabetes drugs in diabetes mellitus type 2 patients	Khalisa A, Tuba S*, Suryanti MR	June 12, 2024 15.15-16.00	Indonesia
25.	BB-0602102-P	Identification of biomarkers for treatment resistance in breast and ovarian cancer patients using transcriptome datasets	Kusalasaiyanon C, Pitinanon K, Hawhan W, Taechawattananan P, Yodsurang V*	June 12, 2024 15.15-16.00	Thailand
26.	BB-0602103-P	Investigation of LINE-1 methylation level as a biomarker of lung cancer: Systematic review and meta-analysis	Pattanapongpornchai C, Nugrak N, Jittikoon J, Chaikledkaew U, Suvichapanich S	June 12, 2024 15.15-16.00	Thailand
27.	BB-0603101-P	Effect of ultrasonic parameters on cell membrane permeability and cell viability of the multifunctional microbubble *in vitro*	Tran TT, Nguyen TP, Bui CK, Nguyen LT*	June 12, 2024 15.15-16.00	Vietnam
28.	BB-0604101-P	Characterization of neuroprotective mechanism of several marine pigments against cell death pathways in HT-22 cells	Nguyen DT*, Serive B, Ruchaud S, Bach S	June 12, 2024 15.15-16.00	Vietnam
29.	BB-0703102-P	Antimicrobial activities of endophytic fungi isolated from *Plantago major* L. (Plantaginaceae)	Luong NT, Vo HT, Nguyen VP.2, Nguyen TM, Nguyen BV*	June 12, 2024 15.15-16.00	Vietnam
30.	BB-0703103-P	Study on *in vitro* inhibitory effect against *Streptococcus mutans* of *Bacillus coagulans*	Trinh AT, Vu TT, Nguyen TM	June 12, 2024 15.15-16.00	Vietnam
31.	BB-0703104-P	Antimicrobial potential of culturable lichen-derived *Streptomyces albus*	Nguyen KH, Nguyen TM, Ho LL, Le TT, Nguyen AT*	June 12, 2024 15.15-16.00	Vietnam
32.	BB-0703105-P	Evaluating antibiofilm activities of *Psidium guajava* extract and *Myristica fragrans* extract against *Staphylococcus aureus*	Le Ngoc K, Bui Thi Thuy L, Tong Xuan Q, Do Thi Huyen T, Tran Thi Minh T, Nguyen Khac T*	June 12, 2024 15.15-16.00	Vietnam
33.	BB-0703106-P	Screening for antibiotic effects of some golden *Camellia* species in northern Vietnam	Tran V*, Hoang HQ, Pham GT	June 12, 2024 15.15-16.00	Vietnam
34.	BB-0704101-P	Prevalence of overexpressed RND efflux pumps of *P. aeruginosa* causing nosocomial infections in several hospitals in Ho Chi Minh City	Le TT, Nguyen TM, Le AT*	June 12, 2024 15.45-16.30	Vietnam

Board No.	Presentation Code	Title	Contributors (Presenter)	Presentation date/time	Country
35.	BB-0705101-P	Antifungal and antitumor activity of *Myxobacter* isolates from the soil in Viet Nam	Nguyen YT, Nguyen DH, Nguyen TM, Nguyen TM*	June 12, 2024 15.45-16.30	Vietnam
36.	BB-0706101-P	Molecular docking analysis and *in silico* toxicity testing of compounds in Kratom (*Mitragyna speciosa*) to prevent drug abuse	Verian EA, Nursanti O, Harahap Y*	June 12, 2024 15.45-16.30	Indonesia
37.	BB-0706102-P	Intergrating *in silico* and *in vitro* approaches to optimise extract for anti-dengue virus from *Phyllanthus amarus* Schum. and Thonn. by respond surface methodology	Anh TN, Thom NT, Mi NH, Thuy NT, Hoa HQ*	June 12, 2024 15.45-16.30	Vietnam
38.	BB-0706103-P	Binding pose metadynamics improves target fishing prediction across three diverse ligands and their true targets	Yau M, Wan AJ, Tiong AS, Yiap Y, Loo JS*	June 12, 2024 15.45-16.30	Malaysia
39.	BB-0706104-P	*In silico* approaches in discovery of natural compounds against NS4B protein of DENV2	Pham PN, Le QN, Nguyen PT*	June 12, 2024 15.45-16.30	Vietnam
40.	BB-0706105-P	The constituents potential from melinjo peel (*Gnetum gnemon* L.) as anti-inflammatory: *in silico* molecular docking and ADME-Tox prediction	Kelutur FJ*	June 12, 2024 15.45-16.30	Indonesia
41.	BB-0706106-P	*In silico* evaluation of the potential antithrombotic and antioxidant properties of *Nauclea orientalis* (Bangkal) bark extract	Gaudiano VD*, De Villa MI, Espino JL, Espiritu MI, Fernandez MR, Garcia NG, Grace KG, Casuga FP	June 12, 2024 15.45-16.30	Philippines
42.	BB-0706107-P	LC-MS analysis and *in silico* evaluation of the anti-rheumatic potential of ethanolic extract of niyog-niyogan (*Ficus pseudopalma*) moraceae leaves	Songco JG, Sy GL, Tan JL, Tolentino LR, Uy JC, Vicencio GT, Wong PJ, Bonalos KH*, Casuga FP	June 12, 2024 15.45-16.30	Philippines
43.	BB-0706108-P	Integrated bioinformatics analysis of hsa-mir-4783-3p target genes and functions in prostate cancer	Nguyen TM, Quang MT*	June 12, 2024 15.45-16.30	Vietnam
44.	BB-0706109-P	Constituent profiling and *in silico* molecular docking analysis of sweet orange (*Citrus x aurantium* f. Aurantium) for the potential management of alopecia areata	Hilapo C, Ibañez J, Jaranilla S, Lesaca M, Ma-alat F, Mangahas B, Marapao A*	June 12, 2024 15.45-16.30	Philippines
45.	BB-0706110-P	Determination of angiotensin-converting enzyme inhibitory potential of crude hexane extract from *Citrullus lanatus* (Watermelon) *in vitro* with liquid chromatography-mass spectrometry characterization and *in silico* evaluation	Ong LS.*, Nacisvalencia JP, Navarro JD., Panganiban M, Rivera BD., Sabalerio RR, Samonte FT	June 12, 2024 15.45-16.30	Philippines

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46.	BB-0706111-P	Evaluation of the wound healing activity of elephant foot yam (*Amorphophallus paeoniifolius* (Dennst.) Nicolson) aqueous flower extract in zebrafish (*Danio rerio*) model	Eduarte MS, Dela Cruz JV, Estanislao NM, Flores AE, Froyalde FP, Garan HD, Garcia SE., Vasquez RD, Villaflores OB*, Alos HC	June 12, 2024 15.45-16.30	Philippines
47.	BB-0710101-P	Preparation of probiotic oil suspension containing *Lactobacillus acidophilus*	Le Ngoc K, Nguyen Thi Thanh D, Nguyen Khac T, Dam Thanh X*	June 12, 2024 15.45-16.30	Vietnam
48.	BB-0710102-P	Research on using gelatinized starch to create probiotic microcapsules to release microorganisms in the colon	Le Ngoc K, Dam Thanh X*, Kieu Thi H, Nguyen Khac T, Nguyen Thi Thu T, Ha Kieu O.	June 12, 2024 15.45-16.30	Vietnam
49.	BB-0710103-P	*In vitro* probiotic potential of lactic acid bacteria (LAB) isolated from fermented foods with anti–*Helicobacter pylori* activity	Cao HT, Nguyen KP, Nguyen AT, Nguyen TM*	June 12, 2024 15.45-16.30	Vietnam
50.	BB-0712101-P	Co-culture of breast cancer cells - fibroblasts: a naturally enhanced ROS model to simulate oxidant-based cellular communication and to evaluate targeting effects of antioxidants	Dao NV, Ercole F, Kaminskas LM, Nowell CJ, Davis TP, Sloan EK, Whittaker MR, Quinn JF*	June 12, 2024 15.45-16.30	Vietnam / Australia
51.	BB-0712102-P	Prevalence of microbiological contamination in herbal products: A public health concern	Namchan K, Bilmusa L, Thirapanmethee K*	June 12, 2024 15.45-16.30	Thailand
52.	BB-0712104-P	Investigate the effects of culture conditions on survival, viability and activity of *Bacillus clausii* M31 spores	Ngo AN*, Xuan DT, Nguyen CN	June 12, 2024 15.45-16.30	Vietnam
53.	BB-0712105-P	Evaluation of microbiological quality in cosmetics: A study on herbal and non-herbal products	Bilmusa L, Namchan K, Thirapanmethee K*	June 12, 2024 15.45-16.30	Thailand
54.	BB-0712106-P	Expression, purification and characterization of CYP154-Sca9 from *Streptomyces cavourensis* YBQ59	Mai Anh DT*, Thanh Diep TT, Bich Thuy LT	June 12, 2024 15.45-16.30	Vietnam
55.	BB-0712107-P	9-hydroxycanthin-6-one, which was isolated from *Eurycoma longifolia* hairy root cultures, has anti-inflammatory properties that are potentially mediated by activation of the aryl hydrocarbon receptor	Tran Minh D*, Le Ngoc K, Tran Thu T, Nguyen Thi Thuy N, Chu Hoang H, Nakahama T, Nguyen Trung N	June 12, 2024 15.45-16.30	Vietnam
56.	BB-0712108-P	Alpha glucosidase inhibitory activity of *Lagerstroemia speciosa* implication for controlling blood glucose level	Vetboocha N, Kitisripanya T, Khuntayaporn P, Chomnawang MT, Thirapanmethee K	June 12, 2024 15.45-16.30	Thailand
57.	BB-0712109-P	Cytotoxic activities of dimer xanthones from lichen *Usnea aciculifera*	Truong TL, Khac MT, Wonganan P, Aree T, Chavasiri W*	June 12, 2024 15.45-16.30	Vietnam

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58.	BB-0712110-P	Antibacterial Activity of *Syzygium aromaticum* L. Leaf Essential Oil Against *Staphylococcus aureus* ATCC 25923	Erviana R, Ambarwati CS, Wibowo AE, Kurniawan MF	June 12, 2024 15.45-16.30	Indonesia♯
59.	PD-0102101-P	Phytochemical analysis and gel formulation development from ethanol-based *Terminalia catappa* Linn. red leaf extract in Thailand: impact on stability and release properties	Chinprasoet N, Chansakaow S, Jaiturong P, Laosirisathian N*, Sirisa-ard P	June 12, 2024 15.15-16.15	Thailand
60.	PD-0102102-P	Formulation and characterization of cream containing a combination of apigenin and tomato powder in overcoming xerosis of heel of the feet	Stiani SN*, Nuraulia TW, Shobah AN	June 12, 2024 15.15-16.15	Indonesia
61.	PD-0102103-P	Development of *in situ* gel containing clove oil for oral spray	Witayanuphap R, Boonsong S, Boonsith S, Tiatragoon W, Pornputtapitak W*	June 12, 2024 15.15-16.15	Thailand
62.	PD-0102104-P	Preparation and characterization of clove oil loaded buccal mucoadhesive film for the treatment of oral ulcer	Thongyoi T, Pansiri P, Rungjitvaranont N, Tiatragoon W, Boonsith S*	June 12, 2024 15.15-16.15	Thailand
63.	PD-0102105-P	Influence of particle size distribution, thickening agents and tonicity modifiers on rheological properties and dissolution profiles of mangiferin suspensions	Dao NV., Tran QT., Luong HT., Thai NV., Vo AQ.*	June 12, 2024 15.15-16.15	Vietnam
64.	PD-0102106-P	Dissolution improvement of celecoxib by wet granulation	Trikoomdun J, Chatchawalsaisin J*	June 12, 2024 15.15-16.15	Thailand
65.	PD-0102107-P	Development and validation of *in vitro - in vivo* correlation for l-tetrahydropalmatine extended-release tablet formulation	Pham DT*, Pham LN, Dang VT, Tran SC, Nguyen LT, Nguyen TT	June 12, 2024 15.15-16.15	Vietnam
66.	PD-0102108-P	Evaluating impacts of formula and processing parameters on mechanical properties of microneedles for dermal/ transdermal drug delivery	Dao NV, Ha TT, Pham PH, Vo AQ*	June 12, 2024 15.15-16.15	Vietnam
67.	PD-0102110-P	Nanosilver dressing with natural bioreduction: effectiveness on diabetic wounds using *Anredera Cordifilia* (Ten.) steenis leaf extract	Dwiastuti RR*, Ardika IF, Setiawati A, Chabib L	June 12, 2024 15.15-16.15	Indonesia
68.	PD-0102112-P	Development and study of factors affecting the stability of extemporaneous preparation of omeprazole oral suspension	Jintapattanakit A*, Channgarm S, Tantivasin A, Phechkrajang C, Chantasart D	June 12, 2024 15.15-16.15	Thailand
69.	PD-0102113-P	Halal by design and emulgel formulation of clove oil (*Syzygium aromaticum* l) as anti-inflammatory	Salamah N*, Azizah NC, Putra AE, Wardhana DA	June 12, 2024 15.15-16.15	Indonesia

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70.	PD-0102114-P	Effect of PEG 6000 based solid dispersion on curcumin dissolution rate: microwave induced melting method	Handoyo M, Setyaningsih D*	June 12, 2024 15.15-16.15	Indonesia
71.	PD-0102115-P	Improvement of rheological properties of intra-articular injectable hyaluronic acid gels for treatment of osteoarthritis by using mannitol and liposomes	Nguyen C*	June 12, 2024 15.15-16.15	Vietnam
72.	PD-0103102-P	Preparation of sustained release naproxen sodium loaded microcapsules from alginate and chitosan through experimental design	Quan LM.*, Man TT., Han DH., Chau TL., Phi NC., Hau L., Nghiem LQ.	June 12, 2024 15.15-16.15	Vietnam
73.	PD-0103103-P	Effects of internal structure on buoyancy and drug release of 3D printed drug delivery system containing levodopa and carbidopa	Le TT, Nguyen NT, Nguyen AT, Tran LT, Le HK, Dao NV, Vo AQ*	June 12, 2024 15.15-16.15	Vietnam
74.	PD-0103104-P	Effect of polymer types and concentrations on the characteristics of alginate-based microspheres containing vitexin and isovitexin	Quan LM*, Han DH, Chau TL, Tri TC, Phi NC, An DP, Yen TP	June 12, 2024 15.15-16.15	Vietnam
75.	PD-0103105-P	Development of sustained-release floating tablets of diltiazem hydrochloride	Nguyen TT, Pham HV, Dinh UT, Bui HT, Le HM, Nguyen DT*	June 12, 2024 15.15-16.15	Vietnam
76.	PD-0103106-P	Fabrication of tailorable controlled release printlets of methylprednisolone using melt extrusion paired with fused deposition modeling 3D technology	Nguyen GT, Le TT, Vo AQ*	June 12, 2024 15.15-16.15	Vietnam
77.	PD-0104101-P	Chitosan and alginate microparticle encapsulation of curcuminoids for targeted drug delivery in the treatment for induced colitis	Zambrano DG, De Guzman Y, Toledo EC, Devanadera MP*, Daya ML, Labrador AM	June 12, 2024 15.15-16.15	Philippines
78.	PD-0105102-P	Green synthesis of zinc oxide nanoparticles using *Pongamia pinnata* leaf extract and its antibacterial activity	Thida A, Hlaing AA*, Ko PN	June 12, 2024 15.15-16.15	Myanmar
79.	PD-0105103-P	Preliminary study on formulation of self-nanoemulsifying drug delivery systems (SNEDDS) containing naringenin	Huynh T*, Nguyen T	June 12, 2024 15.15-16.15	Vietnam
80.	PD-0105104-P	Formulation of a povidone iodine loaded niosome to enhance stability and antibacterial activity	Phan T, Nguyen T, Pham D, Vu T, Tran T., Huynh T*	June 12, 2024 15.15-16.15	Vietnam
81.	PD-0105105-P	Immunomodulatory activity of SNEDDS (Self Nano-Emulsifying Drug Delivery System) Alang-Alang roots extract (*Imperata cylindrica* (L.) P.Beauv.)	Winanta A*, Haresmita PP, Anggreani I, Widada H, Febriansah R	June 12, 2024 15.15-16.15	Indonesia
82.	PD-0105106-P	Formulation of anti-inflammatory gel from the ethanolic leaf extract of *Mimosa pudica*	Jose CA*, Labrador AA, Legada RA, Razo JR, Chua KW, Macni GJ,	June 12, 2024 15.15-16.15	Philippines

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			Samonte JM, De Ocampo Y, Corpuz MT		
83.	PD-0105107-P	Nanoparticle formulation for enhancing the bioavailability of ethyl acetate fraction of papaya leaf extract with carbopol 940: A novel approach in herbal medicine delivery	Chabib L*, Suryani A, Putra MR, Fitria A, Firmansyah F, Laksitorini MD	June 12, 2024 15.15-16.15	Indonesia
84.	PD-0105108-P	A study on nanoparticle-hydrogel interactions in topical formulations: Impacts on drug-loaded nanoparticles and rheology properties	Tran BN, Nguyen CN*	June 12, 2024 15.15-16.15	Vietnam
85.	PD-0105109-P	Development of Sacha Inchi oil solid self-nanoemulsifying drug delivery system	Jintapattanakit A*, Wattanasak N, Sutthikeereesuk P, Jaturanpinyo M, Limwikrant W	June 12, 2024 15.15-16.15	Thailand
86.	PD-0106102-P	Microbiological potency and sterility of non-combined extemporaneously prepared cefazolin and gentamicin eye drops stored at freezer temperatures	Kharomprat N*, Khamching D, Roy CK, Wongwan S	June 12, 2024 15.15-16.15	Thailand
87.	PD-0201101-P	Characterization of starch films formulated from *Colocasia esculenta* (taro) for potential pharmaceutical applications	Tiongson RA*, Uy GV, Fernandez LD, Tagala RM, Ventura MR, Wong AT, Cervantes MN, Corpuz MT	June 12, 2024 15.15-16.15	Philippines
88.	PD-0203101-P	Influence of formulation and punch properties on sticking in the tableting process	Quan LM, Nhi CN, Trinh NT, Ha NV, Phi NC, Hau L*	June 12, 2024 15.15-16.15	Vietnam
89.	PD-0301101-P	Herbal shower gel containing extracts of *Momordica charantia* L. fruit and *Houttuynia cordata* Leaf: Formulation, optimization and anti-inflammatory evaluation	Nguyen TN*, Vo TK, Do NK, Ngo TT, Vo TT, K' N, Nguyen GN, Le DN	June 12, 2024 15.15-16.15	Vietnam
90.	PD-0301102-P	Optimization of lip balm formula with pineapple peel (*Ananas comosus* L. Merr), carrot peel (*Daucus carota* L.) and virgin coconut oil (VCO)	Sukamdi DP*, Nurjanah CI, Harimurti S, Krisridwany A, Amid A	June 12, 2024 15.15-16.15	Indonesia
91.	PD-0303101-P	Development of chewable toothpaste tablets containing mango (nam dok mai) leaf extract	Sobharaksha P, Janwitayanuchit W, Channarong S, Wongtrakul P*	June 12, 2024 15.15-16.15	Thailand
92.	PD-0303102-P	Developing a procedure to simultaneously quantify GSH and ALA in several skin-whitening products using HPLC-PDA and HPLC-MS methods	Nguyen DT*, To NT	June 12, 2024 15.15-16.15	Vietnam

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93.	CP-1501101-P	Impact of tailored pharmacy-based program in improving medication adherence of psychiatric out-patients with schizophrenia, bipolar, and major depressive disorders	Mapandi AN, Capule FR*, Ayran CG	June 12, 2024 15.15-16.00	Philippines
94.	CP-1501102-P	Availability of essential medicines for the management of patients admitted to supportive, hospice, and palliative care in a tertiary government hospital in Manila, Philippines	Sabio CM, Baljon BA*, Hawili AG, Navarro DP, Pepito KY, Dacasin JD, Labradores DC, Guinto MM, Tayko EJ, Ayran CG	June 12, 2024 15.15-16.00	Philippines
95.	CP-1501103-P	Drug utilization evaluation of antibiotics using DU90% in a teaching hospital in Indonesia	Endarti D*, Mawardani AP, Dwinayanty NA., Satibi S, Taufiqurohman T	June 12, 2024 15.15-16.00	Indonesia
96.	CP-1501104-P	A retrospective study of the risk factors for linezolid-induced thrombocytopenia	Ha KN, Vu TT, Nguyen TT, Nguyen HQ, Dang TN*	June 12, 2024 15.15-16.00	Vietnam
97.	CP-1501105-P	Designing a software program for chemotherapy order processing in the oncology pharmacy unit of a tertiary hospital in the Philippines	Montejo-canton JC*, Ayran CG, Capule FR	June 12, 2024 15.15-16.00	Philippines
98.	CP-1503101-P	Individualized vancomycin dosing with AUC-based therapeutic drug monitoring by the Bayesian approach in adult patients with hematological malignancies	Le AH, Nguyen CT, Tran AD, Tran HT, Nguyen TD, Nguyen NQ, Nguyen TH, Hoang LH, Do TN, Nguyen AH, Vu HD*	June 12, 2024 15.15-16.00	Vietnam
99.	CP-1503102-P	Model-informed therapeutic drug monitoring of vancomycin in adult patients: Evaluating and improving the predictive performance of literature models using the clinical care data	Nguyen CT, Truong QT, Le VD, Nguyen AH, Tang AQ, Le NT, Nguyen TN, Ha P, Do TN, Nguyen AH, Vu HD*	June 12, 2024 15.15-16.00	Vietnam
100.	CP-1503104-P	Evaluation on therapeutic monitoring of vancomycin using the 2020 consensus guideline at one teaching hospital at Ho Chi Minh city	Nguyen AT, Ha KN, Dang TN*	June 12, 2024 15.15-16.00	Vietnam
101.	CP-1503106-P	Population pharmacokinetic modeling and convenient sampling of midpoint concentration for therapeutic drug monitoring of vancomycin in Vietnamese pediatric patients	Hai LB, Kien PC, Dua NT, Hao NT, Hung VM, Hai NT, Le J, Huong NT*	June 12, 2024 15.15-16.00	Vietnam
102.	CP-1504101-P	Patients' adherence to fixed-dose combination medicines for tuberculosis in the non-national TB Program in Indonesia	Bernadi M*, Fauna H	June 12, 2024 15.15-16.00	Indonesia
103.	CP-1504102-P	The impacts of clinical pharmacist intervention in the treatment of myocardial infarction at a Vietnamese hospital	Tran NQ, Nguyen TV, Bui QT*	June 12, 2024 15.15-16.00	Vietnam

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104.	CP-1504103-P	Impact of pharmacists' interventions on drug-related problems in hospitalized patients with chronic kidney disease at Gia Dinh People's hospital	Tran TA, Tran MD, Pham TH, Nguyen TH*	June 12, 2024 15.15-16.00	Vietnam
105.	CP-1504104-P	Effectiveness of mobile health in controlling HbA1C levels in type 2 diabetes mellitus patients systematic review	Rindarwati AY, Amalia LA, Permana HP*	June 12, 2024 15.15-16.00	Indonesia
106.	CP-1504106-P	Retrospective evaluation of patients specific factors and clinical outcomes for febrile neutropenia in adult cancer patients at Chulabhorn Oncology Medical Center	Chukkrapirak S, Siriworadetkun S, Tiansuwan P, Tantiwit J, Meanwatthana J*	June 12, 2024 15.15-16.00	Thailand
107.	CP-1504107-P	Impact of pharmacist-led brief behavioral treatment for chronic insomnia in elderly patients	Truong NT, Nguyen HN*, Vuong BG, Nguyen T HT, Bui QT, Quach HT, Nguyen V. HT	June 12, 2024 15.15-16.00	Vietnam
108.	CP-1504108-P	Prevalence of drug-resistant tuberculosis patients at the Universitas Indonesia Hospital	Harahap DW, Andrajati R*, Sari SP, Handayani D	June 12, 2024 15.15-16.00	Indonesia
109.	CP-1504109-P	Identification of medication therapy problems through a patient medication counseling program in a tertiary government hospital	Ngo FU*, Ordoñez JV, Cadag CT	June 12, 2024 15.15-16.00	Philippines
110.	CP-1505101-P	Risk assessment of Diabetes Mellitus and its associated risk factors among residents living in Sen Monorum town, Northeastern part of Cambodia	Chhea S, Chim K, Huor P, Nget S, Chhe S, Sreng N, Oeung S, Chea S*	June 12, 2024 15.15-16.00	Cambodia
111.	CP-1505102-P	Medication use review among residents living in Sen Monorum town, Mondulkiri province	Chhea S, Chhe S, Lim K, Lach K, Meas S, Long C, Poul P, Norng S, Chea S*	June 12, 2024 15.15-16.00	Cambodia
112.	CP-1505104-P	Antibiotic dispensing without a prescription among community pharmacies in the post COVID-19 era: A simulated client approach	Nguyen HQ*, Do TA, Duong ST, Le TT, Quan PB, Du TT, Truong UU, Nguyen NT, Nguyen T, Nguyen KN	June 12, 2024 15.15-16.00	Vietnam
113.	CP-1505105-P	Safety and efficacy of brentuximab vedotin versus other antineoplastic agents, placebo, and standard of care among adult patients with relapsed or refractory CD30+ Hodgkin lymphoma following autologous stem cell transplant: A systematic review	Ngo F*, Carpio JL., Vitacion JA	June 12, 2024 15.15-16.00	Philippines
114.	CP-1506101-P	The patterns of medication use in patients with acute kidney injury at a Vietnamese hospital	Nguyen NT, Nguyen B, Bui QT*	June 12, 2024 15.15-16.00	Vietnam

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115.	CP-1506102-P	Evaluation of the appropriateness of statin indications and associated factors in hospitalized patients at Vinmec Da Nang International Hospital	Phan HD*, Nguyen HN	June 12, 2024 15.15-16.00	Vietnam
116.	CP-1506103-P	Investigation on the appropriate use of proton pump inhibitors at intensive care units of a tertiary hospital in Ho Chi Minh City	Nguyen HT.1*, Nguyen GT, Phung MN	June 12, 2024 15.15-16.00	Vietnam
117.	CP-1506104-P	Investigation on drugs use in the treatment of exacerbated chronic obstructive pulmonary disease at the respiratory department - Gia dinh People's hospital	Vo TT., Nguyen TH.*	June 12, 2024 15.45-16.30	Vietnam
118.	CP-1506105-P	Impact of clinical decision support system on antibiotic dosage in patients with renal impairment: an implementation study in a Vietnamese tertiary hospital	Chinh DD, Hieu LT, Hai NT, Hong LM, Yen NH, Le J, Huong NL, Trung ND*	June 12, 2024 15.45-16.30	Vietnam
119.	CP-1506106-P	The use of chemotherapy in lung cancer patients at Dr. Soetomo Regional General Hospital Surabaya Indonesia	Kirtishanti A, Mayani NI, Febriani A, Yulia R, Jaya HP, Kesuma D, Herawati F*	June 12, 2024 15.45-16.30	Indonesia
120.	CP-1506108-P	Prevalence and predictors of potentially inappropriate medications upon admission among elderly patients in a tertiary care hospital in Pakistan	Faisal S, Khotib J, Zairina E*	June 12, 2024 15.45-16.30	Indonesia
121.	CP-1506109-P	Comparative analysis of healthcare workers' perceptions of antimicrobial resistance management among private and government hospitals in Metro Manila	Tubon N, Abordo WL, Absalud LF, Apuli LR, Arreola RA, Beltran CC, Bocalan MI*, Castro RD	June 12, 2024 15.45-16.30	Philippines
122.	CP-1506110-P	Dosing adjustment guides for supportive, hospice, and palliative medicine in a tertiary government hospital in Manila, Philippines	Sabio CM, Baljon BA*, Hawili AG, Navarro DP, Labradores DC, Guinto MM, Pepito KY, Dacasin JD, Tayko EJ, Ayran CG	June 12, 2024 15.45-16.30	Philippines
123.	CP-1506111-P	Antibiotic utilization review among hospitalized patients with pneumonia during early Corona-19 pandemic: A multicenter study	Yulia R, Halim SV, Setiawan E, Herawati F*	June 12, 2024 15.45-16.30	Indonesia
124.	CP-1506112-P	A mixed methods study on practice and perception of physicians on postoperative thromboprophylaxis for abdominal-pelvic surgery patients in a tertiary central hospital in the North of Viet Nam	Nguyen TT, Tong HT, Nguyen HT, Nguyen TD*	June 12, 2024 15.45-16.30	Vietnam
125.	CP-1507101-P	Impact of surgical interventions on vancomycin dosing therapy for critically ill patients: neurosurgery versus non-neurosurgery	Hoang LH, Nguyen HT, Nguyen CT, Tran DT, Le HT, Nguyen (jr) AH,	June 12, 2024 15.45-16.30	Vietnam

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			Nguyen TT, Luu TQ, Nguyen TA, Nguyen HT, Nguyen AH, Vu HD*		
126.	CP-1508101-P	Enhancing medication safety: How clinical decision support systems and clinical pharmacists' interventions address drug-disease interactions	Hanh NT, Minh VD, Hieu LT, Phuong TT, Hanh NT, Tuyen HT, Cadiz C, Hai NT*	June 12, 2024 15.45-16.30	Vietnam
127.	CP-1508102-P	Assessment of the pharmacovigilance system in one of the largest hospitals in Indonesia	Atmaja DS, Yulistiani Y, Suharjono S, Zairina E*	June 12, 2024 15.45-16.30	Indonesia
128.	CP-1508103-P	Preventability assessment of anticoagulant-related bleeding: Data from The National Pharmacovigilance Database of Vietnam	Cao T*	June 12, 2024 15.45-16.30	Vietnam
129.	CP-1508104-P	Development and validation of a risk prediction model for thrombocytopenia in patients using linezolid	Nguyen NH, Tang AQ, Nguyen HT, Tran HN, Trinh NT, Le H, Nguyen AH, Vu HD*	June 12, 2024 15.45-16.30	Vietnam
130.	CP-1510101-P	Integrating knowledge to action and translational research models for enhanced pharmacotherapeutic dosage adjustments in renal disorders	Ismail A, Sauriasari R*, Yanuar A, Sudiana D	June 12, 2024 15.45-16.30	Indonesia
131.	CP-1510102-P	Development and validation of machine learning-based predictive clinical decision support system for olanzapine in patients with schizophrenia	Kieu AM, Dang HN, Tran KT, Nguyen TT, Nguyen CH, Nguyen TC, Pham HT, Le J, Nguyen HT*	June 12, 2024 15.45-16.30	Vietnam
132.	CP-1510103-P	Adaptation and validation of diabetic foot ulcer scale – short form in Indonesian	Qomariyanti K*, Sauriasari R., Sartika R	June 12, 2024 15.45-16.30	Indonesia
133.	CP-1511101-P	The comparative study on knowledge of emergency contraceptive pills before and after infographic media among senior high school student in Samutprakarn province	Prasertsopa N, Thipunkaew N, Pedchoo W, Tengtrisorn R, Chaivichacharn P*	June 12, 2024 15.45-16.30	Thailand
134.	CP-1511102-P	Measurement of DDD and DOT metrics for optimizing antimicrobial surveillance in two tertiary hospitals in Viet Nam: A four-year retrospective study	Nguyen NP, Truong QT, Huynh TP, Pham HT, Le TD, Nguyen YT, Nguyen NT*	June 12, 2024 15.45-16.30	Vietnam
135.	CP-1601101-P	Both donor and recipient CYP3A5 gene polymorphisms represent as significant factors influencing Tacrolimus weight-dose adjusted concentration in the early phase after living donor liver transplantation	Chinh DD, Minh VD, Hai LB, Duy NH, Huong N, Trung ND*	June 12, 2024 15.45-16.30	Vietnam

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136.	CP-1602101-P	Efficacy of Immune checkpoint inhibitors in advanced non-small cell lung cancer who progressed on targeted therapy: A Systematic review and Meta-analysis	Maneechai T, Tragulpiankit P, Turongkaravee S, Meanwatthana J*	June 12, 2024 15.45-16.30	Thailand
137.	CP-1602102-P	Efficacy of multistrain probiotics as adjunctive therapy in patients with diabetic foot ulcers: A study of glycemic control and inflammatory mediators	Aditama L*, Kirtishanti A, Kok T, Suardiani LK	June 12, 2024 15.45-16.30	Indonesia
138.	SP-1701101-P	Barriers to the mild common illness program among Thai community pharmacies	Limprasert C*, Chotbunyongkul K, Wannakan Chotnok W, Suwannasri R, Kotirum S, Nakrong S	June 12, 2024 15.15-15.45	Thailand
139.	SP-1701102-P	The prevalence and motivators of electronic cigarette usage in the different working population of Metro Manila, Philippines: A cross-sectional study	Babac FR*, Fraile M, Jazul JP, Tubon NT	June 12, 2024 15.15-15.45	Philippines
140.	SP-1701103-P	Implementation of health technology assessment in Vietnam: A hybrid policy Delphi-SWOT analysis	Nguyen NT, Nguyen NP, Thai TT, Nguyen TD, Tran DT, Nguyen YT*	June 12, 2024 15.15-15.45	Vietnam
141.	SP-1702101-P	Budget impact analysis of add-on ezetimibe to moderate-intensity statin versus moderate-intensity statin alone for secondary prevention in patients with acute coronary syndrome in Thailand	Promchit N*, Permsuwan U, Chinwong S	June 12, 2024 15.15-15.45	Thailand
142.	SP-1702102-P	Cost-effectiveness of oseltamivir and favipiravir in COVID-19 patients: Pharmacoeconomic study in hospitals	Udin B, Ahmaddhani S, Yusransyah Y*	June 12, 2024 15.15-15.45	Indonesia
143.	SP-1702103-P	Economic evaluation of HLA-B*13:01 testing preventing phenobarbital-induced drug reaction with eosinophilia and systemic symptoms (DRESS) in Thai children	Turongkaravee S*, Sanoa T, Poperm N, Meanwatthana J	June 12, 2024 15.15-15.45	Thailand
144.	SP-1702104-P	Economic evaluation of nutritional interventions in cancer patients: A systematic review	Nguyen HT, Riewpaiboon A, Tran HT, Youngkong S, Vo TQ, Turongkaravee S*	June 12, 2024 15.15-15.45	Thailand
145.	SP-1702105-P	Cost-utility analysis of atezolizumab plus bevacizumab vs sorafenib as first-line treatment of unresectable hepatocellular carcinoma	Madumadavi MP, Chaikledkaew U, Turongkaravee S*	June 12, 2024 15.15-15.45	Thailand
146.	SP-1702106-P	Knowledge, attitudes, practices, and challenges in the use of pharmacoeconomic evaluations among hospital pharmacists involved in the pharmacy and therapeutics committee in selected tertiary private hospitals in the National Capital region	Siasoco TV*, Rosalita JC, Salazar JC, San Juan LP, Sol HA., Sta. Romana JB	June 12, 2024 15.15-15.45	Philippines

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147.	SP-1702107-P	Cost-utility analysis of ticagrelor versus clopidogrel in patients with acute coronary syndromes undergoing percutaneous coronary intervention	Lam CH, Chaikledkaew U, Turongkaravee S*	June 12, 2024 15.15-15.45	Thailand
148.	SP-1702108-P	A systematic review of economic evaluations of sodium glucose transporter 2 inhibitors (SGLT2) in the treatment of chronic kidney disease (CKD)	Myat Noe Po M, Turongkaravee S*, Chaikledkaew U, Nagi MA, Nguyen HT	June 12, 2024 15.15-15.45	Thailand
149.	SP-1702109-P	A systematic review of efficacy, safety and cost-effectiveness of fixed-dose combinations of pravastatin and fenofibrate in treatment of dyslipidemia	Tran PN, Pham LN, Pham TT, Vu TM, Nguyen NP, Ngo UL, Tran NT, Nguyen NT, Nguyen YT, Dang NT*	June 12, 2024 15.15-15.45	Vietnam
150.	SP-1702110-P	Analysis of direct medical costs in knee joint surgery at Hospital for Traumatology and Orthopaedics in Ho Chi Minh City, Vietnam	Dang TH, Ngo UL, Nguyen NP, Tran PN, Pham LD, Dang NT*	June 12, 2024 15.15-15.45	Vietnam
151.	SP-1702111-P	Cost – effectiveness analysis of hyaluronic acid injection relative to oral medication for knee osteoarthritis treatment at Nguyen Trai hospital in the period of 2022 – 2023	Nguyen HV, Nguyen TQ, Hung QT, Pham PC, Ngo UL, Tran NT, Pham LD*	June 12, 2024 15.15-15.45	Vietnam
152.	SP-1702112-P	The inpatient cost of stroke treatment at Thong Nhat hospital	Duong DT, Nguyen NP, Nguyen HT, Pham LD*	June 12, 2024 15.15-15.45	Vietnam
153.	SP-1702113-P	A systematic review on cost-effectiveness analysis of screening strategy for latent tuberculosis infection (LTBI) in tuberculosis contacts	Yoopetch P, Chitpim N, Jittikoon J, Udomsinprasert W, Thavorncharoensap M., Youngkong S, Praditsitthikorn, Mahasirimongkol S, Chaikledkaew U*	June 12, 2024 15.45-16.15	Thailand
154.	SP-1702114-P	The social willingness to pay for quality-adjusted life years gained: a cost-effectiveness threshold for healthcare decision-making in Vietnam	Nguyen VN, Tran HT, Le PN, Vo TQ*, Nguyen TH, Le NP	June 12, 2024 15.45-16.15	Vietnam
155.	SP-1702115-P	Cost-effectiveness analysis of fixed-dose combination versus free-equivalent combination in hypertension treatment for outpatients: a case study at a regional hospital in Southern Vietnam at Le Van Thinh Hospital, Ho Chi Minh City, Vietnam	Thuong HC, Tran KV, Ngo UL, Tran NT, Tran PN, Pham TT, Dang NT, Nguyen NT, Nguyen YT*	June 12, 2024 15.45-16.15	Vietnam
156.	SP-1702116-P	Cost-utility analysis of HLA-B*15:02 testing for preventing phenytoin-induced stevens-johnson syndrome/toxic epidermal necrolysis (SJS/TEN) in Thailand	Turongkaravee S*, Choosen S, Kaladit J, Meanwatthana J	June 12, 2024 15.45-16.15	Thailand

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157.	SP-1702117-P	Cost-utility analysis of depression preventive services by nurses for adolescents in Thailand	Vuong Nguyen TA, Po May NM, Chaikledkaew U, Turongkaravee S*	June 12, 2024 15.45-16.15	Thailand
158.	SP-1702120-P	Effect of pharmaceutical policy on drug prices in the Philippines	Ngo FU*	June 12, 2024 15.45-16.15	Vietnam
159.	SP-1702121-P	Cost-utility analysis of nintedanib in idiopathic pulmonary fibrosis in Thailand	Malasai K, Jittikoon J, Turongkaravee S, Yoopetch P, Chaikledkaew U*	June 12, 2024 15.45-16.15	Thailand
160.	SP-1703101-P	Validation of the Indonesian version of the medication adherence rating scale questionnaire in coronary heart disease patients	Marselin A*, Amalia L, Dinarti LK	June 12, 2024 15.45-16.15	Indonesia
161.	SP-1703102-P	Evaluation of drug - drug interactions in cancer patients at Hanoi Oncology Hospital in 2022	Nhung DT*, Phuong TN, Thu DH, My CH, Chau DT	June 12, 2024 15.45-16.15	Vietnam
162.	SP-1703103-P	The status of medicine storage by residents living in Cambodia and people's knowledge on how medicines are properly used: A study in Sen Monorum town, Mondulkiri Province	Chhea S, Chhe S, Oudom N, Hout C, Chum C, Eang P, Hout H, Mao K, Chea S*	June 12, 2024 15.45-16.15	Cambodia
163.	SP-1703104-P	4-year Analysis of pharmaceutical inventory management using the ABC-VEN matrix at a tertiary cancer center In Vietnam	Chau DT*, Hao HT, Duong BV, Nhung DT, My CH	June 12, 2024 15.45-16.15	Vietnam
164.	SP-1703105-P	Health promotion intervention to Improve public knowledge on coronary heart disease in Yogyakarta, Indonesia: A preliminary study	Dewi P*, Tasminatun S, Himawan W	June 12, 2024 15.45-16.15	Indonesia
165.	SP-1703106-P	Correlation analysis of factors influencing customer loyalty in retail pharmacy chains: A cross-sectional study in Vietnam	Huong VT, Hung NP*, Minh NT, Khai LQ, Minh TN, Quan LT, Khoa LD, Suong MT	June 12, 2024 15.45-16.15	Vietnam
166.	SP-1703107-P	Patient-centered communication among pharmacy professionals working in a special-grade hospital in Vietnam: Practice and barriers	Le TT, Hoang TA, Vo NT, Tong LK, Dinh CD, Do TX, Nguyen TD*	June 12, 2024 15.45-16.15	Vietnam
167.	SP-1703108-P	Level of influence of factors affecting the customer's decision-making for online healthcare product purchasing in Ho Chi Minh City, Vietnam	Ngo TN*	June 12, 2024 15.45-16.15	Vietnam
168.	SP-1703109-P	Factors affecting consumers' repurchase intention toward skin care cosmetics: A cross -sectional study in Vietnam	Hung NP., Huong VT*, Duyen LT., Minh NT., Thuy LK., Minh TN.	June 12, 2024 15.45-16.15	Vietnam
169.	SP-1704101-P	Community attitudes toward using traditional medicine among the population in Mondulkiri Province	Ung H., So V., Setthy N., Cheng S., Poul P., Ly L., Chea S.*	June 12, 2024 16.15-16.45	Cambodia

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170.	SP-1704102-P	Assessing quality of life using Zhan's concept among Thai osteoarthritis patients: A structural equation modelling approach	Duangchan P, Pumtong S*, Yoopan N	June 12, 2024 16.15-16.45	Thailand
171.	SP-1704104-P	Psychometric properties of EQ-5D-Y among Vietnamese children aged 8-17 years	Nguyen TH, Vo TQ, Nguyen TD, Tran HT*	June 12, 2024 16.15-16.45	Vietnam
172.	SP-1704106-P	Assessing health related quality of life among older adult patients with chronic kidney diseases: Validating the KDQOL-36 in Vietnam	Tran NT, Vo NT, Nguyen NP, Vu TM, Le ND, Nguyen YT, Pham HT, Nguyen B, Pham LD, Le TD*	June 12, 2024 16.15-16.45	Vietnam
173.	SP-1705101-P	A systematic review on telepharmacy barriers	Wijayanti SS, Turongkaravee S, Pumtong S*, Kristina SA	June 12, 2024 16.15-16.45	Thailand
174.	SP-1705102-P	Self-medication among Myanmar migrant workers in Thailand	Pyae ZL, Arthan D, Youngkong S, Pumtong S*	June 12, 2024 16.15-16.45	Thailand
175.	SP-1705103-P	The relationship of knowledge, attitude and experiences of family patients in dengue hemorrhagic fever and prevention	Tuba S*	June 12, 2024 16.15-16.45	Indonesia
176.	SP-1705104-P	Factors influencing community pharmacists' intention to provide smoking cessation program	Rahma AR, Nugraheni G*, Zairina E	June 12, 2024 16.15-16.45	Indonesia
177.	SP-1705105-P	Effectiveness use some applications diabetes – blood sugar diary using single ease question and system usability scale (SUS) method	Rindarwati AY, Amalia LA, Permana HP*	June 12, 2024 16.15-16.45	Indonesia
178.	SP-1705106-P	Pharmacists' beliefs and attitude towards the use of herbal medications for covid-19 treatment	Murandani EN, Yuda A, Kusumawati I, Puspitasari HP, Hermansyah A*	June 12, 2024 16.15-16.45	Indonesia
179.	SP-1705107-P	The first impression and response to tuberculosis infection from the perspective of lay people and healthcare providers in Indonesia	Ramadhania D, Sunantiwat M*, Pumtong S, Sauriasari R	June 12, 2024 16.15-16.45	Thailand
180.	SP-1705108-P	Assessment of knowledge, attitude, and practices of pharmacovigilance among hospital pharmacists in Metro Manila, Philippines	Marquez MA*, Obra PD, Paguio EE, Perez AA, Ramos CD, Reyes KB, Tubon NT	June 12, 2024 16.15-16.45	Philippines
181.	SP-1705109-P	Clinical efficacy and safety of medicinal plants for osteoarthritis: A systematic review and meta-analysis of randomized controlled trials review and meta-analysis of randomized controlled trials	Rassapornmalahan N, Premisarakul C, Thavorncharoensap M, Suansanae T, Bunsupa S, Worakunphanich W, Youngkong S	June 12, 2024 16.15-16.45	Thailand

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182.	SP-1705111-P	Meta-analysis of observational studies using propensity score methods for first-line antihypertensive drug classes	Ta AP, Vo TQ, Rattanasiri S, Thakkinstian A, Chaikledkaew U, Turongkaravee S*	June 12, 2024 16.15-16.45	Thailand
183.	SP-1705112-P	Quality of life in end-stage renal disease patients undergoing dialysis and associated factors	Nguyen KN*, Dinh HT	June 12, 2024 16.15-16.45	Vietnam
184.	PN-1101101-P	Morphological, anatomical and genetic diversity of some *Elsholtzia* species in the North of Vietnam	Hoa HQ*, Giang PL, Quyen D, Trong ND, Chi NQ, Tung NT, Nga PT, Hang DB, Cuong TD	June 12, 2024 15.15-15.45	Vietnam
185.	PN-1105101-P	Associated factors and intention to traditional medicine use among residents in Mondulkiri Province	Ung H, So V, Kem S, Heim M, Ly L, Pen K, Chea S*	June 12, 2024 15.15-15.45	Cambodia
186.	PN-1105102-P	Study of ethnomedicine as self-medication in the community of Ciangsana village, Gunung Putri district, Bogor Regency	Darussalam MF, Pangsibidang RC* Adha PD	June 12, 2024 15.15-15.45	Indonesia
187.	PN-1105103-P	Antitussive and expectorant activity of the herbal preparation Bophe-Hataphar™ containing *Eriobotrya japonica* leaves	Dang NV, Tran HT, Le LV, Do Q*	June 12, 2024 15.15-15.45	Vietnam
188.	PN-1106101-P	Repellency of natural essential oil blends against adult German Cockroach, *Blattella germanica* L. (Blattaria: Blattellidae)	Wongbunmak P, Chooluck K*	June 12, 2024 15.15-15.45	Thailand
189.	PN-1106103-P	Markers-based standardization of Thai traditional formulation for knee poultice (Ya-Pok-Dud-Pid) using UPLC-DAD	Kongkiatpaiboon S*, Saereewat C, Duangdee N, Tayana N, Inthakusol W, Nootim P	June 12, 2024 15.15-15.45	Thailand
190.	PN-1106104-P	Comparative determination of sildenafil as an adulterant in herbal products by TLC-SERS and HPTLC	Minh DT, Lan DT, Ha PT*	June 12, 2024 15.15-15.45	Vietnam
191.	PN-1106105-P	Exploring free radical scavenging and cardioprotective effects via acid-base extraction from *Nelumbo nucifera* Gaertn.	Chaleekornchuwong S, Petchprayoon C, Saengklub N, Kitphati W, Parichatikanond W, Satitpatipan V*	June 12, 2024 15.15-15.45	Thailand
192.	PN-1106106-P	Quantitative and chemical fingerprint analysis of alkaloids and flavonoids for the quality evaluation of lotus leaves (*Folium Nelumbinis*) by using UPLC-MS/MS method	Sil NT, Duyen NT, Tham LK, Ngan NT, Tho DC., Huyen NT	June 12, 2024 15.15-15.45	Vietnam
193.	PN-1106107-P	Formulations of topical ointment for wound healing activity using *Gynura procumbens* (Lour.) Merr leaves extract	Prasopsom M., Pratuangdejkul J, Petchprayoon C, Wichaiyo S, Jaturanpinyo M, Satitpatipan V*	June 12, 2024 15.15-15.45	Thailand

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194.	PN-1106108-P	Development of roselle ointment with antibacterial effects	Chongwilaikasem N, Sithisarn P, Rojsanga P, Ruenraroengsak P, Sithisarn P*	June 12, 2024 15.15-15.45	Thailand
195.	PN-1106109-P	Development of extraction procedure to control rutin content from *Azadirachta indica* A. Juss leaf extract of for diabetes treatment	Duong CX, Nguyen NN, Nguyen TT, Nguyen TT, Le CT, Chau TA, Duong NT, Nguyen NT*	June 12, 2024 15.15-15.45	Vietnam
196.	PN-1106110-P	Determination of strychnine and brucine by HPLC for better quality control of Strychni semen	Quyen D, Binh VN, Lan DT, Ha PT*	June 12, 2024 15.45-16.15	Vietnam
197.	PN-1107101-P	Chemical analysis of *Cannabis sativa* L. extracts and their biological assessment for antioxidant and anti-inflammatory activities	Kongtananeti P, Phanumartwiwath A., Areesantichai C*	June 12, 2024 15.45-16.15	Thailand
198.	PN-1107102-P	*In silico* and *in vitro* Analysis of the antihypertensive and antioxidant potential of abaca (*Musa textilis*) ethanolic leaf extract	Abitria GB, Alba ML, Aquino M*, Austria SK, Ayroso AM, Baldonado SF, Beran MC, Casuga FP	June 12, 2024 15.45-16.15	Philippines
199.	PN-1107103-P	Chemical composition and antimicrobial activity of essential oil from 'mountain' crested latesummer mint growing in the northern Vietnam	Do Q*, Do DT, Nguyen TK, Nguyen TT, Hoang HQ	June 12, 2024 15.45-16.15	Vietnam
200.	PN-1107104-P	*In-vitro* Investigation of standardised leaf extract of *Morus alba* Linn. on kidney stone model	Wahab A., Diah S., Muharram H., Kifli N.*	June 12, 2024 15.45-16.15	Brunei Darussalam
201.	PN-1107105-P	Phytochemical screening, *in vitro* antioxidant, and antimicrobial efficacy of *Humulus lupulus* L. flowers (Newport and Comet Varities) from Thailand	Suphiratwanich P, Yarangsee C, Lomarat P, Laosirisathian N*	June 12, 2024 15.45-16.15	Thailand
202.	PN-1107106-P	The chemotypes of *Elsholtzia ciliata* (Thunb.) Hyl. germplasms in Vietnam	Do DT, Do Q*, Nguyen TT, Nguyen CQ	June 12, 2024 15.45-16.15	Vietnam
203.	PN-1107107-P	Quality control of *Mallotus repandus* stem samples collected in Thailand; pharmacognostic, physical and chemical characteristics	Petchprayoon C., Kitisripanya T., Bunsupa S., Aneklaphakij C., Anantachoke N., Satitpatipan V., Chatsumpun N., Sithisarn P.*	June 12, 2024 15.45-16.15	Thailand
204.	PN-1107108-P	Isolation and identification of major components in Thai traditional formulation for knee poultice (ya-pok-dud-pid)	Saereewat C, Sriyakul K, Nootim P, Duangdee N, Tayana N, Inthakusol W, Kongkiatpaiboon S*	June 12, 2024 15.45-16.15	Thailand

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205.	PN-1107109-P	Enhanced extraction efficiency and stability of verbascoside from *Acanthus ebracteatus* Vahl Using Natural Deep Eutectic Solvents (NADES)	Lertkultham A, Leanpolchareanchai J. Kitisripanya T*	June 12, 2024 15.45-16.15	Thailand
206.	PN-1107110-P	*In vivo* Evaluation on the effects of aqueous flower extract of *Amorphophallus paeoniifolius* in pednisolone-induced osteoporotic zebrafish	Bragat IG, Calvario RV, Capellan JC, Cosio KS, Cu MM, Del Rosario CL, Daganzo NO*, Villaflores OB, Vasquez RD	June 12, 2024 15.45-16.15	Philippines
207.	PN-1107111-P	Screening and antioxidant evaluation of *Bixa Orellana* L. ethanolic leaf extract	Espiritu CL*, Cataluña JC, Dy JA, Francisco KR, Gan AA, Yee MT, Mitra I, Corpuz M	June 12, 2024 15.45-16.15	Philippines
208.	PN-1108101-P	Triterpenoids and flavonoids from *Ludwigia octovalvis* (Jacq.) P.H.Ravens and their bacteriostatic effect on *Helicobacter pylori*	Thong CL*, Triet NT, Ky ND, Thanh HQ, Dan NT, Duyen CT	June 12, 2024 16.15-16.45	Vietnam
209.	PN-1109101-P	Comparative bioactivity analysis of *Polygonum minus*: A traditional herbal medicine	Yang ZM., Yang ZG., Chan KW., Ismail N., Abu Bakar M.*	June 12, 2024 16.15-16.45	Malaysia
210.	PN-1109102-P	Exploring Thai medicinal plants with anti-inflammatory potentials for atopic dermatitis: Steady-state kinetic and molecular modeling studies	Liana D, Eurtivong C, Phanumartwiwath A*	June 12, 2024 16.15-16.45	Thailand
211.	PN-1109103-P	Influence of extracting solvents on hypouricemic effect of three kinds of tea products: A pharmacological – chemical combination study	Hieu NT, Thong CL*	June 12, 2024 16.15-16.45	Vietnam
212.	PN-1109104-P	Investigation of the antioxidant and anti-cancer potential of *Leea indica* leaf extracts from Brunei Darussalam	Shariman S, Rozaini F, Goh H, Kifli N, Ghani H*	June 12, 2024 16.15-16.45	Brunei Darussalam
213.	PN-1109105-P	Biological activities *in vitro* of extracts from *Pinus kesiya* royle ex gordon, Pinaceae	Le TN, Nguyen TH, Nguyen TM, Hoang DT, Ho LL*	June 12, 2024 16.15-16.45	Vietnam
214.	PN-1109106-P	The inhibitory effects of *Curcuma aeruginosa* Roxb. and *Curcuma* sp. "Khamin Oi" on human coronavirus OC43 replication in MRC-5 lung fibroblast cells and vero kidney cells	Pichetpongtorn P, Ruangdachsuwan S, Churod T, Komaikul J, Masrinoul P, Kitisripanya T*	June 12, 2024 16.15-16.45	Thailand
215.	PN-1201101-P	The relationship of sodium and potassium intake with physical activity in undergraduate cadet students batch 3 The Republic of Indonesia Defense University	Rajendra R, Subiakto Y, Rahmania TA*	June 12, 2024 16.15-16.45	Indonesia
216.	PN-1201102-P	Development of microencapsulated powder containing *Lactobacillus acidophilus* and *Clitoria ternatea* L. flower extract	Ekthanachairat A, Kanchanadumkerng P, Thilavech T, Lomarat P*	June 12, 2024 16.15-16.45	Thailand

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217.	PN-1202101-P	Analyzing community pharmacists' knowledge and behavior regarding the sale of functional foods at pharmacy retailers in the Mekong Delta, Vietnam	Huong VT, Hung NP*, Vinh NP, Minh NT, Minh TN, Toan PT, Ha LT	June 12, 2024 16.15-16.45	Vietnam
218.	PN-1202102-P	Nutritional analysis and curcumin level in gitumon formulation: aiming as a new jamu for metabolic syndrome population	Ali MA*, Kurniawati DM, Anggita GM, Noer ER, Ahda ZZ, Susilo MT, Susanto H, Agustina A	June 12, 2024 16.15-16.45	Indonesia
219.	PN-1202103-P	The development of cookie fortified with pea protein and inulin	Tangjeamsri K, Samutsakulcharoen S, Kanchanadumkerng P, Thilavech T, Suriyaphan O	June 12, 2024 16.15-16.45	Thailand
220.	PN-1205101-P	Screening of certain allergens in confectionery products using LC-MS/MS	Vo NH, Lan DT, Thanh TT*	June 12, 2024 16.15-16.45	Vietnam
221.	PE-1301101-P	Beyond the traditional pedagogy: Determining pharmacy student and academic staff readiness in artificial intelligence integration	Miclat JE, Galang KB, Gonzales AL, Gutierrez AR, Sison GV, Sunga AG, Cruz CS, Torio CM*	June 12, 2024 15.15-16.15	Philippines
222.	PE-1301102-P	Pharmacy student-led non-communicable diseases screening as a service-learning activity in a state university in the Philippines	Tayko EJ, Ayran CG*	June 12, 2024 15.15-16.15	Philippines
223.	PE-1301103-P	Evaluation of the reaction and learning of UP College of Pharmacy outbound students in an exchange program with Mahasarakham University using Kirkpatrick's Model	Ayran CG*	June 12, 2024 15.15-16.15	Philippines
224.	PE-1303101-P	Assessing video instruction for protein determination: A study using the Kjeldahl method	Mai Anh DT*, Bac NX, Hien MV, Suong Huyen DN	June 12, 2024 15.15-16.15	Vietnam
225.	PE-1303102-P	Evaluating student's satisfaction towards pharmacist training activities at a private university in Vietnam	Nguyen HT, Tran NT, Duong DT, Dinh LP*	June 12, 2024 15.15-16.15	Vietnam
226.	PE-1303106-P	Grit Matters?: Exploring the correlation between grit levels and pharmacy license exam success	Thampithak A, Phanudulkitti C*	June 12, 2024 15.15-16.15	Thailand
227.	PE-1401101-P	Perception and satisfaction of fourth year bachelor of science in pharmacy students on the introductory pharmacy practice experience of the University of Santo Tomas Manila	Tabligan MI, Timbang RL, Urgel CT, Vallo RN, Viz CL, Yambao LM*	June 12, 2024 15.15-16.15	Philippines
228.	PE-1401102-P	A cross-sectional study on student motivation to pursue pharmacy and course satisfaction and their correlation to the career intentions of 4th Year BS pharmacy students	Cordero P, De Pablo B, Duncil AM, Esguerra M, Gamad N, Gonzales N*, Gatapia N, Tubon N	June 12, 2024 15.15-16.15	Philippines

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229.	PE-1401103-P	Development of hospital medication management system clerkship for pharmacy curricula in Thailand	Suwannakij J, Wongpoowarak P, Fuangchan A, Jenraumjit R, Kitikannakorn N*	June 12, 2024 15.15-16.15	Thailand
230.	PC-0401102-P	*In silico* drug discovery for dual SGLT1 and SGLT2 inhibitors	Nguyen PT*, Nguyen KA	June 12, 2024 14.00-15.00	Vietnam
231.	PC-0401103-P	The synthesis and cytotoxic evaluation of novel 2-methoxy-N-phenylbenzamide derivatives bearing benzimidazole scaffold	Nguyen TC, Dinh HT*, Nguyen HT, Giang AT	June 12, 2024 14.00-15.00	Vietnam
232.	PC-0401104-P	Discovery and development of novel 6-substituted aminoindazole derivatives as IDO1 inhibitors in cancer immunotherapy	Tran P*, Ngo X, Le Q, Tran H, Hoang V.	June 12, 2024 14.00-15.00	Vietnam
233.	PC-0401109-P	Large-scale virtual screening of inhibitors targeting the ST2 receptor based on a novel allosteric pocket identified through mixed-solvent molecular dynamics simulations	Mai TT, Nguyen Vo SK, Lam TP, Thai KM*	June 12, 2024 14.00-15.00	Vietnam
234.	PC-0401110-P	Novel (E)-3-(1-substituted-1H-indazol-5-yl)-N-hydroxypropenamides as histone deacetylase inhibitors: design, synthesis and bioevaluation	Dao OT, Duong AT, Doan SM, Nguyen NH, Han S*	June 12, 2024 14.00-15.00	Vietnam
235.	PC-0402101-P	Benzylic C−H oxidation by photoinduced N-centered radical	Nguyen Q*, Nguyen TV, Phan VQ, Pham HD, Nguyen TM, Duong VB, Nguyen PT, Nguyen VV, Dang PT	June 12, 2024 14.00-15.00	Vietnam
236.	PC-0402102-P	Synthesis of 2-Alkylated quinazolin-4(3h) -ones under a new transition metal-free conditions	Kantichaikajon C, Kanoknetweerakul C, Kitphati W, Songsichan T	June 12, 2024 14.00-15.00	Thailand
237.	PC-0501101-P	Reaction kinetics of peroxide and fatty acid formation under the influence of temperature in bromelain-extracted virgin coconut oil	Harimurti S*, Prayogo GK, Widada H, Orbayinah S, Sukamdi DP., Erviana R, Amid A, Do TC.	June 12, 2024 14.00-15.00	Indonesia
238.	PC-0502101-P	A stability-indicating HPLC method for determination of chemical markers in *Boesenbergia rotunda* extract capsules	Suphakijudomkarn P, Suwanvecho C, Sithisarn P, Khemawoot P, Rojsanga P*	June 12, 2024 14.00-15.00	Thailand
239.	PC-0502102-P	Metadynamics-directed modelling of high affinity quercetin analogues targeting calcineurin	Cheong MX, Yau MQ*	June 12, 2024 14.00-15.00	Malaysia
240.	PC-0502103-P	Analytical method development and validation of acrylamide and glycidamide in volumetric absorptive microsampling (VAMS) sample	Ikhsan M*, Harahap Y, Saputri FC	June 12, 2024 15.15-16.15	Indonesia

Board No.	Presentation Code	Title	Contributors (Presenter)	Presentation date/time	Country
241.	PC-0502104-P	Analysis of 2-ethylhexanoic acid impurity in clavulanate potassium by ion chromatography	Nguyen DT*, Vo XT	June 12, 2024 15.15-16.15	Vietna
242.	PC-0502105-P	Standardization and development of a GC-FID method for the determination of fatty acids in Vietnamese Python fats (*Python reticulatus*)	Nguyen DT*, Bui KT	June 12, 2024 15.15-16.15	Vietnam
243.	PC-0502106-P	Development and validation of bioanalytical method of efavirenz in dried blood spot (DBS) using high performance liquid chromatography–photodiode array (HPLC–PDA)	Putri DN, Harahap Y*, Saputri FA	June 12, 2024 15.15-16.15	Indonesia
244.	PC-0502107-P	Determination of ceftazidime levels in human cerebrospinal fluid by high perfomance liquid chromatography	Ha T, Binh V*	June 12, 2024 15.15-16.15	Vietnam
245.	PC-0502108-P	RSM-based optimization of an RP-HPLC method, analytical method validation, and content determination of daidzein in soy sauce	Riswanto FD*, Wibowo JT, Wulanjari ER, Martyas KS, Gani MR, Martono S	June 12, 2024 15.15-16.15	Indonesia
246.	PC-0503101-P	Excitation wavelength comparison in thin-layer chromatography coupled with surface-enhanced Raman spectroscopic analysis: case study in detection of phosphodiesterase-5 inhibitors adulterated in herbal products	Minh DT, Nhu NT, Lan DT, Ha PT*	June 12, 2024 15.15-16.15	Vietnam
247.	PC-0503102-P	Analytical tool to support the detection of illegal drugs production sites: Quantitation of precursors of methamphetamine and 3,4-methylenedioxymethamphetamine in wastewater by GC-MS/MS	Van BL, Binh VN, Ha TN*	June 12, 2024 15.15-16.15	Vietnam
248.	BB-0712111-P	Novel 1H-Benzo[D]imidazole-based hydroxamic acids: Design, synthesis, and evaluation as antitumor agents	Anh DT, Thang NQ, Nam NH	June 12, 2024 15.45-16.30	Vietnam

PP-0801101-P

In Silico Evaluation of the Anti-Angiogenic Potential of Uvaol

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ABSTRACT

Introduction:

Cancer is one of the most common causes of mortality in the world. Among the hallmarks of cancer, angiogenesis, which is the growth of blood vessels from existing vasculature, is crucial for metastasis of tumor. Therefore, inhibiting angiogenesis is a potentially effective strategy for cancer treatment. Uvaol, a pentacyclic triterpene with a molecular formula of $C_{30}H_{50}O_2$, is proven to possess antitumor and antiproliferative effects. However, the mechanism by which Uvaol influences angiogenesis implicated in cancer is still unknown.

Objectives:

To confirm Uvaol's anti-angiogenic activity and druggability.

Methods:

In silico reverse molecular docking was utilized as a screening method to search for the protein targets of Uvaol and characterize the binding affinity with the druggable targets in the angiogenesis pathway. The drug-likeness profile of Uvaol was also assessed using SwissADME.

Results:

The findings demonstrated that Uvaol has a strong binding affinity for the major angiogenesis-promoting proteins with P-38 mitogen-activated protein kinases (MAPK) and epidermal growth factor receptor (EGFR) exhibiting the highest *in silico* activity with -10.1 and -9.6 binding affinities, respectively. Uvaol is nonmutagenic and met the Lipinski and Veber drug-likeness criteria.

Conclusions:

The molecular docking revealed that Uvaol's binding affinity with the angiogenesis targets indicates that it is a potential promising lead for the development of an angiogenesis inhibitor. This work highlights Uvaol's potential as an anti-angiogenic drug and encourages more research to determine its role in cancer prevention.

KEYWORDS: Angiogenesis; Cancer; EGFR; Molecular docking; P-38 MAPK; Uvaol

PP-0801102-P

Evaluate the Acute, Subchronic Toxicity, and Protective Effect of *Butea superba* Roxb. Extract in the Sodium Valproate-Induced Hypogonadism in Swiss Albino Male Mice

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ABSTRACT

Introduction:

Butea superba Roxb. (BS) has been used in traditional medicine to treat liver malfunction, enhance vitality, and anti-aging effect. However, limited research shows its hypergonadism effects in male mice.

Objectives:

This study aimed to access the acute, subchronic toxicity and the protective effects of BS stem extract in treating hypogonadism induced by sodium valproate (SV) in male mice.

Methods:

The acute and subchronic toxicity tests were conducted following the Guidelines for Preclinical and Clinical Trials of Traditional Medicine and Herbal Medicine by the Vietnam Ministry of Health and OECD guidelines. To investigate the ameliorative effect of BS extract, mice were divided into 5 groups (N = 8): control group (distilled water, p.o.), SV group (500 mg/kg, p.o.), testosterone group (2 mg/kg, p.o.), and treated groups given BS doses of 10 mg/kg and BS 100 mg/kg, orally two hours after using SV (500 mg/kg, p.o.). Viability and sperm concentration were assessed by flow cytometry. Moreover, testosterone levels and testicular H&E staining were determined.

Results:

The BS extract produced no toxic effects at the maximum dose administered orally (36.3 g/kg). The subchronic toxicity at the doses of 10 mg/kg and 100 mg/kg showed no signs of toxicity during 28-day treatment. In the androgenic study, groups treated with BS extract at both doses showed a significant increase in serum testosterone, relative weight and diameter of the testis, sperm count, relative weight of levator ani bulbocavernosus muscles; a notable decrease in the death rate of sperm; and an improvement in the histology of the testis compared to the SV group. These results were similar to those of the testosterone group.

Conclusions:

BS extract did not produce acute and subchronic toxicities at the chosen doses. In addition, BS exhibited protective effects against SV-induced hypogonadism, with the best results seen in the group treated with the dose 100 mg/kg.

KEYWORDS: Acute toxicity; *Butea superba* Roxb.; Flow cytometry; Hypogonadism; Sodium valproate; Subchronic toxicity

PP-0805101-P

Characterization of Neuroprotective Mechanism of Several Marine Pigments against Cell Death Pathways in HT-22 Cells

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ABSTRACT

Introduction:

The mouse hippocampal neuronal cell line HT22 is frequently used for the study of neurotoxicity.

Objectives:

This study aimed to evaluate the in vivo neuroprotective activity of several marine pigments in HT-22 cells, by regulating different cell death pathways.

Methods:

The study focuses on the modulation of cell death pathways induced by glutamate, a neurotoxic molecule, in the HT-22 neuronal cell model. To modulate cell death, a panel of commercial inhibitors, such as Z-VAD-FMK, Nec-1, Nec-1-s, Fer-1, 3-MA, NAC, was used. The protection of marine pigments on HT-22 cells, whose death is induced by a high dose of glutamate or by erastin, was also evaluated.

Results:

The commercial inhibitors protected HT-22 cells against the toxic effect of glutamate, with a significant restoration of cell viability. This observation highlights the involvement of multiple death pathways, including ferroptosis, autophagy, and oxidative stress. The negative results of Z-VAD-FMK and Nec-1-s proved that glutamate-induced cell death does not result from apoptosis or necroptosis. On the other hand, in the presence of glutamate, almost all pigments tested significantly restored the viability of HT-22 cells. By evaluating the relationship between the effectiveness of these molecules and their toxicity, three pigments as diadinoxanthin, lutein and violaxanthin were chosen to carry out in the next step. The EC_{50} (median effective concentration) of these pigments, determined from the dose-response curves, are respectively 22 µM; 34 µM, and 28 µM for diadinoxanthin, lutein, and violaxanthin.

Conclusions:

Diadinoxanthin, lutein, and violaxanthin present the in vitro neuroprotective activity in HT-22 cells. These three marine pigments effectively inhibit glutamate-induced death pathways (autophagy, ferroptosis, and oxidative stress).

KEYWORDS: Cell death pathway; Marine pigments; Neurodegenerative diseases; Neuroprotection; Inhibitors

PP-0805102-P

Anti-Allergy Effect of the Methanolic Flower Extract of Red *Ixora siamensis* Wall ex. G. Don on Dinitrofluorobenzene-Induced Allergic Contact Dermatitis in Mice

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ABSTRACT

Introduction:

Allergic contact dermatitis (ACD) is a condition where skin inflammation is prominent due to contact exposure to allergens. *Ixora siamensis* (Ixora), a common plant from the Philippines, has limited pharmaceutical applications despite several folkloric uses.

Objectives:

This study aims to generate scientific evidence by evaluating the potential of *I. siamensis* as a source of anti-allergy constituents, building on existing knowledge of antioxidant and anti-inflammatory activities of the same genus.

Methods:

The flowers of *I. siamensis* were extracted through percolation using 80% methanol. Various phytochemical screening assays were employed to confirm the presence of bioactive compounds that may contribute to its anti-allergy effect. Female BALB/c mice sensitized with 0.5% dinitrofluorobenzene (DNFB) were used as allergic contact dermatitis model and received topical treatment of the extract at doses 50%, 25%, and 12.5%. Different parameters, like ear thickness, cytokine level, and histopathological scoring, were conducted to evaluate the topical anti-allergy effect of *I. siamensis.*

Results:

Phytochemical screening showed notable amounts of phenolic and flavonoid content correlated to its antioxidant activities. The murine allergic contact dermatitis model revealed that topical application of *I. siamensis* extract inhibited ear swelling after re-exposure to the 0.5% dinitrofluorobenzene (DNFB). Measurement of the ear thickness between the extract group (50%) and the normal group demonstrated no significant difference, suggesting its effectiveness in decreasing ear swelling. This result is supported by histopathological analysis and cytokine level of tissue necrosis factor alpha (TNF alpha) from the murine ear tissue.

Conclusions:

The results demonstrate that the methanolic flower extract of *I. siamensis* possesses topical anti-allergy properties, as it showed promising effects in a murine model of dinitrofluorobenzene-induced allergic contact dermatitis. Further research may be conducted to determine the specific constituents present in methanolic flower extract and establish potential use.

KEYWORDS: Allergic contact dermatitis; Contact hypersensitivity; DNFB; *Ixora siamensis*

PP-0805103-P

In Vitro Determination of the Antiproliferative and Apoptotic Activity of the Philippine Spider Venom Fractions against Breast Cancer Cell Lines (MCF-7)

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ABSTRACT

Introduction:

In the face of the ongoing global cancer crisis, this study takes a unique approach by exploring the therapeutic potential of Spider Venom against cancer. Despite the advancements in cancer treatment and diagnosis, the persistent global cancer crisis necessitates the exploration of unconventional therapeutic avenues.

Objectives:

This study, therefore, assesses the cytotoxic, proliferative, and apoptotic effects of NOM1A-07 venom fractions against MCF-7 breast cancer cell lines *in vitro.*

Methods:

The study employed a quantitative method, extracting and freeze-drying NOM1A-07 Philippine spider venom for analysis. Venom fractions were obtained via RP-HPLC to examine their composition and therapeutic potential. Cytotoxic, antiproliferative, and apoptotic effects of these fractions were compared to Paclitaxel, an anticancer drug, on cells in a 96-well plate and 6-well plate. This aided in evaluating their ability to inhibit cell growth and potential medical applications.

Results:

Among the tested fractions, only Fractions 1, 5, 8, and 9 exhibited cytotoxic effects, with reductions in cell viability reaching 50% or lower. Fraction 5 was chosen for its semi-polar nature and availability, exhibiting antiproliferative activity at 50 µg/mL. Over time, it reduced absorbance, indicating growth inhibition. This fraction exhibited decreasing absorbance readings at 24, 48, 72, and 96 hours (0.6809, 0.5009, 0.3831, and 0.2024, respectively. Fraction 5 induced significant apoptosis (11.90% viability) in MCF-7 breast cancer cells, with a notable apoptotic cell population (43.81%), compared to the Paclitaxel (34.15%), and untreated (5.28%), suggesting potential as a cancer therapeutic.

Conclusions:

The results of this study are significant as they demonstrate the susceptibility of MCF-7 breast cancer cells to the cytotoxic, antiproliferative, and apoptotic effects of NOM1A-07 fractions, particularly Fraction 5. Thus, this supports the therapeutic potential of peptides derived from spider venom in cancer treatment, thereby contributing to our understanding of potential novel cancer therapies.

KEYWORDS: Anti-cancer; Breast cancer; MCF-7; NOM1A-07 Philippine spider venom fraction; Paclitaxel; RP-HPLC

PP-0805104-P

Design, Synthesis and Evaluation the Bioactivities of Novel 1,3-Dimethyl-6-[(4-substituted)benzylamino]-1*H*-indazole Derivatives as Anticancer Agents

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ABSTRACT

Introduction:

Indoleamine 2,3-dioxygenase (IDO1) inhibitors have been extensively developed for the reactivation of the anticancer immune response.

Objectives:

Designed, synthesized new 1,3-dimethyl-6-[(4-substituted)benzylamino]-1*H*-indazole compounds as IDO1 inhibitors, and evaluated the bioactivities of the most potential compound.

Methods:

Designed new compounds based on the structure of the IDO1 active site, synthesized through 3 reactions, and confirmed the structures by spectroscopic methods. Examined their anticancer effect on hypopharyngeal carcinoma cells (FaDu), spuamous cell carcinoma of the oral tongue (YD-15), breast cancer cells (MCF7), and normal dental cancer cells (HDPSC); investigated the suppression in synthetic compounds; performed docking studies; examined the possible anticancer mechanisms of IDO1 inhibitors on FaDu via apoptosis induction and selective activation of extracellular signal-regulated kinases (ERK) in mitogen-activated protein kinase (MAPK) pathways. Finally, investigated the cell mobility inhibition in wound healing assay by downregulating MMP9 in the metalloproteinase family.

Results:

6 compounds of IDO1 inhibitors bearing 1,3-dimethyl-6-[(4-substituted)benzylamino]-1*H*-indazole scaffold were designed and synthesized through three simple steps with high yield. Four of the six compounds demonstrated significant cytotoxic effects and selectivity for FaDu cells in hypopharyngeal cancer (HPC). Particularly, compound 5a showed a significant toxic effect on FaDu cells, with an IC_{50} value of 2.78 μM, and it inhibited IDO1 expression by 45.67% at this concentration. Molecular docking data show that compound 5a interacts with well-known residues in pockets A, B, and heme of IDO1. Furthermore, our mechanistic investigations on compound 5a, suggested that it induced apoptosis by activating caspase-3, cleaving poly (ADP-ribose) polymerase, and selectively overactivating ERK1/2 in the mitogen-activated protein kinase pathways. Additionally, compound 5a inhibited cell migration in a wound healing assay and the expression of matrix metalloproteinase MMP9, indicating its potential to inhibit tumor metastasis.

Conclusions:

Compound 5a appears to be a promising IDO1 inhibitor that could be used to treat hypopharygeal carcinoma, and will serve as a good lead compound for future anticancer development.

KEYWORDS: Apoptosis; Cytotoxicity; 1,3-Dimethyl-6-amino-1*H*-indazole; ERK pathways; Hypopharyngeal carcinoma; Indoleamine 2,3-dioxygenase 1

PP-0805105-P

In vitro and *In vivo* Antihyperglycemic Potential of Santol (*Sandoricum koetjape* (Burm.f.) Merr.) Methanolic Leaf Extract

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ABSTRACT

Introduction:

Diabetes mellitus highlights the need for diverse treatments due to its rising global prevalence. *Sandoricum koetjape* has been reported to possess flavonoids and terpenoids that are known natural antidiabetic agents.

Objectives:

This study investigates the potential of *Sandoricum koetjape*leaf methanolic extract (SLME) in inhibiting glucosidase enzyme activity *in vitro* and reducing blood glucose levels in hyperglycemic zebrafish.

Methods:

The *in vitro* α-glucosidase inhibitory activity of SLME (1000 µg/mL to 31.25 µg/mL) was assessed, utilizing glucosidase as the enzyme and p-nitrophenyl-β-D-glucopyranoside (PNPG) as the substrate, followed by absorbance measurement at 405 nm. Acute toxicity tests on 50 zebrafish (N = 10/group) with SLME (3.25 to 100 mg/kg BW) revealed no mortality or behavioral changes within 96 hours, indicating an LD_{50} exceeding 100 mg/kg BW. Zebrafish were injected with 300 mg/kg BW Streptozotocin and immersed in 2% sucrose solution for 6 hours to induce hyperglycemia. Hyperglycemic fish were divided into five groups (N = 10/group): SLME (100 mg/kg, 50 mg/kg, and 25 mg/kg), Acarbose (300 mg/kg), and hyperglycemic control group.

Results:

Results showed that SLME exhibited an inhibitory activity against α-glucosidase, with IC_{50} of 131.30 µg/mL. For *in vivo*, SLME at 50 mg/kg significantly reduced the blood glucose levels when compared to the baseline levels of hyperglycemic fish ($p < 0.0001$), comparable to the standard drug acarbose ($p = 0.3339$).

Conclusions:

The results show that SLME significantly reduced blood glucose levels and is comparable to the standard acarbose drug, suggesting promising potential for utilizing this natural remedy to manage blood sugar levels. However, further research, including more extensive preclinical and clinical trials with extended durations and diverse animal models, must confirm its safety and efficacy as a diabetes treatment.

KEYWORDS: Diabetes mellitus; Glucosidase; Hyperglycemia; Streptozotocin; Zebrafish

PP-0805106-P

Investigating Anti-inflammatory Potential of Clove oil and Mangosteen extract in Synergistic Manner with Lipopolysaccharide-stimulated RAW 264.7 Macrophages

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ABSTRACT

Introduction:

Inflammation plays an important role in host defense against external stimuli such as infection by pathogen, endotoxin or chemical exposure by the production of the inflammatory mediators that produced by macrophage. Anti-inflammatory factor is important to treat the dangers of chronic inflammation associated with chronic disease. Many plants have interesting biological activities with their therapeutic potential, including *Garcinia mangostana* L. (mangosteen) and *Syzygium aromaticum* L., (clove oil), which is endowed with a variety of biological properties, including antioxidant and anti-inflammatory effects.

Objectives:

This study is aimed to evaluate the anti-inflammatory activity of mangosteen extract and clove oil on lipopolysaccharide (LPS)-stimulated RAW264.7 macrophages by inhibiting the production of inflammatory mediator (TNF-α).

Methods:

A central composite design (CCD) of response surface methodology (RSM) is use to optimize the blending process of herbal extract by using mangosteen extract and clove oil concentration effects in anti-inflammatory.

Results:

IC_{50} values of mangosteen extract and clove oil on RAW 264.7 cells were 2.37 ± 1.12 mg/ml and 6.97 ± 2.13 mg/ml, respectively. The production of TNF-α levels was induced by LPS. The percentage of TNF-α inhibition increased in the presence of mangosteen extract (0.20 - 1.00 mg/ml) and clove oil (0.15 - 0.80 mg/ml) were 18.78 - 30.82 ± 2.87% and 12.34 - 24.37 ± 1.94% in comparison to control cells. By comparing the activities of individual and combined extracts in lipopolysaccharide and induced murine RAW 264.7 cells, the obtained experimental data showed that at the optimized 0.60 mg/ml mangosteen extract concentration and 0.48 mg/ml clove oil concentration resulted in an optimum maximum anti-inflammatory activity of 43.30 ± 1.38%.

Conclusions:

This study provides scientific evidence in support of the combined use of mangosteen extract-clove oil to alleviate inflammatory processes. It is hence recommended that this combination can be topically used for its anti-inflammatory potential and it may also serve as a prospective substitute for synthetic anti-inflammatory agents.

KEYWORDS: Anti-inflammatory; Clove oil; Mangosteen extract; Raw 264.7 cells; Response surface methodology; Tumor necrosis factor-α

PP-0806101-P

GSK-3β-Targeting Fisetin Promotes Melanogenesis in B16F10 Melanoma Cells and Zebrafish Larvae through β-Catenin Activation

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ABSTRACT

Introduction:

Fisetin, a flavonoid that can be observed in a lot of vegetables and fruits like onions and grapes has anti-proliferative, anticancer activity and anti-inflammatory properties. Nevertheless, there are a few studies of fisetin that regulate melanogenesis.

Objectives:

Therefore, the effects of fisetin on melanogenesis were evaluated in B16F10 melanoma cells and zebrafish larvae.

Methods:

To evaluate anti melanogenic potential of fisetin, B16F10 cells and zebrafish larvae were used briefly, B16F10 cells were treated with fisetin for 96 h and evaluated the melanin production and responsible marker expression using both PCR at 48 h and western blot 72 h treatments respectively. For *in vivo* experiments depigmented zebrafish larvae 3 days post fertility were treated with several concentrations of fisetin and evaluated the pigmentation after 72 h.

Results:

Fisetin markedly elevated both intracellular and extracellular melanin synthesis in B16F10 melanoma cells, Additionally, we observed a substantial upregulation in the expression of melanogenesis-associated genes, including tyrosinase and microphthalmia-associated transcription factor (MITF), following fisetin treatment for 48 hours. The pigmentation of zebrafish larvae exhibited an augmentation upon fisetin treatment, peaking at concentrations of up to 200 μM, followed by a slight decline at 400 μM, while showing no discernible changes in heart rates. The molecular docking data also unveiled fisetin's binding affinity towards glycogen synthase kinase-3β (GSK-3β). Consequently, we assessed whether fisetin exerted a negative regulatory effect on GSK-3β, leading to the activation of β-catenin and subsequent melanogenesis. As anticipated, fisetin elevated the expression of β-catenin, facilitating its subsequent translocation into the nucleus. In the functional assay, FH535, an inhibitor of the Wnt/β-catenin, markedly suppressed fisetin-induced melanogenesis in zebrafish larvae.

Conclusions:

Our data suggested that fisetin inhibits GSK-3β, which activates β-catenin, resulting in melanogenesis through the revitalization of MITF and tyrosinase.

KEYWORDS: β-catenin; Fisetin; GSK-3β; α-MSH; Melanogenesis

PP-0806103-P

Isolation and Identification of the Active Compound in *Streptomyces sp.* GMY01 Bacteria as Anti-Breast Cancer Agent by *In Vitro* Study

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ABSTRACT

Introduction:

Breast cancer is still a major health problem in the world because of its high morbidity and mortality. The main problem in cancer treatment is the resistance to anticancer and the emergence of serious side effects due to chemotherapy. The need for sensitive anticancer with a specific mechanism of action is urgently needed. One of the potential producers of new anticancer molecules to be developed is secondary metabolites produced by Actinomycetes bacteria. Previous research showed that the methanol extract of *Streptomyces sp.* GMY01 bacteria isolated from the coast of Krakal, Gunung Kidul has very strong cytotoxic activity on breast cancer cells MCF-7 and T47D with IC_{50} values of 0.6 and 1.3 ug/mL

Objectives:

This research was to isolate and identify the active compounds from *Streptomyces sp.* GMY01.

Methods:

The methanol extract was prepared to isolate the active compounds using bioassay guided isolation method. The active compounds were then identified using UV/Vis spectrophotometer, Fourier transform-infrared (FT-IR), liquid chromatography-mass spectroscopy (LC-MS), ^{1}H-NMR, and ^{13}C-NMR. The active compounds were tested on MCF-7 and Vero cell lines using MTT assay.

Results:

The active compound in the methanol extract of *Streptomyces sp.* GMY01 was mannotriose compounds. The compound had an IC_{50} value of 5.6 ug/ml and 687 ug/ml in MCF-7 and in normal Vero cells line, respectively.

Conclusions:

It can concluded that the mannotriose has strong cytotoxic activity and it did not affect to the normal cells.

KEYWORDS: Cytotoxic activity; Isolation; Selectivity activity; *Streptomyces sp.* GMY01

PP-0807101-P

Morus alba L. Extract Suppression of Cell Proliferation in SH-SY5Y Human Neuroblastoma Cells

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ABSTRACT

Introduction:

Morus alba L., has been utilized in traditional medicine for its anti-inflammatory, anti-cancer, and expectorant properties. Previous research has highlighted its anti-cancer potential across various cancer cell types, attributing these effects to its phytochemical constituents.

Objectives:

This study investigated the anti-cancer activity of *Morus alba* found locally in Brunei Darussalam. We examined *Morus alba* root bark and leaves extracts' ability to suppress the proliferation of SHSY5Y neuroblastoma cancer cells.

Methods:

Cell viability was assessed using both the MTT assay and the trypan blue exclusion assay. Cell apoptosis was evaluated with the annexin V-propidium iodide double staining assay. High-performance liquid chromatography (HPLC) was used to analyze the phytochemicals present in *Morus alba.*

Results:

Cell viability assessment showed that *Morus alba* root bark extract significantly decreased neuroblastoma cells' viability in a dose- and time-dependent manner, which can be observed even at 150µg/ml at 48 hours, whereas *Morus alba* leaves extract only decreased cell viability at higher concentrations of 1000µg/ml. The results were further supported using trypan-blue exclusion assay. Investigation using annexin V-propidium iodide double staining assay showed that early apoptosis was observed in *Morus alba*-treated cells, indicating that the reduction in proliferation was caused by apoptosis. HPLC assay showed the presence of morusin, one of the active ingredients in *Morus alba* root bark known for its anti-cancer properties.

Conclusions:

These results underscore the potential of *Morus alba* L. extracts as effective anti-cancer agents against human neuroblastoma cells.

KEYWORDS: Anti-cancer; Apoptosis; *Morus alba*; MTT; Root bark extract

PP-0807102-P

Novel 2 Oxoindoline-Based Acetohydrazides: Design, Synthesis, and Bioevaluation as Antitumor Agents

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ABSTRACT

Introduction:

PAC-1, the acetohydrazide derivative known to activate procaspase has demonstrated highly favorable *in vivo* anticancer activity profile in several xenografted models. Encouraged by these developments, we expanded our research efforts to investigate novel acetohydrazides bearing 2-oxoindoline moiety.

Objectives:

The primary objective of this research revolves around design, synthesis, and bioevaluation of novel 2-oxoindoline-based acetohydrazides as antitumor agents. Three human cancer cell lines: colon cancer (SW620), prostate cancer (PC3), and lung cancer (NCI-H23) were used for screening the cytotoxicity of the compounds.

Methods:

NMR spectra was acquired utilizing a Bruker 500 MHz spectrometer, employing DMSO-d_6 as the solvent unless stated otherwise. Mass spectra was generated using an LC-MSD-Trap-SL mass spectrometer with ESI. Caspase activity was assessed using a caspase 3 assay kit following the guidelines provided by the manufacturer (Abcam, MA, USA). The cytotoxicity of the compounds was determined through SRB assays.

Results:

The cytotoxic assessment revealed significant activity of the compounds against three human cancer cell lines: SW620 (colon cancer), PC-3 (prostate cancer), and NCI-H23 (lung cancer). Notably, six compounds, including 4f–h and 4n–p, demonstrated cytotoxicity comparable to or surpassing the positive control PAC-1, the initial procaspase-3 activating compound. Compound 4o emerged as the most potent, exhibiting three- to five-fold greater cytotoxicity than PAC-1 across the tested cancer cell lines. Examination of the compounds' impact on cell cycle and apoptosis revealed that representative compounds 4f, 4h, 4n, 4o, and 4p (particularly 4o) induced S phase accumulation in U937 cells and significantly promoted late-stage cellular apoptosis. These findings underscore the potential of compound 4o as a foundational model for the future design and development of novel anticancer agents.

Conclusions:

In summary, the biological results showed significant cytotoxicity against three cancer cell lines for these compounds, indicating that compound 4o could be a template for developing novel anticancer agents.

KEYWORDS: Acetohydrazides; Apoptotic inducers; Caspase activation; Cytotoxicity; 2-Oxoindoline

PP-0807103-P

The Effects of Finger Root Extract on the Genes Expression that Related to Hepatocellular Carcinoma after Induced by Hepatitis B X Antigen

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ABSTRACT

Introduction:

Hepatitis B virus (HBV) infection is a major public health issue worldwide, with chronic infection leading to severe complications such as liver inflammation and liver cancer. The hepatitis B virus X (HBx) protein, encoded by the X gene, plays a crucial role in the development of liver cancer by affecting the expression of genes involved in abnormal cell growth and various cellular processes. Finger root (*Boesenbergia rotunda*) is a traditional medicinal plant known for its hepatoprotective and anti-HBV properties, mainly attributed to its compounds, panduratin A and pinostrobin. However, the effects of finger root extract on gene expression associated with HBV-induced liver cancer remain unclear.

Objectives:

To investigate the effects of extracts from finger root (*Boesenbergia rotunda*), both crude and purified, including finger root crude extract, panduratin A, and pinostrobin, on the expression of genes related to hepatocellular carcinoma (HCC) development induced by the X antigen (HBxAg) of the Hepatitis B virus.

Methods:

Immortalized hepatocyte-like cells (imHC) were developed to produce HBx protein permanently through stable transfection of imHC with HBx plasmid DNA. Drug-resistant cells were selected using G418 (geneticin) to establish an imHC clone with sustained expression of HBx. Subsequently, the imHC-HBx cells were examined for changes in genes related to HCC based on literature reviews. The cells were then treated with the three types of finger root extracts for 2 days and 1 month to study the effects of finger root extracts on preventing gene alterations related to HCC development induced by HBx.

Results:

The data reveal that genes related to HCC development were altered after being induced by HBxAg (imHC-HBx). When treated with finger root crude extract and the purified compound pinostrobin for 2 days, it was found that the extracts could inhibit the stimulation of the cyclin-D1 gene by antigen X. After treating imHC-HBx with finger root crude extract, pinostrobin, and panduratin A for 1 month, it was found that the extracts could reduce the stimulation of Bcl-2, PGC1-α, and β-catenin genes, as well as reduce the suppression of the NQO-1 gene by antigen X. Additionally, panduratin A could also reduce the stimulation of the cMYC gene by HBxAg.

Conclusions:

These preliminary experimental results suggest the possibility of developing finger root extracts for hepatocellular carcinoma prevention. Our study shows statistically significant inhibitory effects of finger root crude extract and pinostrobin on the stimulation of the cyclin-D1 gene by antigen X after being treated with the extracts for 2 days. It also shows statistically significant reducing effects of the extracts on the stimulation of Bcl-2, PGC1-α, and β-catenin genes, as well as on the suppression of the NQO-1 gene by antigen X. Additionally, the reducing effect of panduratin A on the stimulation of the cMYC gene by HBxAg is demonstrated.

KEYWORDS: *Boesenbergia rotunda*; Finger root; Hepatitis B; Hepatocellular carcinoma; X antigen

PP-0807104-P

Assessment of the Cytotoxicity, Cell Migration Effect, and Apoptotic Modulation of Acteoside and Plantamajoside on Human Breast Adenocarcinoma (MCF-7)

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ABSTRACT

Introduction:

Breast cancer is a major worldwide concern, particularly in developing nations where access to treatment is often limited. Thus, the search for a cost-effective and safe treatment for it has been one of the concerns of the healthcare community. Acteoside and plantamajoside are compounds isolated from the Plantago genus that have previously been reported to influence tumorigenesis.

Objectives:

In this study, the anticancer properties of compounds acteoside and plantamajoside were investigated against the MCF-7 breast cancer cell line. Its effects on cell toxicity, proliferation, migration, and apoptosis were specifically evaluated.

Methods:

The IC_{50} of acteoside and plantamajoside were investigated using the Sulforhodamine B (SRB) assay. The IC_{50} value was then utilized in the clonogenic and scratch wound assays to assess cell survival and migration, respectively. Cells with treatment were also analyzed using the caspase 3/7 assay to determine its capability to induce apoptosis. Furthermore, SwissTargetPrediction was used to evaluate the protein targets of the two compounds.

Results:

Acteoside and plantamajoside exhibited cytotoxic activity against MCF-7. The IC_{50} was observed at 134.83 ug/mL and 225.10 ug/mL for acteoside and plantamajoside, respectively. This can be supplemented with the clonogenic assay, which revealed a reduction in the formation of colonies following the treatment. Moreover, it was also able to inhibit cell migration as a significant reduction in the migration area was observed. The increased activity of the caspase 3/7 was also noted, indicating the potential of these compounds to induce apoptosis. Lastly, in silico predictions showed that the anticancer activity of the compounds can be attributed to their interaction with the matrix metalloproteinases (MMPs) and protein kinase C.

Conclusions:

Both acteoside and plantamajoside have demonstrated promising anticancer properties by inhibiting the growth and metastasis of breast cancer, which may be mediated by their ability to interact with MMPs and protein kinase C. Furthermore, these compounds are also capable of modulating apoptosis.

KEYWORDS: Acteoside; Anticancer; Breast Cancer; MCF-7; IC_{50}; Plantamajoside

PP-0807105-P

Establishment of an Intracranial Xenograft Model from Colorectal Cancer in Irradiated Mice

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ABSTRACT

Introduction:

Colorectal cancer (CRC) is the most common type of gastrointestinal cancer metastasizing to the brain. In addition, patients with brain metastasis from CRC have low mean survival time. Preclinical studies play a crucial role in understanding histopathological characteristics of brain tumors and the discovery of anticancer agents. To conduct preclinical studies pertaining to brain metastasis, mouse models are often based on brain-tropic cancer cell lines or spontaneous incidence in orthotropic mouse models, genetically engineered mouse models or patient-derived xenografts. These models could recapitulate metastatic processes and genetic mutations in brain metastasis, but have particular drawbacks pertaining to low yield, prolonged time, and concurrent metastases in other organs. Moreover, in xenograft models, genetically immunodeficient mice are often employed because of their long-term immunodeficiency, but they still have some certain constraints.

Objectives:

In this study, we examined the ability of the human colorectal cancer cell line HCT116 to grow into intracranial tumors in BALB/c mice immunocompromised by irradiation.

Methods:

In the irradiated group, 5/5 mice had intracranial tumors with the median tumor volume reaching 4.68×10^6 μm^3 after a 7-day follow-up. The presence of colorectal tumors in the mouse brains was confirmed by histopathology.

Results:

The results showed that irradiation at the dose of 3Gy x 2 caused immunodeficiency in healthy BALB/c mice and HCT116 cells could initiate tumors intracranially in BALB/c mice immunosuppressed by irradiation with a high take rate.

Conclusions:

BALB/c mice can be used for xenograft models via immunosuppression by irradiation. In addition, the human colorectal cancer cell line HCT116 shows the potential ability to form brain tumors in research animals.

KEYWORDS: BALB/c mice; Brain tumors; HCT116; Irradiation

PP-0812101-P

Isolation of Phytochemical Compounds from *Crinum latifolium* and Network-Pharmacology Investigation of the Potential Mechanism on Benign Prostatic Hyperplasia

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ABSTRACT

Introduction:

Crinum latifolium (*C. latifolium*) L. is a traditional medicinal plant commonly used in various cultures to manage benign prostatic hyperplasia (BPH). This species' therapeutic benefits are due to the presence of certain secondary metabolites, especially alkaloids and flavonoids. However, its potential molecular mechanisms are unknown.

Objectives:

This study aims to develop a process for the simultaneous extraction of alkaloids and flavonoids from *C. latifolium,* and possible mechanisms of these compounds in treating BPH were also investigated.

Methods:

Dried, powdered leaves of *Crinum latifolium* were extracted with the Supercritical Fluid Extraction (SFE) method at 50 degrees Celsius and 200 bar for 2 hours, with alcohol 96% as the solvent. The compounds in each fraction were isolated by silica gel chromatography. Structural analysis was performed using IR, UV, MS, 1D, and 2D NMR spectroscopy. Finally, the potential pathway by which *C. latifolium* alleviates BPH was identified using network pharmacology and molecular docking approaches.

Results:

Seventeen compounds were obtained from the extraction process, with two new alkaloids (compound 2 and compound 11) among them. The compound-target network included 29 nodes (17 compounds and 12 targets) and 53 edges. Crinamidine, 6-hydroxypowelline, undulatine, 6-hydroxybuphanidrine, p-hydroxybenzoic acid, compound 11, GTR1, KDM1A, PA2GA, and CLK2 were important nodes of the network. All compounds were successfully attached to the target, with docking scores ranging from -5.0 kcal/mol to -10.2 kcal/mol. Furthermore, arachidonic acid metabolism was revealed as a potential pathway through which *C. latifolium* might exert its therapeutic effects on BPH.

Conclusions:

The extraction method effectively isolated flavonoids and alkaloids from *C. latifolium*, and the network pharmacology analysis revealed key compounds and targets related to BPH treatment. Involvement in the arachidonic acid metabolism of the targets suggests a specific mechanism for the therapeutic action of *C. latifolium* on BPH.

KEYWORDS: Alkaloids; Benign prostatic hyperplasia; *Crinum latifolium*; Flavonoids; Network pharmacology; Supercritical fluid extraction

PP-0904101-P

Rutin: A Potential Therapeutic Agent in Countering Lung Fibrosis Induced by Bleomycin via TGF-β Receptor Inhibition

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ABSTRACT

Introduction:

This study explores the potential therapeutic role of rutin, a natural flavonoid, in mitigating the aberrant regulation of extracellular matrix (ECM) and epithelial-mesenchymal transition (EMT) observed in idiopathic pulmonary fibrosis (IPF), a chronic lung condition.

Objectives:

Our investigation focused on elucidating rutin's effect on the transforming growth factor-β (TGF-β)-induced ECM regulation and EMT by targeting the TGF-β type I receptor (TβRI)-mediated SMAD signaling pathway.

Methods:

This study used the TGF-β1-induced human embryonic lung fibroblasts (MRC-5) activation and bleomycin-induced lung fibrosis mice model. Flow cytometry analysis for viability and apoptosis, western blot, immunofluorescence staining, quantitative real time-PCR, hematoxylin and eosin staining, Masson's trichrome staining, sircol collagen assay used to evaluate the effects of rutin on fibroblast activation, pulmonary fibrosis. Wound healing assay, cell invasion assay, and migration assays were performed to identify EMT effect. Further, molecular docking was used to predict the binding sites of rutin to TβRI.

Results:

Our results demonstrate that rutin, at non-toxic concentrations, effectively attenuates the expression of TGF-β-induced ECM-related genes, including fibronectin, elastin, collagen 1 type 1, and TGF-β, as well as inhibiting myoblast differentiation in MRC-5 lung fibroblast cells, accompanied by the downregulation of α-smooth muscle actin. Moreover, rutin hinders TGF-β-induced EMT processes such as wound healing, migration, and invasion by modulating the expression of EMT-related genes. Furthermore, in a mouse model, rutin demonstrates efficacy in reducing bleomycin-induced lung fibrosis, suggesting its potential as a therapeutic option for IPF. Molecular docking analyses indicate that rutin interacts with the active site of TβRI, inhibiting SMAD-mediated fibrotic signaling pathways in lung fibrosis.

Conclusions:

These findings underscore rutin's promise as a prospective anti-fibrotic agent for IPF and potentially other diseases characterized by TGF-β-induced fibrosis and cancer. Nonetheless, further studies are warranted to validate its safety and effectiveness in other animal models.

KEYWORDS: Lung fibrosis; Rutin; SMAD; TβRI; TGF-β

PP-0906101-P

Overview of Blood Pressure, Supplement Consumption Habits, and Lifestyle of Runner at University of Indonesia

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ABSTRACT

Introduction:

During sports activities, there will be an increase in heart rate so that the amount of blood that can be distributed becomes greater and is received more quickly by blood cells. Exercise, especially running, has an impact on the smooth circulation of blood containing oxygen in the body. Blood pressure is a parameter that can determine a runner's health level. There are several factors that can influence runners' blood pressure during running activities. The University of Indonesia (UI) is one of the places of choice for running activities for the runner community.

Objectives:

It is necessary to know the blood pressure profile of runners at UI, exercise patterns, supplement consumption, lifestyle, and other factors that influence runners' blood pressure in the UI area.

Methods:

Data analysis was carried out using data collected using a validated questionnaire and the time point for collecting blood pressure data was 10-15 minutes after the subject had run. Data will be described using descriptive statistics.

Results:

Results Of the 120 runners at UI, blood pressure tended to be normal (93.03%) and only 6.07% above normal. The average age of runners at UI is 26 years and they have a normal BMI (82.05%). Runners mostly did not have comorbid such as diabetes (99.02%), dyslipidemia (95.08%), and hypertension (88.03%) and did not have a family history of diabetes (69.02%), dyslipidemia (90.08%), and hypertension (55%). As many as 61.07% of runners did not consume supplements and were still lacking in protein consumption (90%). Most runners still consume caffeine occasionally (54%) but do not consume alcohol (95.08%).

Conclusions:

It was found that runners at UI have a good result on lifestyle when seen from the factors that have been researched, but further analysis needs to be done regarding the interrelationships and relationships between these factors.

KEYWORDS: Blood pressure; Lifestyle; Runner; Supplement consumption

PP-0908102-P

Relationships between Body Mass Index and Children's Stool at a Preschool in Northern Vietnam

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ABSTRACT

Introduction:

Malabsorption, characterized by impaired absorption of nutrients, can affect macronutrients (proteins, carbohydrates, lipids) and micronutrients (vitamins, minerals) equally. Consequently, it leads to fecal nutrient excretion, nutritional deficiencies, and a spectrum of gastrointestinal (GI) symptoms. Constipation, a common GI concern among children, is gaining prominence in contemporary society. Its adverse effects on pediatric nutritional health are multifaceted, potentially impacting both weight and height, thereby shaping long-term developmental pathways.

Objectives:

This study endeavors to investigate the potential correlation between body mass index (BMI) and stool quality in children. By establishing this relationship among preschoolers in Northern Vietnam, we aim to provide a foundation for nutritional interventions tailored to this population.

Methods:

This study involved a stool sample survey encompassing over 110 children aged 2-5 years attending a preschool in Northern Vietnam during 2022-2023, employing the Bristol Stool Form Scale (BSFS) for assessment. Quantitative variables such as child weight, height, and BMI were delineated by mean and standard deviation, with correlation analysis conducted via chi-square tests using SPSS 20.

Results:

A total of 110 children included 51.8% males and 48.2% females. The results showed that gender, age, and stool quality did not have a statistically significant relationship with each other with the Asymptotic Significance (2-sided) Pearson Chi-Square value of 0.493 greater than 0.05. BMI and stool quality have a statistically significant relationship with each other, the stool quality of children with a normal BMI is better than the stool quality of children with a BMI at risk of obesity and underweight BMI number.

Conclusions:

Although a significant correlation between BMI and stool quality was identified, further research, such as expanded cohort studies or clinical trials, incorporating regional nutritional interventions, is warranted to validate weight management strategies among children.

KEYWORDS: Body mass index (BMI); Children; Stool

PP-1002101-P

Growth Characteristics Morphology of Frozen-Thawed Porcine Oviductal Epithelial Cells and their Application in Cytotoxicity Tests of Kratom Leaf Juice using MTT Assay

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ABSTRACT

Introduction:

Porcines are some of the most frequently consumed animals globally. While various aspects of porcines have been extensively examined, scientific research is lacking on the reproductive organs, such as the oviduct. Kratom has recently been decriminalized in Thailand and credited with pain alleviation, leading to increased consumption of kratom leaf juice. The information will provide data for future research on the porcine reproductive system to support the safe development of kratom-based products.

Objectives:

This study aimed to scrutinize the capabilities of porcine oviductal epithelial cells (POECs) for cytotoxicity testing, employing kratom leaf extract as a case study.

Methods:

Frozen-thawed POECs were cultured at 2×10^4cells/well in a 24-well plate and counted every 24 hours for 7 days to determine the growth curve. Cells at the log phase were then treated with kratom leaf juice at concentrations of 5%, 10%, 50%, 75%, and 100% (v/v). Cell viability was determined using MTT assay with absorbance at 540 nm. All experiments were performed in triplicate.

Results:

The growth rate and doubling time of POECs were 0.0142 cells per hour and 21.30 hours, respectively. From the MTT assay, 5% and 100% concentrations of kratom leaf juice from the red vein increased cell viability, whereas the green vein showed only 5%. Other concentrations decreased cell viability. The IC_{50} value of POECs for the red and green veins is 199.44 and 261.45, respectively.

Conclusions:

Frozen-thawed POECs maintained epithelial-like morphology. The optimal time for cell experimentation is 24–48 hours post-thawing during the log phase of maximal growth. The subculture can sustain growth indefinitely, showing potential for cell line development. Kratom juice at 5% boosted cell viability, with varying effects on different strains, whereas at higher concentrations, it inhibited cell growth. The results from this study indicated that POECs are a viable option for cytotoxicity testing.

KEYWORDS: Cytotoxicity; Green vein kratom; Porcine oviductal epithelial cells; Red vein kratom

PP-1002102-P

In Vitro Activities of Leaf and Root Extracts of *Catharanthus roseus* (L.) G. Don. on Human Peripheral Blood Mononuclear Cells

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ABSTRACT

Introduction:

Catharanthus roseus (L.) G. Don. is widely used to treat hypertension, diabetes, poor digestion and dysentery, and fever. However, studies on the pharmacological effects on the immunomodulatory of *Catharanthus roseus* have been limited.

Objectives:

The objective of this study was to investigate the immunomodulatory activity of leaf and root extracts of *Catharanthus roseus* on human peripheral blood mononuclear cells (PBMCs).

Methods:

PBMCs were isolated from 10 mL of EDTA-coagulated whole blood collected from the healthy volunteers. The effects of 96% ethanol extracts and the fractions (n-hexane, chloroform, ethyl acetate, water) from leaves and roots of *Catharanthus roseus* on PBMCs proliferation after 24, 48, 72 hours were evaluated using 2,5-diphenyl-2H-tetrazolium bromide assay. The inhibition of interleukin-1β (IL-1β) and interleukin-6 (IL-6) secretion from PBMCs by leaf and root extracts of *Catharanthus roseus* for 48 hours was evaluated using enzyme-linked immunosorbent assays.

Results:

After 48 hours, the crude extracts and the fractions from leaf and root of *Catharanthus roseus* showed the strongest inhibitory effects on PBMCs proliferation, with the IC_{50} concentrations of the crude extracts from leaves and roots and the ethyl acetate fractions being 6.10 ppm; 51.17 ppm; 76.52 ppm, respectively. Water fraction from *Catharanthus roseus* roots inhibited IL-1β production with IC_{50} value of 38.46 ppm. Chloroform fractions from *Catharanthus roseus* leaves strongly inhibited IL-6 production secreted by PBMCs with IC_{50} value of 41.37 ppm.

Conclusions:

Extracts from the leaves and roots of *Catharanthus roseus* exhibited inhibitory effects on PBMC proliferation and interleukin secretion from PBMCs.

KEYWORDS: *Catharanthus roseus*; Extracts; Interleukin-1β; Interleukin-6; PBMCs

PP-1004101-P

Exploring the Biosafety of Extracts from the Aerial Parts of *Polygonum minus*

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ABSTRACT

Introduction:

Plants are valuable resources in food and medicinal fields due to their rich bioactive compounds. The aromatic plant *Polygonum minus* (PM), well known in Southeast Asian countries, holds significant potential as a promising botanical resource for the development of future dietary supplements and has been extensively studied for the diverse bioactivities of its extracts.

Objectives:

This study aimed to assess the biosafety of leaf and stem extracts of PM to provide foundational evidence for future research and application in clinical.

Methods:

In the present study, PM leaf and stem extracts were prepared using four solvents of varying polarities: hexane, dichloromethane, methanol, and water. NIH3T3 mouse embryonic fibroblast cell line was used for the cytotoxicity evaluation of PM extracts. Additionally, hemocompatibility and brine shrimp lethality assays were performed to further characterize the biosafety profile of PM extracts.

Results:

Results showed that extraction using methanol or water yielded higher extraction rates than hexane or dichloromethane, with PM stem water extract displaying the highest extraction yield. Notably, all PM extracts exhibited low cytotoxicity towards NIH3T3 normal cells, with IC_{50} values exceeding 100 µg/mL, particularly PM stem extracts surpassing 300 µg/mL. Additionally, PM extracts demonstrated favorable hemocompatibility, with low hemolytic activity observed even at concentrations up to 600 ug/mL, except for PM leaf hexane and dichloromethane extracts. Moreover, no mortality was observed in brine shrimp exposed to PM extracts for 24 h, except for the aforementioned PM leaf extracts with low toxicity.

Conclusions:

These findings underscore the pronounced biosafety of PM leaf and stem extracts, characterized by low cytotoxicity towards normal cells, favorable hemocompatibility, and low brine shrimp toxicity, thus potentially facilitating their utilization in pharmaceuticals and dietary supplements.

KEYWORDS: Biosafety; Brine shrimp toxicity; Cytotoxicity; Extracts; Hemocompatibility; *Polygonum minus*

PP-1005101-P

Assessing the Chronic Effects of Pharmaceutical Pollutants on the Survivability, Regenerative Ability, and Behavioral Changes of Malaysian Polychaetes

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ABSTRACT

Introduction:

The presence of pharmaceutical residues in aquatic ecosystems is strongly linked with anthropogenic activities that have raised concern among researchers worldwide. This is due to their negative impact on the non-target organisms.

Objectives:

Here, we examined the potential physiological effects of selected pharmaceutical pollutants on two polychaetes species, *Marphysa moribidii* and *Diopatra claparedii*. The survivability, regenerative ability and behavioral parameters including, spontaneous activity and burrowing activity of both subjects were evaluated after exposure towards the selected drugs, amoxicillin, diclofenac, metformin and paracetamol.

Methods:

Briefly, adult polychaetes were subjected to environmentally relevant concentrations as follows: a) Amoxicillin 10, 50, and 100 ng/L; b) Diclofenac 500, 2500, and 5000 ng/L; c) Metformin 10, 50, and 100 ng/L; and d) Paracetamol 120, 600, 1200 ng/L, untreated samples were used as controls.

Results:

Both species exhibited no recorded mortality after a 28-day exposure period. The regenerative ability of the organisms demonstrated a significant decrease ($p < 0.001$) ranging between 8.86 to 95.56% when compared to the untreated group. The spontaneous activity of the organisms was significantly reduced ($p < 0.001$) as the concentration increased in the spontaneous activity for amoxicillin, diclofenac, metformin, and paracetamol. Under these experimental conditions, a reduction in the organism mobility (spontaneous activity) was observed with the average ranging between 3.67 ± 0.58 cm to 10.83 ± 0.76 cm. On the other hand, a significant increase in time required for burrowing activity was exhibited in this study, ranging from 3.67 ± 0.58 minutes to 10.83 ± 0.76 minutes when compared to the untreated group.

Conclusions:

This finding showed that the potential consequences of pharmaceutical pollution may affect the non-target aquatic organisms that indirectly may have broader implications for marine ecosystems. Nonetheless, biochemical and molecular analysis are required to map the mechanism of action.

KEYWORDS: Behavioral; Impact; Marine; Pharmaceutical pollutant; Polychaetes

BB-0602101-P

Genetic Polymorphism of *PPAR-Γ* and Its Impact on the Response to Anti-Diabetes Drugs in Diabetes Mellitus Type 2 Patients

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ABSTRACT

Introduction:

Diabetes Mellitus (DM) is a prevalent global health issue. In 2017, Indonesia accounted for around 10.3 million cases of diabetes worldwide. Diabetes mellitus (DM) type 2 is defined as a metabolic disorder caused by insufficiently effective use of insulin in the body. The *PPAR-γ* gene produces the *PPAR-γ* protein, which is a group of core receptor proteins that play a role in carbohydrate and lipid metabolism.

Objectives:

The objective of this study is to determine the distribution of genetic variants of *PPAR-γ* in T2DM and its impact on the response to anti-diabetic drugs in patients with T2DM

Methods:

We have recruited 36 patients with T2DM. The study analyzed the HbA1c and blood glucose levels of the patients, as well as their demographic information. The sampling was conducted using the purposive sampling method with inclusion and exclusion criteria. The polymorphism of the *PPAR-γ* gene was analyzed using the PCR-RFLP method using specific primers and the BstUI restriction enzyme. The primer sequences utilized for *PPAR-γ* were as follows: forward primer 5'-CCAATTCAAGCCCAGTCCTTTC-3' and reverse primer 5'-CAGTGAAGGAATCGCTTTCCG-3'. The data is analyzed in both HWE and Chi-Square.

Results:

Not all samples have undergone complete amplification for gene *PPAR-γ* (amplicon size = 270 base pairs). The genotype frequency of the gene *PPAR-γ* variant was absent from the study population and gene *PPAR-γ* was not significant P>0.05. After digestion with restriction enzymes and analysis by agarose gel electrophoresis. Furthermore, the prevalence of HbA1c and factors such as age, heredity, and lifestyle do not significantly differ between patients with T2DM *PPAR-γ* gene polymorphism.

Conclusions:

The absence of significant determination in the distribution association *PPAR-γ* gene polymorphism in T2DM and its impact on the response to anti-diabetic drugs in patients with T2DM in this study. There needs to be rigorous research in a wider community population with a large sample of T2DM patients.

KEYWORDS: T2DM; Anti-diabetic; Polymorphism; *PPAR-γ*; PCR-RFLP

BB-0602102-P

Identification of Biomarkers for Treatment Resistance in Breast and Ovarian Cancer Patients Using Transcriptome Datasets

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ABSTRACT

Introduction:

Breast cancer and ovarian cancer are highly prevalent and life-threatening diseases affecting women globally, characterized by complexity and heterogeneity. Furthermore, women who have experienced breast cancer are also at risk of developing ovarian cancer.

Objectives:

To identify transcriptomic biomarkers for the prediction of disease-free survival (DFS) and overall survival (OS) in breast and ovarian cancer patients.

Methods:

We examine transcriptomic data specific to breast and ovarian carcinoma, exploring gene expression patterns associated with the treatment resistance in these cancers. The biological and genetic data generated via high-throughput screening of two patient datasets were retrieved. Patients were divided into two groups, i.e., recurrence and disease-free, based on their disease-free survival (DFS) status. Differential gene expression (DGE) analysis was performed to compare the differences between the recurrence and disease-free groups, categorized by a fold change (FC) and p-value. Enrichment pathway analysis unveiled the biological pathways linked to drug responsiveness. Additionally, we analyzed the prognostic ability of the candidate gene level to the patient survival rate using the Kaplan-Meier analysis and Cox regression model.

Results:

The enriched pathways of up-regulated genes in both breast and ovarian cancers were related to the hormone biosynthetic process. On the other hand, the immune response pathway was associated with down-regulated genes. The survival analyses demonstrated that the expression levels of the candidate biomarkers notably impacted patients' DFS. The final biomarkers served as independent prognostic markers. RASGRP1 was associated with a good prognosis in breast cancer. In contrast, SEMA5B was associated with a poor prognosis in ovarian cancer.

Conclusions:

We proposed novel transcriptomic biomarkers for predicting responses to the treatment and enhancing treatment strategies for both breast and ovarian cancers.

KEYWORDS: Breast cancer; Ovarian cancer; Biomarker; Recurrence; Disease-free survival; Overall survival

BB-0602103-P

Investigation of LINE-1 Methylation Level as a Biomarker of Lung Cancer: Systematic Review and Meta-Analysis

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ABSTRACT

Introduction:

Lung cancer is the leading cause of cancer deaths. Despite a 13% annual increase, there have been significant advancements in technology and therapeutic options for lung cancer. However, diagnosing and predicting lung cancer outcomes remain inadequate. From previous research reports, several cancers have shown reduced methylation levels in comparison to adjacent normal tissue. However, previous studies have not fully explained the extent of methylation of long-interspersed nuclear element-1 (LINE-1) in lung cancer.

Objectives:

To systematically review and meta-analyze associations between LINE-1 methylation levels and clinical outcomes of lung cancer and to determine potential use of LINE-1 methylation as a diagnostic marker for predicting progressions of lung cancer.

Methods:

A systematic search was conducted across PubMed, Scopus, and Cochrane Library databases, published before September 2023. The quality of studies was assessed, the random-effects model was used to estimate weighted mean differences (MDs) with 95% Confidence Intervals (CIs). Furthermore, subgroup analyses were conducted by ethnicity (Asian or non-Asian populations), and by method of measurement of DNA methylation levels (Combined bisulfite restriction analysis or Bisulfite-PCR and pyrosequencing) and a meta-analysis was performed using the Rev-man website for statistical analysis.

Results:

A total of 15 studies were included in this study. LINE-1 methylation levels in lung cancer tissues were found to be significantly lower than those in normal tissue samples (MD=-4.36; 95% CI: -6.47, -2.25, P=0.02). Lung cancer patients with lower LINE-1 methylation levels had a significantly shorter survival time (OS) and poorer prognosis (PS) than those with higher LINE-1 methylation levels. (OS: HR=1.95,95% CI: 1.09,3.51, P=0.03; PS: HR=1.95,95% CI: 1.09,3.51, P=0.03).

Conclusions:

Line-1 hypomethylation in lung biopsy in lung cancer patients, line-1 hypomethylation associated with reduced rate of the survival and there is no significant association between line-1 hypomethylation and mortality rate in lung cancer patients. Our findings indicate that LINE-1 methylation levels could serve as a useful diagnostic value for lung cancer especially NSCLC. However, further investigation is required to establish their use as reliable biomarkers in clinical practice.

KEYWORDS: Lung cancer; Long interspersed nuclear element-1; Methylation; Prognosis

BB-0603101-P

Effect of Ultrasonic Parameters on Cell Membrane Permeability and Cell Viability of the Multifunctional Microbubble *In Vitro*

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ABSTRACT

Introduction:

The vascular endothelial growth factor receptor 2 (VEGFR2) expression has been associated with tumor growth and aggressiveness in various cancers. VEGFR2 is highly expressed in tumor cells and endothelial cells in blood vessels that nurture brain tumors, therefore it becomes an ideal target to treat cancer. We have developed a novel multifunctional microbubble system, the gene-loaded VEGFR2-targeted microbubble system (VCMB-pDNA) and reported that the combination of VCMB-pDNA with focused ultrasound (FUS) can increase the transfection efficiency of tumor cells by triggering membrane perforation (sonoporation) to improve brain tumor-targeted gene delivery. However, few studies focused on how to increase the efficiency of gene delivery to brain tumor cells with minor cell damage.

Objectives:

The aim of this in vitro study was to find optimal parameters for enhancing cell membrane permeability using VCMB-pDNA.

Methods:

This work focuses on the effect of acoustic parameters and exposure conditions on the ability of VCMB to calcein permeability in glioma cells. The effects of VCMB concentration (0-12 × 10^4/mL), acoustic pressure (0–1200 kPa), duty cycle (5 %), PRF (1-5 Hz) and cycle number (25-10000) on calcein permeability and cell viability were examined.

Results:

The results showed that the VCMB concentration of 4×10^7 MB/ml was optimal conditions for efficient cell membrane permeability and minimum cell damage. In addition, cell membrane permeability and cell viability depended strongly on the acoustic exposure conditions. The optimal FUS parameters include an acoustic pressure of 700 kPa, a duty cycle of 5%, a PRF of 5Hz, and a cycle number of 10000.

Conclusions:

These findings support those microbubble concentrations and FUS parameters of the microbubble -mediated gene delivery system influence cell membrane permeability and cell viability. These results suggest that combining multifunctional microbubbles with FUS exposure was a potential therapeutic system to achieve targeted gene delivery for brain tumor treatment noninvasively.

KEYWORDS: Acoustic parameter; Cell membrane permeability; Cell viability; Focused ultrasound; Gene delivery; Microbubble

BB-0604101-P

Characterization of Neuroprotective Mechanism of Several Marine Pigments Against Cell Death Pathways in HT-22 Cells

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ABSTRACT

Introduction:

The mouse hippocampal neuronal cell line HT22 is frequently used for the study of neurotoxicity.

Objectives:

This study aimed to evaluate the *in vivo* neuroprotective activity of several marine pigments in HT-22 cells, by regulating different cell death pathways.

Methods:

The study focuses on the modulation of cell death pathways induced by glutamate, a neurotoxic molecule, in the HT-22 neuronal cell model. To modulate cell death, a panel of commercial inhibitors, such as Z-VAD-FMK, Nec-1, Nec-1-s, Fer-1, 3-MA, NAC, was used. The protection of marine pigments on HT-22 cells, whose death is induced by a high dose of glutamate or by erastin, was also evaluated.

Results:

The commercial inhibitors protected HT-22 cells against the toxic effect of glutamate, with a significant restoration of cell viability. This observation highlights the involvement of multiple death pathways, including ferroptosis, autophagy and oxidative stress. The negative results of Z-VAD-FMK and Nec-1-s proved that glutamate-induced cell death does not result from apoptosis or necroptosis. On the other hand, in the presence of glutamate, almost all pigments tested significantly restored the viability of HT-22 cells. By evaluating the relationship between the effectiveness of these molecules and their toxicity, three pigments as diadinoxanthin, lutein and violaxanthin were chosen to carry out in next step. The EC50s (median effective concentration) of these pigments, determined from the dose-response curves, are respectively 22 µM; 34 µM and 28 µM for diadinoxanthin, lutein and violaxanthin.

Conclusions:

Diadinoxanthin, lutein and violaxanthin present the in vitro neuroprotective activity in HT-22 cells. These three marine pigments effectively inhibit glutamate-induced death pathways (autophagy, ferroptosis and oxidative stress).

KEYWORDS: Marine pigments; Inhibitors; Cell death pathway; Neuroprotection; Neurodegenerative diseases

BB-0703102-P

Antimicrobial Activities of Endophytic Fungi Isolated from *Plantago major* L. (Plantaginaceae)

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ABSTRACT

Introduction:

Multidrug resistance (MDR) in bacterial pathogens constitutes a pressing global health concern, necessitating the exploration of novel antibacterial agents. Within the realm of modern medicine, endophytes microorganisms residing within the tissues of medicinal plants have garnered attention as promising sources of secondary metabolites with potential therapeutic applications. Extensive research has elucidated a mutually beneficial symbiosis between host plants and endophytes, wherein endophytic microorganisms synthesize and secrete antimicrobial compounds, thus bolstering the host plant's defense mechanisms against various

Objectives:

Plantago (*Plantago major* L., Plantaginaceae), a ubiquitous medicinal herb prevalent across Asian regions, emerges as a compelling candidate for the discovery of novel antimicrobial agents.

Methods:

Endophytic fungiisolated from Plantago on potato dextrose agar, then morphological and ITs identification. The potential antibacterial activity of endophytes was studied by the agar diffusion method.

Results:

In this study, 21 strains of endophytic fungi were isolated from leaf, stem, root, and flower samples of Plantago. Subsequently, when testing the antibacterial activity against MRSA using three agar media: PDA, SDA, CDA, 10 strains of endophytic fungi: MD-H1; MD-L1; MD-L2; MD-L3; MD-L4; MD-L5; MD-R1; MD-T1; MD-T2; MD-T10were identified moderate to strong activity (diameter of antibacterial circle > 15 mm). This demonstrates that Plantago harbor endophytic fungi capable of significantly inhibiting MRSA.

Conclusions:

The endophytic fungi obtained from Plantago represent a promising reservoir of novel antibiotics targeting *MRSA*. Further research avenues will delve into elucidating the structure of secondary metabolites synthesized by these fungi. Additionally, investigations will focus on optimizing the culture conditions to maximize the production of these potential antibacterial agents. This multifaceted approach aims to harness the full therapeutic potential of endophytic fungi associated with Plantago in combating *MRSA* infections.

KEYWORDS: Endophyte; Plantago; Antibacterial; *MRSA*

BB-0703103-P

Study on *In Vitro* Inhibitory Effect Against *Streptococcus mutans* of *Bacillus coagulans*

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ABSTRACT

Introduction:
The use of probiotics to help prevent dental caries is a new direction of interest today. Among them, *Bacillus coagulans* is a probiotic strain that has both the advantages of producing spores and inhibiting pathogenic microorganisms.

Objectives:
This study investigated the growth inhibition ability of *B. coagulans* against *S. mutans* using the agar overlay assay.

Methods:
The inhibitory activity on biofilm formation was investigated based on the amount of biofilm formed by the crystal violet test and evaluating the expression level of genes *gtfB* and luxS related to biofilm formation by the method of RT-qPCR at different sucrose concentrations.

Results:
The results showed that *B. coagulans* has the ability to inhibit *S. mutans* with an inhibition zone of 20 mm. In the crystal violet test, the amount of biofilm formed was reduced by 17.9%, 52.31%, and 75.22%, when co-cultured *B. coagulans* and *S. mutans* at the OD600 ratios of 1:1, 4:1, and 16:1, respectively. The level of *S. mutans gtfB* expression decreased by 36%–76% depending on the sucrose concentrations, and *S. mutans luxS* expression was reduced by 48%.

Conclusions:
B. coagulans has the ability to inhibit both the growth and *in vitro* biofilm formation of *S. mutans*.

KEYWORDS: *Bacillus coagulans*; Probiotic; Biofilm; *Streptococcus mutans*

BB-0703104-P

Antimicrobial Potential of Culturable Lichen-Derived *Streptomyces albus*

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ABSTRACT

Introduction:

Antibiotic resistance is becoming a significant concern in treating infectious diseases worldwide, increasing the demand for new antibiotics. Actinobacteria that inhabit lichen symbionts are considered promising but previously unexplored sources for novel compounds.

Objectives:

We conducted an unprecedented investigation in Vietnam concerning the isolation, identification, and explicit assessment of the antimicrobial activity of actinobacteria associated with lichens.

Methods:

Actinomycete 4VH4, isolated from lichen *Dirinaria applanata*,was identified by combining biological characteristics and 16S rDNA gene sequencing. 4VH4 strain was grown in various culture media, e.g., Bennett's agar, ISPMedium1, ISP medium 2, ISP medium 4, and optimum medium with suitable nitrogen and carbon source was screened. Cell-free supernatant of actinomycete 4VH4 was extracted with dichloromethane (DCM).This isolate's crude extract was analyzed using Thin Layer chromatography(TLC), and the individual compounds in the crude extract were eluted by silica gel column chromatography. Disk diffusion, bioautography, and microdilution techniques were used to screen and identify the antimicrobial activity against *Klebsiella pneumoniae* ATCC 700603, *Escherichia coli* ATCC 25922, Methicillin-susceptible *Staphylococcus aureus* ATCC 25923 (MSSA), Methicillin-resistant *Staphylococcus aureus* ATCC 33591 (MRSA) in biological duplicate.

Results:

The 4VH4 strain exhibited yellow of the substrate mycelium, white of the aerial mycelium, and pigment production on the media ISP2.4VH4 can produce enzymes: catalase, urease, cellulase, and lipase. The 16S rDNA gene sequencing analysis based on NCBI data bank 100% homology with *Streptomyces albus* species. Among the selected culture medium, modified ISP2with carbohydrate components (3 g/l glucose, 4 g/l malt extract), and nitrogen content (3 g/l yeast extract) and pH 7 showed more activity against *K. penumoniae* and the zone of inhibition was 29±2mm. MIC of DCM extract against *K. pneumonia*, *E. coli*, MRSA, and MSSA was 2µg/ml, 8µg/ml, 64 µg/ml, and 32 µg/ml, respectively. MIC of the F6 fraction against *E. coli*, MRSA, and MSSA was 1-2 µg/ml, 4-8 µg/ml, and 2-4 µg/ml, respectively, while against *K. pneumoniae* is 0.25-0.50µg/ml, equivalent to gentamicin.

Conclusions:

4VH4 has good antibacterial activity against gram-negative bacteria, especially *K. pneumoniae*. Fraction F6 could be purified and structurally determined target compound by NMR spectroscopy.

KEYWORDS: Actinomycete; Lichen; Antimicrobial; Bioautography; *Streptomyces albus*

BB-0703105-P

Evaluating Antibiofilm Activities of *Psidium guajava* Extract and *Myristica fragrans* Extract Against *Staphylococcus aureus*

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ABSTRACT

Introduction:

In the search for natural anti-biofilm agents, we discovered several Vietnamese plant extracts that could eradicate *S. aureus* in biofilm, such as nutmeg (*Myristica fragrans*) extract and guava (*Psidium guajava*) extract. Chemical analysis showed that the composition of *M. fragrans* extract includes lignans, neolignans, diphenyl alkanes, phenylpropanoids, terpenoids, alkanes, fatty acids, fatty acid esters, and a few minor constituents such as steroids, saponins, triterpenoids, and flavonoids. Leaves extract from Vietnamese guava also comprises high number of flavonoids and triterpenic derivatives such as ellagic acid, hyperin, isoquercitrin, reynnoutrin, guajaverin, avicularin, ursolic acid, oleanolic acid, asiatic acid, malinic acid, and corosolic acid. Our study was the first report on the *S. aureusanti*-biofilm activities of compounds from these two plants.

Objectives:

Our aim is to study the ability of the extracted fractions of two plants to kill *S. aureus* in biofilm.

Methods:

Staphylococcus aureus biofilm was grown in Tryptic soy broth supplemented with glucose and sodium chloride (TGN) in a 96-well plate. 24-hour biofilm was used to evaluate the antibiofilm activities of extracts and fractions under three conditions: using them alone, in combination with Moxifloxacin, and in combination with Vancomycin. Biofilm was assessed on two criteria: the number of microorganisms in the biofilm (log CFU/ml) and the total biomass of the biofilm (CV absorbance).

Results:

The n-hexane fraction of *Psidium guajava* extract, at a concentration of 100 mg/ml, demonstrated the ability to kill 0.68 log CFU/ml *S. aureus* in biofilm. When combined with Moxifloxacine and Vancomycin, it showed even higher efficacy, killing 0.82 and 1.10 log CFU/mlS. aureusin biofilm, respectively. Similarly, the dichloromethane fraction of *Myristica fragrans* extract, at the same concentration, killed 0.65 log CFU/ml *S. aureus* in biofilm. In combination with Moxifloxacine and Vancomycin, it killed 0.85 and 1.15 log CFU/ml *S. aureus*, respectively. The samples did not reduce the total biomass of the biofilm, as the CV absorbance remained almost the same.

Conclusions:

The n-hexane fraction of *Psidium guajava* extract and the dichloromethane fraction of *Myristica fragrans* extract could eradicate microorganisms in *S. aureus* biofilm, and they didn't reduce biofilm biomass. Combining them with antibiotics (Moxifloxacin and Vancomycin) increased the ability to kill microorganisms in the biofilm fractions.

KEYWORDS: *Staphylococcus aureus*; Biofilm; *Psidium guajava*; *Myristica fragrans*; Extract

BB-0703106-P

Screening for Antibiotic Effects of Some Golden Camellia Species in Northern Vietnam

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ABSTRACT

Introduction:

Camellia is one of diverged genus of Theaceae. They are used in folk medicine to make drinks and treat some skin diseases.

Objectives:

In order to build a scientific basis for the use of *Camellia* species in the North of Vietnam, this study aimed to investigate the antibiotic effects of some golden *Camellia* species in Northern Vietnam.

Methods:

Aqueous and alcohol-aqueous extracts of the leaves of 7 *Camellia* species, including *Camellia chrysanthoides* Hung T.Chang (CA3), *Camellia chrysantha* (Hu) Tuyama (CA4.5), *Camellia sp.1* (CA4.6), *Camellia Luongii* Tran Ninh et Le (CA12), *Camellia nitidissima* C.W.Chi. (CA28), *Camellia sp.2* (CA34), and *Camellia sp.3* (CA37), were tested to inhibit 2 gram-positive bacteria, *Staphylococcus aureus* and *Bacillus subtilis*, 2 gram-negative bacteria, *Pseudomonas aeruginosa*, *Escherichia coli*, and 1 fungus *Candida albicans* by agar plate diffusion method.

Results:

The results showed that 3 samples had an inhibitory effect on *S. aureus* (CA12, CA28, CA37); 6 samples (except CA34) have inhibitory effect on *B. subtilis*; 6 samples (except CA37) have inhibitory effect on *P. aeruginosa*; 4 samples (except CA3, CA12, CA28) have inhibitory effect on *C. albicans*. Samples CA4.6, CA12, CA28, CA37 had the most inhibitory effect on most tested microorganisms. The aqueous extract of CA12, alcohol-aqueous 50 of CA28 and alcohol-aqueous 50 of CA37 had quite small MIC values on *S. aureus*; The alcohol-aqueous 50 extract of CA28 had a fairly small MIC on *P. Aeruginosa*. All research samples had no effect on *E. coli*.

Conclusions:

The test results partly show that the use of *Camellia* species to treat skin diseases in folk medicine has a scientific basis.

KEYWORDS: *Camellia chrysanthoides; Camellia chrysantha*; *Camellia Luongii*; *Camellia nitidissima*; Antibiotic

BB-0704101-P

Prevalence of Overexpressed RND Efflux Pumps of *P. aeruginosa* Causing Nosocomial Infections in Several Hospitals in Ho Chi Minh City

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ABSTRACT

Introduction:

Pseudomonas aeruginosa is a common nosocomial pathogen with a high rate of antibiotic resistance. The increased expression of antibiotic efflux systems plays a crucial role in the resistance patterns of this bacterium in clinical settings.

Objectives:

However, the rate of antibiotic efflux pump overexpression in *P. aeruginosa* has not been investigated in Vietnam yet.

Methods:

P. aeruginosa strains were isolated and identified from hospital infection samples - collected at the University Medical Center of Ho Chi Minh City, and Le Van Thinh Hospital, Ho Chi Minh City, Vietnam. The antibiotic susceptibilities of these isolates were determined. Finally, the rates of overexpression of the MexAB-OprM, MexCD-OprJ, MexEF-OprN, and MexXY- OprM efflux systems were determined using the phenotypic method.

Results:

Sixty isolated *P. aeruginosa* strains showed high rates of resistance to most used antibiotics, including ceftazidime (38.33%), cefepime (40.00%), meropenem (56.67%), imipenem (65.00%), gentamycin (41.67%), amikacin (31.67%), ciprofloxacin (45.00%), and levofloxacin (50.00%). *MexEF-OprN* was the most frequently overexpressed pump, found in 32 out of 60 strains (53.33%), followed by *MexCD-OprJ*, which was overexpressed in 13 out of 60 strains (21.67%). The overexpression of *MexAB-OprM* and *MexXY-OprM* were less common, found in 6 out of 60 strains (10.00%) and 3 out of 60 strains (5.00%), respectively. The overexpression of *MexEF-OprN* was associated with the resistance traits of the isolated strains.

Conclusions:

The current work was successful in determining the prevalence of efflux pumps overexpression in clinical *P. aeruginosa* strains collected at several hospitals in Ho Chi Minh City.

KEYWORDS: *Pseudomonas aeruginosa*; Efflux pump; Antibiotic resistance

BB-0705101-P

Antifungal and Antitumor Activity of *Myxobacter* Isolates from the Soil in Vietnam

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ABSTRACT

Introduction:

Cytotoxic drugs play a vital part in chemotherapy due to their greater experience than other kinds. In the 1990s, researchers discovered that myxobacteria create anti-tumor natural-macrolide chemicals called epothilones. These chemicals inhibit cancer cell growth by inhibiting cell-division microtubules. Decomposing plants and herbivore feces enrich myxobacteria soils.

Objectives:

Our study aims to isolate myxobacteria from soil samples and investigate their capability to produce antifungal and antitumor agents.

Methods:

Myxobacteria were isolated and screened using a multi-step procedure, e.g., surveying the macroscopic characteristics of bacteria on CY and VY/2, investigating cellulose degradation by Hutchinson medium supplemented with filter paper as the sole carbon source, and observing the formation of fruiting bodies and mobility by inoculate bacteria on slides with VY/2 medium. The potential strains were grown in 1CK6 medium with Amberlite XAD-16 resin; then, the active compound was eluted with methanol. A portion of the methanol residue was diluted in DMSO to test antifungal and cytotoxic properties by disk diffusion, thin-layer chromatography-autography technique, and an MTT assay.

Results:

Among 41 soil samples, three strains, including QN01, QN02, and QN04, were determined to contain cellulose-degrading capacity and exhibited fruiting bodies and skid marks created by the bacteria throughout their motility on side culture, which suggested these strains belong to *Sorangium spp.* Furthermore, the QN02 strain demonstrated antifungal against pathogen fungi, including *T. rubrum, T. mentagrophytes, M. gypseum, A. flavus, A. niger, A. fumigatus, Penicillium sp.,* and *Mucor sp*. The extracts from the culture fluids of the QN02 strain had an inhibitory effect on MCF-7 cells (breast cancer cells) with IC50= 159.1 ng/mL and HEK-293 cells (human embryonic kidney cells) with IC50= 528.1 ng/mL.

Conclusions:

Therefore, we could conclude that the QN02 strain can produce antifungal and antitumor to some extent.

KEYWORDS: Cellulose degradation; Myxobacteria; Antifungal; MTT assay; TLC autography

BB-0706101-P

Molecular Docking Analysis and *In Silico* Toxicity Testing of Compounds in Kratom (*Mitragyna speciosa*) to Prevent Drug Abuse

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ABSTRACT

Introduction:

Drug abuse, including NPS, is a global problem, including in Indonesia. Kratom (*Mitragyna speciosa*) contains mitragynine and 7-hydroxymitragynine which bind to Mu-opioid and serotonin receptors.

Objectives:

To identify active compounds that have affinity and interaction with receptors, so that the toxicity of active compounds in kratom can be known as an initial step to assess the risk of using the plant.

Methods:

The structures of kratom compounds were drawn, converted to 3D, and optimized. Standard structures were downloaded from PubChem. Target macromolecules were downloaded from RCSB PDB and optimized. Method validation was performed by redocking. Molecular docking was performed with Autodock Vina. Protein-ligand interaction analysis was performed with Ligplot+ and PyMOL. Toxicity prediction was performed with Protox Web Server

Results:

The docking results showed that several compounds in the kratom plant have the same affinity for the serotonin 2A receptor as the standard compound, clozapine, but none have a higher affinity value than the standard compound. However, at the mu opioid receptor, several compounds have a higher affinity than the standard compound used, morphine

Conclusions:

Compounds in kratom (*Mitragyna speciosa*) can bind to serotonin and Mu-opioid receptors with high affinity and show ideal molecular interactions.

KEYWORDS: Kratom; *Mitragyna speciosa*; Mu-opioid receptor; Serotonin receptor; Molecular docking; In silico toxicity test

BB-0706102-P

Intergrating *In-Silico* and *In-Vitro* Approaches to Optimise Extract for Anti-Dengue Virus from *Phyllanthus amarus* Schum. and Thonn. by Respond Surface Methodology

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ABSTRACT

Introduction:

Phyllanthus amarus Schum. and Thonn. is a significant medicinal species that grows widely and be cultivated by GACP standard in Vietnam. This herb has been known for its usage in traditional medicines as well as pharmaceutical materials for drug. Inhibition of virus have been interesting bioactivities of many compounds from *P. amarus*. Therefore, it is suggested that this species have potent to anti dengue activity.

Objectives:

By in *silico* approach, this study aimed to screen the most efficient anti dengue agents that would be extracted optimized by respond surface methodology from aerial parts of *P. amarus*. In addition, *in vitro* approach was applied to evaluate the inhibition of four serotypes dengue virus DEN 1 - 4.

Methods:

By using AutodockTools 1.5.6 and Auto Dock 4.2.6, *in-silico* screening process selected potential target phytochemicals which had lowest binding affinities with target protein from dengue virus. The optimization for extracting the target phytochemical were implemented by respond surface methodology (RSM). Design Expert 13 software was applied for predication the optimal conditions of extraction. The optimal extract was evaluated anti dengue activity by Plaque Reduction Neutralization Test (PRNT) method against DENV-1, DENV-2, DENV-3 and DENV-4, propagated in BHK-21 cell line.

Results:

From over 100 known phytochemicals from *P. amarus*, in-silico screening process selected top 10 compounds which hold the binding affinities with target protein from dengue virus under -7kcal/mol. Geraniin was proposed for a target compound because of its strong affinity with target proteins (-11.93 kcal/mol with NS2B/NS3 and – 11.08 kcal/mol with NS5 RpRd).The optimal conditions of geraniin extract were defined as follows: extraction temperature 70.26°C; extraction time of 1.25 hours; flour/solvent ratio 1/19.16 and ethanol concentration 32.72%. The 15.17% geraniin extract was obtained in optimal extract from aerial parts of *P. amarus* and had the PRNT50 values of 9.8, 9.8, 4,9 and 9.8 against DENV-1, DENV-2, DENV-3 and DENV-4 virus serotypes, respectively.

Conclusions:

By *in-silico* and *in-vitro* approach, this study was the first time to research on optimization geraniin extract for anti all four sero types of dengue virus from *P. amarus* using RSM

KEYWORDS: *Phyllanthus amarus*; Anti dengue; NS2B/NS3; NS5 RpRd; Geraniin; Response surface methodology

BB-0706103-P

Binding Pose Metadynamics Improves Target Fishing Prediction Across Three Diverse Ligands and Their True Targets

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ABSTRACT

Introduction:

Target fishing provides computational predictions of pharmacological targets for a given ligand. These predictions are invaluable in reducing experimental costs during the target identification phase of drug discovery campaigns. While efficient algorithms exist that provide quick predictions of potential targets for a ligand, true targets may not always rank highly. Molecular dynamics simulation-based methods such as binding pose metadynamics could therefore be utilized to refine initial predictions by these algorithms, but this has not been formally evaluated.

Objectives:

In this study, we aim to assess the ability of binding pose metadynamics to improve the ranking of true targets within predictions of a target fishing algorithm.

Methods:

Three diverse ligands with known experimental activities at six pharmacological targets were subject to reverse pharmacophore mapping using PharmMapper for initial predictions of 300 potential targets based on pharmacophore fit scores. All 900 protein-ligand complexes were then subject to binding pose metadynamics using the OpenBPMD protocol, and predicted targets were then reranked according to CompositeScore, PoseScore, and ContactScore.

Results:

Initial predictions using pharmacophore mapping provided no true targets ranked in the top 50, two targets ranked in the 50-100 range, two targets in the 100-150 range, and two targets in the 250-300 range. Binding pose metadynamics improved the rankings of true targets for four out of the six targets and included the highest ranked predictions overall. The revised rankings included two true targets within the top 50, and one target each within the 50-100, 100-150, 150-200, and 200-250 range. CompositeScore provided the best reranking performance, with no clear benefit observed for reranking using PoseScore or ContactScore.

Conclusions:

Our study represents the first application of binding pose metadynamics in refining predictions from target fishing algorithms. This could be leveraged to further improve the efficiency of target identification phases in drug discovery campaigns via computational methods.

KEYWORDS: Drug discovery; Structure-based drug design; Target fishing; Binding pose metadynamics; Molecular dynamics

BB-0706104-P

In Silico Approaches in Discovery of Natural Compounds against NS4B Protein of DENV2

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ABSTRACT

Introduction:

Dengue virus type 2 (DENV2) is the main cause of major outbreaks and severe cases worldwide. In current targets of dengue drug discovery, NS4B is one of the interest targets for developing antivirals agents due to its central role in the virus life cycle and shares 85% similarity among different DENV strains. Up till now, no NS4B potent inhibitors have progressed to clinical research due to their high toxicity profiles.

Objectives:

This study aimed to identify potential inhibitors of the using an in-house natural compounds.

Methods:

Initially, due to the lack of crystal structure of protein NS4B of DENV2, the 3D structure of this protein was predicted to be used in further *in silico* study through molecular dynamics simulations (MDs) at 25 ns using Gromacs 2022.5 combined with template-free approaches using ColabFold v1.5.2. Subsequently, the binding site was determined based on spatial geometry measurement, traditional machine learning, and blind docking. Then, the virtual screening process was performed through molecular docking using Autodock vina 1.1.2. The most potential compound in terms of binding affinity were selected for MDs using Gromacs ver 2022.5.

Results:

The structure of NS4B of DENV2 was obtained from equilibrium structure after 25 ns of MDs. The ligand binding cavity of NS4B consisting of 30 amino acids was identified. The results obtained from molecular docking demonstated that five compounds, including D113, D155, D170, D203, and D239, bound well in the binding site of NS4B protein. Notably, D155 (neodiosmine) and D170 (spergulin A) had shown the ability to form stable interactions with protein during MDs.

Conclusions:

These 2 compounds D155 and D170 showed promise as suitable inhibitors targeting NS4B protein of DENV2 and could be further investigated by *in vitro* and *in vivo* studies.

KEYWORDS: DENV2; NS4B protein; Natural compound; Molecular docking; Molecular dynamics simulation

BB-0706105-P

The Constituents Potential from Melinjo Peel (*Gnetum gnemon* L.) as Anti-Inflammatory: *In Silico* Molecular Docking and ADME-Tox Prediction

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ABSTRACT

Introduction:

Each part of melinjo (leaves, fruit, fruit peel, and seeds) has pharmacological activity, with stilbenoid compounds being the main secondary metabolites often found. Melinjo peel is reported to contain ascorbic acid, tocopherol, and polyphenols with high anti-inflammatory potential. However, scientific research has not yet been carried out, so in silico is the initial stage in predicting the potential of contained compounds targeting the enzymes cyclooxygenase-2 (COX-2) and inducible Nitric Oxide Synthase (iNOS).

Objectives:

This research aims to in silico investigate the specific target for the anti-inflammatory potential of compounds found in melinjo peel and to predict their ADME-Tox properties.

Methods:

Potential interactions of compounds from melinjo peel (ascorbic acid, trans-resveratrol, gnetin C, gnemonoside A, and gnemonoside D) on COX-2 and iNOS enzymes using AutoDock Tools 1.5.6. Then, in silico molecular docking results were predicted for pharmacokinetic properties using the pkCSM ADMET descriptors algorithm protocol to determine absorption, distribution, metabolism, excretion, and toxicity when used as a drug product.

Results:

In silico molecular docking results are based on the binding affinity values (ΔG and Ki). Gnetin C has the potential to act as an anti-inflammatory for the COX-2 with values of -9.91 kcal/mol and 54.69 nM. However, rofecoxib is still better as a comparison (drug), namely -10.66 kcal/mol and 15.23 nM. Meanwhile, the iNOS target shows that gnemonoside D and gnetin C have excellent potential of -8.61; 486.01 (kcal/mol) and -7.53; 3030 (nM), respectively, compared to dexamethasone (-6.81; 10210) as a drug. The values are obtained from the clustering histogram. Meanwhile, only gnemonoside D meets ADME-Tox predictions based on the parameters water solubility, blood-brain barrier and central nervous system permeability, cytochrome P450, total clearance and renal OCT2 substrate, as well as AMES toxicity and hepatotoxicity.

Conclusions:

The iNOS enzyme is a specific target, and the potential anti-inflammatory compound from melinjo peel is gnemonoside D (stilbenoid).

KEYWORDS: ADME-Tox; COX-2; iNOS; Melinjo peel; Molecular docking

BB-0706106-P

In Silico Evaluation of the Potential Antithrombotic and Antioxidant Properties of *Nauclea orientalis* (Bangkal) Bark Extract

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ABSTRACT

Introduction:

Stroke, commonly induced by thromboembolic events, is a leading cause of disability and mortality worldwide, prompting research into alternative treatments. Furthermore, experimental studies demonstrated a link between ischemic stroke and oxidative stress. In ethnomedicine, *Nauclea orientalis* has been used to treat ischemic stroke, positing its pharmacological potential.

Objectives:

This study assessed the potential antithrombotic and antioxidant properties of compounds from *Nauclea orientalis* through *in silico* molecular docking.

Methods:

Compounds characterized through LC-MS analysis and literature findings were docked against antithrombotic receptors, specifically Factor XA (FXA), Factor VIIA (FVIIA), and Thrombin, and antioxidant receptors, including Xanthine Oxidase (XO) and Peroxiredoxin V (PrxV). The computational docking analysis was performed using PyRx–AutoDock Vina, and the results were analyzed by comparing the binding affinity and amino acid interactions of natural and test ligands.

Results:

Findings on all 24 compounds showed promising binding affinities (ranging from -2.7 to -10.6 kcal/mol) for all the target receptors. Notably, vincosamide exhibited the highest potential in interacting with Factor XA (-9.2 kcal/mol) and Factor VIIA (-8.3 kcal/mol), nearly matching the affinity of its natural ligands at -9.3 kcal/mol and -8.9 kcal/mol respectively. Strictosamide (-10.6 kcal/mol) and albafuran A (-9.5 kcal/mol) also exhibited superior binding capabilities to Thrombin, surpassing its natural ligand at -9.2 kcal/mol. In terms of antioxidants, fifteen compounds displayed stronger binding affinities with Xanthine Oxidase compared to the natural ligand (-6.2 kcal/mol), with angustine and pandamarilactonine-H exhibiting the strongest affinities at -7.9 kcal/mol. Remarkably, all test compounds had lower binding affinity than the natural ligand of Peroxiredoxin V. Additionally, several amino acid residues seen from the 2D visualizations revealed favorable interactions between the receptors and test ligands.

Conclusions:

The results suggest that the stem bark of *Nauclea orientalis* has potential antithrombotic and antioxidant properties. Additionally, its compounds serve as promising leads for drug development studies.

KEYWORDS: Antithrombotic; Antioxidant; *Nauclea orientalis*; *In silico*; Molecular docking

BB-0706107-P

LC-MS Analysis and *In Silico* Evaluation of the Anti-Rheumatic Potential of Ethanolic Extract of Niyog-Niyogan (*Ficus pseudopalma*) Moraceae Leaves

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ABSTRACT

Introduction:

Rheumatoid arthritis (RA) is a pain-causing auto-immune disease wherein healthy cells within the body are being attacked, causing swelling, mainly affecting the body's joints. As an auto-immune condition, the most viable treatment options are medications for symptomatic relief and retarding disease progression. However, there are multiple limitations existing within the current treatments that demonstrate a need for innovation.

Objectives:

To determine the anti-rheumatic activity of the ethanolic extracts of *Ficus pseudopalma* (Niyog-niyogan) leaves, a plant with the potential for anti-inflammatory and antioxidant activities, through *in silico* evaluation.

Methods:

The ethanol extract from the leaves of *Ficus pseudopalma* was obtained through percolation and was subjected to liquid chromatography-mass spectrometry (LC-MS) for phytocompound determination. The identified compounds were screened based on their phytochemical classes, prioritizing flavonoids, alkaloids, and terpenoids. Using the RCSB protein data bank, the biomarkers for rheumatoid arthritis (TNF-a, JAK-1, JAK-2, JAK-3, MMP-9, MMP-13) were obtained for molecular docking using UCSF Chimera, BioVia Discovery Studio, and PyRx to determine the binding affinities and interactions with their ligands and the phytochemicals.

Results:

The binding affinities of all of the ligands show sufficient interaction between the phytochemicals and the biomarkers, indicating the high possibility of anti-rheumatic activity, with most averaging around -7.5 kcal/mol. The compounds with the highest binding energies are Astragalin (JAK-1), Astragalin and Kaempferol (JAK-2), Kaempferol (JAK-3), Isovitexin and Isoorientin (TNF-a), Glycyrrhetic acid (MMP-3), Kaempferol and Tiliroside (MMP-9), Tiliroside (MMP-13)

Conclusions:

The phytochemical compounds present within the plant, with their binding affinities to existing biomarkers of RA, demonstrate potential antirheumatic activity for therapeutic application. These results open the opportunity to further investigate the extent of the antirheumatic activity of *Ficus pseudopalma* through future studies, particularly in *in vitro* and *in vivo* analyses.

KEYWORDS: Rheumatoid arthritis; *Ficus pseudopalma*; Auto-immune disease; Molecular docking

BB-0706108-P

Integrated Bioinformatics Analysis of hsa-mir-4783-3p Target Genes and Functions in Prostate Cancer

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ABSTRACT

Introduction:

Prostate cancer is a significant global health challenge, necessitating a deeper understanding of its complex regulatory mechanisms. This study focuses on the potential role of hsa-miR-4783-3p in the regulation of prostate cancer.

Objectives:

We conducted a comprehensive examination of the involvement of hsa-miR-4783-3p in PCa using integrated bioinformatics methodologies.

Methods:

Our approach encompassed target gene prediction, interaction network analysis, expression validation of identified genes, pathway annotation, and analysis of miRNA-target binding and determination of shared targets with other miRNAs. This integrative strategy enabled the first systematic exploration of the potential regulatory roles of hsa-miR-4783-3p in prostate cancer pathogenesis.

Results:

The analysis identified 66 key genes regulated by hsa-miR-4783-3p and revealed a complex regulatory network, highlighting the diverse interactions mediated by this miRNA in PCa. The intricate nature of this network underscores the multifaceted role of hsa-miR-4783-3p in the regulation of PCa pathogenesis. Notably, genes such as *AKT1*, *ARFGAP1*, *ARHGDIA*, *HRH2*, and *NF2* are implicated in critical pathways associated with PCa development. Furthermore, our findings indicate potential regulatory relationships between hsa-miR-4783-3p and its target genes, as well as shared target genes with other pathogenic miRNAs, providing insights into the complex interplay among regulatory networks in prostate cancer progression.

Conclusions:

Our findings offer a comprehensive insight into the role of hsa-miR-4783-3p in PCa, indicating new avenues for therapeutic intervention. However, further in-depth research and experimental validation are essential to fully understand the functional implications of these findings.

KEYWORDS: Prostate cancer; hsa-miR-4783-3p; Bioinformatics analysis; Gene targeting; Regulatory networks

BB-0706109-P

Constituent Profiling and *In Silico* Molecular Docking Analysis of Sweet Orange (*Citrus x aurantium* f. Aurantium) for the Potential Management of Alopecia Areata

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ABSTRACT

Introduction:

Alopecia areatais an autoimmune disease presented with hair loss. Despite its common occurrence worldwide, it remains as an enigmatic condition with limited treatment options. *Citrus x aurantium* f. Aurantium, also known as sweet orange from the Rutaceae family, has a variety of therapeutic effects owing to its flavonoid and phenolic compounds. It has been explored for its dermatologic uses, specifically for scalp conditions and hair loss.

Objectives:

The study seeks to determine the potential of *Citrus x aurantium* f. Aurantium as an alternative treatment option. The study may benefit patients, healthcare providers, and researchers to generate more data regarding alopecia areata and provide cheaper treatment options.

Methods:

Its possibility as a treatment option is determined by finding the association of its constituents with the biomarkers of alopecia areata through an *in silico* analysis. The fruit will first be subjected to Soxhlet extraction to extract the bioactive compounds, followed by Liquid Chromatography-Mass Spectrometry analysis to determine the presence of flavonoid and phenolic compounds. Molecular docking will then be performed through the employment of several databases, along with appropriate literature, to determine the association of the identified compounds with Alopecia areata.

Results:

Upon analysis, 18 flavonoid and phenolic constituents were identified. Varying results were obtained across all biomarkers. Based on binding affinity (kcal/mol) and amino acid interactions, Isorhamnetin presented high binding affinity with Janus Kinase-1 at –8.1 kcal/mol, Isoschaftoside had the highest affinity with Janus Kinase-3 at –8.6 kcal/mol, and Cyanidin-3-O-sophoroside with Tyrosine Kinase-2 at –8.9 kcal/mol. Other constituents presented unfavorable or no interactions.

Conclusions:

Based on the results, there is positive evidence that points to the potential of *Citrus x aurantium* f. Aurantium as a management treatment for Alopecia areata.

KEYWORDS: Alopecia areata; Autoimmune disease; *Citrus x aurantium* f. Aurantium; Molecular docking

BB-0706110-P

Determination of Angiotensin-Converting Enzyme Inhibitory Potential of Crude Hexane Extract from *Citrullus lanatus* (Watermelon) *In Vitro* with Liquid Chromatography-Mass Spectrometry Characterization and *In Silico* Evaluation

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ABSTRACT

Introduction:

Angiotensin-converting enzyme (ACE) functions as a critical enzyme in blood pressure regulation, thereby underscoring its role in hypertension pathophysiology. This study emphasizes natural sources of compounds like *Citrullus lanatus* (watermelon) with potential ACE inhibition. While other parts and extracts of the watermelon plant have established antihypertensive activity, the ACE inhibitory activity of the seed crude hexane extract has yet to be investigated.

Objectives:

The study aims to assess the phytochemical constituents of watermelon seed crude hexane extract and determine the ACE inhibitory activity via *in vitro* analysis and *in silico* molecular docking studies.

Methods:

Dried, pulverized watermelon seeds underwent Soxhlet extraction with hexane. The watermelon crude hexane extract was subjected to qualitative phytochemical screening and liquid chromatography-mass spectrometry (LC-MS) to determine putative compounds. Molecular docking simulations of ACE C-domain (4C2P) with putative compounds were screened through BIOVIA Discovery Studio Visualizer and PyRx. *In vitro* ACE inhibitory activity was assessed via ACE kit-WST.

Results:

Phytochemical analysis confirmed the presence of steroids, sterols, and terpenoids. The crude hexane extract exhibited an IC_{50} value of -1216350 µg/mL. Eight compounds were identified via LC-MS and docked with 4C2P. Norbuprenorphine and Picroside I demonstrated the highest affinity with 4C2P at -9.0 kcal/mol and -8.9 kcal/mol, respectively. Norbuprenorphine and Picroside I exhibited hydrogen bond interactions with 4C2P at GLN281, ASP453, and LYS511.

Conclusions:

The results suggest that Norbuprenorphine and Picroside I from watermelon seed crude hexane extract are potential ACE inhibitors. Moreover, the crude hexane extract failed to exhibit ACE inhibitory activity *in vitro*. This may be due to the low volume of the crude hexane extract dissolved in DMSO, which was further diluted in deionized water to comply with ACE kit-WST protocols.

KEYWORDS: Angiotensin-converting enzyme; *Citrullus lanatus*; Hexane extract; LC-MS; Molecular docking; Watermelon

BB-0706111-P

Evaluation of the Wound Healing Activity of Elephant Foot Yam (*Amorphophallus paeoniifolius* (Dennst.) Nicolson) Aqueous Flower Extract in Zebrafish (*Danio rerio*) Model

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ABSTRACT

Introduction:

Wound healing is crucial for restoring tissue integrity and function following injury. Recent research has explored phytochemicals in *Amorphophallus paeoniifolius* (AP) flower for their potential therapeutic effects, including anti-inflammatory, antioxidant, and antimicrobial activities, highlighting the compound's potential in wound healing.

Objectives:

The study aimed to evaluate the wound healing activity of *AP* through systematic review, in-silico docking, and in vivo wound healing assay in the laser-ablated cutaneous wound in zebrafish.

Methods:

AP flower extract (APAFE) was obtained via hot water extraction and lyophilization. A systematic review identified its phytochemical constituents. Reverse docking techniques assessed molecular interactions with receptors. Safety evaluation was conducted using FISH OECD 203. Laser-ablated zebrafish (n=15/group) with 1mm2 cutaneous wound were immersed in APAFE (12.5 to 300 mg/L), allantoin (positive control), and Methylene blue (negative control) for 21 days and observed at 0 hr, 24 hr, 7, 14 and 21 days.

Results:

Systematic review identified flavonoids, confirmed by chemical analyses. APAFE flavonoids showed strong binding affinities with transforming growth factor-beta (-7.6 to -9.1 kcal/mol), collagenase-3 (-8.2 to -8.9 kcal/mol), and catalase (-8.1 to -8.7 kcal/mol). LC_{50} exceeded 300 mg/L with no observed mortality within 21 days. APAFE (300 mg/L) enhanced wound healing and closure rate compared to untreated wounds at 0 hr, 24 hrs ($p<0.05$), and 7 days ($p<0.05$). Normal wound healing and closure were observed at day 14 and 21 with APAFE treatment.

Conclusions:

APAFE significantly improved wound recovery and closure rate in zebrafish, potentially due to its flavonoid content. Further research is warranted to understand the wound healing activity and mechanism of action of APAFE, including histopathology, isolation of active compounds and other preclinical assays, to fully understand its effectiveness.

KEYWORDS: *A. paeoniifolius*; Wound healing; Zebrafish

BB-0710101-P

Preparation of Probiotic Oil Suspension Containing *Lactobacillus acidophilus*

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ABSTRACT

Introduction:

Probiotics are defined as microorganisms that, when administered in sufficient quantities, confer a health benefit on the host. As they are very susceptible to environmental conditions, solid dosage forms are used to increase their stability. In pediatric use, liquid preparations of edible oily suspensions containing probiotics are more favorable since they help overcome the difficulty of oral administration in children. However, few research articles related to the preparation process of these oily suspensions were reported in Vietnam.

Objectives:

Our study focuses on preparing an oily suspension containing *L. acidophilus* at a laboratory scale, oriented for use in infants and children under two years of age.

Methods:

The oily suspension was prepared using the dispersion method. Different mixtures of oil and dispersing agents were studied for their effect on the stability of the suspension in terms of sedimentation rate, drop time, average particle size, and the amount of *L. acidophilus*.

Results:

The results showed that an oily suspension containing *L. acidophilus* could be made using the dispersion method with a mixture of oils as the dispersion medium and Aerosil and aluminum tristearate as dispersing agents. The prepared suspension had an appropriate sedimentation rate of about 10–20%, an average drop time of 1.0 drop/s, an average particle size of 3–3.5 µm, and an amount of L. acidophilus above 3 x 10^8 - 5 x 10^8 CFU/ml.

Conclusions:

Our study successfully prepared an oily suspension containing *L. acidophilus* using the dispersion method. The prepared suspension had good physical stability, and the number of L. acidophilus remained over 10^8 CFU/ml during two months of storage.

KEYWORDS: Dispersion method; *L. acidophilus*; Oily suspension; Probiotic; Pediatric uses

BB-0710102-P

Research on Using Gelatinized Starch to Create Probiotic Microcapsules to Release Microorganisms in the Colon

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ABSTRACT

Introduction:

Microcapsules are one dosage form that effectively protects probiotic microorganisms in the body's digestive fluids. In this research, alginate, gelatinized starch, and chitosan are used to create microcapsules containing *L. acidophilus* ATCC 4356. Microbial protection under gastric conditions and microbial release upon reaching the small intestine and colon of selected microcapsule samples are evaluated.

Objectives:

Our aim is to prepare microcapsules containing *L. acidophillus* using the coagulation phase separation method with alginate, gelatinized starch and chitosan to release in the colon.

Methods:

The microcapsules were created using the coagulation phase separation method. The ingredients used were alginate (1.0 - 3.0%), gelatinized starch (2.0 - 5.0%), and chitosan (0.5 - 3.0%). A 2% CaCl2 solution was used as coagulation media. The microcapsules were then freeze-dried. The survival rate of *L. acidophilus* in the microcapsules were evaluated under simulated digestive fluid conditions. This involved shaking the microcapsules at a speed of 75 rpm at 37°C in a simulated gastric pH solution for 2 hours, followed by incubation in a fluid simulating small intestinal pH for 4 hours, and finally incubation in a solution simulating colonic pH for hours. The number of viable microorganisms released into the colon fluid was determined every hour.

Results:

Microcapsules with formula 2% alginate; gelatinized starch 5%; chitosan 0.5 - 3.0% have a uniform, dry spherical shape, achieving the longest disintegration time in simulated digestive fluid. The number of microorganisms encapsulated in the freeze-dried sample reached 9 log CFU/g. After passing through the simulated stomach environment and small intestinal fluid, the number of viable bacteria in microcapsules reached about 7 log CFU/g. In simulated colon fluids, the microcapsules released > 6.0 log CFU/g after every hour. The above microencapsulation formula can be applied to create probiotic products that are released in the colon.

Conclusions:

The microcapsules created using alginate, gelatinized starch, and chitosan have demonstrated their ability to protect microorganisms throughout the digestive tract, all the way to the colon. This finding has significant implications for the development of probiotic products that can effectively release in the colon, potentially improving their efficacy and health benefits.

KEYWORDS: Gelatinized starch; Microcapsules; *Lactobacillus acidophilus* ATCC 4356; Viability

BB-0710103-P

In Vitro Probiotic Potential of Lactic Acid Bacteria (Lab) Isolated from Fermented Foods with Anti –*Helicobacter pylori* Activity

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ABSTRACT

Introduction:

Helicobacter pylori is known for causing inflammation and gastric ulcers. With their antibacterial activity and probiotic performance, lactic acid bacteria (LAB) have been attracting considerable attention in development as an adjuvant therapy for *H. pylori*.

Objectives:

This study aimed to investigate the probiotic potential of lactic acid bacteria (LAB) isolated from fermented foods and their antibacterial activity against *H. pylori* ATCC 43504 *in vitro*.

Methods:

Twenty LAB strains were isolated from fermented foods and identified based on morphological characteristics, Gram staining, and catalase reaction. Acid tolerance (pH2 and pH3), bile tolerance (0.3% w/v bile salts), auto-aggregation, and co-aggregation assays were used as restrictive criteria to evaluate the probiotic potential of LAB. The antagonistic activity of LAB against *H. pylori* ATCC 43504 was assessed by using a disc diffusion assay and the 96-well plate co-culture assay urease activity of LAB with *H. pylori* by red phenol method

Results:

The findings revealed that all LAB strains exhibited good tolerance at pH2 and pH3 after 3 hours (survival rates > 85%). Fifteen out of twenty LAB strains showed survival rates > 50% after 3 hours in the presence of 0.3% bile salts. Ten out of fifteen and thirteen out of fifteen strains showed auto-aggregation and co-aggregation percentages over 20%, respectively. Six LAB strains (DC1, DC3, DC8, DC9, DC11, and DC16) were identified as potential probiotics for in vitro anti-*H. pylori* experiments. All selected strains inhibited *H. pylori*, with DC3 showing the largest zone inhibition diameter (13.67±0.58 mm). In the coculture assay, two LAB strains (DC8 and DC16) showed over 50% inhibition of urease activity, as indicated by the OD 550.

Conclusions:

The study reveals that two LAB strains, DC8 and DC16, have significant probiotic potential, effectively inhibiting *H. pylori* ATCC 43504, suggesting LAB as a cost-effective and effective therapy.

KEYWORDS: Probiotics; *Helicobacter pylori*; Lactic acid bacteria; Fermented foods; Antimicrobial activity

BB-0712101-P

Co-Culture of Breast Cancer Cells - Fibroblasts: A Naturally Enhanced Ros Model to Simulate Oxidant-Based Cellular Communication and to Evaluate Targeting Effects of Antioxidants

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ABSTRACT

Introduction:

Cancer cells can communicate with supporting cells in tumors microenvironment by overproduction of reactive oxygen species (ROS). In breast cancer, this increase is linked with augmented collagen-1 levels, the protein is secreted by fibroblasts and is essential for cancer progression.

Objectives:

To develop a co-culture model of breast cancer cells and fibroblasts to simulate the ROS-based interactions and to evaluate the ROS scavenging ability and targeting ability of antioxidants.

Methods:

Human foreskin fibroblasts (CRL-4001) and breast cancer cells (HTB-22) were co-cultured at different ratios (1:1; 3:1; 5:1) on 96-well plates; mono-culture of each cell line was seeded in parallel. Cellular morphology was observed using microscopes. F-actin cytoskeleton and collagen-1 were visualized by immunofluorescence. Cellular ROS and mitochondrial ROS were detected using CellRox Deep Red and MitoSox, respectively. Cell tracking assay of antioxidants was performed on Cy5-labelled materials.

Results:

In the co-culture, both cell types exhibited cellular modifications that mimics interactions in tumour microenvironment. Co-cultured fibroblasts were found to have formed nests comprised of augmented stained F-actin intensity around foci of breast cancer cells. Cancer cells significantly overproduced oxidants, and that was accompanied by an elevation of the collagen-1 secretion in the co-seeded fibroblasts. The model was used to test the effectiveness of antioxidants without the need of external ROS. Experiments showed that the ROS scavenging ability was impacted by antioxidant structure that drives their cellular trafficking and sites of action. Synthesized nano scavengers, including trisulfide-conjugated cholesteryl polymers and nitroxide-functional PEGylated nanostars, exhibited significant ROS reduction on tested cells (up to 50% compared to the control group) with specific targeting effects observed on cancer cells and their mitochondria, while the impacts observed on natural antioxidants (N-acetylcysteine or catalase) were minimal.

Conclusions:

A co-culture of breast cancer cells and fibroblasts reflecting ROS-based cellular interactions was developed and can be used for interrogating scavenging and targeting effects of antioxidants.

KEYWORDS: Antioxidant; Cell signaling; Co-culture; Nanomedicine; Tumors microenvironment

BB-0712102-P

Prevalence of Microbiological Contamination in Herbal Products: A Public Health Concern

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ABSTRACT

Introduction:

Currently, the popularity of herbal products is surging due to their natural ingredients. To ensure consumer confidence and product safety, regulations are in place. These regulations are established by the Herbal Products Committee, Ministry of Public Health, Thailand.

Objectives:

The aim of this study was to access the adherence of herbal products to microbiological quality control standards established by the Ministry of Public Health, Thailand.

Methods:

The method used in this study were "Microbial Enumeration tests" and "Test for Specified Micro-organisms" according to the Thai Herbal Pharmacopoeia 2020 and British Pharmacopoeia 2020. The criteria were stated by the Ministry of Public Health, Thailand (2021). The sampling period of the product from Microbiology Department, Center for Analysis of Product Quality started from November 2022 – February 2024. During this period, the test performed are total aerobic microbial count (TAMC) and total yeasts and molds count (TYMC). For test for specified micro-organisms, the tests are bile-tolerant gram-negative bacteria, *Salmonella spp.*, Escherichia coli and *Clostridium spp.*

Results:

A total of 35 samples were analyzed. Of these, 18 samples (51.43%) were passed all criteria for every test. Among the remaining 17 samples that failed at least one criterion, the most common failures were TYMC, followed by bile-tolerant gram-negative bacteria and TAMC, respectively. Notably, none of the 35 samples tested positive for *Salmonella spp., E. coli* and *Clostridium spp.*

Conclusions:

This study evaluated the microbiological quality control of herbal products according to the regulation of the Herbal Products Committee, Ministry of Public Health, Thailand. Although more than half (18/35) of the samples passed all criteria, nearly half failed at least one test, most commonly exceeding TYMC. Importantly, no *Salmonella spp*., *E. coli* and *Clostridium spp*. were detected. These results indicate a need for the manufacturers to improve quality control practices to ensure consistent adherence to microbiological standards.

KEYWORDS: Herbal products; The Herbal Products Committee Ministry of Public Health, Thailand; Microbial enumeration tests; Test for specified micro-organisms; Microbiological testing; Microbiological quality control

BB-0712104-P

Investigate the Effects of Culture Conditions on Survival, Viability and Activity of *Bacillus clausii* M31 Spores

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ABSTRACT

Introduction:

Bacillus clausii spores are widely used which renowned for their probiotic benefits, including resilience in the gastrointestinal environment and compatibility with antibiotic therapies. Research into high-density cultivation through medium optimization has employed various statistical experimental designs but which do not emphasize increasing spore yield in culture media, frequently neglecting the functional properties of spores. The fermentation conditions of *B. clausii* strain have not been studied for producing large number of survival, high activity of spores were underreported.

Objectives:

Our study cassed the environmental and growth parameters of *B. clausii* M31 (isolated in laboratory in Vietnam) to bolster spore functionality, and stability, and attain optimal spore density in the culture medium.

Methods:

Strains *B. clausii* M31 has growth under conditions: 37°C, 200 rpm, for 18-24 hrs. B. clausii M31 were cultured on media with varying ingredients. A Design of Experiments (DOE) which was a factorial design with three central points and 24 runs in JMP Pro software was applied. Impacts of eight medium components on total survival, activity, and viability efficiency of *B. clausii* M31 (isolated in laboratory in Vietnam) in cultures were examined across varying concentrations.

Results:

Results demonstrated significant influence of Glucose and MnSO4 concentrations on B. clausii M31 spore formation, stability and production efficiency. Specifically, at Glucose 2.0%, $MnSO_4$ 0.007%, $CaSO_4$ 0.005% along with controlled agitation and aeration rates, maximal viability and stability were observed. Bioreactor-scale experiments achieved high spore densities of approximately 2.06×10^9 CFU/mL and significant sporulation efficiency, antibacterial ring 2.87mm and survival about 75% in pH 3 in 4 h.

Conclusions:

Optimization of media constituents and culture parameters led to potential spore efficiency for *B. clausii* M31 in fermentative systems, reduced nutrient requirements, increased number spores, and strengthened spore activity. This study had significance in dosing and administration frequency for diverse biotechnological applications involving *B. clausii* M31.

KEYWORDS: *Bacillus clausii* M31; Spore; Survival; Activity; Viability; JMP pro

BB-0712105-P

Evaluation of Microbiological Quality in Cosmetics: A Study on Herbal and Non-Herbal Products

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ABSTRACT

Introduction:

Nowadays, cosmetics are widely used by all people, not just women. Cosmetics can be divided into 2 categories: those containing herbal ingredients and those without. Because of various herbs can offer nourishing and beautifying properties, the components in cosmetics should be safe and meet quality standards to ensure consumer safety.

Objectives:

To evaluate microbial contamination in commercially available cosmetics, with a particular focus on products containing herbal ingredients.

Methods:

All samples were collected from the Microbiology Department, Center of Analysis for Product Quality, Faculty of Pharmacy, Mahidol University, during February 2022 to December 2023. A total of 71 cosmetic samples were submitted for testing. of these, 58 contained herbal ingredients, while the remaining 13 did not. All samples underwent testing for microbial contamination using standard methods outlined in the United States Pharmacopeia (2023), specifically General Chapters <61> Microbiological examination of nonsterile products: Microbial enumeration tests and <62> Microbiological examination of nonsterile products: Tests for specified microorganisms. Additionally, all samples containing herbal ingredients were specifically tested for *Clostridium spp*. contamination. The results were required to meet the standards set by the Ministry of Public Health, as published in Royal Gazette, Volume 133, Special Section 72 D.

Results:

From a total of 71 samples, 58 were herbal cosmetics and 13 were non-herbal cosmetics. The accepted criteria were: The total number of aerobic plate count (TAMC and TYMC) must not exceed 1,000 cfu/g. In addition, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Candida albicans*, and *Clostridium spp*., for sample containing herbal ingredients, should not be found. All samples met the specified criteria.

Conclusions:

Detection of microbial contamination in cosmetic products is an important criterion for quality control. Passing these criteria can indicate that the cosmetic product has a standardized production process and is safe for consumers.

KEYWORDS: Herbal cosmetics; Non-herbal cosmetics; Microbial enumeration tests; Test for specified microorganism

BB-0712106-P

Expression, Purification and Characterization of CYP154-Sca9 from *Streptomyces cavourensis* YBQ59

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ABSTRACT

Introduction:

Unparalleled selectivity, efficient and sustainable catalytic capacity make biocatalysis become promising technology for the green synthesis in pharmaceutical industry. Among the most powerful biocatalyst, Cytochromes P450 (CYP or P450), a family of heme containing oxidoreductases, have attracted tremendous attention due to their ability to catalyze a diverse range of oxidative reactions, especially the difficult reactions, such as selective oxidation of allyl alcohol and non-activated C-H bonds.

Objectives:

In this study, a novel P450 belonging to CYP154 family (named CYP154-Sca9) from local Streptomyces (*S. cavourensis* YBQ59) has been expressed in *Escherichia coli*, purified and characterized.

Methods:

Two plasmids pET17bCYP154A and pGro were co-transformed to sensitive strain of *E. coli* BL21(DE3) using heat shock method. After culturing in Terrific Broth medium containing kanamycin, δ – Ala and inductive factors, the bacterial cells were harvested for CYP purification. CYP154-Sca9 was purified by His-select® cobalt affinity chromatography and then the maximum absorption spectrum was determined to verify CYP expression. The effect of environmental factors (pH, temperature, preservation conditions) on the purified enzyme activity as well as the potential substrates were investigated.

Results:

The CYP154-Sca9 was expressed in E. coli at high level (400 nmol/L) and sufficiently stable for isolation and purification. The purity of the purified enzyme was more than 90%. The purified CYP154-Sca9 presented optimum activity at pH 7.4; stable at 30°C and 37°C. The preservation conditions were as follows: -20°C in Potassium phosphate buffer, pH 7,4 containing Glycerol 50%. Geraniol, Octanol-1, Decanol-1, Nerol, Decanol-2 has been identified as a potential substrate of the purified CYP154-Sca9 based on the characteristic spectral shift upon substrate binding. The metabolized product of Geraniol and Nerol was identified by Gas Chromatography–Mass Spectrometry as 8-hydroxygeraniol, a precursor of the terpenoid indole alkaloids such as vinblastine and vincristine.

Conclusions:

The novel CYP154-Sca9 might become a promising green catalyst in pharmaceutical industry.

KEYWORDS: Biocatalysis; Cytochrome P450; *Escherichia coli*; Gene expression; *Streptomyces cavourensis* YBQ59.

BB-0712107-P

9-Hydroxycanthin-6-One, which was Isolated from *Eurycoma longifolia* Hairy Root Cultures, has Anti-Inflammatory Properties that are Potentially Mediated by Activation of the Aryl Hydrocarbon Receptor

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ABSTRACT

Introduction:

Eurycoma longifolia Jack (Simaroubaceae) is a commercially important herb and is widely used in Southeast Asian countries. With broad pharmaceutical properties, its roots have been mixed with other herbs to treat fever, aches, malaria, and sexual insufficiency. Nevertheless, it takes several years to cultivate and harvest the roots of *E. longifolia*. It is well-known that pharmaceutical secondary metabolites extracted from *E. longifolia* showed antibiotic, anti-diabetic, and anti-cancer properties. The bioactivity of 9-hydroxycanthin-6-one, the main compound in *E. longifolia*, however, is not well-understood. The aryl hydrocarbon receptor (Ahr) is an endogenous receptor that is involved in the response to environmental stimuli. The activation of the Ahr by specific ligands during inflammatory conditions reduces the expression level of *IFN, IL-6, IL-12, TNF-α, IL-7*, and *IL-17*. Whereas, the role of *Ahr* in the inflammatory response is still not fully understood.

Objectives:

Our study aimed to accelerate 9-hydroxycanthin-6-one production from *E. longifolia* hairy root cultures and to test its anti-inflammatory activity in RAW264.7 macrophage cell line.

Methods:

The McCown's woody plant (WP), Murashige and Skoog (MS), and Shenck and Hildebrandt (SH) media were used to examine the effects of various media on the growth and production of 9-hydroxycanthin-6-one in *E. longifolia* hairy root cultures. The expression level of *IL-6, TNF-α* and *Ahr* were evaluated by Real-time PCR

Results:

The content of 9-hydroxycanthin-6-one was substantially higher in the hairy roots of *E. longifolia* grown in WP medium supplemented with 3% sucrose and 80 mg L- 1 yeast extract than in wild roots. Furthermore, 9-hydroxycanthin-6-one significantly inhibited *IL-6* and *TNF-α* expression levels in Raw 264.7 cells stimulated with lipopolysaccharide. Interestingly, 9-hydroxycanthin-6-one was found to potentially enhance *Ahr* gene expression.

Conclusions:

The enhancement of (*Ahr*) gene expression by 9-hydroxycanthin-6-one might suggest a potentially uncovered link between natural compounds and *Ahr* induction in preventing inflammatory diseases.

KEYWORDS: 9-hydroxycanthin-6-one; Aryl hydrocarbon receptor (*Ahr*); *Eurycoma longifolia* Jack

BB-0712108-P

Alpha Glucosidase Inhibitory Activity of *Lagerstroemia speciosa* Implication for Controlling Blood Glucose Level

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ABSTRACT

Introduction:

Lagerstroemia speciosa, commonly known as banaba (inthanin in Thai), is a tropical plant indigenous to Southeast Asia. It has been traditionally used in folk medicine for various health purposes, including glycemic control. The alpha-glucosidase enzyme plays a crucial role in carbohydrate metabolism, facilitating the breakdown of complex sugars into absorbable forms like glucose. Inhibition of alpha-glucosidase can decelerate glucose absorption, thereby helping to regulate blood sugar levels.

Objectives:

The aim of this study is to investigate the potential of Lagerstroemia speciosa extracts to inhibit the enzyme alpha-glucosidase.

Methods:

Leaves of *L. speciosa* were harvested from Nakhon Pathom province, Thailand, and subsequently dried and pulverized into powder form. The powder underwent maceration with methanol at a ratio of 1:20 for 48 hours at room temperature. The resulting extract was subjected to in vitro testing for anti-alpha-glucosidase activity and glucose uptake.

Results:

The extraction process yielded a percentage yield of 17.44%. The extract demonstrated dose-dependent inhibition of alpha-glucosidase activity. Notably, at a concentration of 100 µg/ml, the extract exhibited glucose uptake activity comparable to that of insulin.

Conclusions:

The investigation into the alpha-glucosidase inhibitory potential of *Lagerstroemia speciosa* presents promising implications for novel therapeutic approaches to diabetes management. Nevertheless, further research is imperative to comprehensively elucidate its therapeutic benefits and ensure its safe and efficacious integration into clinical practice.

KEYWORDS: Alpha glucosidase; Diabetes mellitus; Glucose uptake; *Lagerstroemia speciosa*

BB-0712109-P

Cytotoxic Activities of Dimer Xanthones from lichen *Usnea aciculifera*

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ABSTRACT

Introduction:

Dimeric xanthones from fungi have recently reported a lot of potential to inhibit cancer cell lines, including drug-resistant cell lines and non-toxic to normal cells. Dimeric xanthones have also been reported in the lichen *Usnea aciculifera* and evaluated their cytotoxicity.

Methods:

The column chromatography and crystallisation techniques were used to isolate the dimeric xanthones from the fraction DCM.3 of the lichen *Usnea aciculifera*. Determination of the structures of the isolated compounds based on NMR spectroscopy. All compounds were evaluated for their *in vitro* cytotoxic activity against four human cancer cell lines (HCT116 colorectal cancer, MCF-7 breast cancer, A549 lung cancer and OVCAR-3 ovarian cancer) using the MTT reduction assay, and cisplatin was used as the positive control.

Results:

Phytochemical investigation of lichen *Usnea aciculifera* led to the isolation of 12 dimeric xanthones including ten new dimeric xanthones, usneaxanthones A-I (1–9) along with three known (10-12). The chemical structures of the isolated compounds were elucidated by a combination spectroscopic data NMR, MS, electronic circular dichroism (ECD) experiments, and single-crystal X-ray crystallographic analyses as well as comparison of their NMR data with those in the literature. The cytotoxicity of the isolated compounds was evaluated on four human cancer cell lines including HCT116 colorectal cancer, MCF-7 breast cancer, A549 lung cancer, and OVCAR-3 ovarian cancer. The IC_{50} results showed a range of 2.41 – 4.53 μM.

Conclusions:

Lichen-derived dimeric xanthones could become a potential lead for cytotoxicity against cancer cell lines.

KEYWORDS: Cytotoxic activity; Dimeric xanthone; Lichen; *Usnea aciculifera*

BB-0712110-P

Antibacterial Activity of *Syzygium aromaticum* L. Leaf Essential Oil Against *Staphylococcus aureus* ATCC 25923

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ABSTRACT

Introduction:

Syzygium aromaticum L., known as clove, had been widely used for many purposes and was rich in potent natural drug compounds. Currently, the flowers of the plant have been commercialized as a drug and food preservative, but not their leaves. Exploring natural resources is important to get new potent but economically friendly drugs, such as natural antibiotics. Clove leaf essential oil has many natural compounds promising to develop as a novel antibacterial agent.

Objectives:

This study aimed to determine the active compound and investigate the antibacterial activity of clove leaf essential oil against *Staphylococcus aureus* ATCC 25923.

Methods:

Clove leaf essential oil was extracted from the leaves by distillation process. The phytochemical study for investigating active compounds in clove leaf essential oil was carried out using Gas Chromatography-Mass Spectrometry. The antibacterial activity of the essential oil against *Staphylococcus aureus* ATCC 25923 was investigated using disc diffusion methods, with concentrations of clove leaf essential oil at 50%, 25%, 12.5%, 6.25%, and 3.125%. The study used 1% dimethyl sulfoxide as a negative control and 0.1% ampicillin as a positive control.

Results:

The phytochemical study showed that clove leaf essential oil contains Eugenol (36,76%), 3-Allyl-6-methoxyphenol (30,67%), and Caryophyllene (23,89%). The antibacterial activity assay showed that the highest concentration of essential oil, which is 50%, had an inhibition zone diameter of 22 mm. Meanwhile, the concentration of 25 and 12.5% showed their activity with a zone inhibition diameter of 20 and 14 mm, respectively. The combination of ampicillin and essential oil showed no significant increase in inhibition zone diameter, explaining that the combination was not synergistic.

Conclusions:

This study revealed that clove leaf essential oil is promising to develop as a new antibacterial agent due to its potent activity against *Staphylococcus aureus* ATCC 25923.

KEYWORDS: Antibacterial; Clove leaf; Essential oil; *Staphylococcus aureus*; *Syzygium aromaticum*

PD-0102101-P

Phytochemical Analysis and Gel Formulation Development from Ethanol-based *Terminalia catappa* Linn. Red Leaf Extract in Thailand: Impact on Stability and Release Properties.

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ABSTRACT

Introduction:

Terminalia catappa Linn., commonly known as Hu-Kwang, is prevalent in Thailand and other tropical regions, drawing significant attention for its medicinal properties. It is notably effective against arthritis, dermatitis, hepatitis, and rheumatoid arthritis due to its anti-inflammatory properties.

Objectives:

The primary objective of this study is to elucidate the phytochemical composition of *Terminalia catappa* Linn. red leaf extract and formulate it into a gel for potential therapeutic applications.

Methods:

Terminalia catappa Linn. red leaf extracts were obtained using a Soxhlet apparatus with 95% ethanol. Subsequently, the crude extract underwent a comprehensive analysis utilizing thin-layer chromatography (TLC) and high-performance liquid chromatography (HPLC) techniques to identify its phytochemical constituents. An alcohol-based gel formulation containing the extract was developed as a main part of this study. The evaluation of all formulations involved a thorough assessment of their stability properties over three months at 4 °C, including the determination of total phenolic content, hydroxyl radical scavenging activity, and various physical characteristics. Additionally, the release kinetics of bioactive compounds from the gel formulations were examined using Franz static diffusion cells with cellophane membranes.

Results:

Analysis of the TLC chromatogram revealed the presence of key phytochemicals such as quercetin, ursolic acid, and gallic acid in the *Terminalia catappa* Linn. red leaf extract. Further quantification through HPLC revealed concentrations of gallic acid, quercetin, and ellagic acid at 2.577, 0.708, and 3.920 mg/g, respectively. Notably, among the tested formulations, the one without enhancers demonstrated optimal attributes by manifesting a sustained release of bioactive compounds over 24 hours and maintaining stability for an extended duration.

Conclusions:

This study represents a significant advancement in understanding the phytochemical composition of *Terminalia catappa* Linn. red leaf extract and highlights the potential of its gel formulation as a therapeutic agent, offering stable release of bioactive compounds with total phenolic contents and antioxidative property.

KEYWORDS: Alcohol-based gel formulation; High-performance liquid chromatography; Phytochemical analysis; Release property; Stability test; *Terminalia catappa* Linn.

PD-0102102-P

Formulation and Characterization of Cream Containing a Combination of Apigenin and Tomato Powder in Overcoming Xerosis of Heel of the Feet

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ABSTRACT

Introduction:

Xerosis is a condition of dry and cracked skin that usually occurs on the heels of the feet due to reduced water content in the stratum corneum due to loss of skin lipids and natural moisturizing factors. Tomatoes and apigenin are efficacious for moisturizing the skin and treating heel xerosis with a very strong antioxidant value (IC50<50 ppm).

Objectives:

This study aims to formulate O/W (Oil in Water) type cream preparations and determine their effectiveness in overcoming heel xerosis.

Methods:

Mix the oil phase (cera alba, lanolin, and stearic acid) with the water phase (TEA, propylene glycol, sodium metabisulfite) which has been melted at a temperature of 70ºC while stirring. Add apigenin dissolved first with propylene glycol and dissolve the tomato powder with distilled oil phase into a hot mortar then stir. Comparison of apigenin and tomato concentrations control formulae; F1 (10%:5%); F2 (7.5%:7.5%); and F3 (5%:10%). Examination of cream includes a homogeneity test, pH measurement, emulsion type test, and preparation stability test with stability parameters such as odor, color, and texture during accelerated storage. The effectiveness of the cream was tested on 30 volunteers who had xerosis of the heel for four weeks by applying the cream twice a day to the heel of the foot. The safety of the cream was determined through an irritation test using a usage test conducted on 30 volunteers.

Results:

The results showed that a combination of apigenin and tomato cream could be formulated into a cream that was homogeneous and stable during 6 cycles of storage. The irritation test showed that no one had irritation on their skin. The best heel recovery was seen in F1 which was able to reduce heel xerosis.

Conclusions:

This study concludes that all preparation formulas combined with apigenin powder and tomatoes can reduce the level of skin dryness and F1 (Apigenin and tomato concentrations 10%:5%) has the best ability to overcome Xerosis of heel and meets all the requirements for the physical properties of the cream.

KEYWORDS: Apigenin; Cream; *Solanum lycopersicum* L.; Xerosis

PD-0102103-P

Development of *in Situ* Gel Containing Clove Oil for Oral Spray

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ABSTRACT

Introduction:

To maintain oral hygiene, oral products such as oral spray are used in daily life. Clove oil is one of interesting components used in oral products due to their antibacterial and antifungal activity. Meanwhile, *in situ* gel used as gel matrix can control the rate of drug release and increase the duration of action. In this study, clove oil loaded in situ gel are developed to use as oral spray.

Objectives:

To develop clove oil loaded in-situ gel for oral spray.

Methods:

In situ gel (ISF) was prepared at different ratios of matrix-forming agents. Borneol (B): palmitic acid (P) ratios of 0:4, 1:3, 2:2, 3:1, and 4:0 were studied. 5% w/w of clove oil was added to each formulation. The physical properties such as pH, density, viscosity, surface tension, and contact angle were investigated. Drug release study was tested by using Franz diffusion cells. The antimicrobial activities were tested with *S. aureus*, *S. mutans*, *C. albicans*, and *P. gingivalis*.

Results:

The pH values of all formulations were in the range of 5-7. At the higher ratio of borneol, the density and surface tension tended to increase, whereas the viscosity was decreased. The release study showed the highest release of clove oil from the formulation of 1:3 (B:P). However, after 8 hours, the release concentration of the formulation of 1:3, 2:2, and 3.1 (B:P) were not significantly different. All formulations can inhibit the growth of bacteria. The higher the amount of borneol in the formulation, the larger the clear zone.

Conclusions:

Clove oil loaded *in situ* gel can be used as oral spray with good antimicrobial activity against all tested bacteria strains. In addition, *in situ* gel can prolong the release of clove oil from gel-matrix over 24 hours.

KEYWORDS: Antimicrobial activity; Borneol; Clove oil; *In situ* gel; Oral spray; Palmitic acid

PD-0102104-P

Preparation and Characterization of Clove Oil Loaded Buccal Mucoadhesive Film for the Treatment of Oral Ulcer

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ABSTRACT

Introduction:

Clove oil is one of the most successful home remedies for mouth ulcers and has a long history of providing various health benefits. This is because clove oil contains eugenol, a substance with natural antibacterial and analgesic qualities that treats all oral issues.

Objectives:

In this study, clove oil was formulated into microemulsion and incorporated into cassava starch film. To increase the adhesive properties of film to buccal mucosal membrane, a variety of bioadhesive polymers were combined with gelatinized cassava starch, including Eudragit, pullulan, hydroxypropyl methylcellulose (F4M), polyvinyl alcohol (PVA217), guar gum, and hydroxyethyl cellulose (HEC).

Methods:

The films were formed through solvent casting method and further evaluated for folding endurance, surface pH, thickness, weight, mucoadhesive properties, swelling capacity, drug release, and antimicrobial properties.

Results:

The microemulsion system of clove oil consisted of Tween20, glycerol, and chitosan solution. Size of the emulsion was 16.31 nm with zeta potential of 16.23 mV. The results indicated that the incorporation with Guar gum, HEC, and F4M greatly improved mucoadhesive properties. Guar gum, however, demonstrated a sustained release pattern. Starch film formulated with HEC had the greatest swelling ratio followed by guar gum (1,400 and 1,200, respectively). The release profiles indicated that at every time point, the drug release from films containing microemulsion of clove oil was higher than that from films containing free clove oil.

Conclusions:

The mucoadhesive properties were correlated with swelling ability while drug release pattern was correlated with thermal degradation profile. Additionally, clove oil's solubility in water was enhanced when it was in the form of a microemulsion, which made it possible to use the appropriate concentration of clove oil at an applied site.

KEYWORDS: Bioadhesive polymer; Cassava starch; Clove oil, Microemulsion; Mucoadhesive film

PD-0102105-P

Influence of Particle Size Distribution, Thickening Agents and Tonicity Modifiers on Rheological Properties and Dissolution Profiles of Mangiferin Suspensions

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ABSTRACT

Introduction:

Physico-chemical properties of suspensions, including particle size distribution and rheological properties, may have a significant influence on drug release with downstream effects on biological performance.

Objectives:

To evaluate the impacts of formula on physico-chemical properties and dissolution of mangiferin suspensions.

Methods:

Mangiferin suspension formulations with three levels of particle size distribution were prepared by grinding wet-milling. Thickening agents and tonicity modifiers were then introduced at different concentrations for suspension stabilisation. Particle size distribution (D[4,3], SPAN) was determined by laser diffraction, and rheological properties (storage modulus, yield stress, viscosity) were characterised using a DHR2 rheometer. The *in vitro* dissolution was evaluated by stirring technique and *in vivo* study was performed on experimental rabbits.

Results:

Thickening modifiers possessed significant impacts on the rheological properties of mangiferin suspensions, the effects likely stemmed from the size-dependent binding affinity of mangiferin particles to polymer chains. The smaller the mangiferin particle size the higher viscosity, storage modulus, and yield stress were observed when Carbopol 974P was used as a thickening agent. Such effects were minimal when cellulose derivatives (HPMC E6, HPC EF) were employed. Furthermore, reducing Carbopol concentration or increasing NaCl (tonicity modifier) level inversely influenced on thixotropic behaviour of suspensions. Rheological experiments also demonstrated that Carbopol-based suspensions exhibited thermal stability in stress conditions. Correlations between rheological properties and drug dissolution were elaborated. The yield stress of suspensions exhibited an inverse effect on *in vitro* dissolution. In the *in vivo* study, mangiferin levels in tear fluid were found to be highest in the eyes treated with the largest particle formulation or with the lowest viscosity formulation, the greatest difference was two folds observed at 5 mins after instillation.

Conclusions:

Mangiferin particle size, thickening agents and tonicity adjusting agents significantly impact on rheological properties, dissolution, and *in vivo* performance of the suspension.

KEYWORDS: Dissolution; Mangiferin; Particle size; Rheological property; Suspension

PD-0102106-P

Dissolution Improvement of Celecoxib by Wet Granulation

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ABSTRACT

Introduction:

Celecoxib is a nonsteroidal anti-inflammatory drug with high selective cyclooxygenase-2 inhibition. It is a Biopharmaceutical Classification System (BCS) class II drug with poor aqueous solubility, resulting in low oral bioavailability.

Objectives:

This study aimed to improve the dissolution of celecoxib by wet granulation process.

Methods:

Celecoxib granules were prepared by wet granulation. The dissolution of the drug in granules was improved using surfactant, beta-cyclodextrin, and hydrophilic polymer. Firstly, celecoxib and polyoxyl 40 hydrogenated castor oil, polyvinylpyrrolidone K30 (PVP), and/or beta-cyclodextrin at various ratios were dissolved in ethanol. Then, the solution was mixed with the dry mixture of 1:1 microcrystalline cellulose: lactose. The wet mass was screened, and the resultant granules were dried in a hot air oven at 60°C for 30 min before characterization. X-ray diffractometry was employed to evaluate the physical state of the granules. The X-ray tube was derived at 15 mA current and potential difference of 30 kV. Granules were scanned from 5°to 45°in the range of 2θ , at 0.05°/s increment.

Results:

Results showed that the combination of beta-cyclodextrin and PVP could significantly improve the dissolution of celecoxib in pH 7.4 phosphate buffer. The drug in the granules was in an amorphous state, as shown by X-ray diffractogram. It also formed an inclusion complex with beta-cyclodextrin and subsequently established ternary complexes through PVP, providing a marked increase in the dissolution of celecoxib, compared with the pure drug and the inclusion complex without PVP.

Conclusions:

With an appropriate ratio of beta-cyclodextrin and PVP in granulating liquid, the dissolution of celecoxib in granules could be improved. However, the insights into this complex system still need further investigation.

KEYWORDS: Beta-cyclodextrin; Celecoxib; Dissolution enhancement; Hydrophilic polymer; Inclusion complex, Ternary complex

PD-0102107-P

Development and Validation of *in Vitro - in Vivo* Correlation for l-Tetrahydropalmatine Extended-Release Tablet Formulation

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ABSTRACT

Introduction:

l-Tetrahydropalmatine (l-THP), widely used in traditional Asian medicine, has potential in the treatment of addiction. l-THP is rapidly eliminated, so it is necessary to develop extended-release formulation for this compound.

Objectives:

This study aimed to develop and validate a Level A*in vitro-in vivo*correlation (IVIVC) as a tool for predicting the bioavailability of l-THP extended-release tablets in dogs.

Methods:

Three rate release formulations (fast -FR, medium -MR, slow -SR) were used for IVIVC development and validation. Pharmacokinetics of these formulations and an intravenous injection were evaluated in dogs, followed by calculating *in vivo* absorption through numerical deconvolution. Seven dissolution methods were screened to establish a linear correlation between *in vitro* dissolution and *in vivo* absorption.

Results:

The *in vivo* absorption fraction demonstrated linear correlation with *in vitro* dissolution from method 7 (USP Apparatus I, 450 ml HCl 0.1 N, 100 rpm). Percentage prediction errors (%PE) for l-THP Cmax and AUC were below 15% for all three formulations, with absolute average %PE for Cmax and AUC below 10%. The predictability of the IVIVC meeting the requirement of the U.S FDA.

Conclusions:

The level A IVIVC was successfully developed and validated for extended-release tablets containing l-THP. It can serve as a valuable tool for predicting the bioavailability of l-THP in dogs.

KEYWORDS: Extended release; l-Tetrahydropalmatine; l-THP; IVIVC

PD-0102108-P

Evaluating Impacts of Formula and Processing Parameters on Mechanical Properties of Microneedles for Dermal/ Transdermal Drug Delivery

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ABSTRACT

Introduction:

Microneedle is a viable approach to overcoming the skin barrier for dermal/ transdermal drug delivery with minimal invasion and painlessness. However, controlling microneedle quality, such as puncturing capability, geometric configuration, and drug release characteristics, remains challenging.

Objectives:

To evaluate the impacts of polymers, plasticizers, drug load, and pressure on the physical strength and skin-puncturing capability of in-house microneedles.

Methods:

Dexamethasone sodium phosphate and mangiferin were used as model drugs to prepare solution-based and suspension-based microneedles, respectively. Microneedles (height:base:pitch 600:200:500 µm) were prepared by solvent casting method using 15x15 array silicone-based pyramidical microneedle molds. The morphology and dimension of the prepared microneedles were examined by using a digital microscope. Microneedle hardness was tested using a CT-3 Texture Analyzer and skin piercing capability was evaluated on both parafilm-based simulated skin and pork skin.

Results:

Various polymers were subjected to screening and polyvinylpyrrolidone (PVP K30) was selected for fabrication of microneedle owing to its low viscosity at relatively high concentrations. The hardness and geometric configuration of microneedles were heavily dependent on formula parameters and vacuum pressure. The hardness of microneedles was significantly increased while their sharpness was compromised with the increase in polymer concentration. Plasticizer level posed reverse effects on the mechanical strength of microneedles. At 2% drug load, solution-based microneedles exhibited approximately a 50% increase in mechanical strength compared to that of the placebo, while suspension-based microneedles did not show any significance. Lower vacuum pressure resulted in sharper and stronger microneedles. Experimental data exhibited that the microneedles containing 30% plasticizer, being processed with 40% PVP K30 solution, possessed sufficient strength to puncture both simulated skin and pork skin with minimal change in their shape.

Conclusions:

Polymer, plasticizer ratio, drug load, and vacuum pressure possessed significant impacts on the configuration, physical strength, and skin-puncturing capability of the microneedles.

KEYWORDS: Dermal drug delivery; Microneedle; Physical strength; Skin puncturing; Transdermal drug delivery

PD-0102110-P

Nanosilver Dressing with Natural Bioreduction: Effectiveness on Diabetic Wounds using *Anredera cordifilia* (Ten.) Steenis Leaf Extract

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ABSTRACT

Introduction:

This study developed the innovative potential of nanosilver spray formulations formulated with *Anredera cordifolia* leaf extract as a bio reductant, to accelerate wound closure in diabetic rats. The nano silver, synthesized with natural extracts, exhibits antibacterial and anti-inflammatory properties. Thus, it potentially accelerates and overcomes chronic wounds in diabetic patients. Therefore, we employed *Anredera cordifolia* leaf extract bio reductant for synthesizing silver nanoparticles. The effectivity of the wound healing process was evaluated as the percentage of wound closure and the efficacy of spray treatments.

Objectives:

Testing the effectiveness of nanosilver with Binahong leafbioreductor spray preparation against wound closure in diabetic-burdened rats.

Methods:

The nanosilver spray was prepared from *Anredera cordifolia* leaf extract and silver nitrate based on previous study. The most optimum formula was then applied to the excision wound of rat induced diabetic by streptozotocin-induced test (STZ). The result of the percentage of wound closure was analyzed with Image J software, for measurement.

Results:

The results obtained by spray preparations produce the characterization parameters with reddish-brown, particle size 87.43 nm± 1.50, pH 4.88± 0.03, and wavelength 438.6 nm± 0.58. Nanosilver with Spray 2 and 3 treatments have the most effective results. Then on the test nanosilver effectiveness statistics obtained a *p*-value <0.05 which is meaningful effective spray wound dressing preparation.

Conclusions:

The study, which was conducted for 21 days, obtained test results of good effectiveness on nanosilver with 2 and 3 sprays to speed up the process of wound closure in wound-treated diabetic rats biopsy.

KEYWORDS: *Anredera cordifolia*; Diabetic wound; Nanoformulation; Nanosilver; Tissue regeneration; Wound Dressing

PD-0102112-P

Development and Study of Factors Affecting the Stability of Extemporaneous Preparation of Omeprazole Oral Suspension

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ABSTRACT

Introduction:

Omeprazole has gained widespread use in children, but the available dosage forms in Thailand are only capsules and intravenous injections. One of the typical extemporaneous preparations of omeprazole is dissolving enteric-coated pellets in $NaHCO_3$ solution. This method causes a very astringent and bitter taste due to sodium bicarbonate and dissolved enteric coat, which leads to the patient's non-adherence problem.

Objectives:

This study aimed to develop extemporaneous omeprazole oral suspension and to study factors affecting the stability of omeprazole oral suspension.

Methods:

Flavored and flavored sugar-free oral suspending vehicles were developed to enhance palatability and mask the bitter taste of omeprazole suspension. Omeprazole oral suspensions at the concentration of 2 mg/ml were prepared by crushing omeprazole pellets and grinding them with sodium bicarbonate, then mixing them with an oral suspending vehicle. The drug content of omeprazole suspensions was determined by a high-performance liquid chromatography (HPLC) method. The physicochemical properties of omeprazole oral suspensions in terms of appearance, odor, viscosity, pH and osmolarity were also examined. The forced degradations of omeprazole suspensions were studied based on hydrolysis, oxidation, photolysis and thermal degradation.

Results:

For the development of the oral suspending vehicle, it was found that adding sweetener, reducing the viscosity and the use of menthol could mask the bitter aftertaste of omeprazole. The results of the forced degradation study showed that omeprazole oral suspension in the flavored oral suspending vehicle was unstable under all forced experiments since the remaining drug was under 90%. However, the omeprazole oral suspension in the flavored sugar-free oral suspension vehicle was unstable only in acid, oxygen, and thermal conditions. Moreover, the viscosity and pH of both formulations were found to be physically unstable.

Conclusions:

Both omeprazole oral suspension formulations should be stored in amber-colored, tight containers and stored in the refrigerator at 2 - 8 °C.

KEYWORDS: Extemporaneous; Force degradation; HPLC; Omeprazole; Stability; Suspension

PD-0102113-P

Halal by Design and Emulgel Formulation of Clove Oil (*Syzygium aromaticum L)* as Anti-Inflammatory

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ABSTRACT

Introduction:
Eugenol is the main component of clove oil which has the potential as an anti-inflammatory agent. To improve comfort and effectiveness of use, clove oil is developed into an emulgel preparation.

Objectives:
This study aims to develop a clove oil emulgel formulation as an anti-inflammatory with a Halal by Design approach.

Methods:
The clove oil emulgel was prepared using the fusion method. Raw materials used in the emulgel formulation were ensured to have documents to ensure no contamination from prohibited substances.

Results:
The research results show that the preparation is milky white in color, has a thick liquid texture, with a pH of 4.44 which is suitable for facial skin pH. The average minimum content test is 8.85, with no container weighing less than 90%. It exhibits pseudoplastic flow properties which are not yet ideal, consistent spreadability at the eighth minute, and adhesive properties of 78.7 seconds indicating that the longer the emulgel adheres to the skin, the more substances are absorbed.

Conclusions:
Based on the research results, it can be concluded that the emulgel formulation with clove flower essential oil shows good results and meets the quality requirements of the preparation according to the compendia.

KEYWORDS: Antiinflammatory; Clove oil; Emulgel; Formulation; Halal; *Syzygium aromaticum*

PD-0102114-P

Effect of PEG 6000 Based Solid Dispersion on Curcumin Dissolution Rate: Microwave Induced Melting Method

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ABSTRACT

Introduction:

Turmeric's active component is called curcumin (*Curcuma longa* Linn). Numerous studies have demonstrated curcumin's potential as a medicinal agent. Since curcumin is nearly insoluble in water, its bioavailability is reduced and its absorption capacity is governed by the rate of dissolution.

Objectives:

In this investigation, curcumin's wettability was improved and particle size was decreased through the use of solid dispersion.

Methods:

Solid dispersion is produced at concentrations of 20%, 25%, and 50% by employing the 450 watt microwave-induced fusion technique. After being crushed with a mortar and glass stamper, the dry forms were sieved through a sieve with a number sixty. In this investigation, UV-Vis spectrophotometry was performed.

Results:

The findings of a drug load test conducted with methanol indicated that there was no discernible degradation of the curcumin solid dispersion caused by microwaves. The greatest increase in curcumin solubility at 20,0% drug load, or 1.8 times, was shown in the results of the curcumin solubility test conducted in phosphate buffer solvent using a shaker for 48 hours. Phosphate buffer pH 6 was used in the curcumin solid dispersion dissolving test, and 0.5% SLS was added to the mixture. The maximum test for dissolution

Conclusions:

The microwave-induced solid dispersion method showed a significant effect on the solubility and dissolution rate of curcumin.

KEYWORDS: *Curcuma longa;* Curcumin; Drug load; Microwave; PEG 6000; Solid dispersion

PD-0102115-P

Improvement of Rheological Properties of Intra-articular Injectable Hyaluronic Acid Gels for Treatment of Osteoarthritis by using Mannitol and Liposomes

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Introduction:

Hyaluronic acid (HA) gels have been used extensively as viscosupplentation for treatment of osteoarthritis (OA). Modifying rheological properties of HA gels might improve their *in-vivo* efficacy in OA patients.

Objectives:

The aim of this work is to improve the rheological properties of HA gels for treatment of OA by employing mannitol and liposomes.

Methods:

Mixtures of Hydrogenated Soybean Phosphatidylcholine (HSPC) and 1,2-distearoyl-sn-glycero-3-phosphoethanolamine-N-[amino(polyethylene glycol)-2000] (ammonium salt) (DSPE-PEG-2000) at different molar ratios have been used as main ingredients for the preparation of liposomes. Liposomal HA gels were prepared by adding HA to liposomal suspensions that were prepared previously by thin film hydration-ultrasonication. The effects of numerous factors including lipid composition, total phospholipid concentration, liposomal size as well as hydration media on the rheological properties of liposomal hyaluronic acid (LP-HA) gels have been investigated using rheometer (TA instrument, USA).

Results:

Among the investigated hydration media, mannitol 5% was found to be the most protective for LP-HA gels against oxidative stress, which plays an important role in OA, compared to HEPES 10mM or glucose 5%. Therefore, mannitol 5% was selected for the preparation of LP-HA gels for further investigation. HSPC liposomal suspensions, with or without DSPE-PEG-2000, with particle sizes ranging from a few hundred nanometers to approximately a few micrometers, have been obtained for preparation of corresponding LP-HA gels. Interestingly, it was found that the zero-shear viscosity and crossover frequency of HA-gels were strongly affected by the presence of liposomes, especially those containing DSPE-PEG-2000. Also, we found that the viscosity of HA gels depends on particle size in a non-linear way.

Conclusions:

The addition of mannitol and liposomes, especially PEGylated liposomes, was found to improve significantly the rheological properties of HA gels in a way that could be beneficial for the treatment of OA. This work encourages future studies on similar systems as the addition of liposomes might not only prolong the viscosupplement activity of HA gels but also provide sustained delivery of active substance.

KEYWORDS: Hyaluronic acid; Intra-articular; Liposome; Mannitol; Osteoarthritis; Rheological properties

PD-0103102-P

Preparation of Sustained Release Naproxen Sodium Loaded Microcapsules from Alginate and Chitosan Through Experimental Design

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ABSTRACT

Introduction:

Naproxen is used as an alternative therapy for arthritis. Though it is administered intra-articular to increase drug concentration in the joint and maximize local effects, naproxen tends to diffuse quickly into the bloodstream. Thus, developing a sustained-release drug delivery system for this application is essential.

Objectives:

The study aimed to optimize the parameters to produce microcapsules structured by naproxen encapsulated in an alginate core and coated with a chitosan outer shell. The achieved microcapsules should have the desired size, encapsulated efficiency, and drug release profile in a sustained manner.

Methods:

The cores were prepared using the emulsification method. The preparation was optimized using response surface methodology (Design-Expert software v13.0). Independent parameters include alginate concentration, calcium chloride concentration, stabilizer concentration, and stirring speed. The microcapsules were produced by immersing the formerly optimized cores into chitosan solutions. The chitosan concentration, stirring conditions, and immersion duration were investigated. The cores and the microcapsules were evaluated in terms of mean size, encapsulation efficiency, and *in vitro* release.

Results:

The investigated parameters had simultaneous effects on the alginate core properties. It is determined that the preparation using sodium alginate 4%; calcium chloride 10%, polysorbate 10%, span 10%, and stirring speed at 7200 rpm resulted in optimum core with mean size at 6.01 ± 0.51 µm, encapsulation efficiency at 18.03 ± 0.97%. As the cores were immersed into chitosan 1.0% solution at pH 5.0, stirring at 1500 rpm for 30 mins, an outer shell of chitosan would be formed, yielding the microcapsules with a mean size of 7.50 ± 0.16 µm encapsulation efficiency 14.7 ± 0.52%, and a complete drug release following sustained manner in 24 hours.

Conclusions:

The optimized conditions for preparing microcapsules containing naproxen from alginate and chitosan were identified. The results of this study can contribute to developing the micro-size drug delivery system.

KEYWORDS: Alginate; Chitosan; Microcapsules; Naproxen; Response surface methodology

PD-0103103-P

Effects of Internal Structure on Buoyancy and Drug Release of 3D Printed Drug Delivery System Containing Levodopa and Carbidopa

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ABSTRACT

Introduction:

Levodopa, a narrow absorption window drug, is the first-line treatment for Parkinson's disease. It is usually taken with carbidopa to minimize its peripheral metabolism. Additionally, individual-based dose adjustment is required throughout the treatment course.

Objectives:

This study aimed to fabricate 3D-printed floating tailorable pills containing levodopa and carbidopa, as well as to investigate the effects of hollow volume, infill percentage, and wall thickness on buoyancy and drug release.

Methods:

Dual drug-loaded filaments were prepared using a single-screw hot melt extruder. Hollow 3D models with various hollow, infill, and wall extents were designed and sliced using Cura software. Printlets were finally fabricated using a standard 3D fused deposition modeling printer. The mechanical strength of filaments was characterized by using a CT3 texture analyzer. The thermal stability and polymorphism of formulations were characterized by thermogravimetric analysis, differential scanning calorimetry, and powder X-ray diffraction. The buoyant force was measured using the resultant weight method. Drug content and dissolution in the simulated gastric fluid of the two drugs were analyzed simultaneously by HPLC.

Results:

Both levodopa and carbidopa were thermally stable and partially amorphized during the process. The filaments were uniform regarding drug load (57.67 ± 4.42 %) and diameter (1.716 ± 0.008 mm). The bending resistance force (4.097 ± 0.082 N) was sufficient to facilitate a smooth 3D printing process. All prepared printlets possessed a great buoyant force (238.55 – 823.23 µN) and the drug release was controlled for up to 10 hours. The buoyant capacity and drug release were co-variant with hollow volume, while they were inversely variant with infill percentage and wall thickness.

Conclusions:

This study demonstrated the capability of developing tailorable floating printlets containing levodopa and carbidopa. The dose, drug release, and buoyancy of the dosage forms could be customized based on the therapeutic needs of each patient for personalized treatment of Parkinson's disease.

KEYWORDS: Carbidopa; Floating drug delivery system; Levodopa; Melt extrusion, Three-dimensional printing

PD-0103104-P

Effect of Polymer Types and Concentrations on the Characteristics of Alginate-Based Microspheres Containing Vitexin and Isovitexin

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ABSTRACT

Introduction:

Vitexin and isovitexin are bioactive flavones known for diverse pharmacological effects, especially in treating diabetes. Both compounds have low oral bioavailability in gastrointestinal tract. Microspheres prepared using biodegradable polymers like alginate offer promising delivery systems to enhance flavones' bioavailability. Microsphere properties, influenced by various factors in preparation process, including polymer types and concentrations, can be controlled to achieve the desired microsphere.

Objectives:

This study aimed to identify impacts of alginate types and concentrations on the mean size, encapsulation efficiency, and *in vitro* release of microspheres loading a compound of purified vitexin-isovitexin(1:1) extract.

Methods:

Alginate-based microspheres were prepared using water-in-oil emulsion technique, followed by external gelation. Nine formulations employing one of three alginate types (low/medium/high viscosity) at a determined concentration (1-2-3%) were carried out. The obtained microspheres were evaluated in terms of particle mean size, encapsulation efficiency, and *in vitro* release at pH 7.4. Vitexin-isovitexin was quantified by UV-Vis-spectroscopy at 269 nm. The morphology was examined by SEM, and FT-IR was used to analyze functional groups of microsphere compositions.

Results:

All microspheres obtained had mean sizes of 1.28±0.38 to 4.55±1.18 µm and narrow size distributions. Although concentration of alginate in range of 1-3% had no significant impact on microsphere efficiency ($p=0.89>0.05$), varying alginate types led to considerable differences in vitexin-isovitexin extract loading rates ($p=0.02<0.05$). Using low-viscosity alginate at 1% resulted in maximum encapsulation efficiency of 5.94%. The *in vitro* study showed that all formulated microspheres released vitexin-isovitexin almost completely in controlled manner for 4 hours. Microspheres were spherical with smooth surfaces, and microsphere's FT-IR spectra highlighted functional groups of alginate and vitexin-isovitexin

Conclusions:

This study's results pointed out influences of polymer on alginate-based microsphere size and encapsulation efficiency. Furthermore, *in vitro* release of vitexin-isovitexin from microspheres was thoroughly examined. These findings can be references for studies aiming to optimize the use of alginate to prepare microspheres through emulsification process.

KEYWORDS: Alginate; Isovitexin; Microspheres; Vitexin

PD-0103105-P

Development of Sustained-Release Floating Tablets of Diltiazem Hydrochloride

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ABSTRACT

Introduction:

Diltiazem hydrochloride (DTZ), used for cardiovascular conditions, requires frequent dosing due to its short half-life. To improve compliance, sustained-release formulations are being developed. Its solubility and absorption characteristics in the upper small intestine make it suitable for gastric-floating tablets, ensuring favorable drug release.

Objectives:

This study aims to formulate sustained-release floating tablets of diltiazem hydrochloride 120 mg, meeting USP2023 dissolution standards, at a batch scale of 1000 tablets.

Methods:

DTZ tablets were formulated using the Quality by Design (QbD) approach, employing wet granulation with hydrophilic polymers for release control and gas-generating excipients for buoyancy. The optimized formulation was scaled up for manufacturing 1000 tablets/batch. Tablets underwent evaluation for floating characteristics (floating lag time, floating time), *in vitro* dissolution, mechanism of drug release.

Results:

After screening, HPMC K100M CR, NaHCO3, and PVP K30 significantly influenced output variables and were selected as input variables for the experimental design. Results indicated that the release rate of DTZ was inversely proportional to the amounts of HPMC K100M CR and NaHCO3, whereas it was only slightly reduced with an increase in the amount of PVP. The optimized formula predicted the following input variables: HPMC K100M CR (501.5 mg), NaHCO3 (244.8 mg), PVP K30 (32.4 mg), and other excipients sufficient to make one tablet. Optimized tablets met USP 2023 dissolution standards with dissolution percentages at 6 hrs: 26.8±2.5%, 12 hrs: 48.1±2.4%, and 30 hrs: 85.7±2.1%, with a floating lag time of < 1 min and a floating time of > 30 hrs. The manufacturing process for 1000 tablets/batch was established, and process parameters were investigated.

Conclusions:

This study investigated various formulation and manufacturing factors and successfully developed 120 mg sustained-release diltiazem hydrochloride floating tablets at a scale of 1000 tablets per batch, meeting the dissolution standards according to USP 2023 and with the potential for further scale-up.

KEYWORDS: Diltiazem hydrochloride; Floating; Quality by Design (QbD); Sustained-release; Tablets

PD-0103106-P

Fabrication of Tailorable Controlled Release Printlets of Methylprednisolone using Melt Extrusion Paired with Fused Deposition Modeling 3D Technology.

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ABSTRACT

Introduction:

Treatment with methylprednisolone for children requires dose adjustment according to body weight, symptom severity, and clinical response. 3D printing has been emerging as a novel platform for manufacturing personalized medicines.

Objectives:

This study focused on the development of tailorable methylprednisolone pills for pediatric treatments by using a 3D Fused Deposition Modeling (FDM) platform.

Methods:

Printing filaments were prepared using a domestic made single-screw melt extruder equipped with a 1.7 mm circular die, where polyvinyl alcohol and glycerol were the main polymer and plasticizer, respectively. 3D models were designed using 3D Builder and sided by using Cura 5.4.0 software. The internal structure and unit dose of the printlets were customized using both model design and printing parameters. Tailorable printlets were fabricated by using a standard 3D FDM printer (Kingroon KP3S Pro). Mechanical strength and uniformity of the filaments were characterized by using a CT3 Texture Analyzer and digital caliper, respectively. The morphology and surface characteristics of the filaments and printed pills were examined by using a stereo microscope. The thermal stability of the formulations was characterized by DSC, TGA, and HPLC. Drug content and dissolution were analyzed by HPLC.

Results:

The extruded strands exhibited good uniformity (diameter 1.819 ± 0.026 mm), smooth surface, and robust mechanical properties (bending resistance force 9.2803 ± 1.2475 N; vertical compression force 39.83 ± 2.84 N). Tailorable pills were successfully fabricated using 3D FDM with a minimal deviation from the designed models (RSD < 8%). Correlations between unit dose (ranging from 6 to 16 mg) and design parameters were successfully derived by geometric calculation and regression approaches. The drug release was governed by the internal design that could be controlled for up to 12 hours.

Conclusions:

The current study proposed a viable paradigm for preparing personalized medications for management of various inflammatory and immunologic disorder diseases in pediatric patients.

KEYWORDS: 3D printing; Methylprednisolone personalized medicines; Pediatric treatments; Tailorable pills

PD-0104101-P

Chitosan and Alginate Microparticle Encapsulation of Curcuminoids for Targeted Drug Delivery in the Treatment for Induced Colitis

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ABSTRACT

Introduction:

Curcuminoids, from *Curcuma longa* (turmeric), are found to be responsible for its anti-inflammatory and anti-oxidant properties. However, curcuminoids are prone to degradation. It is negatively characterized by its poor water solubility, chemical instability, and rapid metabolism. Which poses a challenge in optimal drug effect and stability, highlighting the need to design a drug delivery system.

Objectives:

To evaluate the targeted delivery of curcuminoids encapsulated with chitosan and alginate.

Methods:

Curcuminoid microparticles were prepared and characterized by calculating the encapsulation efficiency, and performing scanning electron microscopy and fourier transform infrared spectroscopy. *In vitro* gastrointestinal simulation was done to determine the site of drug release.*In vivo* analysis using rat model was also performed. Macroscopic and histopathological analyses of the colon were carried out to evaluate the inflammation extent. Levels of oxidative stress biomarkers, catalase and myeloperoxidase, additionally a pro-inflammatory cytokine, tissue necrosis factor-α were measured.

Results:

Encapsulation was confirmed by FT-IR spectra with the 2900 cm–1 C–H peak, phenolic C–O (1250 cm–1) and aromatic C=C (1500 cm–1) peaks. The surface morphology is rough and porous with an average microparticle size of 26.830 µm. An encapsulation efficiency of 99.69% was determined. For the *in vitro* gastrointestinal simulation, major drug release happened at fed state of the intestine. Colon macroscopic scoring indicated disease control had significant difference against all treatments ($P \leq 0.01$). Histopathological analysis exhibited relatively alleviated inflammation in the curcuminoid microparticle group versus the free curcuminoid group. Colonic catalase levels indicate a significant difference between free curcuminoid treatment and curcuminoid microparticle treatment ($P \leq 0.0001$). The myeloperoxidase activity on disease control had a significant difference against all treatments ($P \leq 0.0001$). TNF-α levels of the treatment groups showed significant difference from disease control ($P \leq 0.001$).

Conclusions:

The curcuminoid microparticle elicited greater anti-inflammatory and antioxidant effects on the acetic acid-induced colitis than the free curcuminoids.

KEYWORDS: Alginate; Anti-oxidant; Anti-inflammatory; Chitosan; Curcuminoids; Microencapsulation

PD-0105102-P

Green Synthesis of Zinc Oxide Nanoparticles Using *Pongamia pinnata* Leaf Extract and Its Antibacterial Activity

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ABSTRACT

Introduction:

In recent years, green synthesized nanoparticles from plant extracts have drawn great interest because of their potential nanomedicinal applications.

Objectives:

The current study aims to synthesize zinc oxide nanoparticles using *Pongamia pinnata* leaf extract and determine its antibacterial activity.

Methods:

Zinc oxide nanoparticles (ZnONPs) were synthesized by using aqueous extract of *Pongamia pinnata* leaf and the formation of zinc oxide nanoparticles was characterized by UV-visible spectroscopy, Fourier transform infrared (FT-IR) spectroscopy, X-ray diffraction (XRD), and scanning electron microscopy (SEM). The antibacterial activity of ZnONPs was evaluated by agar well diffusion method.

Results:

The UV-visible spectrum of the synthesized ZnONPs showed peak at 379 nm. The FT-IR study revealed that the presence of some biomolecules and functional groups in leaf extract was responsible for the capping and stabilization of ZnONPs. The XRD pattern showed that the synthesized ZnONPs were crystalline in nature, with an average particle size of 30.30 nm. SEM examination showed the development of nanostructures and the spherical-shaped morphology of ZnONPs. The results of the present study revealed that the synthesized ZnONPs showed antibacterial activity against *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Escherichia coli*. The MIC value of ZnONPs was 0.39 x 103 µg/mL for *Staphylococcus aureus* and 0.20 x 103 µg/mL for *Pseudomonas aeruginosa* and *Escherichia coli*.

Conclusions:

Thus, the green synthesized ZnONPs can be used as antibiotics in the future because of their non-toxic, eco-friendly, and effective nature against bacteria.

KEYWORDS: Antibacterial activity; Nanoparticles; *Pongamia pinnata*; Zinc oxide

PD-0105103-P

Preliminary Study on Formulation of Self-Nanoemulsifying Drug Delivery Systems (SNEDDS) Containing Naringenin

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ABSTRACT

Introduction:

Naringenin, a flavonoid extracted from *Citrus* plants, could exhibit various pharmacological effects on diabetes, central nervous system, and cardiovascular system. However, naringenin shows several limitations, including low oral bioavailability, poor solubility, short half-life $T_{1/2}$, and a possibility to crystallize during gastrointestinal absorption. Self nanoemulsifying drug delivery systems (SNEDDS) has demonstrated to be one of a potential carrier system for improving the bioavailability of poorly soluble drugs.

Objectives:

Main aim of this study is to formulate SNEDDS containing naringenin to overcome drug limitations.

Methods:

Oils, surfactants and co-surfactants, were selected based on solubilization and emulsification efficiency of these excipients. The blank SNEDDS were obtained from the construction of pseudoternary diagrams. These blank SNEDDS were then evaluated for their physicochemical properties and naringenin loading capacity. The developed SNEDDS containing naringenin were further characterized in term of their thermodynamic stability upon dilution in water and in different pH media, droplet size, droplet size distribution, zeta potential, and naringenin assay using a validated UV-Vis spectrophotometric method.

Results:

Propylene glycol monocaprylate (Capryol 90), PEG-40 hydrogenated castor oil and diethylene glycol monoethyl ether (Transcutol HP) were chosen respectively as the oil, surfactant and co-surfactant for the formulation of blank SNEDDS.Drug loading was screened from 1-6% (w/w). All the naringenin exhibited good stability after centrifugation, heating-cooling cycles, and freeze-thaw cycles. The SNEDDS loaded up to 6% naringenin formed transparent of translucent microemulsions, displaying no precipitation after 8 hours of dilution in various pH media. Concerning the droplet size, the higher naringenin loading, the bigger droplet size and a higher polydispersity index were observed. Hence, the final SNEDDS loaded of 5.5% naringenin was chosen. This formulation exhibited good thermodynamically stability in water and in different pH media, with an average droplet size of 19.35 ± 0.029 nm, a single-peak distribution, a polydispersity index of 0.094 ± 0.011, and a zeta potential of -0.824 ± 0.035 mV.

Conclusions:

A stable formulation of SNEDDS containing 5.5% naringenin was developed and can be further investigated as potential drug delivery system for improving the solubility and oral availability of naringenin.

KEYWORDS: Flavonoid; Naringenin; Self-nanoemulsifying drug delivery systems; SNEDDS

PD-0105104-P

Formulation of a Povidone Iodine Loaded Niosome to Enhance Stability and Antibacterial Activity

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ABSTACT

Introduction:

Povidone iodine (PVP-I), a microbicidal substance widely utilized for several decades due to its extensive activity against bacteria, fungi and viruses, shows however certain limitations including potential irritation and poor stability. Consequently, the development of a carrier encapsulating PVP-I to provide therapeutic activity in a controlled manner for a prolonged period of time and/or enhanced drug stability is of big importance. Niosomes are biocompatible vesicular carriers composed of bi-layered structure of nonionicsurfactants which can enhance stability and delivery of the encapsulated aqueous soluble drug.

Objectives:

The aim of this study was to develop a niosomal formulation of PVP-I.

Methods:

PVP-I-loaded niosome was prepared by thin film hydration method. The effects of various factors such as film-forming solvent, surfactants, the ratio of surfactants and cholesterol, hydration time, temperature, and sonication time on the properties of noisome were investigated. PVP-I-loaded niosome was characterized for particle size, polydispersity index (PDI), zeta potential, encapsulation efficiency (%EE), drug stability and antimicrobial efficiency (killing rate test) based on Reference ASTM 1054, ASTM 2315 and CLSI M26-A.

Results:

The PVP-I-loaded niosome consisted of PVP-I, Tween 80, Span 80, polyethylene glycol-40 hydrogenated castor oil, cholesterol and methanol:chloroform(1:1,v/v) as film-forming solvent. Obtained results showed that the Hydrophilic-Lipophilic Balance of surfactants mixture had the influence on some physico-chemical properties of niosome. Hydration phase is carried out at 40 °C for 30 minutes. The final formulation had an average particle size of 122.3 ± 1.6 nm,a PDI of 0.250 ± 0.01, a %EE of 19.22 ± 0.4%, and a zeta potential of –16.4 ± 0.1 mV and could maintain these values when being stored at 5 ± 2 °C during stability test. Concerning the antimicrobial efficiency, both blank niosome and niosomal povidone showed no significant difference with the control (aqueous solution of 0.45% PVP-I) and the reference (Betadine Throat Spray) after 1-min of contact while only the niosomal povidone showed no significant difference with these samplesafter30-seconds of contact, which clearly demonstrated the activity of PVP-I.

Conclusions:

This study has successfully developed the niosomal povidone for potential local delivery system of povidone iodine.

KEYWORDS: Antimicrobacterial efficiency; Niosome; Povidone iodine; Stability; Thin film hydration method

PD-0105105-P

Immunomodulatory Activity of SNEDDS (Self Nano-Emulsifying Drug Delivery System) Alang-Alang Roots Extract (*Imperata cylindrica* (L.) P.Beauv.)

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ABSTRACT

Introduction:

The root of alang-alang (*Imperata cylindrica* (L.) P.Beauv.) is an herbal plant with various pharmacological activities. Dayak people in Central Kalimantan, Indonesia, believe that a decoction of alang-alang roots can increase immunity. The use of reed roots is still limited and there are limitations because it only relies on simple extracts and oral preparations. The development of nanoparticles is the right solution because it can increase absorption so that it can increase the potential of drugs. One of the methods in manufacturing nanoparticles is using Self Nano-Emulsifying Drug Delivery System (SNEDDS).

Objectives:

This study aimed to know the potential of alang-alang roots as immunomodulatory agents formulated in the form of SNEDDS (Self Nano-Emulsifying Drug Delivery System).

Methods:

Alang-alang rootswere extracted using the maceration method using 70% ethanol solvent. Furthermore, the ethanol extract of reed rootwas identified using Gas Chromatography-Mass Spectrometry (GC/MS). SNEDDS test of alang-alang root extract included transmittance test, emulsification time test, nanoemulsion droplet size test, Polydispersity Index (PI), pH test, viscosity test, centrifugation test, nanoemulsion stability test, and immunomodulatory activity test. An immunomodulatory activity testwas conducted in vitro on macrophage phagocytosis activity and lymphocyte proliferation.

Results:

The results of compound identification using GC-MS showed 82 peak compounds, with the most significant percentage of compounds being cis-13-Octadecenoic (oleic acid), which amounted to 22.73%, and 5-Hydroxymethylfultural at 17.38%. The SNEEDS formula test results showed that the SNEDDS formulation of reed root extract obtained transmittance results with a percentage of >90%, emulsification time <1 minute, droplet size <100 nm, particle distribution F1 in the polydispersion category while F2 and F3 in the mono dispersion category, pH in the range of 5-6, viscosity in the range of 422.4 - 447.6 cP and stable test results without any phase separation and physical condition changes.

Conclusions:

SNEDDS administration of alang-alang root extract has immunostimulant activity on macrophage phagocytosis activity and lymphocyte cell proliferation.

KEYWORDS: Alang-Alang root; Immunomodulator; SNEDDS; *In Vitro*

PD-0105106-P

Formulation of Anti-Inflammatory Gel from the Ethanolic Leaf Extract of *Mimosa pudica*

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ABSTRACT

Introduction:

Inflammation is a common physiological response that causes a variety of health issues, necessitating effective anti-inflammatory treatments. *Mimosa Pudica* is a plant that is proven to contain bioactive flavonoids and phenolic compounds. By investigating the potential of *Mimosa pudica* in anti-inflammatory gels, this study aims to contribute to the development of effective topical inflammatory treatments for skin diseases.

Objectives:

This study focuses on formulating a topical gel using *Mimosa pudica*, and in evaluating its physical properties as well as anti-inflammatory activity and skin irritability potential.

Methods:

A gel formulation was prepared using carbopol-940 with different concentrations of *M. pudica* extract prepared by cold percolation method. Quality control tests were performed to measure organoleptic characteristics and pH. The biological activity was also determined using skin irritation tests on Wistar albino rats to determine its toxicity, and carrageenan-induced rat paw edema assay to determine its efficacy. The experimental design includes specific intervals for data collection and statistical analysis using one-way ANOVA and Tukey's test with a confidence interval of 5%.

Results:

The quality control tests of *Mimosa pudica* gel formulations reveal its color ranges from brown to black, with transparency decreasing with concentration. The pH level remains stable at pH 5-5.5. The gel's skin irritability tests show no irritation, and its anti-inflammatory efficacy is comparable to ketoprofen. All concentrations dose-dependently inhibited carrageenan-induced edema, and all formulations showed comparable performance to the positive control after 30 minutes with F3 (50%), F2 (25%), and F1 (12.5%) having p-values of 0.995, 1.000, and 0.742, respectively.

Conclusions:

The formulated *Mimosa pudica* gel with 50% concentration (F3), exhibited better anti-inflammatory properties without side effects. This concentration level showed the most optimal properties among the different concentrations tested, suggesting its potential as an effective topical anti-inflammatory agent.

KEYWORDS: Inflammation; Anti-inflammatory; *Mimosa pudica*; Gel formulation

PD-0105107-P

Nanoparticle Formulation for Enhancing the Bioavailability of Ethyl Acetate Fraction of Papaya Leaf Extract with Carbopol 940: A Novel Approach in Herbal Medicine Delivery

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ABSTRACT

Introduction:

Papaya leaves (*Carica papaya* L.) have potential as an anticoagulant containing carpain-type alkaloid compounds which are lipophilic and have low solubility so they penetrate poorly when applied to the skin.

Objectives:

This study aims to determine the ideal nanoparticle preparation formula of ethyl acetate fraction of papaya leaf extract (*Carica papaya* L.) with varying concentrations of carbopol 940 as a gelling agent.

Methods:

This study consists of the extraction process of papaya (*Carica papaya* L.) leaves by maceration method using methanol solvent, fractionation using ethyl acetate, formulated into a nanoparticle system, namely nano hydrogel with varying concentrations of carbopol 940 (0.5%, 1%, and 1.5%) and analyzed descriptively and statistically with organoleptic parameters, particle size, zeta potential, polydispersity index, morphology, pH, viscosity, spreadability, adhesiveness, and stability test.

Results:

Based on the evaluation of the characteristics of the nano hydrogel preparation, the ethyl acetate fraction of papaya leaf extract (*Carica papaya* L.) is positive for alkaloids, organoleptic observations produce a yellowish green color, a weak characteristic odor, a thick texture, and a spherical morphology and meet the requirements of the physical characteristics evaluation parameters and remain stable during storage.

Conclusions:

The Nanohydrogel formula of ethyl acetate fraction of papaya leaf extract (*Carica papaya* L.) with a 1% concentration of carbopol 940 as a gelling agent showed ideal formula results that meet the requirements of physical characteristics evaluation and good stability.

KEYWORDS: Carbopol 940; Gelling agent; Nanohydrogel; Papaya leaf

PD-0105108-P

A Study on Nanoparticle-Hydrogel Interactions in Topical Formulations: Impacts on Drug-Loaded Nanoparticles and Rheology Properties

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ABSTRACT

Introduction:
As a trend in nanomedicines, different nanoparticles (NPs) were incorporated into hydrogels or creams for topical application. In return, NPs, due to their high mobility, are predicted to interact with the gel matrix.

Objectives:
This study is to investigate the interactions between nanoparticles (NPs) and hydrogels, focusing on rheology behavior and drug permeability.

Methods:
Different active ingredients (APIs) are pH-dependent (ibuprofen or berberine chloride) or pH-independent (hydrophobic substances such as andrographolide). APIs were loaded into nanoparticles (polymeric or lipid-based) via bottom-up techniques (solvent-evaporation). Then the nanoparticles were prepared into hydrogels including (i) non-ionic gels (xanthan gum, HPMC) or (ii) ionic gel (Carbopol or Alginate sodium gels), and (iii) temperature-sensitive gel (poloxamer). Then the encapsulation efficacy (EE), infrared spectra (IR), XRD were evaluated. Drug permeation studies, structure of gel (SEM images), and rheology studies were evaluated to illustrate the fate of NPs inside hydrogels.

Results:
For NPs, pH-dependent drug (100-200 nm) showed a smaller particle than non-ionic loaded nanoparticles (from 150-300 nm). Meanwhile, EE of hydrophobic products were higher than EE of hydrophilic ones loaded nanoparticles. While IR and XRD did not show any chemical interactions among ingredients, rheology results suggested a significant impact of NPs. In which, hydrophobic NPs diffused into gel structure (increasing viscosity, adhesion properties); meanwhile ionized NPs significantly modified rheology behavior of hydrogel (viscosity- shear rates), implying a reformation in gel structure.

Conclusions:
This study is an approach for quality assurance in which the interactions of NPs on hydrogel properties proposed information about gel structures, efficacy, and stability.

KEYWORDS: Drug permeability; Drug-polymer interactions; Encapsulation efficacy; Hydrogels; Nanoparticle; Rheology

PD-0105109-P

Development of Sacha Inchi Oil Solid Self-Nanoemulsifying Drug Delivery System

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ABSTRACT

Introduction:

Sacha Inchi (*Plukenetia Volubilis* L.) oil contains a high amount of omega-3 fatty acid a-linolenic acid. However, it is water-insoluble and omega-3 is easily degraded by oxidation. Solid self-nanoemulsifying drug delivery system (S-SNEDDS) is an isotropic mixture of oil, surfactant and cosurfactant in a solid form. It forms o/w nanoemulsion when introduced into aqueous phases under gentle agitation. It has been shown to improve the solubility, stability and bioavailability of hydrophobic drugs.

Objectives:

This study aimed to study the preparation of Sacha Inchi oil in the form of S-SNEDDS.

Methods:

Sacha Inchi oil SNEDDS was prepared by mixing oil, Tween and Span at different ratios. Viscosity and particle size after dissolving SNEDDS in the DI water were characterized. A suitable ratio of oil, Tween and Span was determined using pseudo-ternary phase diagrams. S-SNEDDS was prepared by triturating SNEDDS with solid inert carriers, i.e., Aerosil®200 (control), mannitol and lactose monohydrate, with different ratios. The S-SNEDDS were characterized in terms of %absorption to the carrier, flowability, and particle size after dissolving them in the DI water. The *t*-test measured statistical significance.

Results:

Tween 80-Span 20 showed the highest area of nanoemulsions, having a size < 200 nm after diluting SNEDDS with DI water at the ratio of 1:250. However, SNEDDS of 70:20:10 Tween20: Span20: oil can produce the smallest nanoemulsions of 90.40 ± 7.39 nm and narrow PDI of 0.236 ± 0.012. Mannitol showed a suitable carrier for preparing S-SNEDDS with a % absorption to the carrier of 11.6 ± 1.3 %. There was no significant difference ($P > 0.05$) in particle size between S-SNEDDS and SNEDDS after dissolving in the DI water. However, all S-SNEDDS presented poor flowability.

Conclusions:

Sacha Inchi oil S-SNEDDS can be prepared. The absorption of SNEDDS onto other solid carriers or the use of other preparation methods should be further studied.

KEYWORDS: Absorption to solid carrier method; Mannitol; Sacha Inchi oil; Solid self-nanoemulsifying drug delivery system; Span; Tween

PD-0106102-P

Microbiological Potency and Sterility of Non-combined Extemporaneously Prepared Cefazolin and Gentamicin Eye Drops Stored at Freezer Temperatures

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ABSTRACT

Introduction:

Cefazolin and gentamicin eye drops are the first-line drugs used for the emergency treatment of bacterial keratitis. Previous studies suggest that storing these drugs at freezer temperatures may improve their stability compared to refrigerated storage.

Objectives:

This study aims to evaluate the antimicrobial potency and sterility of extemporaneous cefazolin (50 mg/ml) and gentamicin (14 mg/ml) eye drops stored at freezer temperatures (-15°C to -20°C) for 28 to 30 days.

Methods:

Cefazolin and gentamicin were separately compounded in sterile water for injection, following aseptic techniques at Phichit Hospital, Thailand. Each formulation was transferred into polyethylene plastic containers and kept in a freezer. Sterility testing was conducted on days 0, 7, 14, and 30 for cefazolin, and on days 0, 7, 14, and 28 for gentamicin, using bacterial and fungal culture methods. Additionally, the Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) for cefazolin eye drops were measured against *Staphylococcus aureus* and *Staphylococcus epidermidis*, while gentamicin was tested against *Pseudomonas aeruginosa*. The broth microdilution method was used to evaluate the antibacterial potency of these eye drops in inhibiting and killing common ocular pathogens.

Results:

Sterility tests showed that the eye drops remained sterile when stored at freezer temperatures for 28 to 30 days. No microbial contamination was detected during the study period. In MIC and MBC tests, cefazolin effectively inhibited and killed *S. aureus* and *S. epidermidis*, while gentamicin had similar effects on *P. aeruginosa*. The MIC and MBC values for cefazolin eye drops were 0.05-0.20 µg/ml and 0.20-6.25 µg/ml, respectively. As for gentamicin eye drops, the MIC and MBC ranged from 0.21 to 1.71 µg/mL.

Conclusions:

These findings support the use of extemporaneously prepared cefazolin and gentamicin eye drops in clinical applications, providing a viable storage option for up to 28 days for gentamicin and 30 days for cefazolin when kept in a freezer.

KEYWORDS: Cefazolin; Extemporaneous; Gentamicin; Minimum bactericidal concentration; Minimum inhibitory concentration; Sterility test

PD-0201101-P

Characterization of Starch Films Formulated from *Colocasia esculenta* (taro) for Potential Pharmaceutical Applications

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ABSTRACT

Introduction:

Increasing numbers of hard capsules prepared with non-gelatin ingredients are being developed to address the issues associated with hard gelatin capsules, including brittleness at lower humidity, softness at higher temperatures, and reactivity with certain drugs. In the Philippines, there are initiatives to find more pharmaceutical applications for underutilized local plants, such as *Colocasia esculenta* (Taro).

Objectives:

This study aims to formulate capsule films using taro starch to evaluate the potential application of such starch as an ingredient for making non-gelatin hard capsules.

Methods:

The study involves the preparation of starch films, preformulation, and physicochemical analysis. The corm of taro obtained from Paracale, Camarines Norte was extracted for starch, wherein samples were blended and filtered through a muslin cloth and oven dried for 24 hours. Films were prepared by subjecting 25% w/w glycerol solutions containing 7%, 8%, and 9% w/v starch to an oven at 50°C. The films' thickness, tensile strength, moisture permeation, and moisture content were measured.

Results:

The properties of taro starch films were determined. The taro starch mixed in distilled water is slightly acidic with a pH of 3.9-4.1. The films were prepared from 7%, 8%, and 9% starch dispersions and were found to have varying thickness. The highest value for ultimate tensile strength of 18.32 N/mm^2 was recorded for the 9% starch dispersion. Furthermore, an 8.83% moisture content was recorded for the 9% starch dispersion. Otherwise, the moisture permeation test for the 9% formulation yielded a rate of 2.85 $g/m^2/day$.

Conclusions:

The formulated films indicate that the isolated taro starch is a prospective excipient in the manufacture of drug dosage forms, specifically as capsule film. The 9% taro starch and glycerin formulation presented as the most acceptable concentration for formulation as it showed the most optimal properties and showed desirable physical characteristics, suggesting its potential as an alternative non-gelatin capsule film.

KEYWORDS: Characterization; Film; Starch; Taro

PD-0203101-P

Influence of Formulation and Punch Properties on Sticking in the Tableting Process

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ABSTRACT

Introduction:
Punch sticking is a common defect in tablet manufacturing. It occurs when particles from the formulation adhere to the punch cup, resulting in defective tablets. However, the mechanisms for punch sticking are not fully understood systematically.

Objectives:
This study aimed to investigate the influence of formulation and punch properties on sticking and provide data supporting a better understanding of how to avoid this defect.

Methods:
The propensity of sticking was investigated using seven model active pharmaceutical ingredients (APIs) (i.e., ibuprofen, aspirin, paracetamol, metronidazole, diltiazem, diclofenac, cefuroxime). Tablets were manufactured through a direct compression process. The APIs stuck to the upper punch were extracted by the appropriate solvent and were quantified using UV spectroscopy. The impact of excipients was conducted on various fillers (i.e., microcrystalline cellulose, lactose monohydrate, dicalcium phosphate, pregelatinized starch, Cellactose®) and lubricants (i.e., magnesium stearate, stearic acid, aerosil, talc). The effects of punch cups (i.e., flat, standard concave, deep concave) and punch materials (stainless steel or chromium nitride coated steel) were also investigated.

Results:
Experimental results show that the APIs with higher melting points and smaller particle sizes have a low tendency to stick. The differential scan calorimetry plots and X-ray diffraction graphs revealed changes in the crystalline structure due to compaction, hence increasing the tendency to stick. The fillers and API particle size affect the degree of sticking. The effect of lubricant or glidant excipients depends on the lubrication mechanism of each substance. Chromium nitride-coated punch does not eliminate potential sticking if the active ingredient has a high melting point and low compaction speed. A flat-face punch causes a higher sticking tendency than that of concave ones.

Conclusions:
The factors contributing to sticking during tablet manufacturing are not only the ingredient properties but the tableting parameters also. The achieved data could be a reference for the formulators once punch sticking needs to be addressed.

KEYWORDS: Direct compression; Punch properties; Sticking, Tableting process

PD-0301101-P

Herbal Shower Gel containing Extracts of *Momordica charantia* L. Fruit and *Houttuynia cordata* Leaf: Formulation Optimization and Anti-Inflammatory Evaluation

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ABSTRACT

Introduction:

Scientists have found that *Momordica charantia* L. and *Houttuynia cordata* extracts can reduce inflammation both *in vitro* and *in vivo*.

Objectives:

This research aims to develop a therapeutic shower gel with evaluated *in vitro* anti-inflammatory effects as well as establish testing standards for the shower gel, such as organoleptic tests, identification, *in vitro* anti-inflammatory activity, limits of microbial contaminants, limits of heavy metals, and the HET-CAM test.

Methods:

The shower gel was formulated with concentrations of 3% *Momordica charantia* L. fruit extract and 2% *Houttuynia cordata* leaf extract. Design Expert software (version 8.0, Stat-Ease Inc., Minneapolis, USA) was used to develop 12 formulas by varying the amounts of sodium laureth sulfate, cocamidopropyl betaine, and PEG-120 methyl glucose dioleate in a full factorial design. Gel characteristics for formula assessment include viscosity, foamability, foam stability, and dirt dispersibility.

Results:

The optimized formula of the shower gel showed the viscosity 5216.67 ± 5.36 cps, foamability 238.56 ± 2.01 mL, foam stability 99.26 ± 0.52%, dirt dispersibility 0.33 ± 0.00 score at the concentrations of sodium laureth sulfate (23.13%), cocamidopropyl betaine (8.10%), and PEG-120 methyl glucose dioleate (1.64%) yield. The physical properties of the shower gel are liquid, transparent, slightly brownish-yellow, and have a mild lemon scent. The anti-inflammatory activity was determined using the bovine serum albumin denaturation method, which yielded an IC50 value of 384.69 ± 10.21 µg/mL. Additionally, the shower gel showed no signs of inducing irritation in the HET-CAM test model.

Conclusions:

These results suggest that herbal shower gel containing extracts of *Momordica charantia* L. fruit and *Houttuynia cordata* leaf is a potential candidate for treating inflammatory skin disease.

KEYWORDS: Anti-inflammatory ability; Formula optimization; *Houttuynia cordata*; HET-CAM; *Momordica charantia* L; Shower gel

PD-0301102-P

Optimization of Lip Balm Formula with Pineapple Peel (*Ananas comosus* L. Merr), Carrot Peel (*Daucus carota* L.) and Virgin Coconut Oil (VCO)

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ABSTRACT

Introduction:

The lips are a single part of the face that affects its overall appearance. Pale, dull, dry, and chapped lips are common lip problems caused by direct exposure of keratin cells to ultraviolet (UV) light and hot and cold conditions. Applying lip balm with sunscreen is critical in addressing this issue. Natural lip balm ingredients include pineapple peel extract and carrot peel extract, which include chromophore groups and antioxidants like β-carotene and vitamin E, capable of absorbing UV A and UV B rays.

Objectives:

This research was conducted to determine and analyse the optimal formulation of lip balm preparations and the ability of pineapple peel (*Ananas comosus* L. Merr) and carrot peel (*Daucus carota* L.) extracts to protect against UV rays.

Methods:

The research design used was quantitative experimental research in the form of formulation and testing of the SPF value of Lip Balm with Pineapple Peel and Carrot Peel Extract. The research data were analysed using the Kruskal-Wallis test

Results:

The results of the study revealed lip balm preparation formulas derived from pineapple peel extract (*Ananas comosus* L. Merr) and carrot peel (*Daucus carota* L.) at concentrations of F0 (0% extract), F1 (10% pineapple peel extract), F2 (10% carrot peel extract), and F3 (10% pineapple peel extract and 10% carrot peel extract). The study of lip balm preparations in four formulae yielded positive results that met the criteria for good lip balm preparations. Lip balms made from pineapple peel extract (*Ananas comosus* L. Merr) and carrot peel (*Daucus carot*a L.) have SPF values of F0, F1, F2, and F3, respectively: 1.03; 8.80; 8.95; and 25.67.

Conclusions:

This research concludes that a lip balm preparation with a combination of pineapple peel extract (*Ananas comosus* L. Merr) and carrot peel (*Daucus carota* L.) with optimal concentration meets the requirements for a good lip balm preparation and has an SPF value of 25.67.

KEYWORDS: Carrot peel (*Daucus carota* L.); Lip balm; Pineapple peel (*Ananas comosus* L. Merr); SPF score

PD-0303101-P

Development of Chewable Toothpaste Tablets Containing Mango (Nam Dok Mai) Leaf Extract

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ABSTRACT

Introduction:

Chewable toothpaste tablets represent a solid form of oral hygiene product designed for convenient use. These tablets, intended for chewing into small particles before brushing, offer a similar effect to traditional toothpaste.

Objectives:

This study aimed to develop chewable toothpaste formulations incorporating mango leaf extract, sourced from *Mangifera indica* (Nam Dok Mai number 4) cultivated in the Bangplee district of Samutprakarn province, Thailand, with a prestigious Geographical Indication (GI) tag. Mangiferin, a xanthone compound abundant in mango leaves, is renowned for its antioxidative, anti-inflammatory, antiviral, and antibacterial properties.

Methods:

Extraction of mangiferin was achieved through simple maceration of mango leaves in 80% ethanol, followed by purification with 95% ethanol, resulting in a 2.8% yield of mangiferin-rich extract. This extract, at a concentration of 0.01% by weight, was incorporated into various dry toothpaste formulations, initially prepared as wet granules before compression into chewable tablets. Physical characteristics such as angle of repose, compressibility index, and Hausner's ratio of granules, along with weight variation, hardness, and friability of tablets, were evaluated. Tablets meeting specified criteria for weight variation, hardness, and friability were selected for preference assessments, including taste, mouthfeel, and foamability. The tablet's efficacy in reducing oral bacteria was also investigated.

Results:

The developed tablets were a rounded shape with a smooth and shiny surface. The cooling sensation in the mouth was a characteristic of menthol. The color of the tablets was uniform, without any observable mottling. Physical properties of the tablets complied to the FDA guidance on quality attribute considerations for chewable tablets. This chewable toothpaste offered a pleasant taste, and oral cleanliness with an appropriate amount of foam. The simulated dispersion of a crushing tablet mixed with 3 mL of water, as would occur in practical application, exhibited bactericidal activity against *Streptococcus mutans*.

Conclusions:

The studies indicate that chewable toothpaste containing mango leaf extract, integrated into a dried toothpaste-based formula, offers a convenient and potentially beneficial alternative for enhancing oral hygiene.

KEYWORDS: Chewable toothpaste; Mangiferin; Mango leaf extract

PD-0303102-P

Developing a Procedure to Simultaneously Quantify Glutathione and Alpha-Lipoic Acid in Several Skin-Whitening Products Using HPLC-PDA and HPLC-MS Methods

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ABSTRACT

Introduction:

Glutathione (GSH) and alpha-lipoic acid (ALA) are two major and anti-aging ingredients that are popular in beauty products. The combination of GSH and ALA in preparations can be more effective due to their synergistic effect. However, overuse of GSH and ALA can also cause harmful effects such as fever, diarrhea, and chest tightness.

Objectives:

The study aimed to control the content of GSH and ALA in preparations.

Methods:

The GSH and ALA quantification procedure was developed using HPLC method with PDA and MS detectors and validated according to ICH guidelines.

Results:

The study developed and validated a process for simultaneously quantifying GSH and ALA in some skin-whitening tablets and capsules, using HPLC-PDA and HPLC-MS methods. For the HPLC-PDA method, the linear range of GSH is from 100 - 600 µg/mL (r = 0.9998), that of ALA is from 10 - 100 µg/mL (r = 0.9995). For the HPLC-MS method, the linear range of GSH is from 30 – 350 µg/mL (r = 0.9997), that of ALA is from 3 – 35 µg/mL (r = 0.9997).

Conclusions:

As a result, the GSH and ALA contents determined from two above methods show no statistically significant difference. The developed method contributes to the quality control of skin lightening preparations.

KEYWORDS: Glutathione; Alpha-lipoic acid; HPLC-PDA; HPLC-MS; Skin-whitening products

CP-1501101-P

Impact of Tailored Pharmacy-Based Program in Improving Medication Adherence of Psychiatric Out-Patients with Schizophrenia, Bipolar, and Major Depressive Disorders

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ABSTRACT

Introduction:

Patients with mental disorder are most likely to be non-adherent due to factors such as poor reasoning and lack of understanding which can lead to symptoms relapse and reduced treatment effectiveness. To avoid these repercussions, the project developed a tailored pharmacy-based service, named PARaMASaYA program, that will utilize expertise of pharmacists to promote adherence among selected psychiatric out-patients at a primary hospital in Antipolo City.

Objectives:

The purpose is to proactively involve pharmacists in the medication management of selected psychiatric patients and to address barriers to adherence that were identified in the research setting.

Methods:

The methodology was divided to pre-implementation, implementation, and post-implementation processes. Capacity building and planning were part of the *pre-implementation*. Program procedures were followed for two weeks during the *implementation*. Program impact was evaluated in the *post-implementation* with the use of Morisky Medication Adherence Scale (MMAS-8). The mean score of the patients were interpreted as non-adherent if less than 7 and adherent if equal or more than 7. The scale was answered twice by the patients during the pilot run – the first attempt was done on the first pharmacy visit during the start of implementation while the second attempt was on the next visit for prescription refill. Mean scores on two attempts were compared to see if there is improvement in medication adherence.

Results:

After the two-week run, MMAS-8 resulted to a score of 2.56 during first visit and increased to 5.00 during second visit. The scores did not reach the value of 7 to imply adherence, however, there is an increment which can still indicate that the program has positive influence on medication adherence.

Conclusions:

Application of pharmacists' expertise through tailored pharmacy-based services has potential to provide patients with schizophrenia, bipolar, and major depressive disorders the appropriate pharmaceutical care they need to improve medication adherence.

KEYWORDS: Pharmacy; Medication adherence; Psychiatry; Mental disorder

CP-1501102-P

Availability of Essential Medicines for the Management of Patients Admitted to Supportive, Hospice, and Palliative Care in a Tertiary Government Hospital in Manila, Philippines

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ABSTRACT

Introduction:

In 2007, the International Association for Hospice and Palliative Care (IAHPC) made a list of medications based on their efficacy, safety, and cost of treatment in addressing prevalent symptoms in palliative care. Updating the local formulary based on the IAHPC list can facilitate identification of potential gaps in medicine appropriateness and availability and can guide formulary decision-making.

Objectives:

This study aimed to: (1) compile a list of available essential medicines in a tertiary government hospital for prescription to patients needing pain management and palliative care, and (2) compare and contrast the list of available medicines in the hospital with the recommended essential medicines list of the WHO and the IAHPC to determine gaps in the availability of medicines.

Methods:

The records of the WHO and the IAHPC were combined in the web-based spreadsheet application Google Sheets to identify eighty-two (82) dosage forms of forty (40) essential medicines for palliative care. This was compared with the Philippine National Formulary (PNF) and, consequently, a tertiary government hospital in Metro Manila, Philippines.

Results:

Compared with the combined list of WHO and IAHPC, forty-four (44) dosage forms of twenty-eight (28) essential medicines are found in the PNF or availability of 53.66% of dosage forms and 70% of essential medicines. Notably, amitriptyline, fentanyl, and methadone, which are recommended by both WHO and IAHPC, are not included in the PNF either completely or in their recommended dosage forms. And, as expected, more commonly utilized medications for palliative care and pain management, such as ibuprofen, morphine, codeine, dexamethasone, and hyoscine butylbromide, are included.

Conclusions:

The Philippine National Formulary (PNF) incorporates most of the essential medicines for pain and palliative care recommended by WHO and IAHPC, demonstrating adherence to their guidelines. This compiled list not only identifies existing gaps in medication availability but also guides prescribing decisions to enhance patient care.

KEYWORDS: Essential medicines; Supportive, hospice, and palliative care; Pain management; National formulary; Drug availability

CP-1501103-P

Drug Utilization Evaluation of Antibiotics using DU90% in a Teaching Hospital in Indonesia

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ABSTRACT

Introduction:

Drug utilization evaluation is one of the efforts to improve rational drug use. Antibiotics is one of drugs that potentially used irrationally.

Objectives:

This study aimed to evaluate the utilization of antibiotics using a quantitative approach which was calculating the consumption using method of drug utilization 90% (DU90) developed by the World Health Organization (WHO).

Methods:

This study followed a quantitative descriptive observational study. Data collection was carried out retrospectively and obtained from the hospital's information system of a teaching hospital in Yogyakarta Province, Indonesia. The retrieved data included antibiotics utilization in the years 2013, 2016, 2019, 2020, and 2021. The periods were selected to represent timeseries trend and possible influence of the starting of universal health coverage program in early 2014 and the Covid-19 pandemic in 2020-2021. Data were analyzed using descriptive statistics following the guideline of WHO – DU90% method.

Results:

Findings from this study revealed that the antibiotics mostly used among outpatients in term of DU90% in the year of 2013, 2016, 2019, 2020, and 2021 were oral ciprofloxacin (18.82%), oral cefixime (35.45%), oral cefixime (22.36%), oral cefixime (27.75%), and oral azithromycin (45.59 %), respectively. Meanwhile, the antibiotic mostly used among inpatients in term of DU90% in the year of 2013, 2016, 2019, 2020, and 2021 were parenteral ceftriaxone (25.92%), parenteral ceftriaxone (31.88%), parenteral ceftriaxone (22.62%), oral cefixime (22.68%), and parenteral levofloxacin (17.04 %), respectively.

Conclusions:

Certain antibiotics namely oral ciprofloxacin, oral cefixime, and parenteral ceftriaxone were used widely in this study site hospital continuously. This study showed antibiotics utilization based on consumption from the aggregate data, therefore cannot straightly indicate the rational use of the drugs. Findings of this study might give insight for future steps to investigate the rational use of antibiotics using qualitative approach from individual level data.

KEYWORDS: ATC/DDD; Rational drug use; Antimicrobial

CP-1501104-P

A Retrospective Study of the Risk Factors for Linezolid-Induced Thrombocytopenia

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ABSTRACT

Introduction:

Linezolid, an oxazolidinone antibiotic, indicated for multidrug-resistant Gram-positive infections is commonly used in fixed doses for all patients, including renal impairment. However, a clear exposure-response relationship has been demonstrated for linezolid-induced thrombocytopenia in this population. Therefore, identifying the risk factors for thrombocytopenia and time-to-event analyses are important to decide the appropriate strategy therapy.

Objectives:

This study aims to determine the frequency of thrombocytopenia among patients with and without renal impairment and identify risk factors for linezolid-induced thrombocytopenia.

Methods:

A retrospective study was conducted among adult patients receiving linezolid standard dose for ≥ 7 days, with excluded criteria, including obvious diagnoses of thrombocytopenia; abnormal baseline laboratory; being treated at ICU; variation of eGFR (CKD-EPI) of > 50%; receiving blood or other blood products. Thrombocytopenia was defined as a 25% reduction from the baseline. The time to development of thrombocytopenia between patients with and without renal impairment was assessed using Kaplan-Meier curves and log-rank test. Cox's proportional hazards model was used to determine factors that might be associated with the risk of thrombocytopenia.

Results:

A total of 170 patients were enrolled in the study (age 67.3 ± 16.3 years), patients with eGFR < 60 mL/min/1.73m2 accounted for 37.1%. Thrombocytopenia developed in 35.3% of patients and occurred 7.0 [5.00; 9.75] days after linezolid initiation. The proportion of thrombocytopenia in eGFR < 60 mL/min/1.73m2 group was significantly higher than that of eGFR ≥ 60 mL/min/1.73m2 group (28.0% vs. 47.6%, p <0.001). Cox's proportional hazards model identified eGFR < 60 mL/min/1.73m2 (aHR=2.204, 95% CI 1.263-3.844, p=0.005) and high baseline total bilirubin (aHR=3.639, 95% CI 1.463-9.052, p=0.005), were significant factors for linezolid-induced thrombocytopenia.

Conclusions:

Thrombocytopenia occurs more frequently in patients with renal impairment and high total bilirubin using a standard dose of linezolid. Therapeutic drug monitoring should be considered for these patients to ensure efficacy and safety.

KEYWORDS: Linezolid; Thrombocytopenia; Renal impairment; Therapeutic drug monitoring

CP-1501105-P

Designing a Software Program for Chemotherapy Order Processing in the Oncology Pharmacy Unit of a Tertiary Hospital in the Philippines

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ABSTRACT

Introduction:

Cancer chemotherapy is a complex and high-risk process, where errors may occur at any stage leading to patient harm or death when left unchecked. The World Health Organization (WHO) advocates a systems approach in improving medication safety, and stressed that a well-designed and error-proof system prevents human from committing errors. The Institute of Safe Medication Practices (ISMP) further recommends the use of technology as aid in sterile compounding, to prevent errors that are not detected by manual process.

Objectives:

This study aimed to(1) identify errors in the manual processing of chemotherapy orders, including the root causes(2)assess the severity, detectability, and frequency of these errors through Failure Mode Effects and Criticality Analysis (FMECA), and (3) design a software program addressing the critical failure modes.

Methods:

A mixed-method developmental study design was implemented. Semi-structured interviews with employed hospital pharmacists (n=10) were conducted to identify the steps in chemotherapy order processing and the errors which may occur at each step. In the FMECA, the pharmacists were asked to evaluate the criticality of the errors identified based on severity, detectability, and frequency. The errors were ranked based on the risk priority numbers (RPN). Lastly, a focus group discussion was conducted to identify software design aimed at addressing the errors.

Results:

Twenty-one (21) failure modes were identified in the manual chemotherapy order processing, rooting from high workload, demand for speedy process, multi-tasking of pharmacists, failure to follow standard checks, complacency, exhaustion, mix-up of materials, incomplete supplies, and use of substandard materials. Based on the RPNs, the most critical failure modes identified involved the pre-compounding and compounding steps. The pharmacists recommended a software design featuring computerized scheduling of patients, pharmacy access to patient information, systems interconnectivity, electronic chemotherapy ordering, automatic computation, label printing, and barcoding of materials.

Conclusions:

To reduce and mitigate medication errors, the use of a software program to automate chemotherapy order processing is recommended to increase accuracy and efficiency of pharmacy operations.

KEYWORDS: Chemotherapy; Order processing; Oncology; Software design; Cancer; Medication error

CP-1503101-P

Individualized Vancomycin Dosing with AUC-Based Therapeutic Drug Monitoring by the Bayesian Approach in Adult Patients with Hematological Malignancies

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ABSTRACT

Introduction:

In hematological malignancy patients, optimization vancomycin dosage is essential due to the high risk of inadequate exposures and bacterial resistance. Previous studies have revealed that acute myeloid leukemia (AML) and neutropenia were the factors influencing vancomycin pharmacokinetics and necessity of increasing dose in these subjects.

Objectives:

This study aims to analyze the results of the adjusted vancomycin dosing with AUC-based therapeutic drug monitoring (TDM) via the Bayesian approach in adult patients with hematological malignancies. Additionally, the study was also implemented to evaluate the impact of age, creatinine clearance and febrile neutropenia on vancomycin exposures (AUC).

Methods:

Based on TDM concentrations, calculations were performed using the in-house developed model-based TDM software (SmartDoseAI) to estimate the AUC value and suggest new dosing regimens achieving a target exposure of AUC 400 – 600 mg.h/L. Risk factors for subtherapeutic vancomycin levels on the first TDM (AUC < 400 mg.h/L) were identified using logistic regression analysis.

Results:

A total of 120 patients were included in this study. The attainment of the target AUC significantly improved after the 1st and 2nd dosing adjustments, from 45.0% to 83.3% and 97.2% respectively. Patients with febrile neutropenia (FN) exhibited higher clearance of vancomycin (CL_{van}) (5.65 vs. 3.87 L/h, $p < 0.001$) and lower AUC compared to non-FN patients (412.83 vs. 475.76, $p = 0.006$). Age ≥ 60 years [odds ratio (OR) 0.12; 95%CI 0.04 – 0.40, $p < 0.001$] and creatinine clearance (OR: 6.47; 95%CI 2.06 – 20.34, $p < 0.001$) were independent risk factors for the subtherapeutic vancomycin levels.

Conclusions:

AML patients with neutropenia or high creatinine clearance (≥ 90 mL/min) were a special population at higher risk of vancomycin underexposure. These findings emphasize the necessity of vancomycin TDM and the Bayesian approach in individualizing doses at the bedside.

KEYWORDS: Vancomycin; TDM; AUC; Bayesian; Adult patients; Hematological malignancies

CP-1503102-P

Model-informed Therapeutic Drug Monitoring of Vancomycin in Adult Patients: Evaluating and Improving the Predictive Performance of Literature Models Using the Clinical Care Data

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ABSTRACT

Introduction:

The population pharmacokinetic (popPK) model is a crucial element of the model-informed precision dosing (MIPD) platform to optimize dosage regimens both at the population and individual levels. Precision dosing aims to improve patient clinical outcomes and minimize the risk of toxicity, however, models developed in one patient population may perform poorly when interpreted to another population. Continuous learning has been proposed as a potential approach to address this challenge, where an initial model is employed for MIPD and then tweaked as more data is collected.

Objectives:

This study evaluates and compares the predictive performance of both published vancomycin popPK models and tweaked models based on TDM concentrations of vancomycin in adult patients.

Methods:

Data were randomly split into a "training" and a "validating" datasets. The popPK models of vancomycin (including Goti (2018), Thomson (2009) and Buelga (2005)) were run on each the increased proportion of "training" dataset (0, 20, 30, 40, 60, 80 and 100%) to obtain tweaked models via the PRIOR approach in NONMEM. The predictive performance of the investigated popPK models were evaluated by a prior prediction approach using relative bias (rBias) and relative root mean squared error (rRMSE) as indicative metrics.

Results:

The "training" and "validating" data sets comprised about 863 and 363 patients, respectively. Overall, rBias and rRMSE of tweaked models were lower than literature models, especially when incorporating 100% of the available data. In Goti's model, rBias declined from 19.56% to 6.2%. The Buelga's model demonstrated a similar tendency, with rBias decreasing from -21.53% to -5.77%. Regarding the Thomson's model, all tweaked models consistently showed low rBias, ranging from -1.04% to 0.15%.

Conclusions:

Tweaked model based on Thomson et al. (2005) is the best model to integrate into MIPD for a general of adult in hospital. The continuous learning approach showed mechanistic and potential to tweak models for each intended use population.

KEYWORDS: Vancomycin; TDM; MIPD; Adult patients; Continuous learning; Pharmacokinetics

CP-1503104-P

Evaluation on Therapeutic Monitoring of Vancomycin Using the 2020 Consensus Guideline at One Teaching Hospital at Ho Chi Minh City

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ABSTRACT

Introduction:

According to the 2020 vancomycin consensus guideline, the ratio of24-hourarea under the concentration-time curve to minimum inhibitory concentration (AUC24/MIC) was considered a better surrogate marker of efficacy than trough concentration in serious MRSA infections.

Objectives:

This study aimed to investigate vancomycin therapy including medication use, pharmacokinetic profiles, therapeutic drug monitoring (TDM), and nephrotoxicity at University Medical Center Ho Chi Minh City (UMC HCMC).

Methods:

A cross-sectional study was conducted among hospitalized adult patients receiving intravenous vancomycin for severe infections at UMC HCMC from May 2020 to April 2021. AUC was estimated using first-order pharmacokinetic equation with Sawchuk-Zaske model. Linear regression analysis was used to estimate vancomycin trough concentration (C_{trough}) and AUC24correlation.

Results:

Ninety-five patients, including 27 patients in ICU group and 68 patients in non-ICU group, were enrolled in the study. The volume of distribution in ICU and non-ICU groups were 1.08 ± 0.36 L/kgand0.95 ± 0.36 L/kg, respectively. Vancomycin clearance in ICU was lower than that in non-ICU (3.56 (IQR 1.38; 19.8) L/h versus 6.07 (IQR 2.30; 13.3) L/h, $p < 0.001$). The mean vancomycin C_{trough} was 10.9 ± 5.4 mg/L and the mean AUC/MIC was 412.3 ± 176.2 mg.h/L. The proportions of patients achievedanAUC24within the targeted range in the C_{trough}< 15 mg/L group and Ctrough15 – 20 mg/L group were 35.1% and 70.0%, respectively. Nephrotoxicity occurred in 10.5% of patients. Logistic regression analyses suggested the association between CrCl < 50 mg/L and the possibility to achieve therapeutic AUC/MIC target (OR = 2.712; 95% CI 1.093 – 6.726; p = 0.031).

Conclusions:

Results from our study showed that AUC/MIC-based dosing strategy could limit the possibility of unnecessary vancomycin exposure, thus providing database for updating the current vancomycin TDM guideline at UMC HCMC and other Vietnamese hospitals.

KEYWORDS: Vancomycin; Pharmacokinetics; Therapeutic drug monitoring

CP-1503106-P

Population Pharmacokinetic Modeling and Convenient Sampling of Midpoint Concentration for Therapeutic Drug Monitoring of Vancomycin in Vietnamese Pediatric Patients

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ABSTRACT

Introduction:

Bayesian AUC-guided dosing of vancomycin is suggested for pediatric patients, preferably obtaining 2 concentrations with at least 1 trough concentration (traditional sampling). However, this approach achieves optimal performance only when using a population pharmacokinetic (popPK) model of vancomycin suitable for the targeted population. Besides, obtaining 2 concentrations at the exact time in pediatrics poses challenges.

Objectives:

This study aims to establish a popPK model of vancomycin in Vietnamese pediatric patients and explores the capability of Midpoint Concentration instead of traditional sampling.

Methods:

This study included pediatric patients ≥ 3 months in two pediatric hospitals with a combined 2000 beds. The popPK analysis was performed by using non-linear mixed-effect modeling approach with Monolix 2023R1®. Monte Carlo simulation was conducted using Simulx 2023R1® to explore if any Midpoint Concentration (C_{mid}) between Peak Concentration (C_{peak}) and Trough Concentration (C_{trough}) can replace traditional sampling in predicting the Area Under the Curve (AUC24) of vancomycin.

Results:

A total of 289 vancomycin concentrations from 98 patients with a median age of 1.86 [0.92 – 3.22] years, were included. The final model was as follows: CL (L/h) = 0.433*(BW/13.86)^0.777*(0.46/SCr)^0.83*(ln(age)/3.26)^2.16; and Vd (L) = 11.5*(BW/13.86)^0.777 (BW: kg, SCr: mg/dL, age: day). The internal validation demonstrated that final model successfully described the observed data with bootstrap analysis, WRES, NPDE, and VPC plots showing good prediction performance. The predicted C_{trough} estimated from C_{mid} correlated with the observed one at R = 0.9. Compared to 2-point monitoring, the accuracy and precision of AUC24 calculating from C_{mid} were below 10% (4.6% and 5.7% respectively.

Conclusions:

The popPK model of vancomycin in Vietnamese pediatric patients over 3 months old was well established, with body weight, age, and serum creatinine identified as significant covariates. A single concentration between C_{peak} and C_{trough} could be an optimal approach replacing the traditional sampling for dosing and monitoring vancomycin therapy in pediatrics.

KEYWORDS: Vancomycin; Vietnamese; Pediatric patients; Population pharmacokinetics (popPK); Midpoint concentration

CP-1504101-P

Patients' Adherence to Fixed-Dose Combination Medicines for Tuberculosis in the Non-National TB Program in Indonesia

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ABSTRACT

Introduction:

We searched for data on pulmonary tuberculosis patients who were treated using 'out of pocket' TB medication at pulmonology clinics in Indonesia.

Objectives:

The purpose of the study was to give a general overview of the various FDC (Fixed Dose Combination) medication types that are currently in use in Indonesia and to evaluate TB patients' adherence levels in a non-national TB program in Indonesia.

Methods:

Information from medical records that had been archived by using prescription data that was kept at the pulmonology clinic. 89 prescriptions contained FDC and information to patient, drug type, treatment duration, compliant/non-compliant patients were among the information we gathered.

Results:

There were 2 brands of TB medicine in Indonesia There were 89 pulmonary TB patients treated during 2022–2023, 27 (30.33%) completed treatment within six months. 29 patients (32.58%) cannot continue due to cost and were referred to a public health center (puskesmas).10 patients (11.23%) pulmonologist refer to the community health center (puskesmas). While 14 patients (15.73%) experienced lost follow-up, and 3 patients (3.37%) stopped treatment completely.

Conclusions:

89 individuals with pulmonary tuberculosis were treated with two different kinds of FDC medication in 2022–2023. 27 patients (30.33%) finished their treatment in six months, whereas 29 patients (32.58%) were sent to a community health center (puskesmas), since they were unable to continue their medicine for financial reasons (after a few days or weeks of treatment). A total of 10 patients (11.23%) were directed to the community health center. Three patients (3.37%) completely stopped receiving their treatment, while fourteen patients (15.73%) experienced lost follow-up. The National TB Program education is critical since patients can choose whether to pay out-of-pocket medicine or not at the start of their treatment. Further studies are needed to determine patient adherence to the non-National TB Program in Indonesia.

KEYWORDS: Patient's adherence; Fixed dose combination tuberculosis drug; Non national TB program; Indonesia

CP-1504102-P

The Impacts of Clinical Pharmacist Intervention in the Treatment of Myocardial Infarction at a Vietnamese Hospital

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ABSTRACT

Introduction:

One of the approaches to promote appropriate prescribing in the treatment of myocardial infarction is clinical pharmacist intervention.

Objectives:

This study aimed to evaluate the impact of clinical pharmacist intervention in the treatment of acute myocardial infarction.

Methods:

A retrospective cohort study was conducted on patients with acute myocardial infarction at the Department of Interventional Cardiology, Thong Nhat Hospital, Vietnam, comparing two phases: phase without the intervention of clinical pharmacists (from August2019 to December 2019) and phase with the intervention of clinical pharmacists (from August 2022 to December2022). The data collection included patients' characteristics, appropriateness of prescribing, treatment outcomes, and adverse events during the treatment course.

Results:

The study included 183 patients in the pre-intervention phase and 211 patients in the intervention phase. The median age of patients in the two phases were 67 (56 – 83) and 65 (57 – 74) with65.4% and 67.3%were male, respectively. The rate of appropriate prescribing at the hospital and at discharge in the intervention phase was significantly higher than that in the pre-intervention phase (85.8%; vs 48.6%, $p < 0.001$ and 97.2% vs 67.8%; $p < 0.001$, respectively). The mortality rate within 6 months after myocardial infarction was 18.6% and 16.5%, respectively ($p=0.604$); 57.4% and 56.4% of patients experienced adverse events during the treatment course, respectively.

Conclusions:

The intervention of clinical pharmacists helps to increase the rate of appropriate prescribing for patients with acute myocardial infarction.

KEYWORDS: Acute myocardial infarction; Appropriateness; Prescribing; Intervention; Clinical pharmacists

CP-1504103-P

Impact of Pharmacists' Interventions on Drug-Related Problems in Hospitalized Patients with Chronic Kidney Disease at Gia Dinh People's Hospital

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ABSTRACT

Introduction:
Hospitalized patients with chronic kidney disease (CKD) are at high risk of experiencing drug-related problems (DRPs). This can reduce treatment effectiveness and safety.

Objectives:
The present study aimed to determine the rate, types and potentially clinical relevance of DRPs occurring in hospitalized patients with CKD, and to evaluate the impact of pharmacists' interventions on the occurrence of DRPs.

Methods:
A cross-sectional study with pre- and post- intervention assessments was conducted on medical records of inpatients with CKD treated at the Nephrology and Cardiology Departments, Gia Dinh People's Hospital. The study was conducted in two periods: pre-intervention (1st October 2022 - 15th January 2023) and post-intervention (1st June 2023 - 15th September 2023). DRPs were identified according to Pharmaceutical Care Network Europe, and evaluated the potentially clinical relevance using Doerper scale. Pharmacists' interventions included reviewing medical records, giving feedback, and consulting physicians on DRPs. Data were analyzed using SPSS software, with significant level of $p < 0.05$.

Results:
In the pre-intervention period, the rate of medical records with at least 1 DRP was 74.7%. The most common DRPs related to dosing frequency (44.7%), dosage (38.7%) and timing of administration (37.3%). The percentage of medical records having DRPs potentially harming patient was 22.7%. In the post-intervention period, the rate of medical records with at least 1 DRP reduced to 46.3%, and most DRP types decreased significantly ($p < 0.05$). The percentage of medical records having DRPs potentially harming patient reduced to 2.7% ($p < 0.001$).

Conclusions:
The rate of hospitalized patients with CKD encountering DRPs was quite high. Pharmacists' interventions helped reduce the rate, types and potentially clinical relevance of DRPs.

KEYWORDS: Drug-related problems; Intervention; Clinical pharmacist; Chronic kidney disease

CP-1504104-P

Effectiveness of Mobile Health in Controlling HbA1C Levels in Type 2 Diabetes Mellitus Patients Systematic Review

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ABSTRACT

Introduction:

Diabetes mellitus type 2 (DMT2) is a chronic disease that cannot be cured but can still be controlled. One of the parameters monitored in controlling DMT2 is HbA1C. With of information and communication technology, mobile applications can be an alternative to controlling diabetes independently.

Objectives:

This study aimed to determine the effectiveness of mobile apps in controlling HbA1C I T2DM patients.

Methods:

Search from 4 databases (Pubmed, Scopus, Google scholar, and ScienceDirect) using the terms "Mobile application", "Telemedicine", "HbA1c", "type 2 diabetes mellitus", "and self-management". The study took form in the randomized controlled trials (RCTs) for patients with type 2 diabetes mellitus with HbA1C control parameters published between 2018 and 2023. Using that strategy, we identified a total of 654 articles. After deleting duplicate journals and applying inclusion-exclusion criteria, 43 articles were obtained.

Results:

From the article search, there are 24 articles showing that telemedicine has a significant impact on reducing HbA1c between the control group and the intervention group. Some others are not significant enough because of several factors, one of which is age. Elderly patients have difficulty understanding and using telemedicine.

Conclusions:

The use of telemedicine can improve HbA1c and contribute to effective self-management of type 2 diabetes mellitus. Further studies need to be carried out in more detail.

KEYWORDS: Diabetes mellitus type 2; HbA1C; Mobile health

CP-1504106-P

Retrospective Evaluation of Patients Specific Factors and Clinical Outcomes for Febrile Neutropenia in Adult Cancer Patients at Chulabhorn Oncology Medical Center

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ABSTRACT

Introduction:

Febrile neutropenia is defined as a single temperature ≥ 38.3 °C orally or ≥ 38.0 °C over1 hour with an absolute neutrophilic count < 500 cells/µL or < 1,000 cells/µL and a predicted decline to≤ 500 cells/µL within 48 hours. It's a common and serious complication that increases the risk of infection and potentially death in cancer patients who received chemotherapy. This condition can occur in both solid cancer and hematological cancer patients.

Objectives:

The aim of this study was to study the incidence and risk factors of febrile neutropenia in adult cancer patients at Chulabhorn Oncology Medical Center.

Methods:

This study was an observational retrospective cohort study. The data were collected retrospectively from the medical records of 224 cancer patients aged ≥ 18 years old who received chemotherapy at Chulabhorn Oncology Medical Center from August 2018 to July 2023. Statistical analysis used the Chi-Square test or Fisher's exact test and calculated the relative risk of each factor and used descriptive statistics to report the incidence of febrile neutropenia in adult cancer patients.

Results:

Among 224 subjects, the incidence of febrile neutropenia was 9.38% (21 of 224) and there were 2 deaths, accounting for 9.52% (2 of 21). The significant risk factors for febrile neutropenia were Eastern Cooperative Oncology Group score ≥2 (P=0.003), never receiving granulocyte colony-stimulating factor (P=0.001), having a history of febrile neutropenia (P<0.001), hemoglobin level<10 g/dL (P=0.004), platelet level < 75 x103cells/µL (P=0.024) and albumin level < 3 g/dL (P=0.050).

Conclusions:

Eastern Cooperative Oncology Group score, history of granulocyte colony-stimulating factor exposure, history of febrile neutropenia, hemoglobin platelet, and albumin levels were factors affecting febrile neutropenia. Therefore, these factors should be evaluated in cancer patients who receive chemotherapy to prevent febrile neutropenia and other complications that may occur.

KEYWORDS: Febrile neutropenia; Risk factor; Cancer

CP-1504107-P

Impact of Pharmacist-Led Brief Behavioral Treatment for Chronic Insomnia in Elderly Patients

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ABSTRACT

Introduction:
Cognitive behavioral therapies for insomnia (CBT-I) are recommended as first-line treatment for chronic insomnia. However, access to therapy for patients remains limited due to requirements for experts in the fields. Simplified version of CBT-I, the brief behavioral treatment for insomnia (BBT-I) has been shown to be more applicable.

Objectives:
To assess the efficacy of adjusted BBT-I, delivered by clinical pharmacists, on sleep quality of elderly patients with chronic insomnia.

Methods:
A pragmatic study was conducted with 2 groups: Participants in the intervention group received BBT-I by clinical pharmacists in 4 consecutive sessions. Patients in the control group had standard care. Clinical pharmacists provided BBT-I to the patients by one face-to-face and three over-the-phone sessions. Sleep quality was assessed at baseline and 4 weeks later, using PSQI questionnaire.

Results:
Eligible patients were assigned to 2 groups: BBT-I group (63 patients) and control group (64 patients). BBT-I had positive and significant changes in sleep parameters as compared to control group in self-reported sleep. PSQI decreased by 1.9 points [95% CI, -2.9; -1.0]. Sleep efficiency increased by 11.8% [95% CI, 7.0; 16.6]. Total sleep time rose by 0.7 hours [95% CI, 0.3; 1.0]. Sleep onset latency and wake-after-sleep-onset reduced by -35.3; -5.2] and 19.9 minutes [95% CI, -36.4; -3.4].

Conclusions:
BBT-I delivered by pharmacists significantly improved the treatment outcomes of elderly patients with insomnia disorders and is potential for wider implementation in other healthcare facilities.

KEYWORDS: Insomnia; Brief behavioral treatment; Elderly; Pharmacy intervention

CP-1504108-P

Prevalence of Drug-Resistant Tuberculosis Patients at the Universitas Indonesia Hospital

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ABSTRACT

Introduction:

Tuberculosis is one of the top 10 causes of death worldwide and the leading cause of death from an infectious agent. According to the Global Tuberculosis Report 2023, Indonesia (10%) ranks second in the world with the highest number of tuberculosis (TB) cases, following India (27%). Indonesia is one of the countries with the highest burden of drug-resistant tuberculosis (DR-TB) in the world. It is estimated that there were 24,666 DR-TB cases in Indonesia in 2022. The aim of the study was to determine the prevalence of Drug-Resistant Tuberculosis Patients at the Universitas Indonesia Hospital.

Objectives:

The aim of the study was to determine the prevalence of Drug-Resistant Tuberculosis Patients at the Universitas Indonesia Hospital.

Methods:

Approximately 87 drug-resistant tuberculosis patients were involved in this cross-sectional health study conducted from February to March 2024. The population consists of all drug-resistant tuberculosis patients ongoing treatment at Universitas Indonesia Hospital. There are some inclusion and exclusion criteria.

Results:

The prevalence of drug-resistant tuberculosis (DR-TB) patients in the productive age group (19-59 years old) was 86%, with 52% being male, 56% being employed, and 46% having completed senior high school education. As for the treatment, it is divided into two categories: long-term treatment at 87% and short-term treatment at 13%. Previous treatment history of patients included relapse cases at 16%, treatment failure or default at 29%, and new cases at 55%.

Conclusions:

Knowledge regarding DR-TB treatment should be more widely disseminated, and the potential consequences of non-compliance with medication should be emphasized, as it may result in the need to restart treatment from the beginning.

KEYWORDS: Treatment; Prevalence; Cross-sectional; West Java

CP-1504109-P

Identification of Medication Therapy Problems Through a Patient Medication Counseling Program in a Tertiary Government Hospital

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ABSTRACT

Introduction:

Medication counseling is an essential service across the healthcare system. Comprehensive medication management focuses on assessing patients' regimens to ensure optimal medication therapy in line with achieving therapeutic goals and patient outcomes. This plays a crucial role in promoting patient safety and medication adherence, reducing errors and optimizing health outcomes especially in high-risk situations including polypharmacy. Thus, implementation of the medication counseling program in a tertiary government hospital was executed to promote optimal medication management.

Objectives:

The objective of this study is to describe the medication therapy problems (MTPs) of patients referred to a pharmacist-initiated medication counseling service in a tertiary government hospital.

Methods:

The study implemented a retrospective cross-sectional records review of patient medication counseling sessions conducted by student and faculty-preceptor pharmacists in the General Medicine service of the Internal Medicine Outpatient Department of a tertiary government hospital. MTPs identified during the counseling session were categorized using the Pharmacy Quality Assurance MTP Categories Framework. The study utilized frequency statistics and logistic regression to analyze the collected data.

Results:

121 counseled patients were included. Most are practicing polypharmacy (76.03%) and less than half (41.31%) are using pharmaceutical devices. Patients with an increasing number of medications have 1.18 odds (95%CI [1.0256-1.3576]; p=0.021) of experiencing MTPs in their drug regimen. Out of all included patients, 86 (71.07%) were identified to have at least one MTP with adherence-related therapy problems being the most common (39.31%). Among the adherence-related MTPs, directions not understood by the patients (47.22%) is the most frequently encountered problem.

Conclusions:

This study shows that a pharmacist-led medication counseling program is an effective intervention to identify MTPs especially for polypharmacy. Continuity of the program is important to observe if pharmacologic and clinical outcomes of pharmacist recommendations are met by patients receiving medication counseling.

KEYWORDS: Patient medication counseling; Medication therapy problems; Polypharmacy

CP-1505101-P

Risk Assessment of Diabetes Mellitus and Its Associated Risk Factors Among Residents Living in Sen Monorum town, Northeastern part of Cambodia

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ABSTRACT

Introduction:

Diabetes, characterized by high levels of blood glucose is a chronic disease, which leads to serious damage to heart, blood vessels, eyes, kidneys, and nerves. The risks of developing Diabetes Mellitus (DM) have highly increased around the world including Cambodia. There is limited scientific evidence on risk assessment and associated risk factors.

Objectives:

This study aimed to assess the risk level of DM and risk factors among residents living in Sen Monorum town, Mondulkiri province.

Methods:

This study was conducted as a cross-sectional study design using convenient sampling. All participants stayed at home, aged over 18 and volunteered to join the process were invited. The study data was analyzed by using Stata MP Version 17 with descriptive statistics and chi-square test.

Results:

The study sample consisted of 64.31% (164) females and 35.69% (91) males, 56.08% (143) aged below 45 years old. The most common occupation found was businessman/woman 45.49% (119). Most males 74.73% (68) had waist circumference of below 94cm whereas most females 58.79% (97) had waist circumference of below 80cm. Participants who had BMI of below 25, 25-29, and 30-39 were 60.78% (155), 29.80% (76), and 9.41% (24), respectively. It was found that the average risk score of developing DM within 10 years among residents was 6.98 ± 4.66. 59.61% (152) and 40.39% (103) of participants had low and elevated level of DM risk development, respectively. In chi-square test, DM risk level has significant association with age, BMI, waist circumference, using hypertensive drugs, high blood sugar and having family members with diabetes ($P<0.05$).

Conclusions:

DM risk level among the residents was low, keeping healthy weight, having low sugar diet are recommended to be adopted. Routine screening is important to prevent people from developing DM risk.

KEYWORDS: Diabetes mellitus; Risk factors; Risk assessment; Sen Monorum, Mondulkiri, Cambodia

CP-1505102-P

Medication Use Review Among Residents Living in Sen Monorum town, Mondulkiri province

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ABSTRACT

Introduction:

Medication use review (MUR) describes pharmacists who work with patients to improve their use of medications, account for their preferences, and ultimately optimize adherence. MUR reduces the morbidity and morbidity of hospitalized patients. Around 45% of patients in Kampong Thom province, Cambodia did not understand the drug dosage correctly. There is limited scientific evidence found in other parts of Cambodia.

Objectives:

This study aimed to assess the MUR among residents living in Sen Monorum town.

Methods:

This study was conducted as a cross-sectional study design using convenient sampling. All participants who stayed at home, aged over 18, under medical treatment, and volunteered were invited. Mosby's Drug Reference for Health Professions, 4th Edition; Vidal 2017; Medscape; and Webmd were used to evaluate the medication use. The study data was analyzed by Stata MP Version 17 using descriptive statistics.

Results:

281 participants joined in this study with the age of 44.24±14.95 years. Most of them were females 64.41% (181). The participants had weight, height, systolic blood pressure, and diastolic blood pressure of 60.59 ±11.85 kg, 154.97±28.18 cm, 118.00±14.09 mmHg and 76.20±7.73 mmHg, respectively. Top 4 common diseases found were hypertension at 11.03% (31), gastritis at 5.34% (15), headache at 2.85% (8), and allergy at 1.78% (5). Drugs commonly used were Acetaminophen 15.98% (66), Amlodipine 5.08% (21), Ibuprofen 2.66% (11), and Metformin 2.18% (9). After MUR, 17.51% (45), 12.89% (33) and 21.57% (55) of participants understood incorrectly about the dosage, administration, and duration of medications, respectively. One and two drug interactions accounted for 9.8% (24) and 0.41% (1) of the participants, accordingly.

Conclusions:

The irrational drug use posed a public health concern in this community. Patients should be well advised on the use of medications rationally. Dispensing and prescribing should be strengthened among health professionals.

KEYWORDS: Medication use review, Sen Monorum, Mondulkiri

CP-1505104-P

Antibiotic Dispensing Without a Prescription Among Community Pharmacies in the Post COVID-19 Era: A Simulated Client Approach

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ABSTRACT

Introduction:

Inappropriate dispensing of antibiotics for common respiratory infections by community pharmacists (CPs) might lead to potential adverse drug reactions (ADRs) and develop antibiotic resistance.

Objectives:

This study aimed to investigate antibiotic dispensing without a prescription along with counseling practice provided by CPs to patients with a common respiratory infection (COVID-19 and common cold) in Ho Chi Minh city (HCMC).

Methods:

A two-phase cross-sectional study was conducted using a simulated client method. In the first phase, 102 community pharmacies from 13 central districts in HCMC were randomly selected from May to July 2022 with a scenario of a client seeking medications for a relative with mild COVID-19 symptoms. In the second phase, a total of 352 community pharmacies across 24 districts in HCMC were randomly selected from March to May 2023 with a scenario of a client with common cold symptoms. The Bayesian Model Averaging method was undertaken to determine factors associated with antibiotic dispensing without a prescription.

Results:

In the first phase, antibiotics were dispensed without a prescription across 58/102 (56.9%) community pharmacies. The proprotions of CPs providing advice on COVID-19 self-care, emergency warning signs, and ADRs of monupiravir were 54.9%, 8.8%, and 6.9%, respectively. In the second phase, antibiotics were dispensed without a prescription across 292/352 (83.0%) community pharmacies. The proprotions of CPs asking the possibility of COVID-19 contraction, providing advice on prudent antibiotic use, and providing potential ADRs of medications dispensed were 3.7%, 8.8%, and 1.7%, respectively. The analyses in both phases indicated chain pharmacies were associated with a lower proportion of antibiotic dispensing compared to independent pharmacies (Phase 1: OR = 0.29, 95%CI = 0.12-0.69; Phase 2: OR = 0.32, 95%CI: 0.17 – 0.59).

Conclusions:

High proportions of antibiotic dispensing without a presciption along with low quality counseling practice provided to patients with a common respiratory infection warrant further intervention to improve CP practices.

KEYWORDS: Community pharmacy; Antibiotic dispensing; Simulated client approach; Common cold; COVID-19

CP-1505105-P

Safety and Efficacy of Brentuximab Vedotin Versus Other Antineoplastic Agents, Placebo, and Standard of Care Among Adult Patients with Relapsed or Refractory CD30+ Hodgkin Lymphoma Following Autologous Stem Cell Transplant: A Systematic Review

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ABSTRACT

Introduction:

Hodgkin lymphoma (HL) is linked to Reed-Sternberg (RS) cells which highly express CD30 receptors. This makes CD30 receptors attractive targets for directed therapy for HL, the exact receptor target of the monoclonal antibody conjugate agent Brentuximab vedotin. This drug was approved by the Philippine FDA in 2021 but is not included in the Philippine National Formulary, but is currently part of the international standard treatment guideline for relapsed and refractory CD30+ Hodgkin lymphoma.

Objectives:

The objective of this review is to analyze the literature on Brentuximab vedotin for relapsed or refractory CD30+ HL following ASCT in terms of efficacy/effectiveness and safety.

Methods:

The study utilized a de novo systematic review of existing literature on Brentuximab vedotin, its efficacy and safety on adult patients with relapsed or refractory CD30+ HL. Literature search was conducted independently by two (2) researchers on eight (8) relevant databases. To rate the quality of evidence for each outcome reported, and guide the development of recommendations, the GRADE system was adopted. Randomized controlled trials were assessed for risk of bias using the Cochrane RoB tool for randomized trials (RoB 2), while observational studies were assessed using the Risk of Bias In Non-randomized Studies – of Interventions (ROBINS-I) tool.

Results:

Brentuximab vedotin, as compared to their comparators (e.g., placebo, standard of care), were found to be more likely to achieve progression-free survival and produce higher overall response and complete response rates. However, the agent possesses a less favorable safety profile than its comparators.

Conclusions:

The decision on the application of Brentuximab vedotin in practice as consolidation therapy for relapsed or refractory CD30+ HL following ASCT is favorable but should be used with careful consideration of adverse events.

KEYWORDS: Brentuximab; Hodgkin lymphoma; Systematic review

CP-1506101-P

The Patterns of Medication Use in Patients with Acute Kidney Injury at a Vietnamese Hospital

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ABSTRACT

Introduction:

Patients with acute kidney injury (AKI)ought to minimize the use of nephrotoxic drugs whenever possible and must have their drug doses adjusted for renal excretion. The use of medications in patients with AKI may be more complicated than in those with chronic kidney disease because renal function in acute conditions changes rapidly, requiring physicians and pharmacists to check prescriptions and dosage more frequently.

Objectives:

This study aimed to analyze characteristics of medication use and evaluate the appropriate use of medications in patients with AKI.

Methods:

A descriptive cross-sectional study was conducted on medical records of hospitalized patients aged 18 or older, diagnosed with AKI, acute kidney failure, or episodes of acute-on-chronic kidney disease at Thong Nhat Hospital, Vietnam, from March 2022 to March 2023.Information on patient characteristics and drug usage was gathered from medical records. The appropriateness of the drug indication and dosage was assessed based on manufacturer's instructions leaflet.

Results:

A total of 191 patients were included in the study, with a median age of 76 years and males accounting for 51.8%. 33.5% of patients used at least one nephrotoxic drug, and 90.6% of patients used at least one drug requiring dose adjustment or discontinuation in case of renal impairment. The overall rate of appropriate drug use was 75.4%, with appropriateness in terms of indication at 84.3% and dose at 89.5%. Drotaverine had the lowest rate of appropriateness in terms of indication (4.2%). Ciprofloxacin and levofloxacin had the lowest rates of appropriateness in terms of dose, both at 2.1%.

Conclusions:

The rate of appropriate medication use in patients with AKI is relatively high. However, doctors and pharmacists need to be more careful when prescribing to ensure medication safety.

KEYWORDS: Acute kidney injury; Medication use; Appropriateness; Prescription

CP-1506102-P

Evaluation of the Appropriateness of Statin Indications and Associated Factors in Hospitalized Patients at Vinmec Da Nang International Hospital

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ABSTRACT

Introduction:

Statins have been recommended by recent guidelines as a cornerstone of primary and secondary cardiovascular disease (CVD) prevention. However, previous studies have illustrated a significant gap between guideline recommendations and clinical practices. In Vietnam, there is limited research assessing statin prescribing practices.

Objectives:

This study aims to investigate statin indications for both primary and secondary prevention and identify factors associated with the appropriateness of statin prescriptions.

Methods:

A cross-sectional prospective study was conducted on patients aged 20 years or older admitted to the Department of General Internal Medicine and Comprehensive Stroke Center, Vinmec Da Nang International Hospital from May to November 2023. Data were collected from electronic medical records. The appropriateness of statin indications was assessed according to recently published guidelines on the management of dyslipidemia and prevention of CVD. A multivariate logistic regression model was performed to identify factors influencing the appropriateness of statin prescribing.

Results:

A total of 128 in-hospital patients were included in this study with a mean age of 57.9 ± 15.7 years and 29.7% of patients were diagnosed with clinical atherosclerotic cardiovascular diseases (ASCVD). Of 128 patients, statins were indicated in 87 patients (67.9%) with moderate-intensity statins being the most frequently chosen (63.2%). 58.6% of statin prescriptions were for primary prevention. Among patients with clinical ASCVD, 15.8% were inappropriately prescribed due to being on lower-intensity statins. On the other hand, there was a high proportion of inappropriate prescriptions in the context of primary prevention (37.8%). Clinical ASCVD was significantly associated with the appropriateness of statin indication (OR 0.28, 95% CI: 0.09 to 0.89, p = 0.031).

Conclusions:

These findings indicate that inappropriate statin prescriptions were significantly higher in patients without clinical ASCVD. Further, this study suggests the need for a greater effort to improve adherence of statin prescribing to current guidelines.

KEYWORDS: Statin; Atherosclerotic cardiovascular disease; Primary prevention; Secondary prevention; Appropriateness

CP-1506103-P

Investigation on the Appropriate Use of Proton Pump Inhibitors at Intensive Care Units of a Tertiary Hospital in Ho Chi Minh City

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ABSTRACT

Introduction:

Proton pump inhibitor (PPI) is one of the most used drugs in hospital, especially in intensive care units (ICUs) at Gia Dinh People's Hospital. However, no study has been done for evaluate the rational use of these drugs at the hospital.

Objectives:

To evaluate the appropriate use of PPI at Intensive Care – Poison control Unit (ICPU) and Surgical Intensive Care Unit (SICU) of Gia Dinh People's Hospital.

Methods:

A retrospective, descriptive study was conducted using clinical data of inpatients at ICPU and SICU from October 1st to December 31st, 2022. Patients admitted at ICPU or SICU for more than 24 hours who were prescribed PPI or non-steroid inflammatory drugs (NSAID) or who had at least one condition for stress ulcer prevention (SUP) based on SUP guideline of ASHP 1999 were included in this study. The appropriate use of PPI was evaluated based on current guidelines on UpToDate 2023 database, the ACG 2009 guideline for NSAID-related ulcer prophylaxis, the ASHP 1999 guideline for SUP, and the summary of product characteristics of PPI used at the hospital.

Results:

Of 347 patients included (188 from ICPU, 159 from SICU), the prescription rate of PPI was 99.1%, predominantly by intravenous route (96.5%). SUP was the most common indication of PPI (65.4%). Lack of PPI-related diagnosis was observed in 45.6% of patients with statistically significant higher rate in SICU compared to ICPU (84.8% vs. 12.4%, $p<0.001$). The rate of appropriate use of PPI in ICPU and SICU were 43.1% and 28.9%, respectively ($p=0.002$). A high rate of patients in this study was prescribed PPI for inappropriate prevention of gastric ulcer (33.1%).

Conclusions:

Low rates of PPI use in ICPU and SICU suggested the necessary to strengthen clinical pharmacy intervention at ICUs.

KEYWORDS: Proton pump inhibitors; Appropriate use of drugs; Intensive care unit

CP-1506104-P

Investigation on Drugs Use in the Treatment of Exacerbated Chronic Obstructive Pulmonary Disease at the Respiratory Department - Gia Dinh People's Hospital

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ABSTRACT

Introduction:

Inappropriate use of medications in the treatment of exacerbated chronic obstructive pulmonary disease (ECOPD) may lead to treatment failures, increased hospital stays and medical costs.

Objectives:

This study aimed to investigate the appropriateness of medications used in the treatment of ECOPD, and to determine factors associated with the length of hospital stay.

Methods:

A cross - sectional study was conducted to collect medical records of patients with ECOPD treated at the Respiratory department, Gia Dinh People's Hospital, between 1st January 2023 and 30th April 2023. Data collected were treatment characteristics and outcomes. The appropriateness of medications use was evaluated based on Ministry of Health (2018) and GOLD (2023) treatment guidelines. Logistic regression was used to determine factors associated with the length of hospital stay, with $p < 0,05$.

Results:

There were 160 patients included in the study (90% males, median age was 68). The exacerbation severity was mostly moderate to severe. The most dominant bacteria isolated were *P. aeruginosa*. Bronchodilators, corticosteroids, and antibiotics were properly indicated in 100%, 89,3%, and 51,3% of patients, respectively. Almost all patients were successfully treated, with a median hospital stay was 5 days. Severe exacerbation and risk factors for *P. aeruginosa* infection were associated with prolonged hospital stays ($p < 0,05$).

Conclusions:

The use of antibiotics in the treatment of ECOPD was suboptimal. Suitable management for patients with severe exacerbations and having risk factors for *P. aeruginosa* may shorten hospital stays.

KEYWORDS: Exacerbation; COPD; Appropriate use of medications; Treatment

CP-1506105-P

Impact of Clinical Decision Support System on Antibiotic Dosage in Patients with Renal Impairment: An Implementation Study in a Vietnamese Tertiary Hospital

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ABSTRACT

Introduction:

Personalized medicine is the primary goal in pharmaceutical care, especially antibiotics as it contributes to the deterioration of renal functions. At 108 Central Military Hospital, Vietnam, managing renally cleared antibiotics (RCA) poses a considerable challenge due to its large facility with 2000 beds. Implementing a clinical decision support system (CDSS) holds promise in improving RCA dosing in patients with renal impairment (PWRI).

Objectives:

We aimed to evaluate the impact of a CDSS in antibiotic prescribing for PWRI.

Methods:

A retrospective study was conducted to assess antibiotic prescriptions in adults > 18 years old with an estimated glomerular filtration rate (eGFR) calculated by both Cockcroft-Gault and MDRD-4 formula under 90 mL/min/1.73 m2during two distinct periods: pre- and post-implementation of a CDSS, which included a drug compendium of 48 antibiotics requiring renal dose adjustment that established through multiple summaries of product characteristics and specialized literature. Alerts were triggered whenever an antibiotic was prescribed within the threshold of the patient's eGFR. The impact of CDSS was determined by comparing the percentage of inappropriate prescriptions between these periods.

Results:

Among 1012 total patients, 65.2% were over 65 years old, and 71.3% were male. The eGFR ranging from 60-90 ml/min was observed in 54.8% of patients during both periods. Of 1545 and 1730 antibiotic prescriptions in the pre- and post-period, 28.2% and 19.4% respectively, were inappropriate (OR 1.63; 95% CI: 1.39-1.92; p<0.001). Inappropriate RCA use significantly decreased in the Internal Medicine department (OR 2.21; 95% CI: 1.77-2.75; p<0.001) and Intensive Care Unit (OR: 1.74; 95% CI: 1.20-2.53; p=0.003), with marked reductions observed in cefoperazone/sulbactam, levofloxacin, and meropenem prescriptions during the post-period (p<0.001). Factors associated with inappropriate prescriptions included age>65, eGFR<90mL/min, patients receiving more than 2 antibiotics, prescriptions of carbapenems, fluoroquinolones, nitroimidazole, penicillin, and experiencing septic shock.

Conclusions:

The CDSS significantly reduced the prevalence of inappropriate antibiotic dosages in PWRI.

KEYWORDS: Antibiotics; Renal disease; Prescription alerts; Clinical decision support systems; Medication safety

CP-1506106-P

The Use of Chemotherapy in Lung Cancer Patients at Dr. Soetomo Regional General Hospital Surabaya Indonesia

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ABSTRACT

Introduction:

In Indonesia, lung cancer has the highest cancer fatality rate. Lung cancer patients have the choice of undergoing surgery, radiation, immunotherapy, or chemotherapy. Chemotherapy is the most commonly utilized treatment option since it works systemically and can prevent cancer cells from spreading to other organs.

Objectives:

The purpose of this study was to evaluate the congruity of chemotherapy use with treatment recommendations, and the profile of side effects, not only acute (during chemotherapy administration) but also delayed adverse drug reactions.

Methods:

This research is an observational study by collecting data from medical records and brief interviews with patients and analyze descriptively.

Results:

Pemetrexed-cisplatin (39.02%), pemetrexed-carboplatin (19.51%), and paclitaxel-carboplatin (14.63%) were the most often used chemotherapy regimens. For patients receiving first-line treatment, the chemotherapy agents and the dosage regimens given to patients were 100% and 94.44%, respectively, followed the recommendation of the National Guideline. Whilst among patients receiving second-line treatment due to intolerance with first-line treatment, both chemotherapy agents and the dosage regimens given to patients were 100% followed the recommendation of the National Guideline. Anemia was the most prevalent adverse effect in individuals receiving the first-line regimen (100%) and in patients receiving the second-line treatment (66.67%). The platinum-based chemotherapy is a standard treatment for lung cancer, but its tolerability limits its uses.

Conclusions:

The findings will give better care to patients to anticipate any adverse drug reactions after chemotherapy and to give a better quality of life.

KEYWORDS: Lung cancer; Chemotherapy; Adenocarcinoma

CP-1506108-P

Prevalence and Predictors of Potentially Inappropriate Medications Upon Admission Among Elderly Patients in a Tertiary Care Hospital in Pakistan

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ABSTRACT

Introduction:

Potentially inappropriate medication (PIMs) is a major health concern for the elderly, and its use often leads to adverse or poorer health outcomes. Data are scarce about the prevalence and risk factors of PIMs among Pakistani elderly patients.

Objectives:

The current study used the 2023 AGS Beers Criteria® to investigate the prevalence of PIMs and associated risk factors among elderly patients in Pakistan.

Methods:

This cross-sectional study collected data from elderly patients admitted to a tertiary care teaching hospital in Swat, Pakistan. The study was conducted between September and December 2023. Data analysis was performed using SPSS version 26.

Results:

A total of 190 patients were included in the study, and the mean age of the patients was 67.95. During admission, PIMs were prevalent in 63.7% of the patients, and 69 (36.3%) patients were found with one PIM, while 29 (15.3%) patients were found with two PIMs. We found a significant difference ($P < 0.05$) in the prevalence of PIMs among patient wards, comorbidity, and the use of polypharmacy (≥5 medications). In addition, a significantly high prevalence of PIMs was found in patients diagnosed with corpulmonale, pneumonia, shortness of breath, myocardial infarction, hypertension, and diabetes mellitus. Furthermore, the regression analysis showed that patients with comorbidity and polypharmacy had higher risks (COR= 2.259, $p = 0.029$) and (AOR = 6.851, $p = <0.001$; OR = 4.0, $P = <0.001$), respectively of having PIMs as compared to their counterparts. Patients with cardiovascular diseases and diabetes mellitus also showed higher odds for the presence of PIMs. Besides, the odds for the prevalence of PIMs were low in patients diagnosed with corpulmonale, pneumonia, and shortness of breath.

Conclusions:

The study found a high prevalence of PIMs among the elderly in Pakistan. Polypharmacy, commodity, and certain chronic conditions were among the most likely predictors of PIMs.

KEYWORDS: Elderly patients; Potentially inappropriate medication; Predictors; Beer's criteria; Pakistan

CP-1506109-P

Comparative Analysis of Healthcare Workers' Perceptions of Antimicrobial Resistance Management Among Private and Government Hospitals in Metro Manila

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ABSTRACT

Introduction:

Antibiotics have been widely used in human and veterinary medicines for decades to treat bacterial infections, significantly decreasing the percentage of deaths associated with bacterial infections and limiting the spread of disease between individuals. This, however, has led to antimicrobial resistance (AMR) becoming a major global health concern, rendering many currently available antimicrobials ineffective, resulting in severe infections, complications, unsuccessful treatment, prolonged hospital admissions, and increased mortality. To combat this, Philippine policies on the control of AMR were established, such as the National Antibiotic Guidelines and Antimicrobial Stewardship Program.

Objectives:

The objectives of this study were to determine the perceptions of the healthcare workers regarding antimicrobial resistance management in terms of the institution's extent of adherence to specific guidelines and its effectiveness. The study also aimed to assess and determine the significant differences between the perceptions of healthcare workers regarding the implementation, adherence, and effectiveness of antimicrobial resistance protocols. Furthermore, another objective was to determine the correlation of the demographic profile with the perceptions.

Methods:

The questionnaire included questions regarding the perceptions of these healthcare workers on the antimicrobial resistance management of their institution in terms of adherence and effectiveness. The collected data was compared and analyzed using descriptive statistics such as percentage, frequencies, mean and standard deviation, as well as inferential statistics, particularly ANOVA, and Chi-square test.

Results:

There was a significant difference in overall perceived practices and effectiveness in the implementation of antimicrobial resistance protocols. Pharmacists were found to have the highest perception score, followed by physicians, and then nurses. The type of hospital and staff position showed a significant correlation with the perceptions of compliance and effectiveness of the antimicrobial resistance protocol.

Conclusions:

These findings provide a comprehensive overview of the healthcare workers, including physicians, pharmacists, and nurses, which is essential for understanding their perspectives on AMR management compliance and its effectiveness. The differences in their perceptions suggest that there may be varying levels of understanding and engagement with AMR management practices among different healthcare professionals. Also, considering both the organizational context and the specific roles of healthcare workers when creating strategies may further enhance AMR management in hospital settings.

KEYWORDS: Antimicrobial resistance; Antimicrobial stewardship; Compliance; Healthcare workers; Philippine national antibiotic guidelines; National Capital Region

CP-1506110-P

Dosing Adjustment Guides for Supportive, Hospice, and Palliative Medicine in a Tertiary Government Hospital in Manila, Philippines

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ABSTRACT

Introduction:

Patients on supportive, hospice, and palliative care are usually on end-of-life care including multiple comorbidities, having altered renal and hepatic functions. This requires dose adjustments on medicines administered based on specific patient factors to ensure the safety of the patient while maximizing the efficacy of the medications and quality of life improvement.

Objectives:

This study aimed to develop web-based drug dosing adjustment guides for the safe and effective use of pharmacotherapy in patients with impaired renal and/or hepatic function on supportive, hospice, and palliative care.

Methods:

Assessment of needs was performed among the head clinicians in the Supportive, Hospice, and Palliative Medicine unit in a tertiary hospital. It was recommended that a web-based drug dosing adjustment guide be developed to facilitate safe and convenient medication prescribing. The web-based guide was developed to feature (1) a renal dosing guide employing a creatinine clearance (CrCl) calculator, (2) a hepatic dosing guide using Child-Turcotte-Pugh Score (CTP), and (3) recommended maximum dose recommendations based on varying CrCl and CTP scores.

Results:

The dosing adjustment guides provided clearer, more explicit dosing for patients with impaired renal and/or hepatic function. The guides have been used by clinicians of the Supportive, Hospice, and Palliative Medicine unit, particularly in dosage adjustments necessary for midazolam and tramadol for pain management.

Conclusions:

The renal and hepatic drug dosing adjustment guides demonstrated practical utility and allowed for more efficient prescribing when used in a tertiary referral hospital. Its use may be further expanded to other areas of the hospital, such as inpatient wards.

KEYWORDS: Palliative care; Dose adjustment; Medication safety; Pain management; Kidney impairment; Hepatic impairment

CP-1506111-P

Antibiotic Utilization Review Among Hospitalized Patients with Pneumonia During Early Corona-19 Pandemic: A Multicenter Study

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ABSTRACT

Introduction:

Effort to optimize the appropriate antibiotic prescriptions was considerable challenging at the time of coronavirus disease 2019 (COVID-19) pandemic especially in the setting with limited antibiotic resources. Whether antibiotics were appropriately prescribed for patients with pneumonia in East Java Province was unknown.

Objectives:

The purpose of this study was to describe the quantity of antibiotic use and to identify the appropriateness of antibiotic prescriptions among hospitalized adult and children patients at the time COVID-19 hit Indonesia.

Methods:

This retrospective study was conducted in three referral hospitals in East Java Province, Indonesia. Antibiotics for patients with pneumonia were recorded in a standardized case report form and were further analyzed descriptively. Data were analyzed quantitatively using the DDD/100 patient-days and 90% drug utilization (DU) indicators. In addition, the appropriateness of antibiotic prescriptions (indication, route, dose, interval, and length of administration) was analyzed against National Antibiotic Use guidelines.

Results:

Antibiotic prescriptions from 181 patients (143 adults and 38 children) were included in this study. The total DDD/100 patient-days value found in this study were 77.89 DDD/100 patient-days and 18.97 DDD/100 patient-days, in adults and children, respectively. The most commonly prescribed antibiotics in adult patients were fluoroquinolone (moxifloxacin, levofloxacin), while beta-lactam (ceftriaxone and ampicillin-sulbactam) were commonly prescribed among children patients. Antibiotics included in the 90% DU among adult patients were moxifloxacin, ceftriaxone, azithromycin, levofloxacin, and meropenem; whereas among children patients were ceftriaxone and ampicillin sulbactam. Compared with the recommendation from the National Antibiotic Use guidelines, the appropriate dose and interval among adult patients were 45.05% and 25.27%, respectively, whilst among children patients were 18.42% and 34.21%, respectively.

Conclusions:

The antibiotic use for pneumonia was high, more than 70% on average. The number of DDD/100 patients in children has to be interpreted carefully because DDD was counted for adults with 70kg weight.

KEYWORDS: Antibiotic consumption; Antibiotic stewardship; Pneumonia; Hospital; Pediatric; Antibiotic quality indicator

CP-1506112-P

A Mixed Methods Study on Practice and Perception of Physicians on Postoperative Thromboprophylaxis for Abdominal-Pelvic Surgery Patients in a Tertiary Central Hospital in the North of Viet Nam

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ABSTRACT

Introduction:
Venous thromboembolism (VTE) prevention for at-risk patients presents the most significant opportunity to improve the patient safety, however, previous works revealed that only 58.5% of at-risk surgery patients received the recommended thromboprophylaxis.

Objectives:
This study aimed to investigate the current practices of VTE prophylaxis in abdominal-pelvic surgical (PAS) patients and identify the factors perceived to influence the surgeons' practice of VTE prophylaxis.

Methods:
This two-phase explanatory, sequential mixed-method study used chart audits followed by semi-structured interviews based on the Theoretical Domains Framework (TDF). During phase I, quantitative data from 240 medical records of PAS patients in April, 2023 was reviewed to measure the adherence rate to standard guideline on thromboprophylaxis. In phase II, in-depth interviews with 16 surgeons were conducted and analyzed using thematic content analysis based on TDF to understand determinants of thromboprophylaxis practice for PAS patients.

Results:
Audits of medical records of 240 PAS patients showed that the rate of appropriate prophylactic method was low, at 11.7%. For patients on anticoagulant prophylaxis, while adherence rates regarding drug selection and dosage were high (100% and 89.3%, respectively), adherence rates regarding time of initiation and length of prophylaxis were low (50% and 28.6%, respectively). The qualitative analysis identified 12 theoretical domains being relevant to thromboprophylaxis practice among surgeons. The most frequently barriers included concerns about bleeding risk; resources issues; low beliefs on preventive benefits on certain PAS patients; inadequate knowledge and training; lack of protocol and policy. The most frequently enablers included positive beliefs in prophylaxis benefit; mandatory policy and computerized supportive tools; thromboprophylaxis set as patient safety goals; leadership and multi-disciplinary working; training.

Conclusions:
Underuse of thromboprophylaxis was common in PAS patients, suggesting a significant quality gap. Qualitative data revealed multiple determinants of suboptimal thromboprophylaxis that should be targeted to further improve the efficiency of VTE prevention care.

KEYWORDS: Venous thromboembolism prevention; Abdominal-pelvic surgery; Guideline adherence; Influencing factors; Mixed methods study

CP-1507101-P

Impact of Surgical Interventions on Vancomycin Dosing Therapy for Critically Ill Patients: Neurosurgery Versus Non-Neurosurgery

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ABSTRACT

Introduction:

Subtherapeutic vancomycin serum concentration was described in critically ill patients with surgical interventions, especially patients having neurosurgery procedures. However, there is no official guideline on vancomycin dosage for patients with surgical interventions. This research was performed to ascertain whether a different vancomycin dosage regimen should be used in surgical ICU patients and particular neurosurgical patients.

Objectives:

The aims of this study were (1) to identify the best-fit vancomycin popPK model for ICU patients with surgery, and (2) to recommend the optimal vancomycin maintenance doses for patient subgroups by PK/PD simulations.

Methods:

Published popPK vancomycin models in neurosurgical patients were identified through the systematic literature review and externally evaluated using a dataset including 88 patients (130 vancomycin concentrations) for the neurosurgery group and 45 patients (58 vancomycin concentrations) for the non-neurosurgery group. The predictive performance was assessed based on a priori and posterior prediction approaches using the numerical method (relative bias, relative root mean square error) and graphical method (goodness of fit plots and prediction-corrected visual predictive checks). Subsequently, Monte Carlo simulations were performed with the most appropriate model to establish initial vancomycin dosing regimens depending on the patient's renal function.

Results:

Augmented renal clearance (ARC)was presented at relatively high rates in both groups (20-30%). The Lin (2018) model and the Thomson (2009) model displayed the best predictive performance for the neurosurgery group and non-neurosurgery group, respectively. Simulations indicated that the initial dose of 2.5-3.5 g/day was adequate in subjects with CrCl < 90 mL/min, higher dosing regimens of 4.0-6.5 g/day were suggested for neurosurgical patients with CrCl greater than 90 or 130 mL/min. For non-neurosurgical patients, suggested dosages for each CrCl subgroup were similar to available recommendations in Vietnam: a maximum of 3g/day for patients having CrCl < 130 mL/min and 4-4.5 g/day for ARC patients.

Conclusions:

Higher initial vancomycin dosing schemes are required for patients with neurosurgery. Lin's model and Thomson's model should be used for individualized precision dosing in these populations.

KEYWORDS: Vancomycin; Surgical intervention; Neurosurgery; Critically ill patients; Augmented renal clearance

CP-1508101-P

Enhancing Medication Safety: How Clinical Decision Support Systems and Clinical Pharmacists' Interventions Address Drug-Disease Interactions

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ABSTRACT

Introduction:

Drug-disease interactions (DDSIs) occur when a medicine aimed at treating one disease may worsen another comorbidity or condition. Clinical decision support systems (CDSS) to screen DDSI have been demonstrated to be an effective and labor-saving method, while clinical pharmacist interventions help manage clinically relevant interactions. Incorporating both CDSS and clinical pharmacist interventions may be a good practice model.

Objectives:

This study aims to assess the impact of the CDSS and clinical pharmacist interventions in mitigating DDSI.

Methods:

A quasi-experimental study was conducted to compare the prevalence of DDSI before and after the application of CDSS on DDSI and clinical pharmacist interventions. The CDSS was developed by integrating a DDSI database into the hospital software systems. The database was built by a multidisciplinary team based on thorough literature screening and discussions with healthcare experts. It included interaction pairs (medicine code – ICD-10 code) with their severity, details on clinical outcomes, and management strategies. The CDSS started to provide alerts for physicians in January 2023. In cases where the physicians ignore the alerts, clinical pharmacists are involved in consultation.

Results:

A total of 139,136 and 150,934 prescriptions were included during the pre and post-interventional periods. After interventions, there was a significant reduction in the prevalence of total DDSI, from 0.14% (95% CI: 0.12% - 0.17%) in the pre-intervention phase to 0.015% (95% CI: 0.010% - 0.022%) in the interventional phase, with an odds ratio of 9.87 (95% CI: 6.35 - 15.34). The rate of contraindicated interactions decreased from 0.26% to 0.02%, and major interactions were reduced from 0.34% to 0.04% ($p < 0.05$). In the post-intervention period, a continuous decrease in the number of interactions was also noted over 3 months.

Conclusions:

The utilization of CDSS for identifying drug-disease interactions and clinical pharmacist interventions have been shown to reduce the prevalence of DDSI, thereby improving medication safety.

KEYWORDS: Drug disease interaction; Clinical decision support system; Clinical pharmacist

CP-1508102-P

Assessment of the Pharmacovigilance System in One of the Largest Hospitals in Indonesia

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ABSTRACT

Introduction:

Indonesia is one of the developing countries that still needs to develop pharmacovigilance systems to increase the safety of drug use. The hospital is one of the health services that can directly identify adverse drug reactions in patients; therefore, an assessment of the pharmacovigilance system profile in the hospital needs to be carried out to ensure the safety of patient drug use.

Objectives:

This study assessed the pharmacovigilance system profile in one of the largest government hospitals in South Borneo, Indonesia, to identify problems, influencing factors, and efforts made regarding pharmacovigilance.

Methods:

This was a cross-sectional descriptive study that was conducted from December 2021 to January 2022. Information was collected from respondents who were responsible for pharmacovigilance activity in each department. A modified version of the pharmacovigilance indicators issued by the World Health Organization (WHO) was used as the research instrument.

Results:

The results on structural indicators, process indicators, and outcome or impact indicators show that pharmacovigilance has been carried out in the hospital, although it has not yet covered all existing aspects. Several problems were identified in each assessment indicator. Influencing factors included regulation and standardization, facilities and accessibility, as well as health workers and patients. This indicates that the pharmacovigilance system was not optimal.

Conclusions:

The appropriate interventions are needed to optimize the pharmacovigilance system, which is carried out continuously in stages. Pharmacovigilance system assessments also need to be carried out periodically to oversee the optimization of the pharmacovigilance system in the hospital.

KEYWORDS: Pharmacovigilance systems; Indicator; Drug safety use

CP-1508103-P

Preventability Assessment of Anticoagulant-Related Bleeding: Data from The National Pharmacovigilance Database of Vietnam

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ABSTRACT

Introduction:

Bleeding is known as the most important adverse effect of anticoagulants. However, there is a lack of evidence of the preventability of bleeding related to those high-risk medications.

Objectives:

This study aimed to investigate the preventability of anticoagulant-related bleeding cases reported through The Vietnamese spontaneous ADR reporting system.

Methods:

We conducted a retrospective descriptive study using spontaneous ADR reports with anticoagulants as suspected drugs registered at The National Pharmacovigilance Database of Vietnam (NPDV) from 1 January 2017 to 31 December 2021. The P Method was used for the preventability assessment.

Results:

Out of 144 ADR reports on anticoagulant-related bleeding, 86 (59.7%) reports were assessed as preventable ADRs (pADRs). The most reported reactions were administration site bleeding (23.6%), followed by gastrointestinal bleeding (22.9%). Being the most reported suspected drug, enoxaparin was also related to the highest number of preventable ADRs (66 cases). Five critical criteria for preventable cases were identified, all related to healthcare professionals' practices including drug-drug interaction, incorrect dose, inappropriate prescription according to patient's characteristics, inappropriate prescription according to patient's clinical condition or underlying pathology, and incorrect drug administration duration. The most common medication errors were drug-drug interactions (79 cases).

Conclusions:

Our study results describe the characteristics of anticoagulant-related bleeding reported by healthcare professionals in Vietnam and the potential factors for its preventability. These findings may be useful for implementing risk management in clinical settings to reduce the burden of serious adverse outcomes of anticoagulants.

KEYWORDS: Anticoagulants; Bleeding; Adverse drug reactions; Preventability; Spontaneous reporting system; Pharmacovigilance

CP-1508104-P

Development and Validation of a Risk Prediction Model for Thrombocytopenia in Patients Using Linezolid

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ABSTRACT

Introduction:

Thrombocytopenia is a common adverse reaction of linezolid, often leading to severe complications. It is challenging to externally validate existing models developed in other countries.

Objectives:

Develop and validate a risk prediction model of linezolid-associated thrombocytopenia (LAT) tailored to Vietnamese setting. We construct a simplified risk score calculation to support clinical decision-making.

Methods:

Data was collected retrospectively from three large hospitals in Northern Vietnam. We selected inpatients treated with linezolid from November 2019 to March 2023. Candidate predictors were chosen based on literature review and clinical experts' opinion. Final predictors were selected using Bayesian model selection. Thrombocytopenia was defined as platelet count value ≤ 112,5 x 109 G/L and a decrease more than 25% from the baseline. A multivariable logistic regression model was constructed to predict the occurrence of LAT. The final model was further validated using internal-external cross-validation.

Results:

Of 776 patients included, 247 patients (31.8%) developed LAT. The strongest risk predictors including in final model were age, duration of linezolid ≥ 14 days, baseline platelet count, creatinine clearance, sepsis, cirrhosis, and heparin use. The model had moderate discrimination, with area under the curve (AUC) of 0.77 (95% confidence interval (CI): 0.72 to 0.83). Model calibration was good, with calibration-in-the-large and calibration slope of 0.00 (-0.37 to 0.38), and 0.94 (0.59 to 1.28) respectively. A risk score scale was established, with the optimal cut-off value being 23 points. At the risk cut-off value of 70.6%, the model had 68.8% sensitivity and 75.7% specificity.

Conclusions:

Our newly developed risk prediction model can effectively predict the occurrence of LAT in Vietnamese patients. We constructed a simplified risk score to enhance applicability in clinical practice.

KEYWORDS: Linezolid; Thrombocytopenia; Risk prediction; Clinical model; Logistic regression

CP-1510101-P

Integrating Knowledge to Action and Translational Research Models for Enhanced Pharmacotherapeutic Dosage Adjustments in Renal Disorders

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ABSTRACT

Introduction:

Renal disorder management in clinical pharmacy practice faces challenges, particularly in precise pharmacotherapeutic dosage adjustments to optimize therapeutic efficacy and minimize adverse effects. This review evaluates the integration of the Knowledge to Action (KTA) Framework and Translational Research Models to enhance knowledge translation in pharmacotherapeutic dosage adjustments for renal disorders.

Objectives:

The objective of this review is to explore the potential of the integrated KTA and T models for improving drug dosing adjustment practices and effectively translating research findings into clinical practice.

Methods:

A systematic examination was conducted on scholarly articles and evidence-based practices related to knowledge translation and its application in dosage adjustments for renal disorders. Databases such as PubMed, Scopus, and Web of Science were utilized, with a focus on the integration of research into clinical pharmacy practice. Subsequently, the Knowledge to Action (KTA) Framework and the Translational Research (T) Models were combined using a conceptual integration approach through comparative analysis to identify similarities, differences, and potential synergies among the frameworks.

Results:

Preliminary perusal of the literature accentuates the intricacy associated with pharmacotherapeutic dosage adjustments in renal disorders, underscoring a discrepancy between extant practices and recommendations predicated on evidence. This review identifies the constituent elements of the synthesized KTA and Translational Research Models as instrumental in surmounting these challenges, suggesting that their integrative and collaborative methodology could markedly ameliorate the incorporation of research evidence into clinical decision-making. However, there is a noted lack of cohesive models that cover the research-to-practice continuum in clinical pharmacology for renal disorders.

Conclusions:

The integration of the KTA and Translational Research Models offers a structured approach to bridging the gap between research evidence and its clinical application, optimizing patient care outcomes in renal disorder management. While promising, further empirical research is needed to validate the effectiveness of this integrated model and to identify barriers to its implementation.

KEYWORDS: Renal disorders; Pharmacotherapeutic dosage adjustment; Knowledge to action framework; Translational research models; Knowledge translation; Clinical pharmacy practice

CP-1510102-P

Development and Validation of Machine Learning-Based Predictive Clinical Decision Support System for Olanzapine in Patients with Schizophrenia

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ABSTRACT

Introduction:

Olanzapine is an atypical antipsychotic used to treat schizophrenia but can cause metabolic syndrome leading to severe cardiovascular events.

Objectives:

To develop a predictive decision tree model for clinical responses and adverse events of olanzapine, and integrate this model into the clinical decision support system (CDSS).

Methods:

The study consisted of three phases: (1) prospectively analyzed clinical responses and safety for hospitalized schizophrenic patients receiving olanzapine at Vietnamese National Psychiatric Hospital No.1; (2) determined the statistically significant predictors and developed predictive algorithms in machine learning (Decision Tree) to build the CDSS that incorporated warnings and predictive models for effectiveness and metabolic syndrome; and (3) conducted a longitudinal study on interventions after CDSS integration.

Results:

Of 232 patients evaluated in phase 1, 76% responded positively to olanzapine, and 31% developed metabolic syndrome. 24 predictive variables were analyzed for effectiveness and 10 others were analyzed for metabolic syndrome. In phase 2, the decision tree model using Bayesian Model Averaging identified important predictive factors for effectiveness, retaining three important nodes: early response, response history, and olanzapine dose, with performance metrics of accuracy 0.89, precision 0.92, recall 0.94 and F1-score 0.93. Besides, another model using univariate regression identified important predictive factors for metabolic syndrome, retaining three important nodes: baseline waist < 89 cm, baseline triglyceride < 3.1 mmol/L, and age < 36 years with performance metrics of accuracy 0.88, precision 0.90, recall 0.69, and F1-score 0.78. Phase 3 evaluated 70 patients using CDSS, with 87% receiving “positively-responded” predictions, and 30% receiving metabolic syndrome predictions in the first week. 22 clinical pharmacist interventions led to doctors changing "clinical decisions", while 389 interventions resulted in the “monitoring plan” of doctors.

Conclusions:

Incorporating machine learning models into CDSS is valuable in helping clinicians identify and make interventions to ensure the effective and safe use of olanzapine in schizophrenic patients.

KEYWORDS: Olanzapine; Schizophrenia; Decision tree; Machine learning; Clinical decision support system

CP-1510103-P

Adaptation and Validation of Diabetic Foot Ulcer Scale – Short Form in Indonesian

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ABSTRACT

Introduction:

Diabetic foot ulcers are one of the complications of diabetes mellitus that have a higher risk of infection, amputation and disability resulting in poor quality of life. Diabetic Foot Ulcer Scale – Short Form (DFS-SF) has been used in many countries to measure quality of life in diabetic foot ulcer patients.

Objectives:

The purpose of this study was to adapt DFS-SF to Indonesian population and validate it.

Methods:

A prospective, observational design was used. Permission to translate the DFS-SF into Indonesian was obtained in advance from the Mapi Research Trust (Lyon, France). The validated EQ5D generic instrument was used as a reference tool. The validity and reliability were assessed using standard statistical methods.

Results:

The Indonesian version of DFS-SF (DFS-SF-Ina) went through the full linguistic validation process included following steps: forward translation; backward translation; experts panel; cognitive debriefing; review of cognitive debriefing results and finalization; proofreading; and final report. DFS-SF-Ina was evaluated in 50 patients with diabetic foot ulcers. The mean population age was 57 years, men (52%) with stage 1 diabetic foot ulcers (46%). DFS-SF-Ina demonstrated good construct validity when correlated with the EQ5D. The validity was satisfactory with item-total correlation coefficients ranging from 0.516 to 0.890. The internal consistency of all scales of the DFS-SF-Ina was high (Cronbach alpha > 0.7).

Conclusions:

The newly translated DFS-SF-Ina may be used to assess the impact of quality of life with diabetic foot ulcers in Indonesian patients.

KEYWORDS: Diabetes; Diabetic foot ulcer; Quality of life; Validity; Reliability; Instrument

CP-1511101-P

The Comparative Study on Knowledge of Emergency Contraceptive Pills Before and After Infographic Media Among Senior High School Student in Samutprakarn Province

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ABSTRACT

Introduction:
The high rate (26%) of unwanted pregnancy among adolescents aged 15–19 years in Samutprakarn Province due to a lack of knowledge about contraception is currently concerning. The infographic media could improve emergency contraceptive information, especially emergency contraceptive pills.

Objectives:
The aims of this study were to promote accurate information about emergency contraceptive pills among senior high school students in Samutprakarn Province.

Methods:
This is a quasi-experimental study. Data were collected via developed questionnaires, including the pre- and post-test scores of contraceptive knowledge before and after self-learning infographic media, respectively, education level, and other characteristics. The paired t-test, or Willcoxon signed rank test, was used to compare the data between the pre- and post-test scores. The ethic consideration was approved by the ethic committee of Huachiew Chalermprakiet University (No.HCU-EC1428/2566).

Results:
This study found that 243 students, 129 (53%) female and 114 (47%) male, had the median (IQR) of pre- and post-test scores of contraceptive knowledge of 12(4) and 14(2), respectively. The post-test scores were significantly higher than the pre-test scores (p-value<0.001).

Conclusions:
The infographic media help to educate the correct use of emergency contraceptive pills in senior high school students in Samutprakarn Province. The increment of this knowledge might increase the awareness of pregnant during underage and decrease the rate of unwanted pregnant.

KEYWORDS: Emergency contraceptive pills; Infographic media; Senior high school; Knowledge; Samutprakarn province; Quasi-experimental study

CP-1511102-P

Measurement of DDD and DOT Metrics for Optimizing Antimicrobial Surveillance in Two Tertiary Hospitals in Viet Nam: A Four-Year Retrospective Study

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ABSTRACT

Introduction:

Monitoring antimicrobial consumption is essential for evaluating antibiotic stewardship programs and controlling resistance. In Vietnam, Defined Daily Dose (DDD) is prioritized over Day of Therapy (DOT) for antimicrobial surveillance due to resource constraints and hospital data retrieval challenges. However, compared to DOT, DDD has been criticized due to its unrepresentativeness when relying on pre-defined values and undefined in pediatric patients.

Objectives:

To compare DDD and DOT metrics of antimicrobials for determining the optimal metric for resource allocation.

Methods:

We retrospectively analyzed clinical and administrative data of inpatients receiving antimicrobials at the Hospital for Tropical Diseases and Thong Nhat Hospital from 01/2017 to 12/2020. Our primary outcome was the differences between antimicrobial use measured by DDDs per 1000 patient-days (DDD/1000PDs) and DOTs per 1000 patient-days (DOT/1000PDs) across periods and age-specific groups. We assessed the relationship between DDD- and DOT-based metrics over time using linear regression. Cohen's d was used to evaluate the standardized mean differences between DDDs and DOTs among pediatric and adult inpatients.

Results:

Two hospitals recorded 1011.68 and 1036.76 DDD/1000PDs, exceeding DOT estimates (920.87 and 838.44 DOT/1000PDs, respectively). DDD- and DOT- metrics showed significant linear relationships for most antimicrobials, except for cefuroxime, ceftriaxone, and linezolid. Fluoroquinolone use calculated by DDD/1000PDs surpassed those calculated by DOT/1000PDs ($p < 0.001$), indicating the administered daily doses often greater than the DDD value assigned by the World Health Organization (WHO-DDD). Carbapenem use showed comparable results between DOT and DDD because the daily dose aligned with WHO-DDD and these antibiotics were mainly used in adult inpatients. Pediatric and adult inpatients displayed DDD and DOT differences, particularly in glycopeptides, with a small effect size of d=0.18 in children and a large one of d=0.96 in adults.

Conclusions:

We suggest using DDD to measure the consumption of last-resort antibiotics efficiently. Additionally, DOT should be prioritized to prevent overestimating consumption levels in frequently used antimicrobial groups like fluoroquinolones.

KEYWORDS: Antimicrobial consumption; Defined daily dose; Day of therapy; DDD; DOT; Vietnam

CP-1601101-P

Both Donor and Recipient CYP3A5 Gene Polymorphisms Represent as Significant Factors Influencing Tacrolimus Weight-Dose Adjusted Concentration in the Early Phase After Living Donor Liver Transplantation

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ABSTRACT

Introduction:
Several factors are considered for individualized Tacrolimus (Tac) dosing in transplant patients, including CYP3A5 genotype as a major one. However, previous studies about the effect of CYP3A5 polymorphism on Tac exposure in living donor liver transplant (LDLT) patients remain inconclusive, largely due to the contribution difference of donor and recipient CYP3A5 genotypes.

Objectives:
This study aimed to assess the combined impact of both donor and recipient CYP3A5 genetic polymorphism on Tacrolimus weight-dose adjusted trough concentration(C0/D) during the first 4 weeks after LDLT.

Methods:
This retrospective, single-center study included 65 adult LDLT patients. Patients with CYP3A5*1*1 or CYP3A5*1*3 are defined as CYP3A5 expressors (E), and those with CYP3A5*3*3 are referred to as non-expressors (N). Bayesian Model Averaging method was used to screen potential factors affecting C0/D, including recipient (R) and donor (D) CYP3A5 genotypes, graft-to-recipient weight ratio, patients' demographic and subclinical characteristics at day 7, 14, 21 and 28 post-transplant. The selected significant factors were then analyzed in multiple linear regression models to evaluate their impact on C0/D. To further explore effect of combined R-D genotype on Tac exposure, C0/D were evaluated among 4 groups (REDE, REDN, RNDE, RNDN) at each time point.

Results:
A high prevalence of CYP3A5 expressors was witnessed in study population, with 61.5% in recipients and 55.5% in donors. In multiple linear regression models, the effect of the recipient CYP3A5 genotype on C0/D was significantly observed throughout the timeline ($p < 0.01$). Significant impacts were also seen in donor CYP3A5 genotype at three out of four time points (except for day 7). Of note, RNDN group had consistently highest C0/D, meanwhile, the lowest C0/D was observed in REDE patients ($p < 0.05$).

Conclusions:
Both recipient and donor CYP3A5 genetic polymorphisms influence Tac C0/D in the first 28 days after transplantation. Personalized Tac dosing after LDLT should be based on combined donor-recipient CYP3A5 genotype.

KEYWORDS: Tacrolimus; CYP3A5 genetic polymorphism; Liver transplantation; Personalized medicine

CP-1602101-P

Efficacy of Immune Checkpoint Inhibitors in Advanced Non-Small Cell Lung Cancer Who Progressed on Targeted Therapy: A Systematic Review and Meta-analysis

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ABSTRACT

Introduction:

Non-small cell lung cancer (NSCLC) patients harboring gene mutations who progressed on targeted therapy often have limited treatment options. Immune checkpoint inhibitors (ICIs) have shown promise in this setting, but their overall clinical benefits remain unclear.

Objectives:

This systematic review and meta-analysis aims to evaluate the efficacy of immune checkpoint inhibitors in managing advanced non-small cell lung cancer patients who have progressed on targeted therapy.

Methods:

A systematic literature search on PubMed, Scopus, abstracts, and presentations from major conference proceedings to identify relevant studies published up to January 2024. Eligible studies included randomized controlled trials (RCTs) that assessed the efficacy of immune checkpoint inhibitors (ICIs) in non-small cell lung cancer patients who had experienced disease progression on targeted therapy. Progression-free survival (PFS) was the main endpoint, assessed using hazard ratio (HR) and 95% confidence interval. Outcome comparisons were performed using Revman 5.4 software. The study evaluated the efficacy of ICIs including monotherapy or in combination with other regimen, compared to other standard treatments. The Cochrane risk of bias tool (RoB 2) was used to assess the risk of bias in the RCTs.

Results:

A total of eight randomized controlled trials involving 1519 participants were included in the meta-analysis. The results indicate that ICIs plus chemotherapy and antiangiogenic therapy significantly associated with prolonged PFS (HR = 0.48, 95% CI : 0.38 - 0.59, $p < 0.00001$) Conversely, for ICIs monotherapy, there was no significant difference in PFS (HR = 1.88, 95% CI : 1.33 - 2.66, $p = 0.0004$) compared to the control group.

Conclusions:

Immune checkpoint inhibitors and their combination therapies improve progression-free survival of non-small cell lung cancer patients who progressed on targeted therapy, Particularly, the combination of ICIs, chemotherapy, and antiangiogenic therapy may be the most effective choice for optimizing PFS.

KEYWORDS: Non-small cell lung cancer; Immune checkpoint inhibitors; Targeted therapy; Efficacy; Meta-analysis; Systematic review

CP-1602102-P

Efficacy of Multistrain Probiotics as Adjunctive Therapy in Patients with Diabetic Foot Ulcers: A Study of Glycemic Control and Inflammatory Mediators

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ABSTRACT

Introduction:

Type 2 Diabetes Mellitus (T2DM) with complications of Diabetic Foot Ulcers (DFU) occurs due to chronic inflammation which interferes with glycemic control and increases the risk of infection. Triggers for infection include dysbiosis due to disturbed normal microflora. Probiotics can be used as an adjunct therapy to treat inflammation and dysbiosis.

Objectives:

The aim of this study was to determine the effect of administering multistrain probiotics on clinical outcomes (fasting blood glucose, post-prandial blood glucose, HbA1c, WBC, ESR) and interleukin-6.

Methods:

The research method uses quasi experimental non-randomized, pre-post intervention studies. The sampling technique uses a non-probability sequential sampling method. A total of 40 subjects were divided into 2 groups, as the intervention and control group. The intervention group was given multistrain probiotics for 8 weeks.

Results:

The results showed that there were significant differences in the reduction of hemoglobin A1c (p=0.006), leukocytes (p=0.009), and interleukin-6 (p=0.024). There was no significant difference in the reduction of fasting blood glucose (p=0.96), postprandial blood glucose (p=0.718), and erythrocyte sedimentation rate (p=0.242).

Conclusions:

Probiotics can be used as an adjunct therapy to control clinical outcomes and inflammation in T2DM patients complicated by UKD. Reducing HbA1c has the potential to reduce the risk of long-term microvascular and macrovascular complications.

KEYWORDS: Diabetes mellitus type 2; Diabetic foot ulcers; Probiotics; Glycemic control; Inflammatory mediators

SP-1701101-P

Barriers to the Mild Common Illness Program among Thai Community Pharmacies

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ABSTRACT

Introduction:
The national program of care for mild common illnesses in community pharmacies' setting has been implemented by the National Health Security Office and the Pharmacy Council of Thailand. This program is expected to enhance the access to services at primary care level.

Objectives:
This study aims to identify barriers and opinion towards the program among pharmacists in community drug stores.

Methods:
Qualitative research technique was adopted using in-depth interviews with the structured questionnaire, consisting of 3 parts including 1) general information of interviewees, 2) barriers to program, and 3) their opinions on this program among participated pharmacists.

Results:
We interviewed 7 pharmacists from 7 community drug stores and found that the most important barriers for mild common illnesses program in community pharmacies' are 'late reimbursed payment' from third party payer to a participated community drug store, 'complicated electronic data input system' for the reimbursement, and 'taxation burden' since the drug store is registered under the third party-payer's electronic system.

Conclusions:
Findings from our pilot research suggested that the main barrier is involved in the monetary issue that the third-party payer should alleviate for the success of hat should overcome for the success of mild common illnesses program at community pharmacies' setting.

KEYWORDS: Common illness; Barrier; Interview

SP-1701102-P

The Prevalence and Motivators of Electronic Cigarette Usage in the Different Working Population of Metro Manila, Philippines: A Cross-Sectional Study

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ABSTRACT

Introduction:

Electronic cigarettes were initially developed as a smoking cessation aid. Due to a wide array of flavors, different levels of nicotine content, increased accessibility, marketing tactics, and lack of appropriate regulation, this raises public health concerns especially in adolescents and young adults. Continuous monitoring of their prevalence and motivators is essential for effective public health initiatives.

Objectives:

The study aims to determine the prevalence of e-cigarette use among the two subgroups of the working-age population of Metro Manila, Philippines. It also seeks to identify the motivators which can serve as indicators in pharmacy smoking cessation and health promotion programs.

Methods:

A prevalence study was conducted among the early (age 18-24) and prime (age 24-54) working population. Chi-square test was used for independence, association between users, various motivators, and sociodemographic characteristics through XLSTAT. Working recommendations were formulated for possible pharmacist-led initiatives through associated motivators.

Results:

The prevalence of e-cigarette use was 40.9% (prime working age) and 39.4% (early working age) group. Three motivators showed a significant relationship among e-cigarette users (n=234). Younger individuals were more likely to use e-cigarettes for tricks ($p=0.006$) and blowing large clouds ($p=0.012$). Older individuals used e-cigarettes for socialization ($p=0.039$). Associations between demographics and e-cigarette usage were observed. Lower-income individuals show higher usage rates. Smoking status was associated with e-cigarette use, indicating higher usage among smokers and triers (all, $p<0.00001$). Pharmacist-led interventions are proposed to be initiated in the community setting alongside with local laws and policies on e-cigarette manufacture, sale, and consumption.

Conclusions:

The study found high e-cigarette prevalence rates among the working population, with significant associations between usage and demographic factors. Enticing motivators such as tricks, blowing large clouds, and socialization must be integrated into the pharmacy smoking cessation program. This highlights the need for targeted interventions to address potential health risks and promote public health.

KEYWORDS: Vaping; Electronic cigarette; Smoking; Public health policy; Motivators; Nicotine

SP-1701103-P

Implementation of Health Technology Assessment in Vietnam: A Hybrid Policy Delphi-SWOT analysis

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ABSTRACT

Introduction:

Given the undeniably important role of health technology assessment (HTA) in low- and middle-income countries, the Vietnamese government has made significant progress in applying this tool to decision-making for a sustainable healthcare system. However, Vietnam is in the preliminary stage of HTA due to insufficient HTA governance, resources, and awareness.

Objectives:

This study aims to identify promising strategies for effectively implementing HTA in Vietnam using a combined Delphi-SWOT approach.

Methods:

A Delphi consensus study with three rounds of semi-structured interviews has been implemented to gather opinions from all relevant stakeholders, including policymakers, clinicians, pharmaceutical companies, and researchers. Firstly, a systematic review (SR) was conducted on PubMed, Embase, and grey literature until December 2023 to identify indicators of barriers and facilitators for implementing HTA. The results obtained from SR were delivered to the first round to formulate a SWOT framework. The second round is to develop a ranking system for each factor in the S, W, O, and T domains, followed by creating strategies using an extended SWOT approach. In the third round, experts will rank strategies based on the desirability, importance, and feasibility criteria.

Results:

After the first round, 81 initial indicators extracted from SR results were reduced to 45 and classified into the SWOT categories (S-11, W-7, O-18, T-9). Fifty experts have participated in the second round, and we expect to complete the remaining two Delphi rounds by 05/2024. Expected results include the consent SWOT framework and best-ranked strategies for facilitating HTA implementation.

Conclusions:

Findings from the study will provide an overview of the current situation related to HTA implementation based on multidisciplinary perspectives. The potential strategic recommendations associated with SWOT analysis could equip policymakers with evidence to develop a detailed action plan for HTA implementation and roadmap in Vietnam.

KEYWORDS: Health technology assessment; Vietnam; DELPHI-SWOT analysis

SP-1702101-P

Budget Impact Analysis of Add-on Ezetimibe to Moderate-Intensity Statin versus Moderate-Intensity Statin Alone for Secondary Prevention in Patients with Acute Coronary Syndrome in Thailand

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ABSTRACT

Introduction:
Statin has an important role in the treatment of patients with acute coronary syndrome (ACS). However, some patients with ACS cannot tolerate adverse events of statins. Ezetimibe is a potential additive medication.

Objectives:
Statin has an important role in the treatment of patients with acute coronary syndrome (ACS). However, some patients with ACS cannot tolerate adverse events of statins. Ezetimibe is a potential additive medication.

Methods:
The BIA compared the costs of two scenarios: EZE-ST and ST from a payer perspective over a 5-year time horizon. The eligible population included patients aged > 60 years old with ACS who received statins but cannot tolerate adverse events of statins. The base case costs included the cost of drugs, ACS treatment, myocardial infarction (MI) treatment, and stroke treatment. The target population and cost data were obtained from the Thai national epidemiological data and literature reviews. The budgetary impact was calculated at 20, 40, 60, 80, and 100% accessibility rates. The budget impact was calculated by multiplying the cost with the target population.

Results:
Over 5 years, in a cohort of 10,078 eligible patients, the average total costs related to EZE-ST were 445,311,221 THB (12,793,799 USD) compared with 367,231,783 THB (10,550,576 USD) in ST. The average net budget impact was 78,079,438 THB (2,243,223 USD). The EZE-ST had lower costs of MI and stroke treatment than ST, despite a higher drug cost and treatment costs of ACS in EZE-ST.

Conclusions:
From the Thai payer perspective, add-on ezetimibe treatment to moderate-intensity statin for secondary prevention in patients with ACS would have an additional budget impact, partially offset by savings in MI and stroke treatment costs. The findings will be useful to policy and hospital decision-makers in assessing purchasing, funding, and reimbursement decisions.

KEYWORDS: Budget impact analysis; Ezetimibe; Statin; Acute coronary syndrome; Myocardial infraction; Stroke

SP-1702102-P

Cost-Effectiveness of Oseltamivir and Favipiravir in COVID-19 Patients: Pharmacoeconomic Study in Hospitals

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ABSTRACT

Introduction:

COVID-19 has become a pandemic that threatens public health in various countries worldwide. Apart from health, the COVID-19 pandemic also threatens the world economy, including health costs. A specific drug has not been found for COVID-19 patients, but there are antivirals that can be used to treat COVID-19, namely oseltamivir and favipiravir. Choosing a good therapy is not only based on effectiveness but also pays attention to cost. Therefore, a cost-effectiveness analysis study is needed to determine highly effective and low-cost therapy options.

Objectives:

This research aims to determine the most cost-effective antiviral therapy between oseltamivir and favipiravir in COVID-19 patients at a hospital in Banten province.

Methods:

The study used non-experimental observational methods on retrospective data in the form of medical records and costs of patients who met the inclusion and exclusion criteria. The pharmacoeconomic method used in this research is cost-effectiveness analysis, calculating the Average Cost-Effectiveness Ratio (ACER) and Incremental Cost-Effectiveness Ratio (ICER).

Results:

The results of this study showed that the ACER value in the favipiravir group (364,010 IDR (n=7)) was lower than the oseltamivir group (431,744 IDR (n=7)) with an ICER value of 60,605 IDR. Based on the results of the Mann-Whitney test, it showed that there was no significant difference between costs in the favipiravir group and the oseltamivir group (p-value 0.940). The results of the sensitivity test show that the cost of Consumable Medical Materials is the cost that has the most influence on cost-effectiveness.

Conclusions:

Based on the results of these calculations, it can be stated that the favipiravir group is more cost-effective compared to the oseltamivir group.

KEYWORDS: Oseltamivir; Favipiravir; COVID-19; Cost-Effective; Hospital

SP-1702103-P

Economic Evaluation of *HLA-B*13:01* Testing Preventing Phenobarbital-induced Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS) in Thai Children

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ABSTRACT

Introduction:

Pharmacogenetics testing plays a vital role in identifying individuals at risk of adverse drug reactions (ADRs). A case-control study revealed significant association between *HLA-B*13:01* and phenobarbital-induced Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS) in Thai pediatric epilepsy patients, with odds ratio of 4.3 (95%CI 1.28-14.26, p = 0.022). Additionally, the prevalence of the *HLA-B*13:01* gene ranks third among genetic markers associated with cutaneous ADRs in the Thai population. Recently, there has been no evidence of economic evaluation to guide physicians and policymakers in making decisions to prevent serious ADRs. Therefore, this study aims to conduct a cost-utility analysis of *HLA-B*13:01* testing before initiating phenobarbital treatment to prevent DRESS and alternative drug with sodium valproate, which has a lower DRESS risk but higher cost compared to phenobarbital treatment without testing in pediatric epilepsy patients.

Methods:

A decision tree and Markov models were developed to evaluate the lifetime costs and quality-adjusted life year (QALY) with one-year cycle length. The analysis was conducted from a societal perspective, including direct medical and non-medical costs. Input parameters, including cost, utility, and transitional probabilities, were obtained from relevant literature, primarily in Thai pediatric epilepsy patients. One-way and probabilistic sensitivity analyses were conducted.

Results:

Implementing *HLA-B*13:01* testing before initiating phenobarbital therapy and alternative treatment strategy was cost-saving compared to no-testing strategy, yielding higher QALYs and lower costs. Furthermore, the number needed to screen to prevent one case of DRESS was 14. One-way sensitivity analysis highlighted that the probability of death due to DRESS was the most impacted on the ICER. At the Thai cost-effectiveness threshold of 160,000 THB/QALY, the alternative treatment strategy had 94% probability of being cost-effective.

Conclusions:

Either *HLA-B*13:01* testing before initiation of phenobarbital or an alternative treatment strategy were cost-saving options for reducing the incidence of phenobarbital-induced DRESS in the Thai context.

KEYWORDS: Cost-Utility Analysis; *HLA-B*13:01* testing; Phenobarbital-Induced DRESS; Drug reaction with eosinophilia and systemic symptoms (DRESS); Adverse drug reactions

SP-1702104-P

Economic Evaluation of Nutritional Interventions in Cancer Patients: A Systematic Review

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ABSTRACT

Introduction:
Malnutrition in cancer patients may result from tumors and treatments. Nutritional interventions have shown the potential in improving treatment response and overall well-being. However, there is no available systematic review of economic evaluation of nutritional interventions.

Objectives:
This study aims to explore and describe the cost-effectiveness of nutritional interventions as either preventive or treatment strategies for addressing malnutrition in cancer patients.

Methods:
A search of PubMed and Scopus databases from inception to April 2024 was conducted. Two reviewers independently selected studies that met inclusion criteria (i.e., being a cost-effectiveness or cost-utility analysis study; evaluating nutritional interventions including counseling, oral nutritional supplements, and enteral and parenteral nutrition; focusing on adult cancer patients). Data extraction was performed, and the study quality was assessed using the Consolidated Health Economic Evaluation Reporting Standards (CHEERS) checklist.

Results:
Seven studies were eventually included in this review. All of them were published between 1989 to 2022. The majority of studies employed cost-utility analyses (57.1%). Gastrointestinal cancer was primarily considered in almost all of the included studies. Heterogeneity existed in time horizons, comparators, and interventions. Four studies demonstrated that oral supplements or parenteral nutrition combined with nutritional counseling tended to be cost-effective compared to do nothing. Factors influencing the finding included clinical efficacy/outcomes and duration of intervention, and strategy combination. While most studies adhered to the CHEERS checklist, gaps were recognized in characterizing heterogeneity and community engagement criteria.

Conclusions:
This is the first systematic review for cancer patients focusing on oral and medical nutritional interventions. The combination of nutritional interventions would be cost-effective, or cost-saving compared to no-intervention or counseling. The finding offers valuable guidance to physicians for optimizing treatments, and probably be useful for supporting policy decision making.

KEYWORDS: Nutrition; Cancer; Economic evaluation; Cost-Effectiveness; Systematic review

SP-1702105-P

Cost-Utility Analysis of Atezolizumab Plus Bevacizumab vs Sorafenib as First-Line Treatment of Unresectable Hepatocellular Carcinoma

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ABSTRACT

Introduction:

Atezolizumab plus bevacizumab improves overall survival by 19.2 months over sorafenib (13.4 months) with hazard ratio of 0.66 (95% CI, 0.52–0.85, P<0.001) in patients with locally advanced metastatic or unresectable hepatocellular carcinoma (HCC) who have not received prior systemic treatment as evidenced by the IMbrave150 trial. However, the affordability of this combination in lower-middle-income countries is uncertain.

Objectives:

This study aimed to evaluate the cost-utility analysis of atezolizumab plus bevacizumab compared to sorafenib in patients with unresectable HCC in lower-middle-income countries context.

Methods:

A Markov model was developed to evaluate 10 years of costs and quality-adjusted life years with one-month cycle length in patients with unresectable HCC. The analysis was conducted from healthcare provider perspective and all direct medical costs were acquired from the Medical Supplies Division, Sri Jayewardenepura General Hospital and the private pharmaceutical market in Sri Lanka. Clinical effectiveness parameters, transitional probabilities and utility data were obtained from the published literature. All costs and outcomes were discounted at a 3% annual rate. One-way sensitivity analysis and probabilistic sensitivity analysis were performed to evaluate the parameter uncertainty.

Results:

Compared to sorafenib, atezolizumab plus bevacizumab therapy added 1.08 quality-adjusted life years (QALY) and yielded $ 5,775.73 additional cost. The incremental cost-effectiveness ratio was $5340.35 per QALY. One-way sensitivity analysis indicated that the transition probability from progression state to progression state in the atezolizumab plus bevacizumab group had the most impact on incremental cost-effectiveness ratio. The probabilistic sensitivity analysis indicated that treatment with atezolizumab plus bevacizumab achieved a 40% probability of cost-effectiveness at a gross domestic product per capita of $3474 in Sri Lanka.

Conclusions:

In the context of a lower middle-income country, the combination therapy of atezolizumab and bevacizumab was not cost-effective compared to sorafenib as a first-line systemic treatment for unresectable hepatocellular carcinoma

KEYWORDS: Atezolizumab plus bevacizumab; Sorafenib; Unresectable HCC; Cost-Utility analysis

SP-1702106-P

Knowledge, Attitudes, Practices, and Challenges in the Use of Pharmacoeconomic Evaluations among Hospital Pharmacists Involved in the Pharmacy and Therapeutics Committee in Selected Tertiary Private Hospitals in the National Capital Region

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ABSTRACT

Introduction:

As healthcare undergoes rapid evolution globally, the accompanying rise in the cost of medicines and services underscores the importance of using pharmacoeconomic tools, especially in developing countries like the Philippines.

Objectives:

This study aims to assess the application of pharmacoeconomic evaluations in selected hospitals within the Philippines, focusing on knowledge, attitudes, practices, and challenges among hospital pharmacists.

Methods:

Using convenience sampling, data was collected from 11 out of 30 tertiary private hospitals situated in the National Capital Region. A total of 24 hospital pharmacists participated by completing questionnaires focusing on four key parameters of pharmacoeconomic evaluations: knowledge, attitudes, practices, and challenges associated with utilizing these tools.

Results:

Among the hospital pharmacists involved in this study, a substantial proportion (87.5%) reported utilizing pharmacoeconomic evaluations in their practice. Common practices included identifying medication costs and benefits and making formulary recommendations based on pharmacoeconomic indices, primarily focusing on initial evaluation stages. Respondents identified challenges such as limited understanding hindering effective application, with pharmacists predominantly focusing on traditional evaluations of efficacy, safety, and acquisition. Additionally, the complexity of pharmacoeconomic concepts and a lack of training to overcome them were noted.

Conclusions:

Despite the relative emergence of pharmacoeconomics in the Philippines, most Pharmacy and Therapeutics Committee hospital pharmacists from tertiary private hospitals in the National Capital Region maintained fair knowledge and attitudes towards pharmacoeconomics, regardless of years of experience. Most pharmacists also use pharmacoeconomic practices actively, but several challenges to their employment are still encountered. Increased training and reinforcements from international organizations are necessary to address these limitations.

KEYWORDS: Challenges; Knowledge; Hospital formulary; Pharmacoeconomics; Pharmacy and therapeutics committee; Practices

SP-1702107-P

Cost-Utility Analysis of Ticagrelor versus Clopidogrel in Patients with Acute Coronary Syndromes Undergoing Percutaneous Coronary Intervention

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ABSTRACT

Introduction:
The meta-analysis revealed that the presence of the CYP2C19*2 allele is associated with decreased efficacy of clopidogrel, resulting in reduced platelet inhibition and a consequent increase in the risk of major cardiovascular events (HR=1.57; 95% CI 1.13-2.16 P=0.006). Meanwhile, ticagrelor, a novel P2Y12 inhibitor, is unaffected by CYP2C19 polymorphism but has a higher cost. The selection of optimal antiplatelet therapy for patients with acute coronary syndrome (ACS) undergoing percutaneous coronary intervention (PCI) poses challenges for clinicians and policy makers.

Objectives:
This study aimed to evaluate the cost utility analysis comparing ticagrelor plus aspirin (ASA) with both generic and original clopidogrel plus ASA in ACS/PCI patients.

Methods:
A one-year decision tree and a lifetime Markov model were developed to simulate the progression of a typical cohort of ACS/PCI patients. The analysis compared the universal use of clopidogrel and ticagrelor. Input parameters regarding costs, utilities, and transitional probabilities were obtained from published studies, including randomized controlled trials, systematic reviews, and meta-analyses. Costs were expressed in 2024 dollars (USD) with a Thai willingness-to-pay threshold (WTP) of 160,000 baht per quality-adjusted life year (QALY) gained ($4,320) from a healthcare perspective. One-way and probabilistic sensitivity analyses were conducted to assess parameter uncertainty.

Results:
Base–case results showed universal ticagrelor strategy was cost-saving compared to both original and generic clopidogrel, yielding higher QALYs and lower costs. One-way sensitivity analysis revealed that the incremental cost-effectiveness ratio (ICER) was most sensitive to the transition probability of remaining in the post-myocardial infarction (MI) state with ASA monotherapy. Probabilistic sensitivity analysis indicated a 59% probability of ticagrelor being cost-effective compared to clopidogrel at the Thai WTP.

Conclusions:
From a healthcare perspective, ticagrelor would be a cost-effective treatment option for ACS/PCI patients compared to clopidogrel for reducing major cardiovascular events.

KEYWORDS: Acute coronary syndrome; Ticagrelor; Clopidogrel; Cost-Utility analysis; Economic evaluation

SP-1702108-P

A Systematic Review of Economic Evaluations of Sodium Glucose Transporter 2 Inhibitors (SGLT2) in the Treatment of Chronic Kidney Disease (CKD)

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ABSTRACT

Introduction:

Initially aimed to enhance glycemic control in type 2 diabetes by reducing renal glucose absorption, SGLT2 inhibitors are now recognized as effective in preventing the progression of CKD in patients, regardless of diabetic kidney disease. However, there is a lack of economic evaluations regarding SGLT2 inhibitors in CKD treatment, which could enhance allocation decisions.

Objectives:

This study aims to systematically review and summarize the cost-effectiveness of SGLT2 inhibitors in CKD.

Methods:

PubMed and Scopus were searched until December 2023. All identified studies were selected following inclusion criteria (original articles and based on PICOS elements-patients with chronic kidney disease from stage One to stage Four of CKD stages, diabetic kidney disease, diabetic nephropathy as population, SGLT2 inhibitors as intervention, ICER as outcome and economic evaluation, cost-effectiveness analysis (CEA) or cost-utility analysis (CUA) as study type). Two reviewers independently extracted data and assessed the quality of reporting using the Consolidated Health Economic Evaluation Reporting Standards checklists (CHEERS).

Results:

Nine studies were identified and published between 2021 and 2023. All studies compared between SGLT2 inhibitors plus Standard of Care (SOC) versus SOC alone in treating CKD with or without DM. SGLT2 inhibitors including dapagliflozin (n=5), canagliflozin (n=2), empagliflozin (n=1), and canagliflozin or dapagliflozin (n=1). Most studies were conducted from the healthcare perspective. Findings revealed that adding dapagliflozin was cost-effective in the UK, Germany, Spain, US, and Japan, while it was cost-saving in Thailand. However, in Canada, adding dapagliflozin was not cost-effective compared to canagliflozin in CKD patients with type 2 DM. Subgroup analysis by diabetes status was also conducted in five studies. Cost-effectiveness variations were due to factors such as model parameters, willingness to pay thresholds, and drug costs across countries. Overall, studies mostly adhered to the CHEERS checklist.

Conclusions:

All studies showed add-on SGLT2 inhibitors as cost-effective or cost-saving versus SOC, except dapagliflozin compared to canagliflozin.

KEYWORDS: Economic evaluation; Sodium glucose transporter 2 inhibitors; Chronic kidney disease; Systematic review

SP-1702109-P

A Systematic Review of Efficacy, Safety and Cost-Effectiveness of Fixed-Dose Combinations of Pravastatin and Fenofibratein Treatment of Dyslipidemia

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ABSTRACT

Introduction:

Fixed-dose combination (FDC) of Pravastatin and Fenofibrate has not been yet approved in Vietnam.

Objectives:

The systematic review is conducted to evaluate the efficacy, safety, and cost-effectiveness of FDC of Pravastatin and Fenofibrate in treatment of dyslipidemia.

Methods:

Databases of Pubmed, Embase were searched for literatures about the coadministration of statins and fibrates in treating dyslipidemia. For Pubmed, literatures were searched from 1900 to 06/03/2024. For Embase, literatures were searched from 1974 to 04/03/2024. To define an explicit research question, PICOS framework was used. Our population includes patients diagnosed with dyslipidemia. Statins and Fibrates are used as interventions. There was no limit to our comparators and outcomes. Randomized controlled trials, cross-sectional studies and controlled clinical trials were included. Animal trials, reviews and conference abstracts publication types were excluded.

Results:

With a total of 3813 papers found from both databases, eleven studies were included in this systematic review after two stages of screening. There were 7 studies included for efficacy and safety of drugs and 4 studies were included for cost-effectiveness of drugs. Regarding the efficacy of FDC for Pravastatin and Fenofibrate, four studies that measured lipid profiles, showed reductions in non-HDL-C, LDL-C, total cholesterol, and triglycerides. Two studies illustrated that FDC of Pravastatin and Fenofibrate had a higher number of patients that reached their treatment target compared to monotherapy. Considering safety of FDC of Pravastatin and Fenofibrate, there was no significant difference in adverse events between FDC of Pravastatin and Fenofibrate and there were no deaths recorded with patients while on treatment with FDC of Pravastatin and Fenofibrate. No studies were found regarding the cost-effective analysis of FDC of Pravastatin and Fenofibrate.

Conclusions:

Compared to monotherapy, FDC of Pravastatin and Fenofibrates modified lipid profiles more effectively and it could be more cost-effectiveness.

KEYWORDS: Fixed-Dose combination, Statins, Fibrates, FDC, Dyslipidemia

SP-1702110-P

Analysis of Direct Medical Costs in Knee Joint Surgery at Hospital for Traumatology and Orthopedics in Ho Chi Minh City, Vietnam

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ABSTRACT

Introduction:

Knee joint surgery is effective in reducing pain and improving functional status in patients with knee arthritis. However, knee joint surgery is a complex, specialized technique in orthopedic trauma surgery, entails high costs.

Objectives:

This study aims to analyze costs and factors associated with increased costs among patients receiving knee joint surgery.

Methods:

The study employed a cross-sectional descriptive method based on retrospective data from the Hospital for Traumatology and Orthopedics, Ho Chi Minh City, Vietnam during the period of 2021-2022. The costs investigated included direct medical costs for an inpatient knee joint surgery, comprising bed costs, medication expenses, surgical fees, material costs. Patient's demographic details, factors affecting the cost (using Generalized Linear Model), direct medical cost details were recorded

Results:

In 2021-2022, the Hospital for Traumatology and Orthopedics performed knee joint surgery on 964 patients, with an average patient age of 56.3±17.2 years. Most patients underwent surgery under health insurance coverage. Knee osteoarthritis (73.3%), total knee replacement surgery (74.07%) were the predominant diagnoses and procedures. Material costs accounted for the highest proportion of expenses, while bed costs were the lowest. Over the two years, the average costs per case was higher in 2021 compared to 2022 ($2,782 vs. $2,984). Insurance payments covered about two-thirds of treatment costs ($2,042 vs. $2,923). Multivariate regression analysis showed that type of surgery, the year of surgery had statistical significance in the patient's total cost. When compared to patients undergoing other surgeries, patient with knee arthroscopic surgery incurred $491 more, while who with knee replacement surgery incurred $2,985 more. On average, compared to 2021, knee surgeries performed in 2022 were $270 cheaper.

Conclusions:

The study indicates that the cost of knee joint surgery was high, depending on the type of surgery. However, the majority of it was covered by health insurance.

KEYWORDS: Cost analysis, Direct medical cost, Knee joint surgery

SP-1702111-P

Cost Effectiveness Analysis of Hyaluronic Acid Injection Relative to Oral Medication for Knee Osteoarthritis Treatment at Nguyen Trai Hospital in the Period of 2022 – 2023

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ABSTRACT

Introduction:

Pharmacological treatments, primarily oral NSAIDs, constituted 73.9% of usage for knee osteoarthritis. Despite the known adverse effects of NSAIDs, they are recommended for KOA management. Hyaluronic acid injections, an emerging alternative, lack consensus and evidence of cost-effectiveness in Vietnam.

Objectives:

This study aimed to analyze the cost-effectiveness of hyaluronic acid injections relative to oral medication treatment in patients with KOA from a health insurance payer's perspective.

Methods:

A retrospective study was conducted using electronic medical records of KOA patients from March 1, 2022, to May 31, 2023, at Nguyen Trai Hospital to analyze costs. A cross-sectional descriptive study of two groups receiving hyaluronic acid injections (HA) or oral medication treatment (PO) was conducted using the WOMAC scale converted to EQ-5D-5L to measure treatment effectiveness in QALYs. A seemingly unrelated regression equation was utilized to estimate the Incremental Cost-effectiveness Ratio (ICER) of HA relative to PO while simultaneously adjusting for other confounding factors.

Results:

The PO group exhibited a higher total WOMAC score than the HA group (PO group: 45.12; HA group: 44.29), indicating greater severity in the WOMAC Pain, Function, and Stiffness categories. The QALYs of HA group was higher than those of the PO group, with QALYs values of 0,719 and 0,661, respectively. The total medical direct costs increased by 6.232.445 VND, and QALYs increased by 0,041 when using HA compared to PO. The ICER reached a 151.184.110 VND/QALY gained. With WTP of 1GDP and 3GDP, the probability of achieving cost-effectiveness of HA compared to using PO was respectively 20.06% and 100%.

Conclusions:

The study demonstrated that ICER based on QALYs of hyaluronic acid injections is cost-effective compared to the standard oral medication approach.

KEYWORDS: Cost analysis; WOMAC; Cost-Effectiveness analysis; Hyaluronic acid injections; Knee osteoarthritis

SP-1702112-P

The Inpatient Cost of Stroke Treatment at Thong Nhat Hospital

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ABSTRACT

Introduction:

The cost of stroke treatment is a significant concern because of its burdens.

Objectives:

This research aimed to evaluate the inpatient cost of stroke treatment at Thong Nhat Hospital.

Methods:

A retrospective cross-sectional study was conducted on a sample of stroke patients with ICD codes I61- I64 who were discharged from Thong Nhat Hospital in Ho Chi Minh City from 2018 to 2020. The database included inpatient costs, epidemiological data, and comorbidities.

Results:

The study sample included 384 patients with an average age of 66 ± 13.75; 56.5% were male, the length of hospital stays of 10.05 ± 5.09 days, and the average total cost per patient was USD 580.62 ± 306.73; 56.62% of which was covered by health insurance organizations. In total cost structure, the cost for preclinical tests, hospital beds, and medication accounted for the highest proportions (USD 202.64 ± 84.50; USD 170.13 ± 103.24; USD 128.70 ± 167.29, respectively). The total treatment cost of Recurrent Ischemic Stroke was higher than other types of stroke (Recurrent Ischemic Stroke: USD 701.84 ± 274.77, Hemorrhagic Stroke: USD 620.94 ± 336.21, Ischemic Stroke: USD 598.92 ± 313.78, Transient Ischemic Attack: USD 387.89 ± 116.55); Patients with Atrial Fibrillation had higher cost than patients without Atrial Fibrillation (USD 792.36 ± 395.22; USD 563.15 ± 290.86, respectively, $p<0.001$), patients used thrombolysis had significantly higher cost in both total treatment cost (increased USD 907.28 ± 69.19) and costs paid by patients (increased USD 429.24± 62.33) than patients who did not use ($p< 0.001$).

Conclusions:

With a hospital stay length of 10.05 ± 5.09 days, the average total inpatient cost of stroke treatment was USD 580.62 ± 306.73 per patient. Patients with atrial fibrillation and those who use thrombolysis incur higher costs. Therefore, more interventions are necessary in health policies and insurance for these groups.

KEYWORDS: Stroke; Treatment cost; Thong Nhat hospital

SP-1702113-P

A Systematic Review on Cost-effectiveness Analysis of Screening Strategy for Latent Tuberculosis Infection (LTBI) in Tuberculosis Contacts

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ABSTRACT

Introduction:

To screen for latent tuberculosis infection (LTBI), either a tuberculin skin test (TST) or an interferon gamma release assay (IGRA) can be utilized. Developed countries have utilized TST due to its affordability. TST's limitations include low specificity in populations with a high frequency of Bacille Calmette-Guérin (BCG) immunization, as well as inconsistency among test readers. In situations where it can support the higher costs, we employ IGRA as a substitute for TST. The absence of research in countries with high tuberculosis incidence since the last review and the utilization of appropriate evaluation methods for quality assessment highlight the necessity for updated studies and a more comprehensive systematic review.

Objectives:

The objective of this study was to perform a comprehensive analysis of economic evaluations of screening methods for LTBI in individuals who have been in contact with tuberculosis (TB) patients, evaluate the quality of these studies, and compare the findings based on the income level of the countries to offer valuable information to other countries on effective screening strategies for LTBI in TB contacts.

Methods:

A comprehensive search was conducted on databases including MEDLINE and Scopus until January 2022. Two independent reviewers assessed the included studies according to the criteria for eligibility, data extraction, and quality evaluation.

Results:

We included eleven economic evaluations of diagnostic tests for LTBI in individuals who have been in contact with TB patients. High-income countries carried out the majority of studies (91%) and employed cost-effectiveness analysis approaches in 73% of them. The quality assessment of reporting and data sources was appropriate, with scores ranging from 71% to 89%. The research interventions varied across studies. The results included the cost per life year gained (27%), cost per quality-adjusted life year gained (27%), cost per TB case avoided (36%), and cost per close contact case (10%).

Conclusions:

In high-income countries, using IGRA alone for screening TB contacts was found to be cost-effective. On the other hand, TST was only cost-effective in two trials. IGRA has the potential to decrease the number of false-positive outcomes, leading to a lower number of patients receiving TB treatment and preventive treatment compared to TST.

KEYWORDS: Latent tuberculosis infection; Interferon gamma release assay; Tuberculin skin test

SP-1702114-P

The Social Willingness to Pay for Quality-Adjusted Life Years Gained: A Cost-Effectiveness Threshold for Healthcare Decision-Making in Vietnam

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ABSTRACT

Introduction:

Economic evaluations aid decision-makers in evaluating the cost-effectiveness of investing in new health technologies by comparing them against a predetermined benchmark - the cost-effectiveness threshold, which determines if technology expenses are eligible for reimbursement.

Objectives:

This study aimed to establish a threshold for healthcare services by estimating individuals' willingness to pay for a quality-adjusted life year (WTP/QALY) in Vietnam.

Methods:

A representative sample of 2,261 Vietnamese individuals were selected and randomly assigned to scenarios. WTP values were collected via a contingent valuation approach, which included dichotomous bidding and open-ended inquiry. The nonparametric Turnbull approach and disaggregate method were used to calculate WTP/QALY as well as four models developed on the grounds of the analysis of replies to the OE questions. Generalized linear model and logistic regression were used to evaluate the influence of variables on WTP/QALY.

Results:

The mean WTP/QALY of the whole sample was USD 12,532 (3.01 times the country's gross domestic product [GDP] per capita). The mean WTP/QALY varied under different scenarios, with the highest in the life-saving scenario at USD 14,893, followed by the life extension scenario at USD 14,547, and the life improvement scenario at USD 10,146, which ranged from 2.41 to 3.54 times the GDP per capita. Educational attainment, income level, proportion of treatment outcome, and scenario type substantially influenced WTP/QALY valuation.

Conclusions:

The results indicate that the established threshold is slightly greater than that proposed by the World Health Organization. Effectively using the findings of this research as a guide in allocating healthcare resources necessitates addressing the practical impediments plaguing the Vietnamese healthcare system.

KEYWORDS: Willingness to pay (WTP); Quality-Adjusted life year (QALY); Cost-Effectiveness threshold (CET); Contingent Valuation method (CVM)

SP-1702115-P

Cost-Effectiveness Analysis of Fixed-Dose Combination versus Free-Equivalent Combination in Hypertension Treatment for Outpatients: A Case Study at a Regional Hospital in Southern Vietnam at Le Van Thinh Hospital, Ho Chi Minh City, Vietnam

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ABSTRACT

Introduction:

Combination regimens have emerged to be the primary strategy in hypertension treatment. By offering the improvement of blood pressure control rates, they have demonstrated higher efficacy compared to monotherapy. However, increasing the number of medications is also strongly associated with lowering patient adherence. Fixed-dose combination (FDC), which are combinations of two or more active drugs in a single dosage form, has demonstrated as a promising strategy to mitigate the issue. Although the use of FDC will increase the medications cost, it is hypothesized to be cost-effectiveness when the total treatment costs are evaluated.

Objectives:

This study aims to evaluate the cost-effectiveness of FDC drugs in HTN treatment at a research hospital.

Methods:

Cost data was analyzed using a generalized linear model. The effectiveness was calculated based on the incidence rate for composite outcomes between the FDC group and the FEC group through survival analysis. The cost-effectiveness analysis was carried out from the payer's perspective. Results of the cost-effectiveness analysis were expressed as incremental cost-effectiveness ratio (ICER), uncertainty was assessed through probability sensitivity analysis.

Results:

The outpatient cost of FEC was 1.33 times higher compared to FDC. Kaplan-Meier and Cox analyses indicated that patients receiving FEC treatment, compared to those receiving FDC treatment, had hazard ratios for cerebrovascular disease, ischemic heart diseases, other forms of heart disease of 1.02 (95%CI: 0.7-1.48), 1.05 (95% CI: 0.9-1.22), 0.58 (95% CI: 0.29-1.17) respectively. In terms of the survival probability of cerebrovascular disease, the cost-effectiveness analysis showed that FDC is dominant compared to FEC. On the other hand, the ICERs were 1,837, 454 VND for a 1% proportion surviving free of ischemic heart diseases, 332, 070 VND for a 1% proportion surviving free of other forms of heart disease.

Conclusions:

The use of FDC was a cost-effective strategy in prevention of cerebrovascular disease compared to FEC among patients with hypertension.

KEYWORDS: FDC, Fixed-dose combination; FEC, Free-equivalent combination; Hypertension; Cost-effectiveness

SP-1702116-P

Cost-Utility Analysis of *HLA-B*15:02* Testing for Preventing Phenytoin-Induced Stevens-Johnson Syndrome/Toxic Epidermal Necrolysis (SJS/TEN) in Thailand

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ABSTRACT

Introduction:

Genetic testing has potential to identify individuals at risk of adverse drug reactions. Meta-analysis data indicated significant association between *HLA-B*15:02* and phenytoin-induced Stevens-Johnson syndrome/toxic epidermal necrolysis (SJS/TEN) with odds ratio of 4.12 (95% CI 1.77-9.59, *p=0.001*). Additionally, the prevalence of the *HLA-B*15:02* gene ranks second in the Thai population. Despite this, there is a lack of evidence from economic evaluation to inform policy decisions for optimizing resource allocation. Therefore, this study aims to conduct cost-utility analysis of *HLA-B*15:02* testing before initiating phenytoin treatment to prevent SJS/TEN and alternative drugs with sodium valproate, known to have a lower risk of SJS/TEN but higher cost compared to phenytoin treatment without testing.

Methods:

A decision tree and Markov models were constructed to evaluate the lifetime costs and quality-adjusted life year (QALY) with one-year cycle length in patients newly diagnosed with focal seizures. The analysis was conducted from societal perspective within the Thai context. Input parameters, including cost, utility, and transitional probabilities, were obtained from relevant literature predominantly conducted in the Thai population. One-way and probabilistic sensitivity analyses were performed to assess the robustness of the findings.

Results:

Compared to no-testing, the incremental cost-effectiveness ratios (ICERs) were 57,185 THB/QALY gained for *HLA-B*15:02* testing before initiation of phenytoin therapy and 54,842 THB/QALY gained for alternative drugs strategy. One-way sensitivity analysis indicated that the phenytoin-induced other ADRs had the most impact on the ICER. At the Thai cost-effectiveness threshold of 160,000 THB/QALY, the probability of the alternative drugs strategy being the most cost-effective was 79%. Furthermore, the number needed to screen to prevent one case of SJS/TEN was 1,470.

Conclusions:

Implementing *HLA-B*15:02* testing and alternative drugs strategy were cost-effective options for reducing the incidence of phenytoin-induced SJS/TEN. These findings provide valuable guidance to physicians for optimizing treatment and policymakers considering decisions to prevent serious ADRs.

KEYWORDS: Cost-Utility analysis; *HLA-B*15:02* testing; Phenytoin-Induced SJS/TEN; Stevens-Johnson syndrome/toxic epidermal necrolysis; Adverse drug reactions

SP-1702117-P

Cost-Utility Analysis of Depression Preventive Services by Nurses for Adolescents in Thailand

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ABSTRACT

Introduction:

By 2021, suicide contemplation among Thai adolescents reached 17.6%, with a mortality rate of 6.0 per 100,000, making suicide the third leading cause of teenage death. The evidence revealed that a nurse-led depression preventive service for adolescents, utilizing screening and intervention via a web-based application, could reduce incidence by 15.53% (RR=66, 95% CI 0.47-0.94) and lowered severity significantly ($p<0.05$). Despite this, there has been no information on the value for money of depression preventive programs to inform policy makers. Therefore, this study aimed to evaluate the cost-utility of the depression preventive service compared to a null scenario (no service).

Objectives:

To examine the cost-utility of the depression preventive service for adolescents by nurses.

Methods:

This study evaluated lifetime costs and quality-adjusted life years (QALY) using a hybrid decision tree and Markov model for a nurse-led depression preventive service among adolescents aged 13 to 18 years from a societal perspective. Input parameters were derived from reviewing literature in the Thai context. To accomplish a rigorous evaluation, probabilistic and one-way sensitivity analyses were performed. Discounting rate of 3% for both cost and health outcomes were utilized.

Results:

The utilization of the depression preventive service including screening and web-based intervention yielded an incremental cost-effectiveness ratio (ICER) of 1,878,227 THB per QALY gained, compared to a null scenario. The transitional probability from a state of no depression to a state of depression regardless of severity was the most impacted to the ICERs. At the current Thai willingness-to-pay (WTP) threshold of 160,000 THB per QALY gained, the probability of the nurse-led depression preventive service being cost-effective was deemed acceptable at 0.8%.

Conclusions:

While the depression preventive service has demonstrated its clinical efficacy, its cost-effectiveness has not met the current Thai WTP threshold. This study contributed valuable information for future research in developing, assessing, and designing evidence-based strategies for adolescent depression prevention.

KEYWORDS: Cost-Utility analysis; Depression; Prevention; Adolescents; Nurses

SP-1702120-P

Effect of Pharmaceutical Policy on Drug Prices in the Philippines

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ABSTRACT

Introduction:

There is a trade-off between affordability of pharmaceutical products and incentives for firms to provide new and better drugs in the market. Price regulation derives from the government's desire to limit expenditures on pharmaceuticals without the effect of moral hazard that can be observed with insurance coverage.

Objectives:

This study aims to measure the effect of the Universally Accessible Cheaper and Quality Medicine Act of 2008 as a regulation that directly influences drug prices in the Philippines using the maximum retail price as the variable of interest showing the effectiveness of the policy.

Methods:

This is a cross-sectional retrospective study using records review of drug prices from the Department of Health – Pharmaceutical Division. The drugs were selected according to the following criteria: (1) presence/absence in the list of drugs with maximum retail price, (2) presence/absence of generic alternatives in the market, and (3) presence/absence in the list of VAT-exempt medicines. Using panel data regression random effects model, the effect of the Universally Accessible Cheaper Medicine Act of 2008 on drug prices shall be estimated using the following model:

$$\log price_{it} = \alpha + \beta 1 + \beta 2 mrp_{it} + \beta 3 generics_{it} + \beta 4 tax_{it} + \beta 5 entry_{it}$$

Results:

The presence of MRP on a set of drug molecules has minimal decreasing effect on the price of originator drugs. This defeats the goal of the Universally Accessible Cheaper and Quality Medicines Act of 2008 which primarily aims to lower prices and increase affordability of medicines through the MRP pricing scheme. The presence of generic counterparts to originator brands has a negative effect to originator drug prices. VAT-exemption has the highest negative effect on originator price compared to maximum retail price and generic counterparts.

Conclusions:

There is a need to revisit the country's external reference pricing criteria and the formula for maximum wholesale and retail prices to ensure that these support the market welfare of both the supply- and demand-sides

KEYWORDS: Pharmaceutical policy; Access to medicine; External reference pricing; Generic medicines

SP-1702121-P

Cost-Utility Analysis of Nintedanib in Idiopathic Pulmonary Fibrosis in Thailand

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ABSTRACT

Introduction:
The Subcommittee for the Development of the National List of Essential Medicines (NLEM) has requested the cost-effectiveness information of nintedanib in patients with idiopathic pulmonary fibrosis (IPF) for making policy decision whether it should be included into the list.

Objectives:
This study aimed to evaluate the cost-utility of nintedanib in patients with IPF in Thailand.

Methods:
A Markov model with a three-month cycle length was used to assess the costs and outcomes of nintedanib with best supportive care (BSC) versus BSC alone for the treatment of IPF from a societal perspective over a lifetime period. The transitional probabilities were derived from randomized clinical trials and utilities were collected using the EuroQoL 5-Dimension (EQ-5D) questionnaires retrieved from the Thai IPF registry database. All costs were calculated in 2023 baht and both costs and outcomes were discounted at 3% per annum. Results were presented as an incremental cost-effectiveness ratio (ICER). One-way and probabilistic sensitivity analyses were used to evaluate the uncertainties of the input parameters.

Results:
Treatment with nintedanib resulted in an estimated total cost of 1,539,485 baht, exceeding the total cost of treatment without nintedanib (110,835 baht). Nintedanib was estimated to improve quality-adjusted life years (QALY) (1.55). The ICER of nintedanib with BSC was calculated at 921,040 baht per QALY gained compared to BSC alone. One-way sensitivity analysis indicated that the pooled relative risk of acute exacerbation of nintedanib was the most sensitive parameter, followed by the unit cost of nintedanib. The cost-effectiveness acceptability curve showed that the probability of nintedanib being cost-effective was 0% at the Thai societal willingness-to-pay threshold of 160,000 baht per QALY gained.

Conclusions:
Nintedanib would not cost-effective at the Thai societal willingness-to-pay threshold. Nevertheless, the price of nintedanib should be reduced by 85% to make it cost-effective in Thai context.

KEYWORDS: Nintedanib; Idiopathic pulmonary fibrosis; Cost-Utility

SP-1703101-P

Validation of the Indonesian Version of the Medication Adherence Rating Scale Questionnaire in Coronary Heart Disease Patients

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ABSTRACT

Introduction:

Coronary heart disease is a chronic disease with a high prevalence rate and requiring long-term therapy. Antiplatelet, antihypertensive, antianginal, and statin groups are used for treating the disease. Medication adherence is a serious problem in preventing the risk of recurrent vascular events and mortality. As many as 31% of patients with myocardial infarction are no longer adherent within 6 months and it increases the risk of recurrent vascular events and mortality. Measurement of medication adherence requires an instrument that has been tested for validity and reliability to produce accurate data. One of the simple and easy to use questionnaires in measuring medication adherence is the Medication Adherence Rating Scale questionnaire.

Objectives:

The purpose of this study is to determine the validity and reliability of the Indonesian version of the Medication Adherence Rating Scale questionnaire in coronary heart disease patients.

Methods:

The research design uses cross-sectional data collection by purposive sampling. The inclusion criteria are minimum 18 years, taking oral medication minimum 6 months, and willing to participate in the study. Pearson Product-Moment coefficient correlation is used as the validity analysis, and the reliability is analyzed by Cronbach's alpha.

Results:

Thirty-four patients were involved as participants in this study. Most of them are male (64.71%), and the most age group is 46-65 years (58.82%). The most patient status is retirees (70.59%). The Pearson coefficient correlation value obtained in the range of 0.541-0.895 shows that all question items are valid. The analysis results of Cronbach's alpha value of 0.80 with a good level of reliability.

Conclusions:

The Indonesian version of the Medication Adherence Rating Scale questionnaire is valid and reliable so that it can be used in measuring medication adherence in coronary heart disease patients.

KEYWORDS: Adherence; Cardiovascular; Chronic disease; Compliance; Instrument; Validation

SP-1703102-P

Evaluation of Drug - Drug Interactions in Cancer Patients at Hanoi Oncology Hospital in 2022

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ABSTRACT

Introduction:

Drug-drug interactions are one of the most important issues in clinical practice, which can have serious consequences on patients, especially for cancer patients due to the use of multiple medications. Research on drug - drug interactions in oncology are necessary to improve patient outcomes.

Objectives:

This study aimed to evaluate the rate and the level of drug-drug interactions on cancer patients at Hanoi Oncology Hospital in 2022.

Methods:

A retrospective study was conducted on 3,911 cancer patients from 01/01/2022to 31/12/2022 at Hanoi Oncology Hospital. We checked drug-drug interactions based on Vietnamese regulatory materials.

Results:

3,911 cancer patients at Hanoi Oncology Hospital had 84,619 prescriptions in total reviewed in 2022. Five pairs of major interactions were identified among the 192 drug-drug interactions detected in 37 cancer patients. These pairs were Gefitinib – Pantoprazole, Erlotinib – Pantoprazole, Fluorouracil – Metronidazole, Domperidone maleate – Ondansetron, and Fluconazole – Ondansetron. The most common interaction is between Pantoprazole and Erlotinib, occurring at 54.2%.

Conclusions:

This study showed major drug - drug interaction pairs in cancer patients at Hanoi Oncology Hospital. Therefore, we recommend that clinical pharmacists at our hospital annually update and supplement the list of drug interactions and integrate the list into the prescribing software to alert doctors about drug interactions.

KEYWORDS: Drug - Drug interactions; Oncology; Cancer patients

SP-1703104-P

4-Year Analysis of Pharmaceutical Inventory Management Using the ABC-VEN Matrix at a Tertiary Cancer Center in Vietnam

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ABSTRACT

Introduction:

The efficacy of cancer patients' treatment plans is significantly impacted by shortages of supplies. Effective inventory management is required to balance inventory expenditure against demands for medications. One useful and reasonably priced way to attain an optimized supply chain is through the application of ABC-VEN analysis.

Objectives:

The study aimed to analyze the pharmaceutical inventory management systems of Hanoi Oncology Hospital using the ABC-VEN matrix for the years 2020 to 2023.

Methods:

We conducted a retrospective cross-sectional review of consumption data and associated expenditures for each treatment regimen for each year from 2020 to 2023. Inventory control techniques, ABC (Always, Better, and Control), VEN (Vital, Essential, and Non-essential) and ABC-VEN matrix analyses were used to study drug expenditure patterns.

Results:

Consumption of drugs increased in total value from $14.28 million in 2020 to $20.81 million in 2023. The following products from 2020, 2021, 2022, and 2023 were included in the analysis: 425, 433, 503, and 524. 220-295 drugs worth 88,33% - 90,38% of the average medicine funding in category I (AV, BV, CV, AE, AN). Less pricey and non-essential groups of medicines (CN), contributed under 1%, ranging from 0.12% to 0.48% of yearly expenses. On an annual basis, the amount of drugs in category III steadily declines.

Conclusions:

To manage purchasing drugs effectively, scientific inventory management tools need to be utilized on a regular basis, especially as there are significant changes in the portfolio structure and value of medication.

KEYWORDS: ABC-VEN; Cancer; Pharmaceuticals inventory management; Pharmaceutical expenditures

SP-1703105-P

Health Promotion Intervention to Improve Public Knowledge on Coronary Heart Disease in Yogyakarta, Indonesia: A Preliminary Study

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ABSTRACT

Introduction:

A lack of public knowledge of coronary heart disease (CHD) contributes to the elevated incidence of delay onset symptoms to the first medical contact (FMC) and major adverse cardiac event (MACE). Health promotion intervention should be the first option in order to direct individuals toward adopting healthy behaviors to particularly averting CHD, improve their knowledge and attitude in handling CHD-related symptoms.

Objectives:

Therefore, this study aimed to observe the impact of educational program on the improvement of public knowledge about CHD in Yogyakarta, Indonesia.

Methods:

A quasi-experimental approach was implemented utilizing a questionnaire developed by the researchers, which included pharmacists and cardiologists, and was based on the BASNEF model. An hour educational program was carried out three times in a month by inserting the program in the community's routine agenda. A descriptive analysis, t-test, and multivariate regression were performed to examine the influence of an educational program on participants' knowledge enhancement of CHD.

Results:

Higher proportion of participants with smoking environment (79.6%), diabetes mellitus (88.9%), abnormal waist girth (61.9%) and abnormal 2 hours post prandial blood glucose (77%) among 113 were involved in this study. Significant improvement was observed among the overall results of pre-test (75.59±15.29) and post-test (86.05±8.99) with p-value <0.001. Older participants and participants with ACS history were significantly improved their knowledge of CHD after the health promotion program with p-value 0.022 and 0.008 respectively.

Conclusions: These findings suggest that educational interventions could increase participants' knowledge of CHD. Even though the average of participants scored well on the initial test, a lack of belief and subjective norms on CHD were still observed. Local health officials should implement more health promotion to significantly enhance public knowledge of CHD.

KEYWORDS: Health promotion; Public knowledge; Coronary heart disease

SP-1703106-P

Correlation Analysis of Factors Influencing Customer Loyalty in Retail Pharmacy Chains: A Cross-Sectional Study in Vietnam

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ABSTRACT

Introduction:

In the current era, health has become a growing concern for everyone, leading to a rise in the number of pharmacies in residential areas. This has created a fiercely competitive market, compelling pharmacy chains to implement effective elements and strategies to retain customers.

Objectives:

Our research aims to assist pharmacy chains in better understanding the elements that lead to customer retention and higher-quality service. Additionally, evaluate and improve quality assurance guidelines and practices, which will result in patient-centered treatment and client involvement.

Methods:

Analyze factors affecting customer loyalty to pharmacy chains in Can Tho City from 2023 to 2024. The data for this study was collected through interviews with customers who purchased medication from pharmacy chains. A pre-designed set of questions was used to gather information.

Results:

A total of 747 participants who met the research criteria were included in the study. There were 4/32 variables eliminated after conducting the Cronbach's Alpha test. The Kaiser-Meyer-Olkin (KMO) coefficient, ranging from 0.886 to 0.91, indicated that the data was statistically significant and met the criteria for Exploratory Factor Analysis (EFA). The results satisfied the requirements for total variance extracted (>50%) and the Eigenvalue coefficients were all greater than 1 (from 1.014 to 5.385, $p<0.05$). Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) were consistent with market data on factors affecting customer loyalty. The analysis revealed that pharmacy chain brands, price, facilities, convenience, and employee knowledge had a positive influence on loyalty. Importantly, all factors demonstrated a statistically significant impact ($p<0.05$).

Conclusions:

This analysis successfully identifies and models the factors influencing customer loyalty to the services provided by pharmacies, thereby advancing research on the impact of dedication, trust, and barrier transformation on customer loyalty.

KEYWORDS: Influencing factors; Loyalty; Pharmacy chain; Satisfaction

SP-1703107-P

Patient-Centered Communication among Pharmacy Professionals Working in A Special-Grade Hospital in Vietnam: Practice and Barriers

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ABSTRACT

Introduction:

Patient-centered care (PCC) with the participation of pharmacy professionals has been suggested to provide benefits such as improved patient-healthcare provider communication and better disease self-management to patients. A better understanding of the practice of PCC and the barriers that can affect the practice of PCC in pharmacy professional' consultations is needed.

Objectives:

The objective of this study was to explore hospital pharmacy professionals' practice of PCC and their barriers towards the practice of PCC.

Methods:

A cross-sectional study design was conducted with all pharmacy professionals from 5 hospital pharmacies of 108 Military Central hospital in Vietnam. A self-report questionnaire was used to collect data. Descriptive statistics were employed using R version 4.3.1.

Results:

A total of 29 pharmacy professionals with a median age of 41 (IQR: 21) years were included in the study. How to use special drugs such as insulin pens or inhalers; dosage and the time of medicine intake were often initiated by both pharmacy professionals and patients. These information was frequently provided by pharmacy professionals or asked by patients at a rate of about 40%. The most common information that pharmacy professionals proactively consulted patients was drug storage conditions, at 89.6%. Drug dosage was written advice which usually was given by a pharmacy professional or requested by a patient (approximately 50%). High patient load and time constraint were found to be the main barriers of the pharmacy professionals for not practicing PCC (85.1% and 77.0%, respectively).

Conclusions:

The study findings outlined the potential barriers of PCC that may influence its implementation in hospital pharmacy professionals' consultations. Policy makers, stakeholders and researchers should collaborate to design interventions to improve the current dispensing practices at hospital pharmacies.

KEYWORDS: Barriers; Hospital; Practice; Pharmacy; Patient-centered care; Vietnam

SP-1703108-P

Level of Influence of Factors Affecting the Customer's Decision-Making for Online Healthcare Product Purchasing in Ho Chi Minh City, Vietnam

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ABSTRACT

Introduction:

The trend of using online purchasing is increasing in healthcare products. Based on the Theory of Planned Behavior (TPB), Theory of Risk Perception (TPR), Technology Acceptance Model (TAM)and related research results, the author conducted this research.

Objectives:

The study was conducted to determine the level of influence of factors affecting the customer's decision-making for online healthcare product purchasing in Ho Chi Minh City, Vietnam.

Methods:

Data was collected from 323 customers through a direct survey using a 5-level Likert scale questionnaire from June 2022 to December 2022. There are 7 factors that affect customer decision to purchase healthcare products online: (1) Perceived usefulness; (2) Convenience; (3) Personal attitude; (4) Subjective norms; (5) Perceived behavioral control; (6) Perceived risks on product quality and (7) Perceived risks on service quality. Exploratory factor analysis and multivariate linear regression were used to analyze data and their interactions.

Results:

83.3 % of participants were female and 59.8% of participants were between 31 and 40 years old. The ranking of positive influencing factors is as follows: Perceived usefulness (β = 0.264); Convenience (β = 0.179); Personal attitude (β = 0.167); Subjective norms (β = 0.162); Perceived behavioral control (β = 0.148) with the percentages were 22.56%, 15.30%, 14.27%, 13.85% and 12.65%, respectively. The ranking of negative influencing factors is as follows: Perceived risks on product quality (β = -0.144) and Perceived risks on service quality (β = -0.106), with the percentages were 12.31% and 9.06%, respectively.

Conclusions:

The most important positive factor affecting customers' online healthcare product purchasing decisions was perceived usefulness. The applicability of this research is to help pharmaceutical companies to grasp the trend of buying healthcare products online and to build more effective marketing plans, sales strategies and ensure the quality of products to customers.

KEYWORDS: Healthcare products online; Factors affecting customers decisions; Ho Chi Minh City

SP-1703109-P

Factors Affecting Consumers Repurchase Intention Toward Skin Care Cosmetics: A Cross-Sectional Study in Vietnam

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ABSTRACT

Introduction:

Beauty is a fundamental human need, with cosmetics becoming a popular and convenient method. The cosmetics industry, driven by advancements in science and technology, is thriving and generating significant profits. By examining customer behaviors, and factors impacting their intention of repeatedly buying skincare products, manufacturers and sales businesses are able to more effectively comprehend their clients' demands.

Objectives:

By examining customer behaviors, and factors impacting their intention of repeatedly buying skincare products, manufacturers and sales businesses are able to more effectively comprehend their clients' demands.

Methods:

To analyze factors affecting consumers repurchase intention toward skin care cosmetics Can Tho city, Vietnam, who have purchased skincare cosmetics for the second time. Participants aged over 16 years old and living in 9 districts in Can Tho city from December 2022 to October 2023 based on a cross-sectional descriptive method. A pre-designed set of questions developed on the 5-point Likert scale was used to summarize information.

Results:

A total of 531 participants who met the research criteria were included in the study. The factors impacting repurchase intentions for skincare merchandise involve attitude, reliability of signal quality, and retailer credibility, with attitude being the most powerful influence, followed by retailer credibility and reliability of signal quality respectively. These factors accounted for 27.5% of behavior variance. The clarity element of signal quality reliability does not affect behavioral intention.

Conclusions:

Based on this study, cosmetic companies understand the analysis of factors that influence customers' repeat purchase intentions. From there, it is possible to develop policies, improve product quality in accordance with customer needs, retain potential customers, and improve competitiveness.

KEYWORDS: Repurchase intention; Trustworthiness; Signal quality, Retailer credibility; Can Tho city; Consumers behavior

SP-1704101-P

Community Attitudes Toward Using Traditional Medicine among the Population in Mondulkiri Province

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ABSTRACT

Introduction:

The demand for traditional medicine (TM) for managing and treating various diseases has been used for centuries. There is still high usage of traditional medicine in developing countries and globally. Superstitious beliefs, culture, and heritage could be the reasons behind the continued popularity of traditional medicines.

Objectives:

This study aims to explore the community attitudes toward using traditional medicines in Krong Senmonoron, Mondulkiri province.

Methods:

A cross-sectional survey was conducted among the residents in two out of four communes in Krong Senmonorom. Four-hundred fifty-eight people aged over 18 were invited to attend the interview on February 06, 2024. A semi-structured questionnaire was used for face-to-face interviews. Data entry and analysis were conducted by using Google form, Microsoft Excel, and Statistical Package for Social Sciences (SPSS), version 26. Descriptive data analysis of attitudes was conducted.

Results:

A total of 458 responses were received with the majority of female (n=330, 72.05%). Based on the findings, most of the participants believe that traditional medicines could treat the illness (n=395, 86.2%), take adequate care of their health (n=362, 79.0%), and have fewer adverse effects compared to modern medicine (n=252, 55.0%). Additionally, they evaluate that utilizing traditional medicine is good (n=375, 81.9%), that it is inexpensive regarding its efficacy (n=374, 81.7%), and enhances their health (n=343, 74.9%). In contrast, more than fifty percent did not agree traditional medicine was ineffective and produced bad results. Positive attitudes toward using traditional medicine were observed by 88.4% (95% CI: 0.85, 0.91%) of the respondents.

Conclusions:

According to the study, the majority of participants have favorable attitudes to traditional medicines. It is vital for the relevant authority to educate the community on the risk of using unproven herbal medicines to diminish the effects that may arise from using uninvestigated herbs.

KEYWORDS: Attitude; Traditional medicine; People; Mondulkiri

SP-1704102-P

Assessing Quality of Life Using Zhan's Concept among Thai Osteoarthritis Patients: A Structural Equation Modelling Approach

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ABSTRACT

Introduction:
Quality of life in Thai patients with knee osteoarthritis and its predicting factors according to Zhan's concept have been well described by various studies; but not all factors have been simultaneously tested in a single study.

Objectives:
This study aimed to examine quality of life of Thai patients with knee osteoarthritis, as well as direct effects of personal factors, health-related factors, and social/culture/environmental factors on quality of life of patients with knee osteoarthritis.

Methods:
300 patients aged 60 years or older receiving care at five hospitals in Nakhonnayok, Thailand, were purposively selected from May 2019 to June 2020. Participants completed the knee osteoarthritis severity scale, social support scale, quality of life scale, and demographic and health status questions. Structural equation modeling was used to analyze the data.

Results:
Overall quality of life was at a moderate level. Knee osteoarthritis severity: which was health-related factor, and social support; which was social/culture/environmental factors, had significantly, negative and positive direct effects on quality of life, respectively. These two causal factors could explain 33% of the variance of quality of life.

Conclusions: Healthcare providers and settings should provide more programs with activities to promote social support and alleviate knee osteoarthritis severity for the Thai elderly patients with knee osteoarthritis.

KEYWORDS: Quality of life; Knee osteoarthritis; Thai patients; Structural equation modeling

SP-1704104-P

Psychometric Properties of EQ-5D-Y among Vietnamese Children Aged 8-17 years

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ABSTRACT

Introduction:

The EQ-5D youth version (EQ-5D-Y) is a generic health-related quality of life questionnaire widely used in pediatric research but not yet validated in Vietnam.

Objectives:

The objective of this research was to assess the psychometric properties of EQ-5D-Y self-reported versions for Vietnamese 8-17-year-old children and to evaluate the performance of these versions across various health conditions.

Methods:

The psychometric validation method was based on the consensus-based standards for selecting health measurement instruments (COSMIN). Participants self-completed the EQ-5D-Y-3L (Y-3L), EQ-5D-Y-5L (Y-5L), and Pediatric Quality of Life Inventory version 4 (PedsQL). Reliability was confirmed by test-retest methods using Cohen's kappa and the intraclass correlation coefficient (ICC). Spearman's correlation coefficients were calculated between responses to the EQ-5D-Y and both responses to and scores of the PedsQL in order to assess convergent validity. The Y-3L and Y-5L were also evaluated in terms of ceiling effects, feasibility, distribution properties, and responsiveness.

Results:

A total of 609 children in three setting groups, including acute, chronic, and healthy, were enrolled in this study, and 346 children completed the 2-day follow-up survey. The percentage of missing responses was below 1.0%. The face validity index achieved a score of 0.87 and 0.89 for the Y-3L and Y-5L versions, respectively. The EQ-5D-Y demonstrated a consistent result for the test-retest reliability, with kappa values ranging from 0.522 to 0.739 and an ICC value of 0.780. EQ-5D-Y had a moderate correlation with similar items on the PedsQL generic measure. The Y-3L and Y-5L (level sum scores and Visual Analogue Scale scores) detected significant differences between the general population and ill health but not between acute and chronic groups ($p<0.01$).

Conclusions:

The findings indicate that EQ-5D-Y is feasible, consistent, and reliable for the target population. This instrument appeared to be easy to use and comprehend for children.

KEYWORDS: Children; EQ-5D-Y; Psychometric properties; Quality of life; Vietnam

SP-1704106-P

Assessing Health Related Quality of Life among Older Adult Patients with Chronic Kidney Diseases: Validating the KDQOL-36 in Vietnam

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ABSTRACT

Introduction:

Chronic kidney disease (CKD) stands as a significant health challenge in Vietnam, impacting over 10 million individuals and imposing a substantial disease burden. Health-related quality of life (HRQOL) experiences notable declines, particularly among end-stage renal disease (ESRD) patients. The monitoring of HRQOL proves indispensable throughout disease management. However, the KDQOL-36 Questionnaire, a specialized tool tailored for individuals with kidney disease, remains unexplored and underutilized within Vietnam.

Objectives:

This study aims to validate the KDQOL-36 questionnaire for CKD patients in Vietnam and to assess HRQOL across various renal replacement therapies.

Methods:

A hospital-based cross-sectional study was conducted at Thong Nhat Hospital, Ho Chi Minh City, Vietnam, from March to May 2023. The research entailed the translation and validation of the KDQOL-36 questionnaire, utilizing methods such as reliability assessment through Cronbach's alpha and exploratory factor analysis (EFA). Subsequently, the KDQOL-36 Questionnaire, along with the EQ-5D-5L instrument, was employed to evaluate HRQOL among hemodialysis (HD), peritoneal dialysis (PD), and non-dialysis patients.

Results:

In the pilot study (n=30), KDQOL-36 demonstrated strong internal consistency (Cronbach's Alpha = 0.878) across domains: physical health (0.767), mental health (0.741), and kidney disease-related (0.872). The Kaiser-Meyer-Olkin measure was 0.882, indicating suitability for EFA, and Bartlett's test showed significance (sig. = 0.000 < 0.05). Cumulative explained variance was 65.754%. In the main study (n=361), non-dialysis patients had higher KDQOL-36 and EQ-5D-5L scores compared to PD and HD patients, with significant differences in "Effects of kidney disease" and "Burden of kidney disease" via KDQOL-36, but not EQ-5D-5L.

Conclusions:

CKD patients, especially those undergoing dialysis, experience a decline in HRQOL. The KDQOL-36 questionnaire proves suitable for deployment in the Vietnamese context, providing evidence for healthcare professionals to prioritize interventions aimed at improving patients' HRQOL.

KEYWORDS: Health-Related quality of life; Chronic kidney disease; Dialysis; KDQOL-36 questionnaire; Thong Nhat hospital

SP-1705101-P

A Systematic Review on Telepharmacy Barriers

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ABSTRACT

Introduction:

Telepharmacy offers remote pharmaceutical services, demonstrating advantages and potential solutions to enhance patients' access to medications and improve coverage in underserved areas. Although telepharmacy is still a relatively new technology with significant advantages and great concepts, implementation can be challenging.

Objectives:

To understand more about this evidence gap, this study was conducted to review the factors related to telepharmacy barriers.

Methods:

The systematic review was conducted following the PRISMA guidelines. Studies included were searched using MEDLINE (via PubMed), Scopus, and ScienceDirect databases up to February 2024 and selected based on the inclusion criteria. Search terms were derived from PICo framework, the Population (P) was pharmacist, Interest (I) was telepharmacy, and Context (Co) was barrier. Two independent reviewers selected studies based on inclusion criteria, which were reporting telepharmacy obstacles/ barriers encountered by pharmacists and original research article, and performed data extraction. Descriptive analysis was employed to synthesise the findings.

Results:

Eleven studies were included in the review. The studies were performed between 2010 and 2024, with more than half conducted in the Asia region. The finding demonstrated that telephone was the most used tool to provide telepharmacy. The most prevalent barrier identified was insufficient technical support or resources.
Notably, ten out of eleven telepharmacy studies (91%) were conducted post-COVID-19 (from 2020 onward), with three studies directly addressing telepharmacy's role during the pandemic.

Conclusions:

Telephone have long been used to deliver pharmacy services, and our review demonstrated that it is still beneficial in telepharmacy. The COVID-19 pandemic influenced the surge in telepharmacy studies and its practice, highlighting its critical role during public health emergencies. Addressing the identified barriers to telepharmacy is essential to fully benefiting from the service and ensuring its successful integration into the healthcare system. The protocol was registered with PROSPERO, identification number CRD42023397845.

KEYWORDS: Telepharmacy; Pharmacy service barrier; Digital health

SP-1705102-P

Self-Medication among Myanmar Migrant Workers in Thailand

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ABSTRACT

Introduction:
Self-medication with over-the-counter medicines is becoming increasingly popular including Asian countries. Nevertheless, comprehensive data regarding the prevalence of self-medication among Myanmar migrant workers in Thailand is scarce.

Objectives:
This study aimed to investigate self-medication behavior among Myanmar migrant workers in Thailand.

Methods:
A cross-sectional study was conducted among Myanmar migrant workers in Samut Sakhon province, Thailand. A convenience sampling was used to recruit the participants. Data was collected through self-administered questionnaires in January 2024.

Results:
Findings showed that a total of 384 participants were included in this study. The average age of them was 30± 7.8(range: 18-55). Nearly two-thirds of them were female. Almost 90% were factory workers. An average household income was 9,211± 4076Baht. Two-thirds of them reported taking self-medication within the last three months. More than half of them used self-medication due to their previous experience or personal knowledge (34%) as well as having leftover medicine (29.6%). Headache (54.2%) was the main reason for taking medicine on their own, followed by fever (25.3%) and cough (21.3%) respectively. Thus, nearly 80% of them bought medicine for relieving pain and fever, mostly at drugstores. Healthcare professional consultation was the most common source of information about self-medication (32.4%), followed by friends/family (29.6%). Among demographic variables, gender and household income were found to be statistically significant. Women were more likely to self-medicate compared to men. Additionally, people with a household income of less than or equal to 10,000 Baht were more likely to self-medicate than those with a higher income.

Conclusions:
This study revealed a high prevalence of self-medication among Myanmar migrant workers when they had minor illnesses. The majority bought their medicine at the drugstore. As a result, the community pharmacist plays a crucial role in giving patients information about drugs and health

KEYWORDS: Self-Medication; Minor illness; Drugstore; Myanmar migrant workers; Thailand

SP-1705103-P

The Relationship of Knowledge, Attitude and Experiences of Family Patients in Dengue Hemorrhagic Fever and Prevention

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ABSTRACT

Introduction:

The number of cases of dengue hemorrhagic fever in the city of Bandung is still high, namely 2,790 cases. In an effort to overcome the increasing number of cases and deaths, one of the prevention programs is to break the chain of transmission by eradicating mosquito nests.

Objectives:

This research is to analyze the relationship between experience with dengue hemorrhagic fever, knowledge, and attitudes towards the practice of eradicating mosquito nests.

Methods:

This study used a cross-sectional design. The population in this study were all families in the working area of the Ujung Berung Indah Primary Health Centre. The sample was taken by simple random sampling of as many as 116 housewives. The subjects of this research are housewives. The instrument used in this research was a questionnaire. The statistical test used is chi square.

Results:

The research results showed that the majority of respondents had experience with dengue hemorrhagic fever (61.2%) and had a less supportive attitude towards preventing dengue fever (73.3%). More than half of respondents performed poor practices in eradicating mosquito nests (56%), and they had low knowledge (54.3%). Variables related to the practice of eradicating mosquito nets were experience of dengue hemorrhagic fever ($p = 0.003$, OR = 3.4), knowledge ($p = 0.007$, OR = 3.0), and attitude ($p = 0.013$, OR = 3.1).

Conclusions:

Prevention of dengue hemorrhagic fever can be done by increasing the knowledge and attitudes of housewives, and experience of illness can change the behavior of housewives to eradicate mosquito nests.

KEYWORDS: Attitude; Dengue hemorrhagic fever; Mosquito breeding site eradication; Knowledge

SP-1705104-P

Factors Influencing Community Pharmacists' Intention to Provide Smoking Cessation Program

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ABSTRACT

Introduction:

The current utilization of tobacco stands as a principal preventable cause of mortality globally. Tobacco consumption escalates the susceptibility to ailments such as cardiovascular diseases, cancer, and chronic respiratory illnesses, thereby exacerbating economic burdens, mainly through escalated healthcare expenditures. Hence, there is an urgent need to expand smoking cessation programs to other health care facilities including community pharmacy. The objective of this study was to reveal factors that influence community pharmacists' intention to provide smoking cessation programs.

Objectives:

The objective of this study was to reveal factors that influence community pharmacists' intention to provide smoking cessation programs.

Methods:

This was a cross-sectional study conducted in Surabaya, Indonesia. This electronic survey addressed active pharmacists who work in community pharmacies. Random sampling was performed to obtain sample with specific sampling frame provided by Indonesian Pharmacist Association. The instrument utilized was developed based on the Theory of Planned Behavior. Knowledge profile was also assessed. Content, face, and construct validity were evaluated. Correlation analysis was accomplished using SPSS.

Results:

From 107 respondents, almost all were female (90.7%), around half (50.5%) was young pharmacists (20-30 years of age), had 0-10 years working experience (72%), and positioned as a chief pharmacist (72.9%). Most respondents worked in independent pharmacies (69.2%) but only 22.4% owned their own pharmacies. Descriptively, knowledge was moderate (79.4%) and attitude was mostly positive (99.1%). Strong intention was identified from around half of respondents (58.9%). Several factors were significantly correlated with intention ($p<0.005$). Perceived behavioral Control was the most significant factor ($r=0.681$), followed by attitude ($r=0.620$, and subjective norms ($r=0.446$). Meanwhile, knowledge did not influence the intention for providing smoking cessation program.

Conclusions:

Because the attitude was quite good, continuing professional development for pharmacists should be focused on training on providing a smoking cessation program in community pharmacies to enhance confidence, skills and facilities are needed.

KEYWORDS: Community pharmacy; Pharmacist; Smoking cessation; Theory of planned behavior; Health promotion

SP-1705105-P

Effectiveness Use Some Applications Diabetes-Blood Sugar Diary Using Single Ease Question and System Usability Scale (SUS) Method

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ABSTRACT

Introduction:

Diabetes is a medical condition characterized by high levels of blood sugar in the body, which can be caused by insufficient insulin production by the pancreas or the body's inability to use insulin effectively. Diabetes can cause various health problems if not treated properly. Digital health apps can help people with diabetes meet their needs, such as medication reminders, exercise guides, or blood sugar monitoring. To maximize its use, the application needs to be usable and easy to use. This article aims to test the effectiveness of the "Diabetes: M-Blood Sugar Diary" App based on SEQ and SUS methods. The result of the SEQ method has an average value of 5, so the application can be classified as Easy Enough whereas using the SUS method, the average value of SUS is 62 and can be classified as Poor

Objectives:

Digital health applications can assist individuals with diabetes in meeting their needs, such as medication reminders, exercise guidance, or blood sugar monitoring.

Methods:

To maximize their usage, these applications need to be usable and user-friendly. This article aims to test the effectiveness of the "Diabetes: M-Blood Sugar Diary" application based on the SEQ and SUS methods.

Results:

The results from the SEQ method have an average value of 5, categorizing the application as moderately easy. Meanwhile, using the SUS method, the average SUS score is 62, classifying the application as poor.

Conclusions:

The average score for the use of the application "Diabetes: M-Blood Sugar Diary" is 62 with the final result entering the marginal category.

KEYWORDS: Effectiveness; Diabetes mellitus type 2; HbA1C; M-blood sugar diary; SEQ; SUS

SP-1705106-P

Pharmacists' Beliefs and Attitude Towards the use of Herbal Medications for Covid-19 Treatment

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ABSTRACT

Introduction:

The lack of treatment options for Covid-19 has driven general public to seek for alternative medicines including the use of herbal medications. However, the paucity of information regarding the effectiveness and safety of herbal medications for Covid-19 treatments has made pharmacists become uniquely positioned to respond to such concern.

Objectives:

To investigate the pharmacists' beliefs and attitude about the use of herbal medications for Covid-19 treatment.

Methods:

A national cross-sectional survey was conducted recruiting a sample size of 1,720 community pharmacists in Indonesia during Covid-19 pandemic. Participants completed an online survey addressing their beliefs and attitude about herbal medications and practice of sharing information in relation to the use of herbal medications for Covid-19 treatment. A descriptive analysis was subsequently used in this study.

Results:

Overall, 53.3% of pharmacists received frequent information about the use of herbal medications predominantly from social media and only 7.3% who eventually shared the information. For attitude, the majority of pharmacists (64.89%) perceived that herbal medications can be both effective for treatment and prevention against Covid-19 infection. They believed that several herbal products including ginger, turmeric, meniran, echinacea and black cumin can be consumed primarily for immune booster to limit the infection.

Conclusions:

Pharmacists had positive beliefs and attitude that herbal medications are effective for treatment and prevention of Covid-19. Further studies were suggested to provide more evidence supporting the use of herbal medications against Covid-19 infection.

KEYWORDS: Herbal; Medicine; Pharmacist; COVID-19; Healthcare

SP-1705107-P

The First Impression and Response to Tuberculosis Infection from the Perspective of Lay People and Healthcare Providers in Indonesia

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ABSTRACT

Introduction:

For many years, campaigns and programs have been launched and promoted to control and eliminate the spread of tuberculosis. However, these interventions have not completely successful due to misconception and stigmatized feeling about tuberculosis

Objectives:

This study aimed to explore understandings and experiences related to tuberculosis and its treatment from the perspective of lay people and healthcare providers.

Methods:

As much as 27 participants were purposively selected. A qualitative approach was conducted through 17 sessions of in-depth interview with lay people, tuberculosis cadres, activists and district health office program manager; and two sessions of focus group discussion with healthcare workers in Depok, West Java, Indonesia where tuberculosis cases were relatively high.

Results:

The findings show that lay people and healthcare providers had almost the same understanding of tuberculosis but responded to symptoms, diagnosis and treatment of tuberculosis differently. Lay people had to encounter fear, discomfort and discouragement caused by the stigmatized image of tuberculosis in the community while striving for recovery. In addition, they had to bear occupational and social relationship risk following tuberculosis infection. For the healthcare providers, lay people's ignorance, dishonesty and non-compliance to a series of tuberculosis care cascade could lead to a great number of drug-resistance and tuberculosis mortality rate. Therefore, it roused their commitment to intensify contact investigation, health education and provision of support for tuberculosis-affected households.

Conclusions:

The ideas, feelings, emotions and responses of lay people to tuberculosis infection were influenced by their social status and life context. Their knowledge and beliefs grew their perceptions, concerns and stigmatized feelings about tuberculosis. This study shows that health education about tuberculosis is essential to raise awareness and control tuberculosis transmission. In addition, clinical, financial, social and psychological cross-sector support for tuberculosis-affected households are the keys to minimize the misery from the disturbing symptoms of tuberculosis, stigmatization and pressure to finish the treatment.

KEYWORDS: Tuberculosis; Lay people; Healthcare provider; Understanding; Experience; Stigma

SP-1705108-P

Assessment of Knowledge, Attitude, and Practices of Pharmacovigilance among Hospital Pharmacists in Metro Manila, Philippines

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ABSTRACT

Introduction:

Despite strict regulations ordained by governing bodies such as the Food and Drug Administration (FDA), drug-related morbidity and mortality as a result of adverse drug reactions (ADRs) are still relevant to this day. In pharmacovigilance, it is the pharmacists' pivotal duty to detect, assess, understand, and prevent adverse effects, prioritizing patient safety.

Objectives:

The study aims to assess and determine the correlation between the knowledge, attitude, and practices of hospital pharmacists in pharmacovigilance, and evaluate the pharmacovigilance system in hospitals in Metro Manila based on current practices.

Methods:

A cross-sectional study with a descriptive and correlational design was used to evaluate hospital pharmacists using a questionnaire adapted from Abdulsalim et al. (2023), which was disseminated to 120 hospital pharmacists in selected hospitals in Metro Manila. Responses were analyzed using descriptive statistics and Pearson's R Correlation.

Results:

Out of 120 respondents, 45% (n=54) and 48% (n=58) showed fair and moderate knowledge, respectively, while 7% (n=8) exhibited poor knowledge. Majority of the respondents displayed a positive attitude (n=120), however, 54% (n=65) showed poor practices. There is no significant correlation between knowledge and attitude and between knowledge and practices, with weak coefficient values of -0.0002 and 0.129 and non-significant p-values of 0.987 and 0.161, respectively. Conversely, the correlation between attitude and practice was significant, with a positive value of 0.199 and a p-value of 0.029, indicating a potential relationship between variables. Hospitals in Metro Manila follow most of the minimum requirements set by the FDA, with 79.2% (n=95) reporting that their institution submits all adverse drug events reports to the FDA.

Conclusions:

The weak correlations suggest that external factors may influence pharmacovigilance. To obtain an operative pharmacovigilance system, interventions should be made to address gaps in the knowledge and practices of hospital pharmacists, as well as in the practices of their respective institutions, ultimately improving patient safety.

KEYWORDS: Pharmacovigilance; Adverse drug reaction; Hospital pharmacist

SP-1705109-P

Clinical Efficacy and Safety of Medicinal Plants for Osteoarthritis: A Systematic Review and Meta-Analysis of Randomized Controlled Trials

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ABSTRACT

Introduction:

Osteoarthritis (OA) is a common problem with an increasing incidence around the world including Thailand, where it ranks as one of the most causes of disability-adjusted life years among Thai elderly. Besides conventional medicine, medicinal plants offer a promising alternative for treating the OA symptoms. However, previous systematic reviews and meta-analyses (SR-MA) on medicinal plants for OA treatment revealed limited quantity and quality clinical evidence.

Objectives:

This study aimed to evaluate the clinical efficacy and safety of oral monotherapy medicinal plants for treating OA from existing evidence of randomized controlled trials (RCTs).

Methods:

The search on RCT studies was performed through three international databases (PubMed, EMBASE, Scopus), and four Thai databases (Thai Index Medicus, ThaiJo, TCTR, and ThaiLIS) from inception until October 2023. The RCTs that compared the effect of monotherapy medicinal plants with placebo or pharmacological standard treatment for treating OA which reported any relevant outcomes (i.e., joint pain, function, stiffness, quality of life, and adverse events) were selected. Risk of bias was assessed using the Cochrane risk-of-bias tool for RCTs version 2. This SR-MA was registered at PROSPERO registration number: CRD42024496955.

Results:

A total of 42 RCTs met the inclusion criteria. Of these, 12 RCTs of *Curcuma longa* L. were used for meta-analysis. The analysis revealed that efficacy of *Curcuma longa* L. in reducing pain and improving joint function were significantly better than placebo (the scores measured with Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and Visual Analog Scale (VAS) decreased) with high heterogeneity. In addition, the review showed a potential efficacy of Curcuma longa L. when compared with NSAIDs. There were no serious adverse events of *Curcuma longa* L. reported from the included RCTs. The most common adverse effects were GI-related symptoms.

Conclusions:

This SR-MA provided updated knowledge about the efficacy of medicinal plants in treating OA and suggested trends of medicinal plants for further investigation study. Our meta-analysis of *Curcuma longa* L. shows statistically significant improvements in overall joint efficacy when compared to placebo. However, its efficacy was probably not significantly different from that of NSAIDs. Nevertheless, due to high heterogeneity, small sample size, and high risk-of-bias in the study design of the included RCTs, further adequate methodological quality RCTs are needed.

KEYWORDS: Medicinal plants; Osteoarthritis; Systematic review; Meta-analysis; Efficacy

SP-1705111-P

Meta-Analysis of Observational Studies Using Propensity Score Methods for First-Line Antihypertensive Drug Classes

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ABSTRACT

Introduction:
Antihypertensive medications are linked to preventing cardiovascular events, however, there's a significant gap in understanding of how different medication classes compare in real-world effectiveness.

Objectives:
This study aims to quantify mortality and morbidity effects from different first-line antihypertensive drug classes including RASI (Renin–angiotensin system inhibitor), beta-blockers (BB), calcium channel blockers (CCB) and diuretics, in observational studies using propensity score (PS) method in hypertensive patients.

Methods:
Systematic searches were conducted in PubMed and Scopus until March 2024, including observational studies utilizing PS methodology comparing first-line drug classes in hypertensive adults. Outcomes included all-cause mortality, cardiovascular mortality, heart failure (HF), hospitalization for heart failure (HHF), stroke, composite cardiovascular events (CCE), and myocardial infarction (MI). Direct meta-analysis was performed with at least three studies sharing similar treatment comparisons and outcomes. Adjusted risk ratios (RR), odd ratios (OR), hazard ratios (HR) were pooled using a random or fixed-effect model based on the presence of heterogeneity. Risk of bias was assessed using the Non-Randomized Studies-of Interventions (ROBINS-I). Publication bias and subgroup analysis were performed.

Results:
The study included 36 cohort studies with 12,469,461 patients, with 19 studies conducted in COVID-19 patients. Mean participant age was 63 years. Compared to non-RASI, RASI reduced mortality (RR 0.51, 95%CI 0.07, 0.96; OR 0.73, 95%CI, 0.62, 0.84; HR 0.9, 95%CI 0.86, 0.94), stroke (HR 0.9, 95%CI 0.86, 0.94), MI (HR 0.84, 95% CI 0.77, 0.91) but not reduce HF. Compared to RASI, diuretics and BB did not reduce mortality, HF, and stroke. CCB increased stroke (HR 1.10, 95%CI 1.00, 1.19) and CCE (HR 1.04, 95%CI 1.02, 1.07), but did not reduce HF, HHF and MI compared with RASI.

Conclusions:
RASI reduced all morbidity and mortality outcomes except for HF and HHF. RASI, diuretics, and BB show similar effectiveness. CCB were inferior to RASI.

KEYWORDS: Antihypertensive; Hypertension; Meta-Analysis

SP-1705112-P

Quality of Life in End-Stage Renal Disease Patients Undergoing Dialysis and Associated Factors

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ABSTRACT

Introduction:
The prevalence of end-stage renal disease (ESRD) patients requiring dialysis is increasing in Vietnam. However, there are limited data regarding the relationship between medication use, clinical factors, and the quality of life (QoL) among ESRD patients undergoing dialysis.

Objectives:
This study aims to explore the association between QoL and sociodemographic, clinical, and medication-related characteristics in this patient population.

Methods:
A cross-sectional, descriptive study was conducted among 340 ESRD patients receiving dialysis at Khanh Hoa Provincial General Hospital in Vietnam. Face-to-face interviews were conducted using the Vietnamese version of the WHOQoL-BREF questionnaire.

Results:
Among the 340 ESRD patients, 257 were undergoing hemodialysis (HD), while 83 were on peritoneal dialysis (PD). Hypertension (100%) and anemia (100%) were the most prevalent comorbidities. However, only 40.3% of patients achieved their blood pressure targets, and 30% reached the desired hemoglobin levels. The overall average QoL score was 47.77 ± 10.04, with the physical and mental domains showing the lowest QoL scores among the four assessment domains. HD patients had significantly lower QoL scores than PD patients across all domains and overall QoL perception ($p < 0.05$). Employment status ($p < 0.05$), duration of HD/PD ($p < 0.05$), dialysis method ($p < 0.001$), blood pressure target achievement ($p < 0.001$), and phosphate concentration ($p < 0.05$) were significantly associated with overall QoL in ESRD patients.

Conclusions:
To enhance the QoL of ESRD patients in Vietnam, targeted interventions should focus on achieving treatment goals, addressing employment status, and providing risk modification strategies, particularly for HD patients.

KEYWORDS: Kidney; End stage renal disease; Quality of life; Hemodialysis; Peritoneal dialysis

PN-1101101-P

Morphological, Anatomical and Genetic Diversity of some *Elsholtzia* species in the North of Vietnam

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ABSTRACT

Introduction:

Elsholtzia Willd. (Lamiaceae) is a taxonomically diverse group with documented use in traditional Vietnamese medicine.

Objectives:

This study aimed to assess the diversity of *Elsholtzia* species in Northern Vietnam using a combined approach of morpho-anatomical characterization and Internal Transcribed Spacer (ITS) sequence analysis.

Method:

Eight *Elsholtzia* specimens were collected from Northern Vietnam. The morphological characters of the samples were analyzed using a descriptive-analytical method. The anatomical characteristics of cross-sections of leaves and stems were observed under the microscope. Species identification was achieved using taxonomic keys from the Flora of Vietnam and Flora of China. Total genomic DNA was extracted from young leaves by the CTAB method. Polymerase Chain Reaction (PCR) amplification was performed utilizing ITS region primers to generate amplicons for subsequent genetic diversity and phylogenetic relationship analyses among the eight *Elsholtzia* samples.

Results:

Eight samples of *Elsholtzia* from the North of Vietnam were identified as *Elsholtzia blanda* (Benth.) Benth.; *Elsholtzia ciliata* (Thunb.) Hyland.; *Elsholtzia communis* (Collett. & Hemsl.) Diels.; *Elsholtzia penduliflora* W. W. Smith.; *Elsholtzia flava* Benth. and *Elsholtzia fruticosa* (D.Don) Rehder. Among them, *Elsholtzia flava* Benth. and *Elsholtzia fruticosa* (D.Don) Rehder were new records for Flora of Vietnam. Morphologically, these species were differentiated based on bract shape, leaf structure, inflorescence type, and petal color. Additionally, anatomical microcharacters, specifically trichome density and morphology, were employed for taxonomic classification. Their ITS sequences with a length of approximately 700 nucleotides, which illustrated the genetic distance between 8 samples was from 0,03 to 0,16. Interestingly, three specimens identified as *E. ciliata* exhibited close phylogenetic relationships based on ITS sequences but displayed distinct morphological characteristics, particularly in leaf shape and odor.

Conclusions:

This study successfully employed a combined morpho-anatomical and molecular approach to assess the diversity of *Elsholtzia* species in Northern Vietnam. The findings contribute to a better understanding of this genus, which holds potential as a source of herbal medicine in Vietnam.

KEYWORDS: *Elsholtzia blanda*; *Elsholtzia ciliata*; *Elsholtzia communis*; *Elsholtzia flava*; *Elsholtzia fruticosa*; *Elsholtzia penduliflora*

PN-1105101-P

Associated Factors and Intention to Traditional Medicine Use Among Residents in Mondulkiri Province

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ABSTRACT

Introduction:

The practice of traditional medicine in Cambodia comes from different biodiversity, cultures, and beliefs which can bring negative or positive effects to consumers.

Objectives:

This study aims to identify the factors associated with the intention for using traditional medicine among population in Mondulkiri province.

Method:

A cross-sectional survey in Krong Senmonorom interviewed 458 adults aged over 18 from two out of four communes on February 06, 2024. The estimated population of adults aged over 18 years old is 8.576 people (2019 General Population Census). A semi-structure questionnaire was used for face-to-face interview. The questionnaire covered socio-demographics, personal attitudes/beliefs, subjective norms, and perceived behavioral control. Descriptive statistics were used for data analysis. Data were entered using Google Forms and Microsoft Excel, then analyzed with Statistical Package for the Social Sciences (IBM SPSS) version 26 using descriptive statistics and chi-square test was used to explore factors associated with traditional medicine use.

Results:

Most participants were females with the average age 43.8±13 years old. Most were single, working as sellers or housewives. Four hundred and fifty-eight responses were analyzed to find associated factors among residents. Among the four factors, personal attitude, subjective norms and perceived behavioral control were found significantly associated with the intention for using traditional medicine (p<.005). 88.40% had a positive attitude towards traditional medicine, with 59.20% influenced by close relatives, and 91.70% finding it easy and accessible, leading to a high intention to use traditional medicine in the future.

Conclusions:

Our result showed that people in rural areas still have a strong belief in the outcome of using traditional medicines with the easy behavioral performance which endeavor them to remain using it. Therefore, community education and further studies on the efficacy and safety of traditional medicines should be given great attention.

KEYWORDS: Factor associated; Intention; Mondulkiri Province; Population; Traditional medicine

PN-1105102-P

Study of Ethnomedicine as Self-Medication in the Community of Ciangsana Village, Gunung Putri District, Bogor Regency

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ABSTRACT

Introduction:

Indonesia is a tropical country with vast territory and abundant natural resources. It is also known as a producer of various natural products, including herbal medicine. According to the World Health Organization, the percentage of traditional medicine utilization for self-medication in developing countries is 80% of the population. Thus, Indonesia requires studies related to ethnomedicine as self-medication. Currently, there is still no data regarding ethnomedicine and traditional medicine. Therefore, this research aims to obtain data related to traditional medicine as self-medication to provide insights into the national herbal research database.

Objectives:

Explaining the pattern of traditional medicine usage in self-medication.

Methods:

The study on ethnomedicine for self-medication involved interviewing residents of Ciangsana village, Gunung Putri district, Bogor regency. Data analysis included utilization patterns of plants (Use Value/UV, Informant Consensus Factor/ICF, and Fidelity Level/FL).

Results:

There are 8 medicinal plants used for self-medication. The utilization of plant parts is predominantly rhizomes (52%), followed by leaves (37%), leaves and stems (7%), and stems (4%). The processing method for medicinal plants applied is boiling (100%). Plants with high UV values include brotowali (0.4375), ginger (0.4375), kencur (0.4375), and turmeric (0.4375). The highest ICF values include lowering cholesterol (1.00), reducing gastric pain (1.00), and relieving muscle aches (1.00). Plants with the highest fidelity level (FL) scores (100) are brotowali (for uric acid), ginger (for lowering cholesterol), kencur (for increasing appetite), turmeric (for reducing gastric pain), and temulawak (for increasing appetite).

Conclusion

There are 8 types of plants utilized by the community in Ciangsana village as medicines, including brotowali, ginger, kecibeling, kencur, kumis kucing, turmeric, sambiloto, and temulawak. The most commonly utilized plant organ is rhizomes (52%), and the most common processing method is boiling (100%). This research could contribute to national regulations on herbal medicine.

KEYWORDS: Ethnomedicine; Self-medication; Traditional medicine; Medicinal plant; Community of Ciangsana village

PN-1105103-P

Antitussive and Expectorant Activity of the Herbal Preparation Bophe-Hataphar™ Syrup Containing Dried Extract of *Eriobotrya japonica* (Thunb.) Lindl. leaf

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ABSTRACT

Introduction:

Eriobotrya japonica (Thunb.) Lindl. (commonly known as Loquat) is an evergreen fruit tree, only distributed in some northern provinces of Vietnam (Lang Son, Cao Bang, Lai Chau). The Loquat leaf has been used in traditional herbal medicine for treating coughs and respiratory conditions. The main ingredient of Bophe-Hataphar™ is dried extract of *E. japonica*l eaves and some anti-coughing herbal drugs such as *Platycodi radix*, *Fritillaria cirrhosa bulbus*, *Zingiberis rhizoma*. The herbal preparation was prepared in syrup form for this study.

Objectives:

This study aims to evaluate the antitussive and expectorant activity of Bophe-Hataphar™ syrup using *in vivo* expreriments.

Method:

For the antitussive assay: the antitussive effects were evaluated using a classical mice cough model induced by ammonia liquor. Codeine phosphate was used as a positive control. For the expectorant assay: phenol red secretion experiments were conducted to evaluate the expectorant activities of Bophe-Hataphar™. NH_4Cl was used as apositive control.

Results:

The results showed that Bophe-Hataphar™exhibited potent antitussive effects, significantly reducing coughs in a dose-dependent manner. At doses of 7.2 mL/kg and 14.4 mL/kg, the herbal preparation reduced coughs to 1 (0-3) and 3 (0-8) per 5 minutes, respectively ($p<.001$), demonstrating its antitussive activity. In the expectorant assay using the phenol red secretion mice model, Bophe-Hataphar™was evaluated for its ability to promote expectoration. The results showed that the herbal preparation significantly increased phenol red secretion, indicating expectorant activity. Both doses of Bophe-Hataphar™ (7.2 mL/kg and 14.4 mL/kg) resulted in a 1.5-fold increase in phenol red secretion, similar to the positive control ($p> .05$).

Conclusions:

Overall, the study demonstrated that Bophe-Hataphar™ syrup has significant antitussive and expectorant activities *in vivo*. It effectively reduced coughing and promoted expectoration. This research is the first to report on antitussive and expectorant activity of herbal preparation containing dried extract of the leaves of *E. japonica* as major ingredient.

KEYWORDS: Antitussive; Bophe-Hataphar™; *Eriobotrya japonica*; Expectorant; Herbal preparation

PN-1106101-P

Repellency of Natural Essential Oil Blends Against Adult German Cockroach, *Blattella Germanica* (Blattaria:Blattellidae)

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ABSTRACT

Introduction:

The German cockroach, *Blattella germanica* has been considered as one of the most common sources of indoor allergens. Historically, cockroach control has been based on the use of chemical insecticides, which could lead to issues such as pesticide resistance, environmental contamination and human health concerns. Therefore, development of alternatives to replace chemical pesticides is essential. Several essential oils (EOs) have been reported for their repellency activities against insects including German cockroach. Furthermore, EOs have been considered generally safe and there is little concern regarding their residue in the environment.

Objectives:

This study aimed to develop eco-friendly repellent products using EOs blends for the use in home or office areas such as, living room, kitchen and bedroom.

Method:

The chosen EOs and monoterpenes, such as citronella, kaffir lime, menthol and camphor, have been widely used in food, cosmetic and pharmaceutical industries. The blends with pleasant odor were developed and tested for repellent activity against adult German cockroach at the National Institute of Health of Thailand. Repellency assays were conducted using area preference method. The chemical constituents of each EO and blend were investigated using Gas chromatography-Mass spectrometry (GC-MS).

Results:

The developed blends named MU-kaffir lime and MU-Citronella exhibited repellency effects against the insect (96.7%). The MU-kaffir lime was chosen for development of repellent spray by mixing with diluents in a ratio of 30:70. It was found that the repellency rate of the diluted blend was 98.3% similar to that of the concentrated blend. The major constituents of each EO and blends were successfully identified. The developed blends named MU-kaffir lime and MU-Citronella exhibited repellency effects against the insect (96.7%). The MU-kaffir lime was chosen for development of repellent spray by mixing with diluents in a ratio of 30:70. It was found that the repellency rate of the diluted blend was 98.3% similarto that of the concentrated blend. The major constituents of each EO and blends were successfully identified using GC-MS.

Conclusions:

The EOs blends developed in this study could be further developed as eco-friendly cockroachrepellents. The relative peak areas of the chromatograms could be used for quality control of each EO and the blends.

KEYWORDS: *Blattella germanica*; Eco-friendly; Essential oil; German cockroach; Repellent

PN-1106103-P

Markers-based Standardization of Thai Traditional Formulation for Knee Poultice (Ya-Pok-Dud-Pid) Using UPLC-DAD

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ABSTRACT

Introduction:

Thai traditional formulation of knee poultice (Ya-Pok-Dud-Pid) has been widely used for the treatment of knee inflammation, osteoarthritis, and other related symptoms. It contains *Zingiber aromatica*, camphor, *Citrus hystrix, Piper nigrum, Curcuma aromatica, Globba malaccensis, Alpinia galanga, Plumbago indica, Piper retrofractum, Putranjiva roxburghii, Tamarindus indica, Acacia concinna, Zingiber zerumbet, Zingiber officinale, Cleome viscosa, Acorus calamus, Gloriosa superba, Crinum asiaticum, Tradescantia zebrina*, and salt as ingredients.

Objectives:

To develop and validate the quantification method for quality assessment of Thai traditional formulation for knee poultice (Ya-Pok-Dud-Pid).

Method:

The tincture was diluted with methanol and filtered through 0.22 mm nylon membrane filter. Ultra-high performance liquid chromatography coupled with diode array detector (UPLC-DAD) was developed and validated for determination of major components of Thai Traditional Formulation for Knee Poultice (Ya-Pok-Dud-Pid). Different batches of drugs from Thai traditional and Complementary Medicine Hospital were analyzed.

Results:

An UPLC method was developed for quantification of compound D, colchicine, D-acetate, DMPBD, piperine and zerumbone in Thai traditional formulation for knee poultice (Ya-Pok-Dud-Pid). These compounds were the major components with anti-inflammatory activity. The optimized condition was achieved using Hypersil Gold C-18 column. The method was validated for its specificity, linearity, precision, and accuracy according to ICH guidelines. The validation parameters were within acceptable values. The concentrations of compound D, colchicine, D-acetate, DMPBD, piperine, and zerumbone of different batches of drugs (n = 4) were 224 ± 130, 10.7 ± 4.5, 105 ± 56, 110 ± 88, 191 ± 51, and 41 ± 39 mg/mL, respectively, indicating the natural variation of active components in raw materials.

Conclusions:

The developed and validated UPLC-DAD method was suitable for determination of major active components of Thai traditional formulation for knee poultice (Ya-Pok-Dud-Pid), providing a mean normalized dose for further study. Considering together with its therapeutic and safety dose, the rangedconcentration could be proposed for its specification.

Keywords: Chromatography; Herbal medicine; Quality control; Thai traditional medicine; UHPLC

PN-1106104-P

Comparative Determination of Sildenafil as an Adulterant in Herbal Products by TLC-SERS and HPTLC

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ABSTRACT

Introduction:

TLC-SERS is a method using thing layer chromatography combined with surface-enhanced Raman spectroscopy for fast detection of analytes with high sensitivity, simplicity and has been successfully applied to detect analytes. However, many factors can influence the signal intensity in TLC-SERS analysis. Therefore, determination by TLC-SERS has always been a challenging task. In this study, determination of sildenafil adulterated in herbal products was conducted using TLC-SERS analysis. Several critical factors were investigated and controlled for reliable quantitative results. In paralel, an HPTLC method was also developed for the analysis of the same compound in the same samples.

Objectives:

In this study, a TLC-SERS method was developed and validated for the determination of sildenafil adulterated in herbal products. Determination by TLC-SERS method was compared to HPTLC method.

Method:

Simple sample preparation for sildenafil extraction was done using methanol with 5 minutes vortex and 10 minutes sonication before application to TLC plate. For HPTLC, after TLC development, the TLC spot with Rf corresponding to sildenafil was scanned with UV light and quantified at 304 nm. For TLC-SERS, the spot was marked with pencil on TLC plate. Nano silver colloid for SERS effect was then introduced on the marked spot, and SERS signal was measured immediatly afterwards, and quantitation was conducted on the peak at 1232 cm^{-1}.

Results:

Both methods were validated according to AOAC, TLC_SERS has a detection limit of 1.65 ng/spot, much lower than 95 times compared with HPTLC method (157 ng/spot). Quantitation were conducted paralelly using TLC-SERS and HPTLC analysis on some real adulterated samples. Sildenafil content obtained was not significantly different between the two methods.

Conclusions:

Therefore, TLC-SERS is a new method that opens up many prospects in the application of detecting illegal mixing of sildenafil in herbal preparations both in qualitative and quantitative aspect.

KEYWORDS: Adulteration; Determination; Herbal products; HPTLC; Sildenafil; TLC-SERS

PN-1106105-P

Exploring Free Radical Scavenging and Cardioprotective Effects via Acid-Base Extraction from *Nelumbo nucifera* Gaertn.

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ABSTRACT

Introduction:

Nelumbo nucifera Gaertn. (sacred lotus) is belongs to the family Nelumbonaceae. Its plumules (P) and leaves (L) are rich in alkaloids, predominantly neferine and nuciferine, respectively. These compounds have been reported to exhibit various pharmacological activities, notably, cardiovascular effects. In this study, alkaloids from *N. nucifera* were extracted using acid-base extraction (ABE), a technique that effectively isolates alkaloid compounds from plants. Concurrently, the study investigated the free radical scavenging and cardioprotective effects on H9c2 cells.

Objectives:

The objectives of study were to quantify neferine and nuciferine content in lotus plumule and leaf extracts through HPLC analysis. These extracts were obtained through ABE method. Additionally, the study assessed the antioxidant potential using DPPH and FRAP assays, and evaluated the cardioprotective effects of lotus extracts in H9c2 cells.

Methods:

The ABE was utilized to extract compounds from lotus, either 70% or 95% ethanol. The neferine and nuciferine content were analyzed by HPLC technique. The antioxidant activity was assessed through DPPH and FRAP assays. Furthermore, the cardioprotective effect against oxidative stress induced by H_2O_2 in H9c2 cardiomyoblasts was evaluated.

Results:

From our obtained results, P-ABE95 showed a higher neferine content (177.24 ± 0.79 mg/g) compared to P-ABE70 (112.46 ± 0.72 mg/g) in lotus plumule extracts. Similarly, the lotus leaf extracts revealed a higher nuciferine content in L-ABE95 (9.50 ± 0.01 mg/g) compared to L-ABE70 (8.03 ± 0.03 mg/g). In terms of antioxidant activity, P-ABE95 demonstrated the highest efficacy in both DPPH (IC_{50} of 50.416 ± 0.87 µg/ml) and FRAP assays (value of 50.416 ± 0.87 mM/100g extract). Based on the evaluation of their antioxidant activity, the most promising extracts (P-ABE95) were selected for further in vitro cardioprotective testing in H9c2 cardiomyoblasts. The results indicated that P-ABE95 extract significantly increased cell viability in H9c2 cells ($p < 0.05$).

Conclusions:

The amount of neferine and nuciferine in lotus extracts were determined using the HPLC technique. Extracts obtained with 95% ethanol showed higher concentrations of neferine and nuciferine compared to those obtained with 70% ethanol. Notably, P-ABE95 exhibited the highest antioxidant activity among these extracts. Moreover, regarding in vitro cardioprotective effects, the P-ABE95 extract enhanced the cell viability of H9c2 cells induced by H_2O_2.

KEYWORDS: Acid-base extraction; Cardioprotective effect; Neferine; *Nelumbo nucifera*; Nuciferine; Plumule

PN-1106106-P

Quantitative and Chemical Fingerprint Analysis of Alkaloids and Flavonoids for the Quality Evaluation of Lotus leaves (*Folium Nelumbinis*) by Using UPLC-MS/MS Method

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ABSTRACT

Introduction:

Lotus (*Nelumbo nucifera* Geartn.) is widely utilized in traditional medicine and cuisine throughout Asia, with its leaves harboring alkaloids and flavonoids renowned for highly valuable bioactivities. However, lotus leaves are often considered waste, urging the need for methods to analyze these components and enhance biological and economic value. Chemical fingerprint is endorsed by global regulatory agencies, as an effective method for assessing the quality of herbal medicines.

Objectives:

A rapid, sensitive, and reliable UPLC-MS/MS method was developed to evaluate the quality of *Folium Nelumbinis* by establishing the first chromatographic fingerprint of simultaneously determination of bioactive alkaloids (nuciferin, *N*-nornuciferin, *O*-nornuciferin) and flavonoids (kaempferol, quercetin, isoquercitrin, quercetin-3-*O*-glucuronide).

Methods:

The approach was validated following the AOAC and EC/657/2002 guidelines and applied to analyze and evaluate 80 samples of lotus leaves harvested from various areas in Vietnam.

Results:

The optimum MS/MS conditions were achieved using positive or negative electron spray ionization and multi-reaction monitoring mode for three alkaloids and four flavonoids. The chromatographic separations were performed on the Hillic column (1.7 µm, 50 x 2.1 mm) with isocratic elution of acetonitrile and 0.25% formic acid in a 35:65 (v/v) ratio at 25°C. The result indicated good regression (R^2 > 0.995) within linear ranges, a recovery rate from 95.0% to 103.9%, and limit of detections and quantifications for most analytes were less than 0.5 ng/mL and 1.5 ng/mL, respectively. Respective results revealed significant qualitative and quantitative differences depending on the growing area and season. In all samples, nuciferine (0.05 - 1.19%) and quercetin-3-*O*-glucuronide (0.31 - 5.71%) were the most dominant alkaloids and flavonoids. The alkaloid and flavonoid contents were highest in Ha Noi (21.1 ± 0.12 mg/g) and Quang Nam (66.5 ± 1.56 mg/g), respectively.

Conclusions:

This study indicated that combining quantitative and chromatographic fingerprint analysis can effectively control the quality of *Folium Nelumbinis* and its traditional Vietnamese medicinal preparations.

KEYWORDS: Alkaloid; Chemical fingerprint; Flavonoid; *Folium Nelumbinis*; Quality control; UPLC-MS/MS

PN-1106107-P

Formulations of Topical Ointment for Wound Healing Activity Using *Gynura Procumbens* (Lour.) Merr Leaves Extract.

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ABSTRACT

Introduction:

Gynura procumbens (Lour.) Merr., an herb found in Southeast Asia has been used in traditional medicine for treatment at a wide range of health ailments. The previous studies revealed that ethanolic *G. procumbens* leave extract contained chlorogenic acid as the major compound, which exhibited antioxidant, anti-inflammatory and wound healing potential.

Objectives:

In this study, we aimed to develop topical formulations of *G. procumbens* extract and evaluate wound healing in mice.

Method:

Gynura procumbens was extracted with 95% ethanol. Phytochemicals were investigated and quantifed using thin layer chromatography (TLC) and high-performance liquid chromatography (HPLC) techniques. The analysis of total phenolic content (TPC), total flavonoid content (TFC) and diphenyl-picrylhydrazyl (DPPH) radical scavenging assay were performed. Topical ointment of *G. procumbens* leaves extract for further pharmaceutical purposes was developed. The stability and shelf-life of these formulations, as well as the crude extract, underwent evaluation in accordance with ASEAN guideline. A full thickness excisional skin wound (4 mm diameter) was generated on the shaved dorsum of eight-week-old C57BL/6 mice. *G. procumbens* ointment (0.5 or 2%w/w) or ointment base was applied once daily for 7 days. The wound size was monitored once a day for 14 days.

Results:

The ethanolic *G. procumbens* leaves extract contained total phenolic and total flavonoid at 43.80 ± 1.79 μg GAE and 132.67 ± 1.40 μg QE in 1 g extract, respectively. For DPPH radical scavenging activity, the extract exhibited IC_{50} of 181.70 ± 0.76 µg/mL. Formulation of topical *G. procumbens* ointment with 0.5% and 2% w/w extract were developed. Stability study revealed that, *G. procumbens* ointment formulas and crude extract unstable under accelerated stored for 6 months. For *in vivo* wound healing study, topical *G. procumbens* ointment showed a good appearance and smooth texture when applied on mice but did not significantly accelerated wound closure compared to the ointment base-treated controls.

Conclusions:

Therefore, although *G. procumbens* extract trend to potential for antioxidant and wound healing activity, it is imperative to conduct further studies on the chemical degradation pathways that could compromise the potency and quality of drug products. Additionally, employing larger sample sizes in these studies is recommended to ensure accuracy and reliability of the results.

Keywords: *Gynura procumbens*; Ointment; Stability; Wound healing activity

PN-1106108-P

Development of Roselle Ointment with Antibacterial Effects

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ABSTRACT

Introduction:

Hibiscus sabdariffa (roselle or krachiap daeng in Thai) is a plant commonly used as a beverage and herbal medicine for diuretic purposes. There is no previous development of topical formulation from quality-controlled roselle extract.

Objectives:

To develop an ointment containing the roselle extract and investigate for the physical, chemical, and biological stabilities.

Methods:

The ointment was developed from roselle extract. Physical properties including organoleptic characteristics, pH and microbial contamination were investigated. Phytochemical characteristics were investigated by thin layer chromatographic technique. Total anthocyanin contents were analyzed by pH differential methods. In vitro antibacterial activities against clinical isolated bacteria were evaluated by agar well diffusion method. The stability test of the ointment was conducted according to ASEAN guideline on stability study and shelf-life of traditional medicine (2013).

Results:

Roselle ointment appeared as dark red semi-solid with smooth texture, pH 3.81 and no microbial contamination. Thin layer chromatography showed the major bands corresponded to delphinidin-3-sambubioside and cyanidin-3-sambubioside. The ointment kept in the refrigerator (2 – 8 °C) showed the highest remaining total anthocyanin content (1.50 ± 0.00 mg% cyanidin-3-glucoside equivalent (mg%C3GE) of the ointment) after 4 weeks. Roselle ointment in all storage conditions still promoted inhibitory effects against ***Staphylococcus aureus*** and ***Staphylococcus intermedius*** with the inhibition zone ranging from 9.61 ± 0.10 to 11.97 ± 0.05 mm at the end of stability test.

Conclusions:

Roselle ointment was developed with good physical, chemical, and biological activities. The refrigerator was recommended as storage condition to prolong chemical stability of the ointment.

KEYWORDS: Anthocyanins; Antibacterial activity; *Hibiscus sabdariffa*; Ointment; Roselle; Stability

PN-1106109-P

Development of Extraction Procedure to Control Rutin Content from *Azadirachta indica* A. Juss Leaf Extract for Diabetes Treatment

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ABSTRACT

Introduction:

In Vietnam, *Azadirachta indica* A. Juss was widely planted in many southern provinces and often used in traditional medicine.The pharmacological activities of *A. indica* are mentioned as anti-cancer, antibacterial, and diabetes. Therefore, the quantification of the main phenolic compounds accumulated in *A. indica* is necessary to improve thequality of the raw material, facilitating its use in the pharmaceutical industry. To our knowledge, there are currently very few studies on using rutin as a marker in *A. indica*.

Objectives:

The study aimed to evaluate diabetes treatment of *Azadirachta indica* extract by alpha-glucosidase enzyme inhibiting activity. After that, the extract was optimized condition of ultrasound-assisted extraction and quantified rutin as a marker of *Azadirachta indica* by HPLC/PDA.

Methods:

The diabetes treatment of *Azadirachta indica* extract was evaluated by alpha-glucosidase enzyme inhibiting activity. An ultrasound-assisted extraction was used to optimize the extraction process. HPLC/DAD was developed to determine rutin in *A.indica* leaf with Phenomenex C18 column (250 mm × 4.6 mm i.d., 5 µm) with an isocraticelution of methanol: 0.1% formic acid/water (30:70) at a flow rate of 1.0 mL/min; detection was at 254 nm. The extraction efficiency was evaluated by the peak area of rutin in the *Azadirachta indica* extract sample. The quantification method was validated for selectivity, linearity, limit of detection (LOD), limit of quantification (LOQ), precision, and accuracy according to the AOAC and ICH guidelines.

Results:

The methanol extract has the strongest alpha-glucosidase enzyme inhibitory activity (197.2±0.14 µg/mL) and was selected as the extraction solvent. The optimal extraction process was used: the solvent chosen for extraction was methanol with a volume of 30 mL, ultrasound time of 30 minutes, extraction temperature of 50°C, and extraction 3 times.The limits of detection and quantification were 0.125 µg/mL and 0.412 µg/mL, respectively. The rutin content in *Azadirachta indica* leaf extractwas 5.53 mg/g.

Conclusions:

The validated method was successfully applied to quality control rutin compound in *Azadirachta indica* which has potential pharmacological for diabetes treatment.

KEYWORDS: Alpha-glucosidase enzyme inhibiting activity; *Azadirachta indica* A. Juss; Rutin; Ultrasound-assisted extraction

PN-1106110-P

Determination of Strychnine and Brucine by HPLC for Better Quality Control of Strychni Semen

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ABSTRACT

Introduction:

Strychni semen is a traditional medicine used for different purposes including antioxidant, pain relief, and diabetes treatment. After detoxification, processed Strychni semen is also used as stimulant of nerves or anti-inflamatory agent. Strychnine and brucine are two main alkaloids responsible for pharmaceutical activity as well as toxicity of Strychni semen. In Vietnamese Pharmacopoeia, 19 different *Strychnos* species are accepted in Strychni semen monograph. However, different species contain significantly different levels of strychnine and brucine, resulting in variation in quality of the traditional medicine.

Objectives:

In this study, the content of strychnine and brucine in Strychni semen collected from different provinces in Vietnam were determined using HPLC method. Processed samples were also analyzed for content of strychnine and brucine with the same method.

Methods:

The HPLC method for assay of strychnin and brucin in Chinese Pharmacopoeia was used, with C18 column (4.6 x 100 mm, 3.5 mm) and mobile phase containing sodium heptane sulfonate in pH 2.8 phosphate buffer and methanol. Strychnin and brucin was extracted by reflux with chloroform and diluted with methanol.

Results:

In 10 crude Strychni semen samples, five samples conformed to Vietnamese Pharmacopoeia standards for strychnin content, among which 4 samples conformed to Chinese Pharmacopoeia standards for both strychnin and brucin contents. Among 5 samples that did not conform to Vietnamese Pharmacopoeia, and 4 samples was found at very low content of both strychnin and brucin. Nine processed Strychni semen samples were analyzed, showing a lower content of both strychnine and brucine.

Conclusions:

From strychnin and brucin content in crude Strychni semen samples, starting material *Strychnos nux-vomica* seed can be identified with required levels of strychnine. On the other hand, strychnine and brucine content in processed Strychni semen samples were also determined, although these contents are not yet specified in Vietnamese pharmacopoeia.

KEYWORDS: Brucine; Determination; HPLC; quality control; Strychni semen; Strychnine

PN-1107101-P

Chemical Analysis of *Cannabis sativa* L. Extracts and Their Biological Assessment for Antioxidant and Anti-inflammatory Activities

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ABSTRACT

Introduction:

Inflammation is a protective mechanism involving the blood vessels and various cells to eliminate the cause of injury, clear out damaged cells, and initiate tissue repair. Symptoms of inflammation typically include every part of the body linked to muscular tissues and skin health. So, the development of new anti-inflammatory drugs was important. *Cannabis sativa* L. has been popularly used in herbal medicine, in particular treatment of inflammation. Previous studied have shown that CBG and CBD effectively inhibit inflammatory and oxidative stress signaling in HDFs. In addition, cannabinoids in *C. sativa* L. also show antipruritic and antinociceptive properties.

Objectives:

To determine their major bioactive compounds by mass spectrometry and evaluate in vitro antioxidant and anti-inflammatory properties of *C. sativa* L. ethyl acetate extracts derived from five different parts, including seed, leaf, inflorescence, stem and root.

Methods:

Five different parts of the *C. sativa* L. plant were extracted with ethyl acetate through an ultrasound-assisted extraction method. Gas chromatography-mass spectrometry (GC–MS) was used to analyze their bioactive compounds. Based on the assessment of their biological properties, in vitro antioxidant potentials were determined by 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging and nitric oxide assays. In addition, the anti-inflammatory activity was assessed on the 5-lipogenase (5-LOX) inhibitory assay. Their half-maximal inhibitory concentration (IC_{50}) values were also determined.

Results:

The *C. sativa* L. inflorescence ethyl acetate extract was the most active against DPPH and NO radicals (IC_{50} = 3849.01 mg/mL and 31.19 ± 0.96 % inhibition (at a concentration of 1.25 mg/mL), respectively). In addition, GC-MS detected delta-9-tetrahydrocannabinol (THC) and cannabinol (CBN) as the main bioactive compounds found in the inflorescence part. Furthermore, all *C. sativa* L. extracts showed the inhibition of 5-LOX.

Conclusions:

The cannabis extracts obtained via ultrasound-assisted extraction can provide a potential functional ingredient for drugs, supplements, and skin care aimed at various health purposes, including anti-aging and pain relief.

KEYWORDS: Anti-inflammatory activity; Antioxidant activity; Biological assessments; *Cannabis sativa* L.; Chemical analysis; Ultrasound-assisted extraction

PN-1107102-P

In silico and *In vitro* Analysis of the Antihypertensive and Antioxidant Potential of Abaca (*Musa Textilis*) Ethanolic Leaf Extract

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ABSTRACT

Introduction:

Hypertension prevails to be one of the leading causes of cardiovascular diseases in the Philippines. Given its significant health risks and economic burden, research into management strategies has led to the exploration of antihypertensive and antioxidant properties found in abaca *(Musa textilis),* a plant endemic to the Philippines.

Objectives:

This study aims to establish the efficacy of *M. textilis* ethanolic leaf extract at different concentrations in the treatment of hypertension and antioxidant potential.

Method:

In silico analysis is used to predict the interaction of compounds present in *M. textilis* with the target protein involved in hypertension and antioxidant activity. Moreover, the *M. textilis* ethanolic leaf extract is subjected to in vitro analysis through 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay and angiotensin-converting enzyme (ACE) inhibition assay for the evaluation of its antioxidant and antihypertensive properties, respectively.

Results:

The findings from the DPPH assay indicate that the IC50 value of the ethanolic leaf extract of *Musa textilis (M. textilis)* is comparable to that of the positive control, ascorbic acid. Moreover, the ACE inhibition activity exhibited by the*M. textilis* ethanolic leaf extract is comparable to that of the positive control, captopril. In the in silico analysis, bioactive compounds present in the *M. textilis* ethanolic leaf extract, demonstrated favorable interactions in addition to a limited number of unfavorable bonds characterized by negative binding affinity when bound tothe angiotensin-converting enzyme (ACE), lipoxygenase, CYP2C9, NADPH-oxidase, and xanthine oxidase.

Conclusions:

These outcomes underscore the potential of the *M. textilis* ethanolic leaf extract as a probable dual antihypertensive and antioxidant for managing hypertension.

KEYWORDS: ACE inhibition assay; Antihypertensive; Antioxidant; DPPH assay; *in silico*; *Musa textilis*

PN-1107103-P

Chemical Composition and Antimicrobial Activity of Essential Oil from Crested Late-summer Mint Growing Wild in the Northern Vietnam

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ABSTRACT

Introduction:

Crested late-summer mint is an aromatic plant, belongs to the Lamiaceae family, is cultivated for culinary, and medicinal purrposes. However, we recently discovered a species of the genus *Elsholtzia* Wild. growing wild in the north of Vietnam, used by the Mong minority to treat pimples, rashes, antibacterial, not for culinary.

Objectives:

To determine the scientific name; chemical composition, and antimicrobial activity of essential oil.

Method:

Materials were collected in Y-Ty, Laocai, Vietnam. Essential oil (EO) was obtained by hydrodistillation from aerial parts, using a Clevenger-type apparatus. Qualitative GC-MS analyses were carried out on the Agilent 5977B GC/MSD. The antibacterial activity was studied on *Staphylococcus aureus* 25923 (MSSA), *S. aureus* 33591 (MRSA), *Escherichia coli* 25922, and *Candida albicans* 10231 by broth dilution. The growth control corresponded to the appropriate medium and the inoculum (1.5 x 10^6 CFU/ml for bacteria; 1.5 x10^4 CFU/ml for yeast). MIC was recorded by turbidity of inoculum suspensions. MBC as the concentration that can kill > 99.9% of prepared inoculum.

Results:

Based on the morphological descriptions, classification keys (Flore of Vietnam) the sample is identified as *Elsholtzia ciliata* (Thunb.) Hyl. EO analysis by GC-MS reveal six compounds (100%): limonene 71.0%, D-carvone 15.5%, 1,8-cineole 9.73%; *β*-pinene 1.48%, α-caryophyllene 1.27%, and *α*-thujene 1.02%. The EO exhibited antimicrobial activity against *S.aureus* MSSA (MIC 1.56%, MBC 1.56%), *E.coli* (MIC 1.56%, MBC 3.12%), and *Candida albicans* (MIC 0.39%, MBC 3.12%). This results show that EO has bactericidal activity on both *S.aureus* and *E.coli*, only inhibitory activity on *C.albicans*, no activity for methicillin-resistant *S.aureus*.

Conclusions:

The study concludes that *Elsholtzia ciliata* (Thunb.) Hyl. can be a valuable source of essential oil with a high limonene content and potential antibacterial properties. This research is the first to report on the essential oil from *E. ciliata* growing wild in the northern of Vietnam.

KEYWORDS: Antimicrobial; Crested late-summer mint; *Elsholtzia ciliata*; Essential oil; Vietnam

PN-1107104-P

In-vitro Investigation of Standardised Leaf Extract of *Morus Alba* Linn. on Kidney Stone Model

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ABSTRACT

Introduction:

Urolithiasis, characterised by urinary tract stone deposition, poses a global health issue due to its high prevalence. Conventional treatments often have adverse effects and high recurrence rates of 70–80% in males and 47–60% in females. *Morus alba* Linn. (*M. alba* L.) leaves, traditionally used in Brunei for kidney stones treatment, present a promising alternative. Prior studies have correlated the phytochemicals in *M. alba* L. leaves with their anti-oxidative, nephroprotective, and anti-inflammatory properties, supporting their potential utility as a therapeutic intervention in managing urolithiasis. Currently, no reported studies have investigated the anti-urolithiatic effects of locally sourced *M. alba* L. leaf extract in Brunei.

Objectives:

This study aims to assess the *in-vitro* effects of locally grown *M. alba*L. leaf extract on kidney stone formation.

Methods:

Morus alba L. leaves were processed and subjected to microwave-assisted extraction using 60% aqueous methanol. Quantitative analysis of phytochemicals was conducted, employing total phenolic content and total flavonoid content assays. Additionally, the extract was assessed for its anti-oxidative capacities through 2,2-diphenyl-1-picrylhydrazy (DPPH), 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) and ferric reducing ability of plasma (FRAP) assays. Calcium oxalate nucleation assay was performed and microscopically evaluated to investigate the inhibitory effect of *M. alba* L. leaf extract on nucleation crystal formation.

Results:

Preliminary phytochemical quantification of *M. alba* L. leaf extract has shown high total phenolic and flavonoid contents of 41.96± 1.10 mg gallic acid equivalent/g of dry weight of extract and 23.95 ± 4.37 mg quercetin equivalent/g of dry weight of extract, respectively. Moreover, the extract exhibited anti-oxidative capacities in DPPH, ABTS and FRAP assays. Nucleation assay has shown a significant reduction in percentage crystal mass in a concentration-dependent manner.

Conclusions:

Our findings have shown the potential effects of inhibiting the formation of kidney stones. Further experiments will explore other stages of stone formation, focusing on aggregation, crystal growth stages and crystal-cell interactions. Active compounds in the extracts will be identified using high-performance liquid chromatography (HPLC).

KEYWORDS: Biological activities; Kidney stones; *Morus alba*; Nephrolithiasis; Phytochemicals; Urolithiasis

PN-1107105-P

Phytochemical Screening, *in vitro* Antioxidant, and Antimicrobial Efficacy of *Humulus lupulus* L. Flowers (Newport and Comet Varities) from Thailand.

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ABSTRACT

Introduction:

Humulus lupulus L. (hop) has a rich history in beer brewing, prized for its contributions to flavor, aroma, and preservation qualities. Polyphenols in hops have been reported for various activities, especially antioxidant, anti-inflammatory antibacterial and anti-cancer properties.

Objectives:

This study aims to explore the effects of flowers extracts of the Comet and Newport varieties of *H. lupulus* L. on antioxidant and antibacterial potential.

Methods:

Ethanolic hop extracts were prepared, and their antioxidant activity was assessed using the 2,2-diphenyl-1-picryhydrazyl (DPPH), ferric ion reducing antioxidant power (FRAP), and 2,2'-azino-bis (3-ethylbenzthiazoline-6-sulphonic acid) radical cation decolorization (ABTS) assays. Total phenolic and flavonoid contents were quantified via the Folin–Ciocalteu and colorimetric aluminum chloride assays, respectively. Antibacterial efficacy was evaluated using the microdilution method. Additionally, the chemical composition of hops from various varieties included in our investigation was analyzed using liquid chromatography-mass spectrometry (LC-MS).

Results:

Ethanolic extracts from the Newport and Comet varieties of *H. lupulus* L. contained total phenolics content about 36.98±2.38 and 66.66±7.96 mg QE/g extract, respectively. Total flavonoid content of the Newport and Comet were 5.26±0.04 and 8.20±0.65 mg QE/g extract, respectively. Chemical analysis revealed phenolic and prenylflavonoid compounds in the extracts. Both varieties exhibited strong antioxidant activity, with DPPH assay IC50 values of 0.67 and 0.24 mg/mL, and ABTS assay IC50 values of 0.54 and 0.16 mg/mL, respectively. Additionally, the FRAP assay showed antioxidant capacity of 28.02 and 19.88 mgTE/g extract for Newport and Comet. Furthermore, the Newport and Comet extracts displayed significant antibacterial activity against *Stapphylococcus aureus* with MIC 0.061 and 0.146 mg/mL, respectively and *Cutibacterium acnes* with MIC 0.061 and 0.073 mg/mL, respectively.

Conclusions:

This study represents the first investigation into the phytochemical and biological activity of *H. lupulus* L. varieties in Thailand, revealing promising antioxidant and antibacterial properties in both Newport and Comet varieties against *S. aureus* and *C. acnes*.

Keywords: Antibacterial activity; Antioxidant activity; Biological activities; *Humulus lupulus*; Minimum inhibitory concentration (MIC); Phytochemical compounds

PN-1107106-P

The Chemotypes of *Elsholtzia ciliata* (Thunb.) Hyl. Germplasms in Vietnam

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ABSTRACT

Introduction:

Elsholtzia ciliata (Thunb.) Hyl., commonly known as crested latesummer mint, an important aromatic and medicinal plant in the Lamiaceae family. The plant has been cultivated and used for culinary and medicinal purposes in Vietnam for a long time. Due to factors like cross-pollination and polyploidy, *E. ciliata* exhibits significant chemical variability. Therefore, studying the current status of chemotype of *E. ciliata* in Vietnam will provide a guide for different uses, such as food or medicinal plants.

Objectives:

To investigate the chemical composition of the essential oil of *E. ciliata* germplasm in Vietnam and assess its variability.

Methods:

A total of ten *E. ciliata* accessions were collected from different parts of the country. Essential oil was obtained using hydrodistillation. GC-MS analysis was performed to identify the volatile components in the essential oil.

Results:

The GC-MS analysis of EOs of 10 *E.ciliata* accessions resulted in identification of 61 compounds, with major compounds included: limonene (0%-71%), *(α+β)* citral (0%-40.2%), *β*-ocimene (0%-36.23%), *(α+β)* caryophyllene (0.76%-32.95%), verbenone (0%-28.87%), *D*- carvone (0%-24.89%), *trans- β*- farnesene (0%-22.72%), 1,8-cineole (0%-9.73%), geranyl acetate (0%-6.98%), octen-3-ol (0%-7.1%), humulene (0-6.49%). The hierarchal cluster analysis based on the major compounds categorized the samples into two chemotypes. Chemotype A was characterized by a high content of limonene, while chemotype B had a high content of *(α+β)* citral. Chemotype A accessions were predominantly found in the northern mountainous region, while chemotype B accessions were collected from the delta and coastal regions of Vietnam.

Conclusions:

The study concludes that the chemical variability observed in *E. ciliata* germplasm indicates its potential for various applications. The accessions with high limonene and *(α+β)* citral content may be of interest in food, herbal medicine, and aromatherapy.

KEYWORDS: Chemotype citral; Chemotype limonene; *Elsholtzia ciliata*; Essential oil; Vietnam

PN-1107107-P

Quality Control of *Mallotus repandus* Stem Samples Collected in Thailand; Pharmacognostic, Physical and Chemical Characteristics

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ABSTRACT

Introduction:

Mallotus repandus (Rottler) Müll. Arg. is a plant in the Euphorbiaceae family. The stem of this plant has been assigned in the herbal formulations in the List of Herbal Medicine Products, Essential Drug List of Thailand 2023 as muscle pain-relieving agents. However, quality control including the identification, pharmacognostic, and physical and chemical properties of this plant is still required.

Objectives:

To investigate the chemical composition of the essential oil of *E. ciliata* germplasm in Vietnam

To evaluate the microscopic analysis, physical characteristics, and phytochemical screening of *M. repandus* (Rottler) Müll. Arg. Stem samples.

Method:

Mallotus repandus (Rottler) Müll. Arg. Stem samples were collected from twelve different locations in Thailand and were evaluated for macroscopic, microscopic, physical, and phytochemical characteristics using the official methods in Thai Herbal Pharmacopoeia 2019.

Results:

Mallotus repandus had woody stems with no odor or taste. The main histological characteristics of the plant powder were the corks, which were composed of alternating layers of polygonal cells, large fibers with prism calcium oxalate crystals, medullary rays, and phloem parenchyma cells with a lot of large border pitted vessels and some amount of small round starch granules. Foreign matter contents were less than 1% weight per weight (w/w), with a loss on drying of less than 10% w/w. The total ash and acid-insoluble ash contents were less than 10% w/w and 1% w/w, respectively. The ethanol-soluble extractive and water-soluble extractive contents were in the ranges 3.13 ± 0.06 to 9.23 ± 0.09% w/w and 5.23 ± 0.20 to 11.42 ± 0.03% w/w, respectively. Thin layer chromatographic analysis of *M. repandus* stem samples showed specific chromatographic fingerprints with the chemical marker corresponding to bergenin. Phytochemical screening using color reaction suggested the presence of phenolics and coumarins.

Conclusions:

Mallotus repandus stem macroscopic and microscopic characteristics, physical properties, as well as phytochemical properties were reported. These results are useful for further quality control of raw materials and finished products.

KEYWORDS: Chromatographic fingerprint; *Mallotus repandus*; Microscopic characteristics; Pharmacognostic characteristics; Physical properties

PN-1107108-P

Isolation and Identification of Major Components in Thai Traditional Formulation for Knee Poultice (Ya-Pok-Dud-Pid)

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ABSTRACT

Introduction:

The Thai traditional formulation of knee poultice (Ya-Pok-Dud-Pid) has been widely used for the treatment of knee inflammation, osteoarthritis, and other related symptoms. It comprises *Zingiber cassumunar*, camphor, *Citrus hystrix, Piper nigrum, Curcuma aromatica, Globba malaccensis, Alpinia galanga, Plumbago indica, Piper retrofractum, Putranjiva roxburghii, Tamarindus indica, Acacia concinna, Zingiber zerumbet, Zingiber officinale, Cleome viscosa, Acorus calamus, Gloriosa superba, Crinum asiaticum, Tradescantia zebrina, and salt* as ingredients.

Objectives:

To isolate and identify the major components of Thai traditional formulation for knee poultice (Ya-Pok-Dud-Pid).

Method:

The tincture of Thai traditional formulation of knee poultice (Ya-Pok-Dud-Pid) and methanolic extract of each plant sample were subjected to UPLC-DAD and TLC analysis to get an overview profile. Known compounds were identified by co-chromatography with the authentic compounds. Major components were isolated using column chromatography (CC, Merck silica gel) using hexane, dichloromethane, ethyl acetate and methanol as eluting solvent. The final cleaning up was carried out using a Sephadex LH-20 column eluted with methanol. Their chemical structures were elucidated by comparing the melting point, 1H NMR, 13C NMR and mass spectra with reported data.

Results:

This study could isolate compound D (87 mg), DMPBD (75 mg), and D-acetate (57 mg) from *Z. cassumunar* (200 g); zerumbone (139 mg) and zerumbone epoxide (45 mg) from *Z. zerumbet* (200 g); 6',7'-dihydroxybergamottin (190 mg) and oxypeucedanin hydrate (45 mg) from *C. hystrix* (200 g). By comparing with authentic standards, we could identify piperine from *P. nigrum* and *P. retrofractum*; plumbagin from *P. indica*; *beta*-asarone from *A. calamus*; colchicine from *G.superba*; 6-gingerol and 6-shogoal from *Z. officinale*. Major peaks in the UPLC-DAD chromatogram were comprehensively identified.

Conclusions:

These identified compounds covered major components of the Thai traditional formulation of knee poultice (Ya-Pok-Dud-Pid). The present study would benefit for the standardization of this traditional formulation using chemical marker-based techniques and quality control.

KEYWORDS: Natural products; Phytochemistry; Structure elucidation; Thai traditional medicine

PN-1107109-P

Enhanced Extraction Efficiency and Stability of Verbascoside from *Acanthus ebracteatus* Vahl Using Natural Deep Eutectic Solvents (NADES)

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ABSTRACT

Introduction:

Acanthus ebracteatus Vahl leaves are rich in verbascoside and other phenolic constituents known for their antioxidant, anti-inflammatory, antimicrobial, and wound-healing properties. Natural deep eutectic solvents (NADES) offer a green extraction alternative, preserving the bioactivity of compounds without the need for removal after extraction. This makes NADES-derived extracts highly suitable for innovative pharmaceutical and cosmeceutical applications.

Objectives:

To investigate the chemical composition of the essential oil of *E. ciliata* germplasm in Vietnam

The objective is to determine the extraction efficiency of NADES in extracting verbascoside from *A. ebracteatus* and its stability.

Method:

Eight NADES were prepared using choline chloride combined with glycerol, lactic acid, citric acid, or levulinic acid at varying molar ratios. The dried powder leaves of *A. ebracteatus* were extracted using NADES via ultrasonic-assisted extraction. The verbascoside content of each obtained extract from different solvents was quantified using high-performance liquid chromatography. Then, all extracts were kept for 1 month at -20°C to evaluate the stability of verbascoside content. The significant difference in verbascoside content of each extract was analyzed using a t-test with a p-value < 0.05.

Results:

NADES composed of choline chloride and lactic acid at a 1:2 molar ratio (DES4) yielded the highest verbascoside content from *A. ebracteatus* (14.18 ± 0.08 mg/g dry weight), surpassing the conventional solvents, methanol (9.77 ± 0.47 mg/g dry weight) and ethanol (6.09 ± 0.37 mg/g dry weight). Storage at -20°C for one month maintained verbascoside content in *A. ebracteatus* extract using DES4, unlike methanol-extracted samples.

Conclusions:

DES4 demonstrated superior extraction efficiency for verbascoside from *A. ebracteatus* compared to methanol. Further stability studies under varied conditions and bioactivity assessments are necessary prior to application.

KEYWORDS: *Acanthus ebracteatus* Vahl; NADES; Natural deep eutectic solvent; stability; Verbascoside; Ultrasonic-assisted extraction

PN-1107110-P

In vivo Evaluationon the Effects of Aqueous Flower Extract of *Amorphophallus paeoniifolius*in Prednisolone-induced Osteoporotic Zebrafish

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ABSTRACT

Introduction:

Glucocorticoid-induced osteoporosis (GIOP) poses a significant challenge for patients on glucocorticoid therapy, particularly with high doses and prolonged treatment. Prednisolone (PN) adversely affects bone metabolism, leading to decreased bone mineral density and increased fracture risk. *Amorphophallus paeoniifolius*, a perennial herb that grows in Southeast Asian countries, has been used in traditional medicine for many years.

Objectives:

To investigate the chemical composition of the essential oil of *E. ciliata* germplasm in Vietnam

The study aimed to evaluate the effects of *A.paeoniifolius* aqueous flower extract (APAE) on prednisolone-induced osteoporotic zebrafish.

Method:

The study used 6-8-month-old zebrafish immersed in 125 uM PN for seven days to induce osteoporosis. The fish were then grouped (n=10/group) and immersed in a treatment group with different concentrations (100 mg/L, 50 mg/L, 25 mg/L), standard drug Alendronate (70 mg/L; positive), and no treatment (negative). On the 15th day of the experiment, the fish were euthanized with tricaine (0.168 mg/mL). Scales (n= 10/group) were removed from each fish and stained with alizarin red (0.25%) and counterstained with alcian blue (0.125%). The stained scales were then viewed under the microscope, and the pictures were subjected to ImageJ software to measure the scales' area containing calcium.

Results:

Acute toxicity test conducted on the zebrafish (n=10) revealed no mortality up to the highest concentration of 100 mg/L APAE, as stated by the limit test of the OECD Guideline 203. Statistical analysis showed that APAE significantly inhibited osteoporosis at 100 mg/L ($p<0.0001$), a result comparable to the standard drug, Alendronate ($p=0.3707$). Furthermore, among the different concentrations of APAE, 100 mg/L showed the significantly highest activity against osteoporosis ($p<0.0001$).

Conclusions:

This shows that APAE, at 100 mg/L, is effective in treating osteoporosis in prednisolone-induced zebrafish and implies that APAE has a promising potential to be used as an anti-osteoporotic agent.

KEYWORDS: *Amorphorphallus paeoniifolius*; Flower Extract; Glucocorticoid-Induced Osteoporosis; Osteoporosis; Zebrafish

PN-1107111-P

Phytochemical Screening and Antioxidant Evaluation of *Bixa Orellana* L. Ethanolic Leaf Extract

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ABSTRACT

Introduction:

Bixa orellana L. is renowned for its bioactive compounds, which are believed to contribute to its antioxidant capacity. However, the pharmaceutical application of *B. orellana* leaves' natural antioxidants remains to be undermined in the industry. This study, therefore, presents a phytochemical screening of *B. orellana* leaf ethanolic extract (BLE), aiming to establish a correlation between its bioactive compounds and antioxidant properties.

Objectives:

The study aims to analyze the phytochemical screening of BLE, correlate this profile with its potential antioxidant properties, and assess its antioxidant capacity through a series of assays.

Methods:

B. orellana leaves were collected, authenticated, and extracted through percolation using 80% ethanol for 48 hours and concentrated using a rotary evaporator. For preliminary screening, the total phenolic content (TPC) and total flavonoid content (TFC) were quantitatively assessed using gallic acid and quercetin as reference standards, respectively. Additionally, BLE was analyzed through Fourier Transform Infrared Spectroscopy (FTIR) to confirm functional groups, while 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging and Ferric Reducing Antioxidant Power (FRAP) assays were assessed for antioxidant properties with ascorbic acid as a reference standard.

Results:

BLE revealed a notable amount of phenol (690.40 mg GAE/g of extract) and flavonoids (316.00 mg QE/g of extract), and are parallel to the IR spectra, exhibiting absorption bands for hydroxyl groups (3310 cm-1), carbonyl groups (1700 cm-1), and aromatic ring (1500 cm-1). The DPPH assay proved a significant radical scavenging activity using 4 mg/mL of BLE, which measured 75.35%, while the FRAP assay yielded an amount of 50.37 µg/mL ascorbic acid equivalent.

Conclusions:

BLE contains a significant concentration of phenolic and flavonoid compounds. Furthermore, the FTIR analysis, DPPH assay, and FRAP assay validated its potential activities through functional group identification, radical scavenging activity, and reducing power, respectively, suggesting its antioxidant activity. Overall, the data serves as a reference for future research on the pharmacological application of BLE.

KEYWORDS: Antioxidant activity; *Bixa Orellana*; DPPH; FRAP

PN-1108101-P

Triterpenoids and Flavonoids from *Ludwigia octovalvis* (Jacq.) P.H.Ravens and Their Bacteriostatic Effect on *Helicobacter pylori*

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ABSTRACT

Introduction:

In Vietnamese folk medicine, *Ludwigia* species are used in the management of peptic ulcers caused by *Helicobacter pylori*. To search for evidence of the plant's folk use, this work investigated in the bacteriostatic effect on *H. pylori* of extracts andrelatedphy to constituents from *Ludwigia octovalvis* (Jacq.) P.H.Ravens.

Objectives:

Following bioactivity-guided isolation methodology, triterpenoids and flavonoidswere isolated from the aerial parts of *L. octovalvis*. The compounds were then tested forbacteriostatic effect on *H. pylori*.

Methods:

The plant's aerial parts (1,000 g) were percolated with methanol, yielding the crude extract (110.1 g). The crude extract was then fractioned into *n*-hexane (39.6 g), ethyl acetate (15.6 g), and *n*-butanol fraction (8.2 g). Bioactivity-guided isolation was then performed following bacteriostatic capacity on *H. pylori*, where theactivity of fractions and subsequently isolated compounds wasassessed by broth microdiluting assay (obtaining MIC value). Potential fractions were selected for isolation of phytoconstituents by utilization of column chromatography. The compounds' structures were determined by analysis of their 1D-, 2D-NMR, and MS data. The compounds' activity was also tested.

Results:

The ethyl acetate and *n*-hexane fractions revealed notable activity, with MIC < 6.25 mg/ml. Luteolin (1) - 20 mg was obtained from the EtOAc fraction. Five known triterpenoids were isolated from the *n*-hexane fraction, including ursolic acid (2) – 22 mg, oleanolic acid (3) – 19 mg, lupeyl myristate (4) – 18 mg, urs-12-ene-2, 3β, 7β, 16α-tetraol (5) – 33 mg, and daucosterol (6) – 980 mg. This work reported the first identification of (4) and (5) from *L. octovalvis*, and the first full-structural NMR assignment of (4). All compounds exhibited moderate suppression of bacteria growth ($p < 0.05$), whereas (1) revealed itself the most potential candidate (MIC < 6.25 mg/ml).

Conclusions:

These results suggested that luteolin could be a potential suppressor of *H. pylori* from *L. octovalvis*, whereas triterpenoids could assist in the bioactivity. This work could partially provide reasonable implementation for the use of *Ludwigia octovalvis* in folk medicine.

KEYWORDS: *Helicobacter pylori*; *Ludwigia octovalvis*; lupeyl myristate; luteolin ursolic acid; oleanolic acid

PN-1109101-P

Comparative Bioactivity Analysis of *Polygonum minus*: A Traditional Herbal Medicine

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ABSTRACT

Introduction:

Polygonum minus (PM), known as *Polygonum kawagoeanum*, is a fragrant herb widely utilized in culinary practices, flavoring, and traditional medicine.

Objectives:

This study aimed to evaluate the antioxidant activity and anticancer potential of PM extracts.

Method:

PM leaf and stem extracts were obtained using four solvents of varying polarities (hexane, dichloromethane, methanol, and water), followed by evaluation of their antioxidant activity via 1,1-Diphenyl-2-picrylhydrazyl (DPPH) and 2,2'-azinobis-(3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) radical scavenging assays. Anticancer activity against colon cancer cell lines (HCT-116, CT-26) of each PM extract was determined using the 3-(4,5-dimethylthiazol-2-yl)-2,5 diphenyltetrazolium bromide (MTT) assay. In addition, the phytochemical constituents of PM extracts were identified using Gas Chromatography-Mass Spectrometry (GC-MS).

Results:

PM water stem extract (PM-S-W) exhibited the highest yield, followed by water leaf extract (PM-L-W), and the lowest was observed with hexane stem extract (PM-S-H). Moreover, PM methanol stem extract (PM-S-M) demonstrated superior antioxidant potential, with the highest values for DPPH (554.04 ± 52.89 µg TE/mg) and ABTS (667.91 ± 23.18 µg TE/mg). Interestingly, PM stem extracts exhibited no cytotoxic effects on colon cancer cells, while PM hexane leaf extract (PM-L-H) demonstrated significant anticancer activity ($p < 0.01$), exhibiting time-dependent antiproliferative effects with distinct IC50 values. Furthermore, GC-MS analysis of PM-L-H identified dodecanal and gamma-sitosterol as major constituents.

Conclusions:

Overall, PM-S-M exhibited notable antioxidant properties, while PM-L-H displayed promising in vitro anti-colon cancer activity, suggesting their potential application in various formulations including cosmetics, food supplements, and pharmaceuticals.

KEYWORDS: Anticancer; Antioxidant; Bioactivity; Extracts; *Polygonum minus*

PN-1109102-P

Exploring Thai Medicinal Plants with Anti-inflammatory Potentials for Atopic Dermatitis: Steady-state Kinetic and Molecular Modeling Studies

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ABSTRACT

Introduction:

Human 5-lipoxygenase (5-LOX) and cyclooxygenase-2 (COX-2) are potential targets for suppressing pruritic in atopic dermatitis (AD). In addition, *Staphylococcus aureus* colonization and oxidative stress worsen AD skin conditions.

Objectives:

We aimed to investigate anti-inflammatory activity against 5-LOX and COX-2, and anti-staphylococcal, and antioxidant potentials of seven Asian medicinal plants bio-prospected from traditional medicine related to AD pathogenesis.

Methods:

Hydrodistillation and ultrasound-assisted extraction were used to extract essential oils and hexane extract from seven medicinal plants (*Artemisia vulgaris*, *Cassia fistula*, *Camellia sinensis*, *Wedelia trilobata*, *Mentha villosa*, *Boesenbergia rotunda*, and *Dimocarpus longan*), respectively. Gas chromatography-mass spectrometry (GC–MS) was used to analyze phytochemicals presented in bioactive extracts. Antibacterial activity against *S. aureus* was determined. Further, antioxidant potentials were assessed using FRAP, DPPH, and NO radical scavenging assays. *In vitro* 5-LOX and COX-2 inhibitory assays were used to investigate the anti-inflammatory potency associated with AD-related symptoms, and the inhibition mode of the active compound was investigated using kinetic study and molecular modeling.

Results:

Camellia sinensis essential oils (EO), *Wedelia trilobata* EO, and *B. rotunda* hexane extract and EO were shown to exhibit antibacterial against *S. aureus* with the highest activity possessed by *B. rotunda* hexane extract (MIC = 10 µg/mL). *B. rotunda* hexane extract also possessed antioxidant properties (IC_{50} = 557.97 and 2651.67 µg/mL against DPPH and NO radicals, respectively). In addition, a major flavonoid, pinostrobin, was further non chromatographically isolated and showed to be a potent 5-LOX inhibitor (IC_{50} = 0.499 µM) compared to nordihydroguaiaretic acid (NDGA; IC_{50} = 5.020 µM) and betamethasone dipropionate (BD; IC_{50} = 2.077 µM). Additionally, pinostrobin inhibited COX-2 (IC_{50} = 285.67 µM), which was as effective as diclofenac sodium (IC_{50} = 290.35 µM) and BD (IC_{50} = 240.09 µM). Kinetic study and molecular modeling showed the mixed-type inhibition of NDGA and pinostrobin against 5-LOX.

Conclusions:

B. rotunda and its bioactive pinostrobin have promising properties for AD therapy.

KEYWORDS: Antibacterial; Anti-inflammatory; Antioxidant; Fingerroot; Flavonoid; GC-MS

PN-1109103-P

Influence of Extracting Solvents on Hypouricemic Effect of Three Kinds of Tea Products: A Pharmacological – Chemical Combination Study

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ABSTRACT

Introduction:

Medicinal food for the management of hyperuricemia has raised scientific interest. The use of tea (*Camellia sinensis* (L.) Kunzte) was included in this tendency. In this work, the influence of extracting solvents on hypouricemic effect of tea products was focused.

Objectives:

Two independent solvents employed for extraction were ethanol and water, with hot macerated method.

Methods:

Three kinds of tea were investigated, including green tea, black tea, and oolong tea. The bioactivities of extracts were assessed in terms of xanthine oxidase inhibition and DPPH scavenging activity. Multivariate analysis of variance (MANOVA) was utilized for hypothesis testing of the effect of extracting solvents on the bioactivities. Potential extracts were then investigated for potential phytoconstituents, by the assay of total phenolic content and isolation of phenolic compounds by colunm chromatography.

Results:

All extracts showed moderate capacity of DPPH scavenging (IC_{50} 45-55 µg/mL), while the ethanolic extract of oolong tea exhibited strongest inhibition on xanthine oxidase (IC_{50} 24.63±0.01 µg/mL). The ethanolic extracts did not reveal significant difference of bioactivities from the aqueous extracts ($p>0.05$), and no significant correlation between the two activities was observed ($p < 0.05$). The total phenolic content of ethanolic and aqueous extract of oolong tea were 139.06 and 109.07 mg/g gallic-acid-equivalent, respectively. Therefore, the ethanolic extract of oolong tea was selected for isolation to get four phenolic compounds: protocatechuic aldehyde, protocatechuic acid, luteolin, and quercetin.

Conclusions:

These results proved that tea products could potentially inhibit xanthine oxidase and neutralize radical species. Also, the two common solvents, ethanol and water, could be used interchangeably as they could exhibit equal effect on hyperuricemia ($p>0.05$). The phenolic compounds could be potential constituents accounting for hypouricemic effect of oolong tea. In short, this work provided pharmacological and phytochemical evidence on hypouricemic effect of tea products and suggested that regular ways of drinking tea could relieve hyperuricemia conditions.

KEYWORDS: DPPH scavenging capacity; Extracting solvents; MANOVA analysis; Phenolic compounds; Tea products; Xanthine oxidase inhibition

PN-1109104-P

Investigation of the Antioxidant and Anti-cancer Potential of *Leea indica* Leaf Extracts from Brunei Darussalam

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ABSTRACT

Introduction:

Conventional cancer treatment modalities are often marred by adverse side effects. Future prospects point towards using medicinal plants that are rich in phytochemicals. Previous studies have indicated that the leaves of a medicinal plant, *Leea indica*, exhibit various biological properties, including antioxidant activity and cytotoxicity in cancer cell lines.

Objectives:

In this study, we investigate the phytochemical constituents and antioxidant activity of local *L. indica* leaf extracts and tested their cytotoxic effects against human cancer cell lines.

Method:

Fresh and healthy *L. indica* leaves from Brunei Darussalam were harvested and extracted via microwave-assisted extraction using three different solvents, namely water, 50% ethanol, and 100% ethanol. The phenolic and flavonoid contents of these extracts were determined and compared using Folin-Ciocalteu and aluminium chloride colorimetric assays, respectively. The antioxidant activity was measured using 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay. Cytotoxicity against two different cancer cell lines, A549 (lung) and MCF-7 (breast), at four different concentrations (5, 10, 50, and 100 µg/mL) was evaluated using 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay.

Results:

Of the three tested *L. indica* leaf extracts, the 50% ethanolic extract contained the highest phenolic and flavonoid contents at 515.2 ± 121.3 mg gallic acid equivalent/g and 16.7 ± 0.8 mg quercetin equivalent/g dry sample, respectively. Both 50% and 100% ethanolic extracts demonstrated the highest antioxidant activity at 942.3 ± 10.4 and 894.24 ± 21.4 mg ascorbic acid equivalent/g dry sample, respectively. Interestingly, the aqueous (water) extract displayed the most potent cytotoxic effect against both A549 and MCF-7 cancer cell lines at 100 µg/mL, with IC50 values of 97.1 ± 54.9 µg/mL and 79.8 ± 7.1 µg/mL, respectively.

Conclusions:

Our findings suggest the presence of phytochemicals in the different *L. indica* leaf extracts with promising antioxidant properties and cytotoxic effects against cancer cell lines. Additional studies entailing comprehensive phytochemical analyses and further testing against other cell lines will further validate the potential therapeutic qualities of local *L. indica* leaves.

KEYWORDS: Antioxidant; Cancer; Cytotoxicity; *Leea indica*; Phytochemical; Plant extracts

PN-1109105-P

Biological Activities *in vitro* of Extracts from *Pinus Kesiya* royle Ex Gordon, Pinaceae

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ABSTRACT

Introduction:

Pinus kesiya Royle ex Gordon (Pinaceae) is widely used in folk medicine for the treatment of many diseases.

Objectives:

In this research study, the biological activities of extracts from different parts of *Pinus kesiya*, including branches, barks, and leaves, were evaluated.

Method:

The phytochemical composition of *Pinus kesiya* was preliminarily analyzed using the methodology for analysis of vegetable drugs. *Pinus kesiya* was extracted by using percolation extraction with 50% ethanol and ultrasonic-assisted extraction with methanol. The total extract was partitioned by liquid-liquid extraction with *n*-hexane, ethyl acetate, and *n*-butanol.The antimicrobial activity and minimum inhibitory concentration (MIC) of fractions were investigated by agar well diffusion method and resazurin-based broth microdilution on 96-well plates. Additionally, the antioxidant activity *in vitro* wase valuated by the DPPH free radical scavenging method, and α-glucosidase inhibitory activity *in vitro* was determined through the PNPG substrate cleavage reaction of the enzyme α-glucosidase.

Results:

The main phytochemical components of *Pinus kesiya* were flavonoids, proanthocyanidins, and polyphenols. The extracts showed antibacterial activity against Gram-positive bacteria, including MSSA, MRSA, *Bacillus cereus* with MIC values from 0.25 to 8.0 mg/mL. Their antioxidant activity with EC_{50} values was in the range of 3.32 - 110.79 µg/mL, 1.2 - 40 times higher than ascorbic acid (EC50 = 2.74 µg/mL). The bark extract showed the strongest activity. The α-glucosidase enzyme inhibitory activity also showed good results at a concentration of 20 µg/mL, in which the n-butanol fraction of the bark extract (IC50 = 0.84 µg/mL) had stronger activity than quercetin (IC50 = 4.23 µg/mL).

Conclusions:

Pinus kesiya was determined as a potent source for the isolation of compounds that possessed antibacterial, antioxidant, and α-glucosidase inhibitory activity.

KEYWORDS: α-glucosidase inhibition; Antimicrobial activity; Antioxidant activity; DPPH; *Pinus kesiya*; PNPG

PN-1109106-P

The Inhibitory Effects of *Curcuma aeruginosa* Roxb. and *Curcuma* sp. "Khamin Oi" on Human Coronavirus OC43 Replication in MRC-5 Lung Fibroblast Cellsand Vero Kidney Cells

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ABSTRACT

Introduction:

Curcuma aeruginosa Roxb. (CA) and *Curcuma* sp. "Khamin Oi" (CKO) are distinct species with known medicinal properties. In traditional Thai medicine, both plants' rhizomes aid digestion. Certain terpenoids and curcuminoids in these plants have shown promise for their potential antiviral properties. However, there are no reported findings regarding the efficacy of these plants against coronaviruses as well as human coronavirus OC43 (HCoV-OC43).

Objectives:

This study aims to investigate the inhibitory effects of CA and CKO on the replication of human coronavirus OC43 in MRC-5 lung fibroblast and Verokidneycells.

Method:

The rhizomes of CA and CKO were dried and ground into powder form. Hexane and ethanol were utilized as solvents for extraction. The anti-HCoV-OC43 replication efficacy of the extracts was assessed through in-cell ELISA, with results expressed as the inhibitory concentration at 50% (IC_{50}). The extract from each plant demonstrating the highest anti-HcoV-OC43 activity underwent phytochemical profiling using LC-MS/MS analysis.

Results:

The extraction yields (%w/w) using hexane were 2.42 ± 0.09 (in CA) and 4.19 ± 0.25 (in CKO), while ethanol extraction yielded 5.02 ± 0.04 (in CA) and 8.33 ± 0.51 (in CKO). In MRC-5 cells, the IC_{50} values against HCoV-OC43 of crudehexane extracts from CA and CKO were 14.06 µg/mL and 18.47 µg/mL, respectively. While, in Vero cells, the IC_{50} values were 14.12 µg/mL and 10.92 µg/mL, respectively. These results suggest potent anti-HCoV-OC43 activity from crude hexane extracts of both plants, possibly attributed to terpenoid compounds identified through LC-MS/MS analysis.

Conclusions:

In this study, the anti-HCoV-OC43 activity of both plants suggests a promising direction for further research in combating coronavirus infections. However, it is crucial to identify active markers for quality control of these plants for their practical application.

KEYWORDS: *Curcuma aeruginosa* Roxb.; *Curcuma* sp.; Curcuminoids; Human coronavirus OC43; Khamin Oi; Terpenoids

PN-1201101-P

The Relationship of Sodium and Potassium Intake with Physical Activity in Undergraduate Cadet Students Batch 3 the Republic of Indonesia Defense University

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ABSTRACT

Introduction:

Nutrition plays a crucial role in maintaining and improving the health of individuals from infants to the elderly. Proper nutrition reduces the risk of non-communicable diseases, such as digestive and cardiovascular disorders. The undergraduate program at the Defense University combines military physical activities with indoor learning that can impact the concentration of essential minerals like sodium and potassium in the body to maintain a balanced nutritional state under normal conditions.

Objectives:

Analyzing the relationship between sodium and potassium intake and physical activity in cohort 3 undergraduate student cadets at The Republic of Infonesia Defense University

Method:

The research utilized an observational analytic design with a cross-sectional study. The sample consisted of 175 cadet students obtained through random sampling using the Slovin formula. Data collection involved direct methods such as the administration of a food recall questionnaire for 3x24 hours, a Food Frequency Questionnaire (FFQ), a Physical Activity Index Questionnaire, and Body Mass Index (BMI) measurements. Statistical data analysis was conducted using the Chi-Square test, with significance indicated by a p-value < 0.05, performed using SPSS 23 for Windows application.

Results:

The bivariate analysis results indicate a significant relationship with a p-value of 0.046 between sodium intake and physical activity, as well as a p-value of 0.030 for the relationship between potassium intake and physical activity.

Conclusions:

There is a relationship between sodium intake and potassium intake and physical activity.

KEYWORDS: Nutrition; Potassium; Physical Activity; Sodium

PN-1201102-P

Development of Microencapsulated Powder Containing *Lactobacillus acidophilus* and *Clitoria ternatea* L. Flower Extract

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ABSTRACT

Introduction:

Lactobacillus acidophilus, one of the most common probiotics, has been found to show health benefits to human such as anti-infective, anti-inflammatory, and gut health modulatory activities. *Cliteria ternatea* L. flower contains anthocyanins as major bioactive compound and shows several biological activities including antioxidant, antimicrobial, and anti-inflammatory activities.

Objectives:

This study aims to develop microencapsulated powder containing *L. acidophilus* and *C. ternatea.*

Method:

Spray drying technique was used for encapsulation of *L. acidophilus* and *C. ternatea*aqueous extract. The parameters were set as follow:aspirator 100%, air pressure of 0.6 mPa, pump 10%, and feed rate of 3.0 mL/min. The inlet temperatures were varied at 130, 140, 150, and 170 °C. Maltodextrin (3 and 5% w/w) was added as a carrier. *L. acidophilus* JCM1132 1 mL (1.00×10^{12}CFU/mL) and *C. ternatea* flower extract (TSS 8 °Brix) 100 mL were added. The powder was evaluated for yield, moisture content, total monomeric anthocyanins content, and total plate count.

Results:

The powder produced by using the inlet temperature at 140°C and maltodextrin at 5% w/w demonstrates the best powder properties. The encapsulation efficiency in terms of the number of *L. acidophilus* was46.30% and the yield was found to be 33.99%. The spray-dried powder has moisture content of 4.45 ± 0.70 % and contains total monomeric anthocyanins content of 1.93 ± 0.03 mg delphinidin-3-glucoside/g powder.

Conclusions:

The microencapsulated powder produced by using inlet temperature at 140 °C and maltodextrin at 5% w/w showsthe best properties. *L. acidophilus* and anthocyanins in *C. ternatea* flower extract could be preserved in the developed powder. Further studies on the variation of other types of carrier and stability of the microencapsulated powder are recommended.

KEYWORDS: Anthocyanins; *Clitoria ternatea* L. flower extract; Delphinidin-3-glucoside; Encapsulation; *Lactobacillus acidophilus*

PN-1202101-P

Analyzing Community Pharmacists' Knowledge and Behavior Regarding the Sale of Functional Foods at Pharmacy Retailers in the Mekong Delta, Vietnam

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ABSTRACT

Introduction:

After the Covid-19 pandemic, there has been a notable increase in people's demand for and usage of functional foods at pharmacy retailers. Consequently, the role of pharmacists in providing guidance and recommendations for the use of functional foods has become increasingly significant. However, the knowledge of pharmacists about functional foods remains limited, often resulting in inaccurate or inappropriate advice to consumers.

Objectives:

The study was conducted to analyze the knowledge and behavior of pharmacists in selling functional foods at pharmacy retailers in the Mekong Delta, Vietnam.

Method:

A cross-sectional descriptive study was conducted through a survey of pharmacists at retail pharmacy establishments in the Mekong Delta during the period from June 2022 to March 2023. The questionnaire was constructed using the following factors based on the theory of planned behavior (TBP) model, consisting of 32 observed variables.

Results:

Of the 575 pharmacists participating in the study, pharmacists with good knowledge accounted for 52%. A scale measuring knowledge, attitude, and behavior of functional food sales among pharmacists was constructed using the following factors: (1) Attitude; (2) Subjective standards; (3) Perceived behavioral control, consisting of 32 observed variables. Survey variables were assessed using a 5-level Likert scale. The scale exhibited reliability, with both Cronbach's Alpha coefficients exceeding 0.7 and variable-total correlation surpassing 0.3. Exploratory Factor Analysis (EFA) indicated that the constructed scale is of high quality. Multivariate regression analysis showed that "Perceived behavioral control" affects the selling behavior of functional foods among pharmacists at retail pharmacies in the Mekong Delta.

Conclusions:

Considering the selling behavior of functional foods by pharmacists during their professional practice is vital to ensure the health benefits of consumers and promote the development of the functional food market.

KEYWORDS: Attitude; Behavior; Functional foods; Knowledge; Mekong Delta; Selling behavior

PN-1202102-P

Nutritional Analysis and Curcumin Levelin Gitumon Formulation: Aiming as a New Jamu for Metabolic Syndrome Population

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ABSTRACT

Introduction:

Metabolic syndrome is a growing global health problem in developing countries, especially in urban populations. Medicine is one of the main treatments. However, most people living in developing countries need to have access to medicine, particularly herbal medicine. The concept of Indonesian herbal medicine (Jamu) is close to Chinese herbal formula. At this stage, proposing Gitumon as a new formulation which is a mixture of ginger, turmeric and cinnamon is an innovation.

Objectives:

This study aims to evaluate the nutritional value and the curcumin levelin Gitumon.

Method:

Gitumon was formulated using 2,200 grams of turmeric, 200 grams of ginger, 100 grams of cinnamon, 100 grams of tamarind, and 100 grams of palm sugar. Curcumin contained in turmeric and ginger has been proven to improve metabolism. Cinnamon's function in the body is like insulin, lowering fasting blood glucose significantly. Tamarind improves the gut microbiota diversity in obesity and is associated with reduced inflammation. Lastly, palm sugar is nutritionally advantageous for the diabetic population compared to others. Vitro experimental design was chosen to conduct this study. Fat content in this study was analyzed using the Soxhlet method according to AOAC 2005. Protein content in this study was analyzed using the Kjeldahl micro method according to AOAC 2005. The by-difference method was used to analyze carbohydrate content. The curcumin level in the Gitumon formulation was analyzed using the spectrophotometric method. Quantitative descriptive analysis was used to analyze all the data.

Results:

In every 2,000 ml of Gitumon, it contains 362.56 grams of carbohydrate (18.12%), 64.07 grams of fat (3.20%), and 124.78 grams of protein (6.23%). Meanwhile, the curcumin level in every 2,000 ml of Gitumon is 204 mg.

Conclusions:

Gitumon contains nutrients and curcumin, indicating potential healing properties, which suggests a possible role as a therapeutic agent in addressing metabolic syndrome.

KEYWORDS: Diabetes mellitus type 2; Hypertension; Jamu; nutraceutical; Obesity; Rhizomes

PN-1202103-P

The Development of Cookies Fortified with Pea Protein and Inulin

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ABSTRACT

Introduction:

Plant-based protein and prebiotic fortification in bakery products, especially cookies, is considered as a promising strategy for creating a healthier snack. Recently, pea protein has emerged as a potential functional ingredient due to its favorable biological activities, and positive interaction with human gut flora. Inulin has also been recognized as an effective prebiotic ingredient. Nonetheless, the optimum amount of pea protein and inulin must be determined to maintain the nutritional, textural, sensory, and storage characteristics of fortified cookies.

Objectives:

To develop pea protein and inulin-fortified cookies (without added sugar type).

Method:

The basic recipe for cookies control samples was 120 g wheat flour, 50 g rice bran oil shortening, 30 g mashed pumpkin, one egg, 1.5 g salt, 1.5 g vanilla flavor powder, 3 g baking powder, 0.03 g stevia and 0.04 g sucralose. The inulin-fortified cookies were created by adding inulin to control cookies in three different amounts (15 g, 20 g, and 25 g). The pea protein and inulin-fortified cookies (20 g inulin) were then prepared by replacing wheat flour with pea protein isolate (85% protein, MattellTM) at three different substitution levels (10%, 15%, 20%). Fortified cookies were evaluated in terms of color (L*, a*, b*), texture (hardness), water activity (aw), % protein content, and sensory evaluation (9-point Hedonic scale and 5-point just about right scale, n=70).

Results:

The higher amount of added inulin resulted in higher L* value and hardness of cookies. The optimal amount of inulin was 20 grams. The presence of pea protein in cookies decreased L* value and hardness while increasing water activity and % protein content. Based on sensory evaluation, the pea protein (20%) and inulin (20 g)-fortified cookies were not well accepted by 67% of panelists due to the strong beany flavor.

Conclusions:

The main limitation of using pea protein in inulin-fortified cookies was its distinct beany flavor. The recommended amount of pea protein in cookies for general consumers was less than 20%.

KEYWORDS: Cookies; Inulin; Pea protein

PN-1205101-P

Screening of Certain Allergens in Confectionery Products Using LC-MS/MS

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ABSTRACT

Introduction:

Food allergies can induce severe reactions, including anaphylaxis and potentially fatal outcomes, particularly in children. The Food and Drug Administration (FDA) has identified nine primary food allergens: milk, eggs, fish, crustaceans, tree nuts, peanuts, wheat, soybeans, and sesame. Regulations require that food products or ingredients containing these allergens be clearly labeled with the source of the allergen so that consumers can avoid. Analytical methods for screening allergens in food products with high diversity must be both selective and sensitive enough.

Objectives:

1. To develop and validate a screening method for several allergens (almonds, cashews, hazelnuts, macadamia nuts, pistachios) in confectionery products using tandem mass spectrometry liquid chromatography. 2. To apply this analytical method to screen for the presence of allergens in selected confectionery samples.

Method:

The sample was defatted using n-hexane, followed by extraction with Tris-buffer. The extraction was then added with trypsin for hydrolysis. The hydrolyzed solution was purified using an HLB column prior to LC-MS/MS analysis to screen for peptides. The LC separation was done on a C-18 column (3,0mm x 150mm, 3,5µm) and a mobile phase using a gradient mixture of acetonitrile-water containing 0.1% formic acid. MS/MS analysis on a triple quadrupole instrument with electrospray ionisation (+) source in multi reaction monitoring mode.

Results:

Method was validated according to AOAC method performance requirement in terms of linear, specifility, recovery from 60-120%, RSDr =< 20%, RSDR =< 30%. Validated method was applied to analyze 20 cookie samples which was taken randomly in the market in Hanoi, Vietnam.

Conclusions:

The analysis results indicate that among the 20 samples tested, some were found to be positive for seed allergens not listed on the product packaging.

KEYWORDS: Allergens; Confectionery products; Screening; Tree Nuts; LC-MS/MS

PE-1301101-P

Beyond the Traditional Pedagogy: Determining Pharmacy Student and Academic Staff Readiness in Artificial Intelligence Integration

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ABSTRACT

Introduction:

Artificial Intelligence (AI) demonstrates its capacity for enhancing the educational experience, yet its full potential remains underutilized in Philippine pharmacy education. Integrating AI into educational delivery is crucial to maximize technical knowledge and skills. However, its adoption requires further research to promote integration and application.

Objectives:

Hence, this study focused on determining the readiness for AI integration in the traditional pedagogical approaches, considering knowledge, attitudes, perceptions, pedagogy, and ethical considerations among pharmacy students and academic staff.

Methods:

Through a mixed method study approach employing an explanatory sequential design, close-ended survey questionnaires were distributed to pharmacy students and teaching academic staff for the quantitative phase. Subsequently, selected participants underwent structured interviews for the qualitative phase. The analysis involves correlation and identifying emerging themes for the quantitative and qualitative phases.

Results:

Among 398 students and 13 academic staff, 92.2% of students and 92.3% of staff used AI in learning/teaching. Both agree on AI's effectiveness in learning/teaching (73.4% students, 76.9% staff), citing time efficiency (84.2% students) and teaching flexibility (84.6% staff) as key motivators to use AI. However, ethical concerns (69.1% students) and lack of training (84.6% staff) hinder AI use. Nonetheless, concerns about AI replacing staff exist (47.5% students, 46.2% staff). Despite concerns, majority support AI integration (74.1% students, 69.2% staff). The correlations between the students' and academic staff's knowledge ($r = -0.254$), attitude ($r = -0.240$), and perceptions ($r = 0.199$) towards AI are weak and not statistically significant ($P > 0.05$). Themes emerged are: understanding the capabilities of AI, human interaction with AI, and considerations of AI.

Conclusions:

The integration of AI in pharmacy education offers transformative potential, enhancing personalized learning while complementing traditional pedagogical methods. Despite the concerns, there is a generally positive outlook towards AI integration, highlighting the importance of comprehensive education and training to harness its benefits effectively.

KEYWORDS: AI integration; AI readiness; Pharmacy education; Traditional pedagogy

PE-1301102-P

Pharmacy Student-led Non-communicable Diseases Screening as a Service-Learning Activity in a State University in the Philippines

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ABSTRACT

Introduction:

Non-communicable diseases (NCDs) are among the top causes of death in the Philippines. Routine screening and early detection have been proven to be vital in the effective management of NCDs. Clinical skills for NCDs screening is among the essential skills that pharmacy students are trained for, and skills development may be achieved through a service-learning activity.

Objectives:

This study aimed to evaluate an NCD screening service learning activity in terms of patient satisfaction and pharmacy student experience.

Methods:

Fourth year BS Pharmacy students organized a week-long student-led NCDs screening service involving (1) blood pressure measurement, (2) blood glucose measurement, (3) BMI calculation, and (4) urine dipstick testing. A client satisfaction survey was conducted among patients who consented. Further, a 5-point Likert scale survey was conducted among the pharmacy students to evaluate their experience in terms of (1) preparedness to provide NCD screening services, (2) satisfaction in the conduct of the project, and (3) perceptions in the conduct of the project.

Results:

A total of 130 clients were served during the NCD-screening, with 106 (81.54%) of whom consented to answer the client satisfaction survey. All of the patients served agreed that they were satisfied with the service and that they will recommend the service to others. In terms of student experience, majority of the 41 pharmacy students felt prepared and confident to provide NCD screening service (4.37/5), with everyone recommending the implementation of the activity again (4.98/5). On the other hand, many also recommended that facilities and resources be improved in the next implementation (4.15/5).

Conclusions:

The implementation of an NCD screening service in a state university was highly appreciated not only by the patients, but also by the pharmacy students as a service-learning activity. It is recommended that similar initiatives be included as part of the clinical assessment training of pharmacy students.

KEYWORDS: Clinical assessment; Non-communicable diseases; Pharmacy student; Service-learning Screening service;

PE-1301103-P

Evaluation of the Reaction and Learning of UP College of Pharmacy Outbound Students in an Exchange Program with Mahasarakham University Using Kirkpatrick's Model

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ABSTRACT

Introduction:

The UP College of Pharmacy International Student Exchange Program with Mahasarakham University in Thailand (Outbound Students) is a three-week program designed to orient and expose Filipino pharmacy students to the different areas of Thai pharmacy profession, concerning patient-directed care and population-based services.

Objectives:

The evaluation was conducted to determine the points for improvement in terms of handling and coordinating the student exchange program using Kirkpatrick Model Level 1 (Reaction) and Level 2 (Learning). Specifically, the evaluation focused on the logistics, academic, social, and extra-curricular experience, and knowledge gained by the students from the exchange program.

Methods:

A mixed-method research design was utilized, with two batches of outbound students (n=8) as subjects. For Level 1, data were collected through an online evaluation questionnaire administered after the return of the outbound students, and were analyzed using descriptive statistics. For Level 2, data were collected through focus group discussions and grading of the submitted outputs of the outbound students. Qualitative data were then analyzed through identification of recurring themes, while quantitative data were analyzed using a checklist-rubrics and descriptive statistics.

Results:

The exchange program elicited favorable reaction and learning from the two batches of outbound students. All four main areas (logistics, social, academic, and extracurricular experiences) showed satisfactory results exceeding the expectations of the outbound students. For learning, the students were able to identify the socio-cultural and economic determinants of health and community service in Thailand, and point out pharmacy-related concepts experienced through their submitted proposal output discussing strategies to improve the pharmacy practice in the Philippines.

Conclusions:

The exchange program was able to achieve its intended outcomes as evidenced by satisfactory logistics, social, academic, and extracurricular experiences and knowledge gained by the students. It is recommended that community immersion opportunities and language barriers be improved in the next implementation of the program. Further, Levels 3 (Behavior) and 4 (Results) evaluation are recommended to evaluate the long-term program outcomes.

KEYWORDS: Exchange program; Kirkpatrick's model; Mahasarakham University; Student mobility; UP College of Pharmacy

PE-1303101-P

Assessing Video Instruction for Protein Determination: A Study Using the Kjeldahl Method

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ABSTRACT

Introduction:

Nowadays, video has become an indispensable tool in higher education. However, how video could be used in practical courses, especially the practical courses of medicine and pharmacy, has still been a big challenge for many universities.

Objectives:

In this study, we not only developed a video-based system for introducing a lab-based practical experiment to students but also a procedure to evaluate the effectiveness of this video-based system.

Methods:

The video was designed based on the cognitive theory of multimedia learning of Mayer R. E and guidelines for maximizing student learning from video content of Cynthia J. Brame. The video was filmed using Canon EOS 60D and then was edited by Vegas Pro, Premiere. The effectiveness of the video was evaluated using a sample of 150 third year students. The questionnaire was validated using reliability and exploratory factor analyses (Cronbach's alpha, Kaiser-Meyer-Olkin test, Bartlett's test, Eigenvalues…).

Results:

The size (663,765 KB), the length (11:03) and the format (MP4) of the video are highly compatible with all types of presentation devices and is easy to share on media platforms. The questionnaire used to evaluate the effectiveness of the video was reliable (Cronbach's alpha index > 0.6 (0.907); KMO >0.7, Barllet's test significant < 0.0001). The entire 13 items were grouped into 3 sets of components (learning outcomes and contents; practice activities; assessment methods) characterized by 3 Eigen values >1, a total variance explained 69,211 % and impact factor >0.6. The data from the questionnaire showed that all items (for both groups) were well presented (the mean >4.2/5). There was no significant difference between two examined groups for all 3 sets of components (p> 0.05).

Conclusions:

A video-based system for introducing a lab-based practical experiment to students was successfully developed and could be used for distance education.

KEYWORDS: Distance education; Practical experiments; Video-based system

PE-1303102-P

Evaluating Student's Satisfaction Towards Pharmacist Training Activities at a Private University in Vietnam

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ABSTRACT

Introduction:

In the context of a competitive market economy, student satisfaction plays an important factor in determining competitiveness and enhancing the position and reputation of the university.

Objectives:

This study aimed to build a scale to evaluate factors associated with student's satisfaction towards pharmacist training activities at a private university in Vietnam.

Methods:

A cross-sectional survey was conducted on 564 pharmacy students (from 1st year to 5th year) at Tay Do University, Can Tho, Vietnam from April to June 2023 via Google forms. A structural questionnaire included 32 items, with an additional item assigned to assess overall satisfaction was built based on literature review and expert consultation. Cronbach's Alpha reliability test and exploratory factor analysis (EFA) were used to evaluate the scale, while multivariate regression analysis determined the relationship between satisfaction factors and overall satisfaction of students.

Results:

A total of 495 students completed the survey (88%). The student satisfaction with pharmacist training activities was influenced by 5 main factors, with internal consistency assessed using Cronbach's alpha (α) being: the facilities ($\alpha = 0.908$), the training programs ($\alpha = 0.914$), the teaching staff ($\alpha = 0.901$), the service ability ($\alpha = 0.909$) and the movement activities ($\alpha = 0.896$), respectively. The corresponding level of student's satisfaction towards these factors were 62.8%, 60.8%, 71.7%, 51.9% and 69.5%. All factors had a positive impact on student's satisfaction wherein the training programs factor ($\beta = 0.249$, $P < 0.001$) had the greatest impact on the student's satisfaction.

Conclusions:

In general, the level of student's satisfaction with pharmacist training activities at the university was relatively good. However, the university still needs to implement more synchronous solutions to improve student satisfaction, with a focus on training programs.

KEYWORDS: Pharmacy students; Satisfaction; Training activities; Vietnam

PE-1303106-P

Grit Matters?: Exploring the Correlation Between Grit Levels and Pharmacy License Exam Success

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ABSTRACT

Introduction:

Academic excellence and resilience are crucial in the demanding field of pharmacy. Grit, defined as perseverance and passion for long-term goals, has been shown to influence achievement. However, the relationship between grit levels and licensure exam performance among Thai pharmacy students remains unexplored.

Objectives:

This study was to assess grit levels and investigate the association between grit components (perseverance and passion) and licensure exam performance among Thai pharmacy students eligible for the 2024 exam at Burapha University.

Methods:

This observational study utilized an online survey of pharmacy students at Burapha University who were eligible for the 2024 licensure exam. The pre-survey consisted of 21 items across three sections: Grit (10 items), Preparedness (5 items), and Demographics (6 items). The post-survey had only one question regarding their exam result (Pass or Fail). Data were analyzed using SPSS version 26. Institutional review board approval was obtained for this study.

Results:

Most respondents (n=23) were female (78.26%), in the pharmaceutical care track (56.52%), sixth-year students (95.65%), with a cumulative GPA of 2.50-2.99 (47.83%) and previous semester GPA of 3.50-4.00 (69.57%). The average grit score was 3.29 (SD=0.58), higher than 30% of referenced adults, with passion at 3.10 (SD=0.55) and perseverance at 3.48 (SD=0.76). The logistic regression model predicting exam success included passion and perseverance as predictors, demonstrated good fit (Hosmer-Lemeshow p=0.99), and explained 42% of variance (Nagelkerke R2=0.42). Perseverance was positively associated with passing (B=2.84, SE=1.45, Wald=3.84, p=0.05), suggesting a 17-fold increase in odds for each one-unit increase.

Conclusions:

This study provides valuable insights for pharmacy educators and students, emphasizing the crucial role of perseverance in achieving academic excellence and success in licensure exams. By fostering perseverance and other components of grit, pharmacy programs can better equip students with the resilience and determination necessary to navigate the demanding field of pharmacy.

KEYWORDS: Grit; Licensure exam; Pharmacy students; Thailand

PE-1401101-P

Perception and Satisfaction of Fourth Year Bachelor of Science in Pharmacy Students on the Introductory Pharmacy Practice Experience of the University of Santo Tomas, Manila

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ABSTRACT

Introduction:

Understanding students' perceptions and satisfaction in the Introductory Pharmacy Practice Experience Program (IPPE) is crucial for improving pharmacy education. The pharmacy internship program is vital to a pharmacy student's growth as it involves the integration of theoretical knowledge into real-life practice.

Objectives:

This study assessed students' perceptions, evaluated program satisfaction, and identified specific IPPE areas for enhancement. Moreover, factors such as gender, travel time, knowledge, level of support, experience, and interest were assessed if these factors have a significant relationship with the perception and satisfaction of the pharmacy interns regarding the IPPE program.

Methods:

Utilizing a quantitative approach, questionnaires were distributed to 4th-year BS Pharmacy students of the University of Santo Tomas who have completed or were on the last rotation of their internship. Data analysis employing descriptive and inferential statistics like Independent T-Test, Paired T-Test, One-Way ANOVA, and Pearson Correlation Coefficient have provided comprehensive insights.

Results:

Implications of the findings suggest that the IPPE Program of the University of Santo Tomas successfully meets the expectations of 4th-year BS Pharmacy students in all areas, with Hospital Pharmacy rotation regarded as the most favorable area by students, while the students indicated the lowest satisfaction during the Industrial Pharmacy rotation. Moreover, the findings of this study have determined that the level of interest, social support, knowledge in prerequisite courses, and experience in pharmaceutical practice received by the respondents increases their perception and satisfaction with IPPE.

Conclusions:

In conclusion, students have the highest level of perception and satisfaction in the hospital pharmacy area. Also, gender does not significantly impact the perception and satisfaction of the interns in their internship experience. Factors such as level of support, interest, knowledge, and experience affect their perception and satisfaction of the IPPE program. Lastly, expectations of the students were met since the positive perception resulted into the satisfaction of the program.

KEYWORDS: Introductory pharmacy practice experience program; Perception; Pharmacy interns; Satisfaction

PE-1401102-P

A Cross-sectional Study on Student Motivation to Pursue Pharmacy and Course Satisfaction and their Correlation to the Career Intentions of 4th Year BS Pharmacy Students

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ABSTRACT

Introduction:

The maldistribution of the pharmacy workforce in the Philippines is significantly correlated to the underutilization of healthcare resources. This emphasizes the importance of career planning and understanding the determinants of career intentions amidst the lack of studies.

Objectives:

With the pharmacy profession taking on various fields, it was crucial to assess the intricate link between the motivations for choosing a pharmacy degree and the satisfaction that ultimately affects pharmacy students' job choices in the Philippines.

Methods:

To bridge this gap, a cross-sectional study was carried out at the Faculty of Pharmacy, University of Santo Tomas. A comprehensive survey questionnaire was administered to 130 fourth-year BS Pharmacy students.

Results:

The findings of this study keynoted and encompassed several aspects of the 4th year pharmacy students' demographics, motivations, satisfaction levels, and career ambitions. The study concludes that personal and external factors are moderately influential factors, while interpersonal influences do not serve as motivation for students to enroll in BS Pharmacy. The 4th year students are divided into pursuing pharmaceutical (46.92%) and non-pharmaceutical careers (50.77%) and a minor group selecting both (2.31%). Regulatory pharmacy (68.85%) was the most sought-after pharmaceutical career among fourth-year students, followed by hospital pharmacy (47.51%) and clinical pharmacy (40.98%). In terms of a non-pharmaceutical career path, the majority (96.97%) show interest in seeking a medical postgraduate degree. The Cramer's V indicates a weak correlation between satisfaction level and the pharmaceutical career path of BS Pharmacy Students. Interpersonal influences, personal interest, and external factors show a weak correlation as a driving force that motivates BS Pharmacy Students to pursue a pharmaceutical career path.

Conclusions:

This study highlighted the importance of understanding career intentions and the factors influencing the students' preferences, which could be useful in ensuring a balance in the health-allied workforce in the Philippines.

KEYWORDS: Career intentions; Graduating students; Influences; Motivation; Pharmacy; Satisfaction

PE-1401103-P

Development of Hospital Medication Management System Clerkship for Pharmacy Curricula in Thailand.

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ABSTRACT

Introduction:
The pharmaceutical care clerkship required a course called Hospital Medication Management System. The learning outcomes centered on identifying and fixing systemic challenges with hospital medication systems.

Objectives:
The purpose of this study was to test the usability of clerkship manual.

Methods:
A qualitative research was undertaken by interviewing all stakeholders to assess the clerkship model's learning results. Create a new manual clerkship and then compare its usability testing between experienced and new pharmacy preceptors at six practice sites based on four criteria: ease of use, usefulness, efficiency, and satisfaction. Two students from each setting were invited to participate in the final evaluation process. The System Usability Scale (SUS) Score was used to assess user satisfaction with the manual.

Results:
The ease of use and efficiency tests revealed that all users were able to execute all activities in accordance with the established goals in both manuals. The pharmacists' feedback on using the new manual is that it is straightforward, simple to read and understand, and concise. The assessment form has clear scoring guidelines and is easy to evaluate. The questions about self-learning activities are basic. The overall SUS score was 81.04, which met the satisfaction criterion. However, a sample training activity program should be provided each week to facilitate the training site.

Conclusions:
The guidebook created for this study is brief and straightforward. The behavioral evaluation contains additional information that can be self-learned and understood rapidly. The assessment outcomes were obvious and consistent, regardless of the preceptor's expertise. Assessment scores were tied to students' competencies. This guidebook is designed to be broadly applicable.

KEYWORDS: Clerkship; Hospital accreditation; Medication management system; Pharmacy education

PC-0401102-P

In silico Drug Discovery for Dual SGLT1 and SGLT2 Inhibitors

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ABSTRACT

Introduction:

The sodium-glucose cotransporter (SGLT) plays a crucial role in human glucose uptake. Dual inhibition of SGLT1 and SGLT2 provides significant advantages in treating type 2 diabetes, heart failure, and chronic kidney disease.

Objectives:

This study aimed to explore potential natural inhibitors targeting both SGLT1 and SGLT2 through using *in silico* approaches.

Methods:

Molecular dynamics simulations (MDs) were carried out for SGLT1 and SGLT2 structures using GROMACS. MDs-based pharmacophore models were then generated by MOE 2015.10 using representative conformations obtained from cluster analysis of MD results. Virtual screening by pharmacophore models and induced-fit molecular docking using MOE 2015.10 was conducted to identify potential dual SGLT1 and SGLt2 inhibitors.

Results:

The five-feature pharmacophore model for SGLT1 (model S1-MD) (Se = 93.33%, Sp = 87.03%, Acc = 87.55, EF = 4.75, GH = 0.46) and the five-feature pharmacophore model for SGLT2 (model S2-MD) (Se = 89.46%, Sp = 93.90%, Acc = 92.66%, EF = 3.04, GH = 0.81) were obtained from MDs. The screening process based on these pharmacophore models for 286 phytochemicals revealed 10 compounds that satisfied both models. By applying induced-fit molecular docking, 7 of them including C155, C156, C157, C165, C186, C258 and C270 were discovered as potential dual inhibitors which were able to bind into both SGLT1 and SGLT2 (their docking scores on SGLT1 ranging from -10.07 to -13.67 kcal.mol^{-1} and SGLT2 ranging from -10.56 to -13.90 kcal.mol^{-1}). Moreover, these compounds formed the important interactions with the targets, similar to the reference compound.

Conclusions:

This study identified 7 potential natural dual SGLT1 and SGLT2 inhibitors. Further experimental assays would be required to confirm the activities of 7 phytocompounds in both targets.

KEYWORDS: Dual SGLT1 and SGLT2 inhibitors; *In silico* drug discovery; Molecular docking; Molecular dynamics simulations; Pharmacophore models derived from molecular dynamic

PC-0401103-P

The Synthesis and Cytotoxic Evaluation of Novel 2-Methoxy-*N*-phenylbenzamide Derivatives Bearing Benzimidazole Scaffold

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ABSTRACT

Introduction:

HSP90 is a 90 kDa heat shock protein that plays an important role in maintaining cellular homeostasis. The expression of HSP90 increased by 2-4 times in cancer cells, which is a new molecular target for anticancer agent. In general, almost all HSP90 inhibitors in clinical trials are *N*-terminal inhibitors which have side effects such as heat shock response (HSR). *C*-terminal HSP90 inhibitors become alternatives without HSR. The NCT-58 compound, a novobiocin and deguelin hybrid derivative is an anti-cancer agent by inhibiting *C*-terminal HSP90. From NCT-58 compound, its structure is modified to design novel 2-methoxy-*N*-phenylbenzamide derivatives bearing benzimidazole scaffold as *C*-terminal HSP90 inhibitors.

Objectives:

Novel 2-methoxy-*N*-phenylbenzamide derivatives bearing benzimidazole scaffold are synthesized and evaluated for their cytotoxicity.

Methods:

Target compounds were synthesized by EDC coupling reaction between amine intermediate and acid derivatives. Their structures were elucidated based on NMR, MS, and IR data. The cytotoxicity was evaluated using the MTT method on MDA-MB-231 and A549 cell lines. The docking assay confirmed the binding mode of synthesized compounds with *C*-terminal HSP90.

Results:

Six *N*-phenylbenzamide derivatives bearing the benzimidazole scaffold were synthesized and showed significant tumor suppressive effects in triple-negative breast cancer MDA-MB-231 (IC_{50} = 2.53–14.41 μM) and non-small cell lung cancer A549 (IC_{50} = 5.91–25.46 μM). Among them, compound VIII.6 exhibited the most potent antitumor activity with IC_{50} of 3.67 μM in MDA-MB-231 and 5.91 μM in A549. The docking study of VIII.6 showed that it could bind to amino acids and fit well into the predicted ATP binding region at the *C*-terminal domain of HSP90.

Conclusions:

Based on the structure of compound NCT-58, a series of inhibitors derived from opening the chromene ring and replacing the piperidine heterocyclic sidechain with a benzimidazole structure was synthesized and evaluated for antitumor activity. The result contributes to enriching the library of benzimidazole compounds as anti-cancer agents.

KEYWORDS: Anti-cancer; Benzimidazole; Ccytotoxicity; HSP90; 2-Methoxy-*N*-phenylbenzamide

PC-0401104-P

Discovery and Development of Novel 6-Substituted Aminoindazole Derivatives as IDO1 Inhibitors in Cancer Immunotherapy

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ABSTRACT

Introduction:

Indoleamine 2,3-dioxygenase 1 (IDO1) is one of the heme-containing enzymes that involve in the immune system suppression process. It catalyzes the oxidative ring-opening of tryptophan, the first and rate-limiting step of the kynurenine pathway. IDO1 is overexpression in different types of cancer cells and tumors and helps these cancers escape the immune system. Indazole, a bioisostere of indole ring in tryptophan, was used as the skeletal structure for design new IDO1 inhibitors.

Objectives:

In the present study, two series of 6-substituted aminoindazole derivatives were designed, synthesized and evaluated bio-activities.

Methods:

The compounds were initially designed as IDO1inhibitors based on the structural feature of five IDO1 inhibitors which are currently on clinical trials and the important anticancer activity of indazole scaffold. Next, the designed compounds were synthesized, evaluated for their anti-proliferative activity in different cancer cell lines. The potent compounds were investigated the IDO1 suppression, performed docking studies, examined the possible anticancer mechanisms in the IDO1 high expression cancer cell lines.

Results:

Two new series including 78 compounds bearing 6-substituted aminoindazole scaffold were designed, synthesized. All of these compounds were screened their cytotoxicity. Among 78 compounds, compounds 7, and 36 exhibited potent anti-proliferative activites, with an IC_{50} value of 2.78±0.3 µM in hypopharyngeal carcinoma cells (FaDu), and 0.4±0.3 µM in human colorectal cancer cells (HCT116), respectively. In addition, two compounds remarkably suppressed IDO1 protein expression. Moreover, compound 7 induced apoptosis by activation of cleaved caspase-3, cleaved poly (ADP-ribose) polymerase (PARP), and activated p-p42/44 in mitogen-activated protein kinase (MAPK) pathways, suppressed cell migration in wound healing assay and the expression of matrix metalloproteinase MMP9 and MMP2; while suppressive activity of compound 36 in HCT116 cells was related to G2/M cell cycle arrest in the cell-cycle studies.

Conclusions:

Altogether, we believe that compounds 7, and 36 might be useful as molecular probes to identify the biological role of IDO1, and could inspire the design of new anticancer agents. The discovered 6-substituted aminoindazole derivatives as IDO1 inhibitors demonstrates promising agents in cancer immunotherapy.

KEYWORDS: Aminoindazole; Cancer; IDO1; Immunotherapy; Inhibitors

PC-0401109-P

Large-scale Virtual Screening of Inhibitors Targeting the ST2 Receptor Based on a Novel Allosteric Pocket Identified Through Mixed-solvent Molecular Dynamics Simulations

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ABSTRACT

Introduction:
The ST2 receptor, a crucial member of the interleukin(IL)-1 receptor family, specifically binds to its IL-33 ligand. The IL-33/ST2 pathway is highly correlated with various autoimmune and inflammatory diseases. While inhibitors targeting the orthosteric sites of the IL33/ST2 protein-protein interaction (PPI) interfaces are being developed, the allosteric sites remain unidentified.

Objectives:
Identify druggable binding sites on ST2 and evaluate their therapeutic potential through virtual screening and computational methods.

Methods:
Mixed-solvent molecular dynamics (MixMD) simulations were employed to identify potential binding sites on ST2. Normal mode analysis (NMA) was conducted to predict the allosteric potential of the binding cavities detected by MixMD. At the most potential binding pocket, a deep learning-based virtual screening was conducted on the Enamine Screening Collection (> 4M compounds). A graph neural network (GNN) model was built on a training set (5% of the database), which was docked and labeled as virtual active (1%) or inactive (99%) based on their docking scores. The trained GNN model forecasted the remaining 3.8 million compounds. Finally, the top 10,000 predicted 'active' compounds underwent detailed docking and MD simulations.

Results:
We pinpointed 10 potential binding cavities on ST2 using MixMD. NMA has confirmed the top-ranked site as an allosteric site with a significant change in protein's flexibility caused by pseudoligands (p-value = 0.000817). The trained GNN model achieved a high sensitivity of 0.89 at a significance of 0.5. Subsequent virtual screening revealed the top five compounds with docking scores ranging from −12.364 to −12.662 kcal.mol^{-1}. MD simulations highlighted Z52088515 as a promising lead candidate with a favorable binding free energy of −35.68 kcal.mol^{-1}.

Conclusions:
The discovered allosteric pocket opens new avenues for developing inhibitors for the ST2 receptor. From this study, the hit compounds identified from the virtual screening should be biologically evaluated to confirm their inhibitory activity.

KEYWORDS: Allosteric; Large-scale screening; MixMD; ST2 receptor

PC-0401110-P

Novel *(E)*-3-(1-Substituted-1*H*-indazol-5-yl)-*N*-hydroxypropenamides as Histone Deacetylase inhibitors: Design, Synthesis and Bioevaluation

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ABSTRACT

Introduction:

Histone deacetylase inhibitors have been known as promising anticancer drugs. To date, at least four HDAC inhibitors have been approved by the U.S. FDA for use in clinical settings. Our team of researchers has focused on this target for more than twenty years. Herein, we report the design, synthesis and evaluation of novel *N*-hydroxypropenamides bearing indazole moieties as potent HDAC inhibitors and anticancer agents.

Objectives:

In this study, we synthesized two series of *N*-hydroxypropenamides (5a-i and 7a-i) as analogs of panobinostat or belinostat using a 3-(1-substituted-1*H*-indazole) ring as a cap group. Next, these two series were tested for their cytotoxicity against three human cancer cell lines, as well as for their capacity to inhibit HDAC.

Methods:

The synthesis of *N*-hydroxypropenamides incorporated into indazole rings was performed via a three-step synthetic pathway, as depicted in Scheme 1. The structures of the synthesized compounds were directly derived from the study of spectroscopic data, including IR, MS, ^{1}H NMR, and ^{13}C NMR. The cytotoxicity of compounds 5a-i and 7a-i was tested against three human cancer cell lines, including SW620 (colon cancer), PC3 (prostate cancer), and MDA-MB-231 (breast cancer), as well as for their capacity to inhibit HDAC using HeLa cell nuclear extract assay. SAHA served as a positive control. Cytotoxicity was determined using CellTiter-Glo (Promega).

Results:

The steps for the synthesis of two series are shown in Scheme 1. Overall, compounds 5a-i and 7a-i were obtained with moderate yields (39-49%). The bioactivity results demonstrate that all 18 produced substances show impressive cytotoxicity against all three tested human cancer cell lines, with IC_{50} values less than 10 microM. In addition, the synthesized compounds 5a-f and 7a-f were the most potent HDAC inhibitors, with IC_{50} values ranging from 0.126 to 3.750 microM.

Conclusions:

In conclusion, we have successfully designed and synthesized two series of *N*-hydroxypropenamides (5a-i and 7a-i) via a three-step synthetic pathway from a single intermediate 5-bromo-1*H*-indazole. All compounds showed excellent HDAC inhibitory activity and cytotoxicity against three human cancer cell lines. Moreover, all compounds showed 5- to 30-fold more potent inhibitor activity against HDAC6 in comparison to a mixture of HDAC isoforms.

KEYWORDS: Histone deacetylase inhibitors; Hydroxamic acids; *N*-Hydroxypropenamides; Indazole

PC-0402101-P

Benzylic C−H oxidation by Photoinduced *N*-centered Radical

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ABSTRACT

Introduction:

Protocols for direct and selective oxidation of benzylic C−H bonds to aromatic ketones and carboxylic acids are highly sought after for the synthesis of pharmaceutical and other valued products. Classic oxidation methods involve strong oxidants, either organic (PCC, IBX, peroxides) or metallic (Cr(VI), Mn(VII), Ce(IV), etc) combined with harsh conditions, and are not desirable for molecules with complex structure and functional groups. More recent advancements in the field utilize photocatalysts that are more selective but are often expensive and lacking user-friendliness.

Objectives:

In this study, we aim to develop a greener alternative that utilizes the energy from light to generate *N*-centered radicals, which is able to activate benzylic C−H bonds and make them reactive toward atmospheric oxygen, the most sustainable oxygen source, to directly obtain ketones and carboxylic acids.

Methods:

Under UVA irradiation, the two commercial fluorinating reagents, Selectfluor and NFSI, can generate *N*-centered radicals, which are versatile intermediates for hydrogen-atom transfer (HAT) reaction. They are able to selectively activate labile benzylic C−H bonds from substrates containing either benzylic CH_2 or CH_3 moieties, to generate benzylic radicals, which undergo rapid oxidation with molecular oxygen.

Results:

The reaction conditions have been optimized for the photo-induced oxidation to obtain aromatic ketone and carboxylic acid products. The utility of the reaction was evaluated with a reaction scope consisting of 15−20 molecules, of which there are several drug and natural product related compounds. Experimental data support the mechanism which involves the HAT step of the *N*-centered radical intermediate.

Conclusions:

A green protocol for benzylic C−H bond oxidation was developed for quick access to valuable ketones and carboxylic acids. The advantages of this method are its high selectivity, cost effectiveness, and its mild operational requirements. Further efforts are being carried out in our laboratory for its application to a wide range of pharmaceutical products.

KEYWORDS: Benzylic oxidation; C−H functionalization; Green chemistry; *N*-Centered radicals; Photochemical reaction

PC-0402102-P

Synthesis of 2-Alkylated Quinazolin-4(3*H*)-ones Under a New Transition Metal-Free Conditions

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ABSTRACT

Introduction:

2-Alkylated quinazolinone is heterocyclic compound containing two nitrogen atoms and one alkyl group at C2 position. Natural and synthetic 2-alkylated quinazolinones have been used as drugs and exhibited a wide range of biological activities. One of the strategies to access 2-alkylated quinazolinones is Minisci-type reaction which is regioselective substitution at C2-position of quinazolinones with alkyl radical. New conditions for this type of reaction are currently under investigation.

Objectives:

1. To develop a new method for synthesis of 2-alkylated quinazolinones through a Minisci-type reaction, employing quinazolinone derivatives and alkanes as starting materials.
2. To prove and propose the reaction mechanism of this newly transformation.

Methods:

The reaction conditions were optimized in different solvents, solvents ratios and oxidants. After the best conditions was obtained, 2-alkylated quinazolinone were synthesized by using various quinazolinone derivatives and alkane to explore substrate scope. The radical trapping experiments using TEMPO and BHT were performed for mechanistic study.

Results:

Potassium persulfate as an oxidant, acetonitrile and water in a ratio of 4:1 as a solvent provided the highest yield and the best reaction conditions. Quinazolinone with large substituents at N3 positions gave lower yield compared to quinazolinone with small substituents. The alkane chain with more carbon atoms as alkylating agent tends to provide lower yields. The highest yield was obtained from nitro-containing quinazolinone at 82%. From the mechanistic study, it can be concluded that the reaction was performed via radical pathway.

Conclusions:

The suitable reaction conditions is potassium persulfate as an oxidant, acetonitrile and water in a ratio of 4:1 as a solvent conducted in seal tube at 80 °C. Under the new conditions, 26 products were obtained with the %yield ranging from 13-82%. The suitable quinazolinone substrates are quinazolinone without substituent or small substituents at N3 position and quinazolinones with EWG at C6 position. The suitable alkylating agents are small-sized alkanes with low steric hindrance.

KEYWORDS: Alkane; Free radical; Potassium persulfate; Quinazolinone; Substitution reaction

PC-0501101-P

Reaction Kinetics of Peroxide and Fatty Acid Formation under the Influence of Temperature in Bromelain-extracted Virgin Coconut Oil

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ABSTRACT

Introduction:

Virgin Coconut Oil (VCO) has many uses: it prevents disease, reduces the risk of hyperlipidemia, and as some cosmetic material. The bromelain-extracted VCO has been produced. Quality during handling, storage, and transportation is an importance issue to be determined.

Objectives:

Therefore, the research aims to determine the kinetic parameter of VCO degradation based on formation of peroxide and free fatty acid, also to determine the shelf life of bromelain-extracted VCO in vary temperature.

Methods:

Determination of kinetic parameter and shelf life VCO were done by measuring the number of peroxides and free fatty acids at temperatures of 50°C to 200°C. Heating was done in 1 L conical flash immersed in the paraffin bath. Collecting samples for each temperature was conducted at 0 to 60 minutes. The rate constant of peroxide and free fatty acids formation was done based on Microsoft Excel regression analysis of plot between sampling time and value of peroxide and free fatty acid number.

Results:

The profile of peroxide and free fatty acid number was increase by increasing temperature and sampling time. The rate constant of peroxide formation increases from 0.0114 to 0.1419 mEq Kg^{-1} min^{-1}, when the VCO heated at 50 - 200°C. Meanwhile, the rate constant of free fatty acid formation increased 0.0188 to 0.0393 % min^{-1}, when heated at 50 - 200°C. Based on the shelf-life prediction according to Indonesian standard National or Asian and Pacific Coconut Community, the shelf-life of bromelain-extracted VCO range 10 - 3 hours for temperature 2 – 50°C. Conditioning of storage and addition of antioxidant may be interested to be studied in the future for longer shelf life.

Conclusions:

It was found that by increasing temperature the shelf-life of bromelain-extracted VCO was shorter. This data will inform that temperature is important for stability of bromelain-extracted VCO.

KEYWORDS: Bromelain; Formation rate; Regression; Shelf life; VCO; Zero order

PC-0502101-P

A Stability-indicating HPLC Method for Determination of Chemical Markers in *Boesenbergia rotunda* Extract Capsules

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ABSTRACT

Introduction:

Boesenbergia rotunda, or krachai in Thai, is a medicinal plant with the potential for medicinal and nutraceutical development because of its pharmacological properties. Therefore, a well-developed and accurate analytical method is crucial to ensure the appropriate quality control of *B. rotunda* products.

Objectives:

This study aimed to develop a simple stability-indicating HPLC-UV method for the quantitative determination of pinocembrin, pinostrobin, and panduratin A contents in *B. rotunda* extract capsules.

Methods:

HPLC chromatographic conditions were optimized using a C18 column. The mobile phase comprised of 0.1% formic acid in water and methanol in acetonitrile using a gradient system at a flow rate of 1 mL/min. The detection wavelength was 300 nm. The method was validated according to the guidelines of the International Conference on Harmonization (ICH Q2) for linearity, accuracy, precision, and specificity. Forced degradation studies under acid, base, oxidation, and sun photolytic conditions were also performed.

Results:

The forced degradation of *B. rotunda* extract capsule showed that all selected chemical constituents were stable in acid and oxidative conditions, but they were highly labile under basic and photolytic conditions. There was no interference from impurities, degradation products, or excipients in the HPLC chromatogram at the retention times of those standards indicating the specificity of the analytical method. The developed HPLC method promoted linear correlations in the range of 10-200 µg/mL for pinocembrin, 50-1000 µg/mL for pinostrobin, and 5-100 µg/mL for panduratin A, with correlation coefficients (r) > 0.99. The recoveries were acceptable for all markers. Relative standard deviations (RSDs) of repeatability and intermediate precision were less than 2.0%.

Conclusions:

HPLC method has been successfully developed and validated for quantitative analysis of chemical markers in B. rotunda extract capsules. This study provides a promising chemical analysis approach for quality control and standardization of herbal medicines, especially B. rotunda products in the future.

KEYWORDS: *Boesenbergia rotunda*; HPLC; Panduratin A; Pinocembrin; Pinostrobin; Stability indicating method

PC-0502102-P

Metadynamics-Directed Modelling of High Affinity Quercetin Analogues Targeting Calcineurin

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ABSTRACT

Introduction:

Recent research revealed the potential utility of quercetin as calcineurin inhibitors with minimal adverse effects for the treatment of autoimmune diseases. Nevertheless, its poor bioavailability limits its clinical use, prompting efforts to improve its pharmacologic properties. Prior studies revealed bioavailability improvement with methylation of free hydroxyl groups, hence alkylation approach was adopted in this study. Enhanced sampling methods, like binding pose metadynamics (BPMD), have significantly improved structure-based computational drug design through their efficacy in accurately predicting ligand binding poses and affinities within protein binding sites.

Objectives:

In this study, we utilized BPMD to optimize the modeling of prominent quercetin analogues targeting calcineurin.

Methods:

Thirty-two analogues which satisfied Lipinski's rule of five were designed through alkylation of free hydroxyl groups in quercetin. Subsequently, *in silico* ADMET profiling was performed for each analogue using SwissADME and ADMETlab 3.0. The analogues were docked into calcineurin using AutoDock Vina. Molecular dynamics simulations were then performed using GROMACS with AMBER ff14SB force field. Subsequently, each analogue was subjected to BPMD, following the protocol implemented in OpenBPMD.

Results:

In silico ADMET evaluation using SwissADME model predicted nine analogues as well absorbed without brain access, while ADMETlab 3.0 model predicted twenty-two analogues to have higher bioavailability and permeability in comparison to quercetin. Molecular docking results revealed four mono-methyl and two mono-ethyl analogues possessing higher binding affinities to calcineurin than quercetin ($\Delta G_{bind\ (analogues)}$ = -7.302 to -7.757 kcal/mol vs. $\Delta G_{bind\ (quercetin)}$ = -7.242 kcal/mol). BPMD results predicted twenty-three analogues to be more stable than quercetin when bound to calcineurin (CompScore $_{(analogues)}$ = 7.236 to 33.606 vs. CompScore $_{(quercetin)}$ = 33.766).

Conclusions:

Structural modification of quercetin's free hydroxyl groups can enhance its pharmacological properties and affinity for calcineurin, potentially treating autoimmune diseases with few side effects. Binding pose metadynamics represents a promising approach for improving the efficiency of lead optimization in drug discovery.

KEYWORDS:, Calcineurin; Metadynamics; Molecular docking; Molecular dynamics; Quercetin

PC-0502103-P

Analytical Method Development and Validation of Acrylamide and Glycidamide in Volumetric Absorptive Microsampling (VAMS) Sample

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ABSTRACT

Introduction:

Acrylamide is a carcinogenic compound that can be found in commonly consumed foods and cigarette smoke. This compound is metabolized by cytochrome P450 in the human body to a more reactive metabolite, glycidamide.

Objectives:

This study aimed to optimize and validate a sensitive analytical method for determining acrylamide and glycidamide simultaneously in the volumetric absorptive microsampling (VAMS) sample using high performance liquid chromatography with an ultraviolet detector.

Methods:

Isoniazid as an internal standard (IS) was added to the VAMS sample containing acrylamide and glycidamide prior to protein precipitation. The analytes and internal standard were separated using the C18 Sunfire™ Waters® column (5 µm; 250 mm x 4.6 mm) and was detected at a wavelength of 210 nm. Method validation referred to The United States Food and Drug Administration (US FDA) Guideline for Bioanalytical Method Validation 2018 in term of parameters selectivity, carry over, sensitivity, calibration curves and linearity, accuracy, precision, recovery, dilution integrity, and stability. The selectivity test was evaluated by determining blank samples from 6 different sources.

Results:

The optimum chromatographic condition was eluted at a column temperature of 30 ºC with a mobile phase of 6 mM potassium dihydrogen phosphate pH 3.5 – methanol (96:4 v/v) using a flow rate of 0.50 ml/min. The LLOQ was obtained at 1.0 µg/mL for both acrylamide and glycidamide. The calibration curve was linear over the concentration range of 1.0-100.0 µg/ml. The mean intra- and inter-day assay precision were ≤9.72% for acrylamide and ≤6.93% for glycidamide while the bias (accuracy values) were ≤13.05% for acrylamide and ≤13.31% for glycidamide. The value of the selectivity test showed that the interference responses at the retention time of analytes were less than 0.77% and there was no interference at the retention time of IS.

Conclusions:

The developed bioanalytical method was valid based on US FDA Guideline 2018.

KEYWORDS: Acrylamide; Analytical method; Glycidamide; Validation; Volumetric absorptive microsampling

PC-0502104-P

Analysis of 2-Ethylhexanoic Acid Impurity in Clavulanate Potassium by Ion Chromatography

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ABSTRACT

Introduction:

Clavulanate, a *β*-lactamase inhibitor, is commonly used in the amoxicillin/clavulanic acid combination to treat infections because it effectively overcomes the resistance of bacteria to antibiotics. Quality control of clavulanate raw materials is essential. 2-Ethylhexanoic acid (2-EHA), an impurity of clavulanate, is regulated by Vietnam Pharmacopoeia V and US Pharmacopoeia USP 44 - NF 39 for limit control by gas chromatography, but not by ion chromatography.

Objectives:

The study was conducted to analyze 2-EHA impurity in potassium clavulanate by ion chromatography.

Methods:

The study was performed on placebo samples spiked with reference standards (clavulanate potassium standard and 2-EHA standard). Through the investigation, the parameters of chromatographic conditions were determined. The procedure was then validated according to ICH Q2 guidelines.

Results:

The chromatography method was performed on an IonPac AS19 column (7.5 µm, 4 mm × 250 mm), IonPac AG19 guard column (11 µm, 4 mm × 50 mm), at column temperature of 30 °C, flow rate of 1.0 mL/min, sample injection volume of 10 µL, gradient elution mode with KOH mobile phase in the range of 5 - 30 mM. The elution time was 25 minutes. The procedure conformed systematic suitability, specificity, detection limit and quantification limit of 0.06 µg/mL and 1.0 µg/mL, respectively, linear range of 1.0 to 6.4 µg/mL (R = 0.9992), high accuracy and precision..

Conclusions:

An analytical procedure by ion chromatography was developed to help determine the impurity limit of 2-EHA in clavulanate raw materials.

KEYWORDS: Clavulanate, 2-Ethylhexanoic acid, Ion chromatography, Validation

PC-0502105-P

Standardization and Development of a GC-FID Method for the Determination of Fatty Acids in Vietnamese Python Fats (*Python reticulatus*)

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ABSTRACT

Introduction:

Python fat is a widely used in medicine for its ability to effectively treat burns and scars.

Objectives:

The study was carried out with the goal of developing methods for controlling the quality of Vietnamese python fats (*Python reticulatus*).

Methods:

Criteria include characterization, density, microbial limits, qualitative and quantitative criteria and a number of related indices. The quantification of fatty acids in python fat is carried out using the GC - FID method validated according to ICH guidelines.

Results:

The quantification procedure of fatty acids in python fat was performed on the GC - FID system with the following chromatographic conditions: thermal program with starting temperature of 170ºC, carrier gas flow rate of 1.1 mL/min, sample injection volume of 1.0 µL and flow ratio of 150:1. The method was then validated according to ICH guidelines, meeting the requirements for specificity, accuracy, precision, and linear range of methyl derivatives of palmitic acid, stearic acid, oleic acid, and linoleic acid respectively are 1-5, 1-5, 2-10, 0.1-0.35 mg/mL. The content of these fatty acids in python fat were determined 11.38% palmitic acid, 6.99% stearic acid, 29.03% oleic acid and 0.76% linoleic acid. Other criteria including characterization, density, microbial limits, qualitative and quantitative criteria, and some related indices were also evaluated.

Conclusions:

The results of the study contribute to developing pharmacopoeia quality standards for Vietnamese python fats.

KEYWORDS: Fatty acid; Gas chromatography; Python fats; *Python reticulatus*

PC-0502106-P

Development and Validation of Bioanalytical Method of Efavirenz in Dried Blood Spot (DBS) using High Performance Liquid Chromatography–Photodiode Array (HPLC–PDA)

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ABSTRACT

Introduction:

Efavirenz (EFV) needs to reach adequate serum concentrations (1-4 µg/mL) as inconsistencies in drug levels can result in virological failure or central nervous system toxicity. Study indicates that there is a significant variability in patient response to EFV treatment. Therefore, monitoring drug levels is important to prevent adverse drug events. Previously published method for determination of EFV in dried blood spot (DBS) using High Performance Liquid Chromatography-Photodiode Array (HPLC-PDA) did not use any internal standard.

Objectives:

This study aims to develop an optimum and validated analysis of EFV in DBS, utilizing an internal standard.

Methods:

An analytical method for quantifying EFV in DBS samples using a High-Performance Liquid Chromatography photodiode array detector was developed and validated. The optimum chromatographic conditions were obtained by using C18 column (Sunfire TM 5 µm; 250 x 4.6 mm) at 40oC; eluted isocratically using acetonitrile (ACN):phosphate buffer 10 mmol pH 3.15 (63:37) as mobile phase; flow rate of 1.0 mL/min; UV detection at 245 nm; and warfarin (WFN) as internal standard. DBS sample preparation was evaluated using the protein precipitation method with various spotting volume, blood spots drying time, composition and volume extraction solvent, vortexing and sonication time, also centrifugation speed and time. The extract was evaporated with nitrogen, then reconstituted with 100 µL mobile phase.

Results:

This method obtained a lower limit of quantification (LLOQ) of 0.3 µg/mL and shows linearity within the concentration range of 0.3-30 µg/mL. The method has been validated according to the requirements set by the US Food and Drug Administration (2018) and the European Medicines Agency (2022).

Conclusions:

This method is accurate, precise, and sufficiently sensitive when high sensitivity is not essential. The validated method can then be applied to measure EFV in DBS for in vivo studies such as therapeutic drug monitoring and pharmacokinetic.

KEYWORDS: Dried blood spot; Efavirenz; High performance liquid chromatography (HPLC); HIV; Therapeutic drug monitoring; Warfarin

PC-0502107-P

Determination of Ceftazidime Levels in Human Cerebrospinal Fluid by High Performance Liquid Chromatography

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ABSTRACT

Introduction:

Ceftazidime is a third generation cephalosporin antibiotic with many outstanding advantages such as broad spectrum, strong effect on Gram-negative bacteria, resistance to many *β*-lactamases, especially good effect on *P. Aeruginosa*. Ceftazidime has excellent penetration into the cerebrospinal fluid (CSF) and is indicated in cases of meningitis. For patients undergoing cranial surgery, antibiotic concentrations in cerebrospinal fluid are more significant than plasma concentrations. For time-dependent antibiotics such as penicillins, cephalosporins and carbapenems, the time above the minimum inhibitory concentration (T > MIC) is related to the bactericidal effect and determines the therapeutic effect of the drug. To develop an individualized treatment plan and minimize side effects, it is extremely important to monitor ceftazidime concentrations in the cerebrospinal fluid.

Objectives:

In this study, we demonstrate a simple, rapid and accurate HPLC method for determination of ceftazidime in CSF.

Methods:

The method used a on a C18 column (4.6 mm x 150 mm, 5 µm) using a mobile phase composed of acetonitrile and phosphoric acid (pH 2.5) (12:88, v/v) at room temperature (25 ◦C), and the detection wavelength was 260 nm. For sample preparation, an internal standard was added, and acetonitrile was added for protein precipitation.

Results:

Good separation of ceftazidime from the interfering peaks in CFS was obtained with analytical time of less than 10 min. With the chosen analytical conditions, the method was validated according to the FDA Guidelines. Ceftazidime was quantified between 0.2 and 50 ppm in CSF with desired precision and accuracy with a relative standard deviation less than 14% and recovery in the range 86%-114% according to FDA regulations.

Conclusions:

A reliable analytical method was developed and validated for the quantitation of ceftazidime concentration in CFS. With simple procedure, fast analysis and low LLOQ obtained, the method was found as an efficient tool for clinical practice and clinical studies concerning ceftazidime dosage in treatment of meningitis.

KEYWORDS: Ceftazidime; Cerebrospinal fluid; CSF; Determination; HPLC

PC-0502108-P

RSM-Based Optimization of an RP-HPLC Method, Analytical Method Validation, and Content Determination of Daidzein in Soy Sauce

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ABSTRACT

Introduction:

Soybean is extensively consumed in Indonesia and is known to be beneficial for human health. One of the soybean products is soy sauce. Soybean and its products are reported to contain isoflavone aglycone daidzein which can provide beneficial biological activities for humans. Hence, it is important to develop a suitable analytical method to analyze the daidzein content in soy sauce.

Objectives:

Aiming to determine the optimum condition for analyzing daidzein in soy sauce, this study was conducted using reverse phase HPLC (RP-HPLC) assisted by response surface methodology followed by analytical method validation and content determination of daidzein.

Methods:

The Box–Behnken design (BBD), a widely used response surface methodology (RSM), was performed to optimize the independent variables such as mobile phase composition of methanol and acetonitrile and flow rate condition. Analytical method validation including linearity and range, selectivity, accuracy, and precision was evaluated in this study.

Results:

The optimized conditions for daidzein analysis were the mobile phase of methanol:water: acetonitrile (60:35:5 v/v/v), flow rate of 1.0 mL/minute, and detection wavelength at 251 nm. This condition met the requirements of the system suitability test with low variance for tailing factor, resolution, retention time, number of theoretical plates, and area under curve. The analytical method was successfully validated for several parameters including linearity and range, selectivity, accuracy, and precision.

Conclusions:

RP-HPLC method for analyzing daidzein in soy sauce can be optimized by implementing the Box-Behnken Design. This method met the analytical method validation acceptance criteria for linearity, range, selectivity, accuracy, and precision. The quantitative determination resulted that daidzein content in soy sauce sample was of 1.40 mg/100 g.

KEYWORDS: Daidzein; Response surface methodology; Reverse phase HPLC; Soy sauce; Validation

PC-0503101-P

Excitation Wavelength Comparison in Thin-Layer Chromatography Coupled with Surface-Enhanced Raman Spectroscopic Analysis: Case Study in Detection of Phosphodiesterase-5 Inhibitors Adulterated in Herbal Products

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ABSTRACT

Introduction:

Thin layer chromatography coupled to surface-enhanced Raman spectroscopy (TLC-SERS) is a newly emerged hyphenated technique that combines a simple traditional separation tool (TLC) with a new approach for detection at high sensitivity and selectivity (SERS). Therefore, a lot of fundamental studies on factors influencing the enhancement of Raman signal in SERS still need to be done, among which the excitation wavelength built in the equipment was not compared in previous studies.

Objectives:

The excitation wavelength of 633 nm and 785 nm was compared in TLC-SERS in terms of intensity and resolution. A TLC-SERS method was developed accordingly for the detection of PDE-5 inhibitors adulterated in herbal products.

Methods:

TLC-SERS method with Silica gel 60 F254 size (20 x 10 cm) TLC plate as stationary phase; mixture of *n*-butyl acetate-MeOH- formic acid (11:2.5:1.5) as mobile phase; 5 µL sample volume. After TLC separation, the aqueous colloidal silver suspension (1.5 µl) prepared according to the sodium citrate reduction method was dripped directly to each spot market on the TLC plate, and SERS signal were measured on two excitation wavelengths of 633 nm and 785 nm.

Results:

The intensity of signal were compared on typical peaks of vardenafil and tadalafil. In Raman spectra, the intensity was higher at 785 nm for both compounds, while SERS spectra intensity as well as resolution was higher for 633 nm for vardenafil. This can be explained by the influence of nanosilver colloid on SERS signal, which is higher for 633 nm than 785 nm. All 48 products were analyzed using the developed method, 7 samples were adulterated with tadalafil and vadenafil.

Conclusions:

The signal intensity and resolution of peaks in SERS spectra versus original Raman spectra was compared in TLC-SERS analysis. Suitable wavelength was chosen for TLC-SERS detection of vardenafil and tadalafil adulteration in herbal products collected from the market.

KEYWORDS: Detection of adulteration; Excitation wavelength comparison; Herbal products; Phosphodiesterase-5 inhibitor; Thin layer chromatography coupled to surface-enhanced Raman spectroscopy; Vardenafil and tadalafil

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Analytical Tool to Support the Detection of Illegal Drugs Production Sites: Quantitation of Precursors of Methamphetamine and 3,4-Methylenedioxymethamphetamine in Wastewater by GC-MS/MS

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ABSTRACT

Introduction:

Illegal drugs production, especially the popular amphetamine group drugs methamphetamine (MET) and 3,4-methylenedioxymethamphetamine (MDMA), is increasing in Vietnam, and becoming difficult to control. Analysis of wastewater in surrounding areas of suspecting illegal drugs production sites can be a supporting tool for investigation. In this study, a method was developed using GC-MS/MS to quantify some precursors of MET and MDMA for this purpose. Due to the limited access to the forbidden drug precursors, no previous studies have been found on this topic yet.

Objectives:

Analytical tool to support the detection of illegal drugs production sites: Quantitation of precursors of methamphetamine and 3,4-methylenedioxymethamphetamine in wastewater by GC-MS/MS.

Methods:

Seven precursor standards of MET and MDMA were added to wastewater samples that tested free of analytes. Samples were adjusted to pH 8.0 with ammonia and extracted by chloroform, then dried under nitrogen flow and dissolved in methanol for analysis using the GC-MS/MS method. Precursors simultaneously quantified in wastewater included: benzyl cyanide, 2-bromo propiophenone, ethyl phenylacetate, methyl phenylacetate, piperonyl methyl ketone, safrole.

Results:

The validation results showed good specificity, precision, and accuracy with a relative standard deviation from 1.03% - 9.15% and a recovery rate in the range of 80.1% - 105.2%. Quantitation of the 7 precursors of MET and MDMA was reliable within a wide linear range (0.5 - 5 ppm). The detection limit of the method is from 5ppb - 50 ppb for 7 precursors. The feasibility was tested in the applications on 03 wastewater samples collected from several industrial parks in the city of Hanoi and analytical precursors were not detected.

Conclusions:

For the first time in Vietnam, the study conducted a survey and developed a method to quantify 07 precursors in wastewater using gas chromatography-mass spectrometry (GC-MS/MS) to support in the investigation and tracing of illegal drugs production sites of MET and MDMA.

KEYWORDS: Determination; GC-MS/MS; Methamphetamine; MDMA, Precursor; Wastewater

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The Status of Medicine Storage by Residents Living in Cambodia and People's Knowledge on How Medicines are Properly Used: A Study in Sen Monorum Town, Mondulkiri Province

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ABSTRACT

Introduction:

Medications play an important role in treating, preventing, and saving lives. Improper medicine storage leads to the degradation of medicine quality. The use of degraded medicines posed significant public health issues in developing countries, particularly Cambodia. So far, there is limited scientific evidence on how medicines are kept at home for use and the knowledge that people have to take those medicines properly in Cambodia, especially in Mondulkiri.

Objective:

This study aimed to explore the status of medicine storage and the knowledge of people who keep medicines for use among residents living in Sen Monorum town, Modulkiri province.

Material and Method:

This cross-sectional study used convenient sampling. The study was approved by the UP-Research Committee. All participants who stayed at home, aged over 18, and volunteered to join the process were invited. Mosby's Drug Reference for Health Professions, 4thEdition; Vidal 2017; and Medscape were used to evaluate the knowledge of medication use regarding dosage, administration, and duration. The study was analyzed by Stata MP Version 17 using percentage and frequency.

Results:

304 households joined the study. 474 medications were found to be stored at home. The study found 21.10% (100) of the medications used were not properly stored at home. 10 frequently stored medicines were Acetaminophen 55.49% (263), Amlodipine 6.12% (29), Antacid 5.91% (28), Omeprazole 3.59% (17), Ibuprofen 3.59% (17), Loperamide 3.16% (15), Antihistamine 2.95% (14), Multivitamin 2.53% (12), Amoxicillin 1.90% (9), and Metformin 1.27% (6). In addition, 5.51% (26), 10.19% (48), 11.81% (56), and 13.29% (63) of participants did not understand correctly the drug indication, dosage, administration, and duration, respectively.

Conclusions:

Improper medicine storage raised a healthcare concern for the medication quality in Sen Monorum town. Educating patients about proper medicine storage is important to promote therapeutic outcomes and avoid the misuse of medicines.

KEYWORDS: Medicine Storage; Degradation; Medicine quality; Sen Monorum; Mondulkiri; Cambodia

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Novel 1*H*-Benzo[D]Imidazole-Based Hydroxamic Acids: Design, Synthesis, and Evaluation as Antitumor Agents

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ABSTRACT

Introduction:

Suberoylanilide hydroxamic acid (SAHA) serves as a powerful suppressor of histone deacetylases (HDACs), inducing growth inhibition, differentiation, and/or programmed cell death in numerous tumor varieties both in vitro and in vivo. Inspired by these advancements, we extended our research endeavors to explore novel hydroxamic acids bearing 1H-benzo[d]imidazole moiety.

Objectives:

The main focus of this research involves designing, synthesizing, and assessing the biological activity of new hydroxamic acids based on 1H-benzo[d]imidazole fragments as potential anti-cancer agents. The cytotoxicity of the synthesized compounds was evaluated against three cell lines, including SW620 (colon cancer), MDA-MB-231 (breast cancer), and MRC-5 (human fetal lung fibroblast cells).

Methods:

Nuclear magnetic resonance spectra were obtained using a Bruker 500 MHz spectrometer, with DMSO-d6 used as the solvent unless otherwise specified. Mass spectra were generated using an LC-MSD-Trap-SL mass spectrometer equipped with ESI. The HDAC enzymes assay was conducted utilizing a Fluorogenic HDAC Assay Kit (Abcam, MA, USA). The cytotoxicity of the compounds was assessed through SRB assays.

Results:

The compounds were synthesized via a four-step pathway, starting from commercially available 5-nitro-1H-benzo[d]imidazole. A total of 54 novel compounds were conceived and synthesized. The biological assessment pointed out that compounds **29c**, **31c**, and **33c** stood out as the most effective inhibitors of HDAC and demonstrated significant potential as anti-cancer agents. Furthermore, compound **31c** exhibited a 3-fold higher inhibitory activity against the mixture of HDAC isoforms in Hela cell nuclear extract compared to SAHA. Representative compounds **29a-b** caused a similar accumulation of cells in the S and G0/G1 phases as observed with SAHA. In the Annexin V-FITC/PI apoptotic analysis, compounds **29a-c** induced noticeable early and late apoptosis in SW620 cells.

Conclusions:

This research underscores the potential of 1H-benzo[d]imidazole-based hydroxamic acids as both antitumor agents and HDAC inhibitors. These findings offer valuable insights for the future development of more potent HDAC inhibitors and antitumor agents.

KEYWORDS: Hydroxamic acids; HDAC inhibitor; Cytotoxicity; 1*H*-Benzo[d]imidazole

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