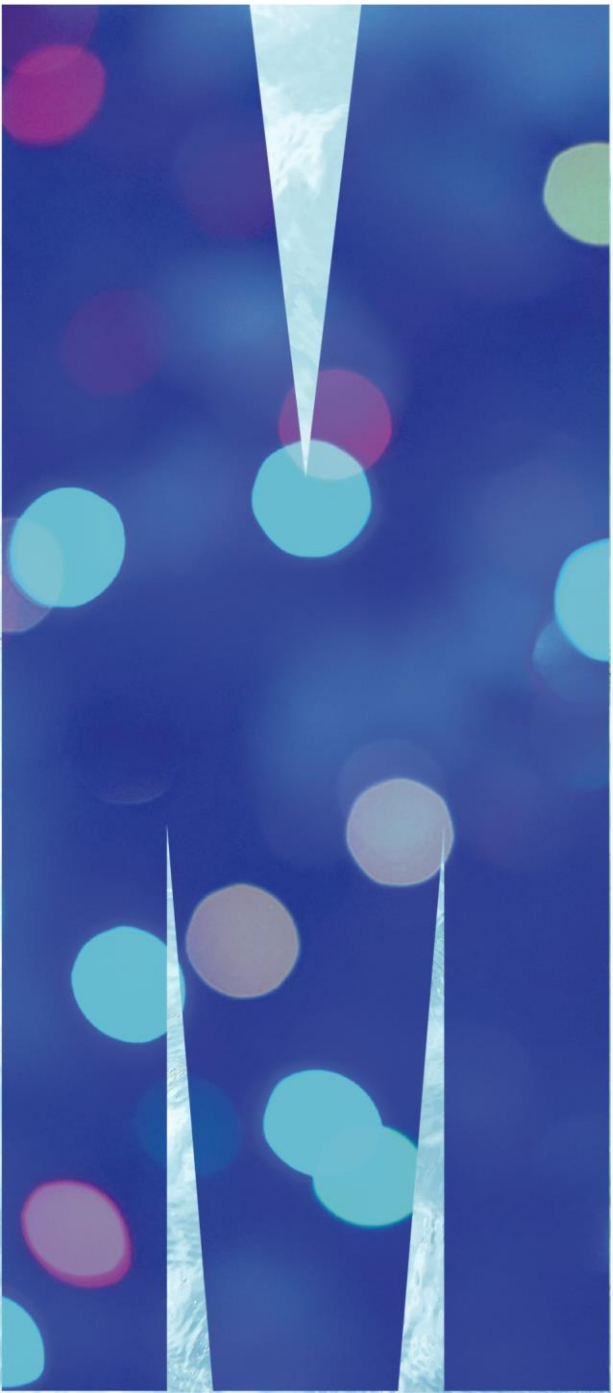
MONASH University

MALAYSIA



MONASH INITIATE 2021

The Inaugural Monash International Health Science and Technology Conference

16-17 June 2021

WELCOME SPEECH

PRESIDENT AND PRO VICE-CHANCELLOR

On behalf of Monash University Malaysia, it is with great honour to welcome all of you to the Inaugural Monash International Health Science and Technology Conference (Monash Initiate 2021). This event is expecting to serve as a platform where we can all share and inspire one another with our very own unique research journey.

Researchers are often relentless in challenging boundaries while curiosity knows no bounds. This innate nature makes life more interesting & challenging. Through collaboration and constant communication with one another, we continue to bring changes to the very lives of individuals around us. Medicine for incurable diseases, advancement in technology where no one thought was possible, and a greater understanding of the things around and within us is the centre core. This conference has gathered the best of the best through carefully selected speakers from all over the world. Through this conference, we hope to inspire and awaken the passion in research both in the juniors and seniors for the benefit of all. As with Monash's motto of *Ancora Imparo* ("I am still learning"), let us continue our quests for knowledge and be agents of change.

Finally, I wish to congratulate the organizing committee from the School of Pharmacy for their efforts in making this conference a success. It is with much dedication and enthusiasm that they had gone the extra mile to put together such an outstanding conference amidst the pandemic. My heartfelt thanks to our sponsors as well for their continuous support towards our commitment to grooming young scientists. Last but not least, I would like to express my appreciation towards our speakers for offering their time, knowledge, and expertise to all our participants, without which this conference will not be possible. I believe that the Monash Initiate Conference would be truly impactful and meaningful to everyone of us. I wish you all the best and a great time at this conference.

Professor Andrew Walker
President and Pro Vice-Chancellor
Monash University Malaysia

WELCOME SPEECH

HEAD OF SCHOOL

Dear Distinguished Participants and Colleagues

On the behalf of Monash Initiate 2021 hosted virtually at the Monash University, Malaysia I heartily welcome you all.

We are hosting the first-ever conference, initiated through School of Pharmacy, Monash Malaysia, covering cutting edge research on various topics but not limited to pharmaceutical sciences. The scientific meeting will serve as a platform to bring renowned researchers from all over the world which can help strengthen scientific progress and collaboration between young and established scientists as well.

It is hoped that this conference will offer plenty of networking opportunities to interact with leading scientists from Monash Australia as well as renowned scientist from Malaysia. Each speaker is an expert in his/her specific specialized area and topics which includes a wide area from the pharmaceutical and biomedical research fields.

Finally, I am thankful to the organizing committee which consisted of mostly Monash PhD students whose sincere efforts has led to the successful preparation of this much-awaited conference.

I again welcome you all to this exciting and vibrant conference that will help in bringing excellence in the scientific world and fostering new research ideas and collaborations. Enjoy!

Professor Gan Siew Hua
Head, School of Pharmacy
Monash University Malaysia

WELCOME SPEECH

FOUNDING ADVISOR

Welcome

It is my great pleasure to welcome you to the Monash INITIATE 2021. The main intention of this conference is to provide an avenue for researchers, academics and postgraduate students from Malaysia and around the world to communicate their research findings.

The wonderful thing about Monash INITIATE 2021 is about the international perspective our member speakers bring to these discussions. The conference theme is "Inspiring Innovation via Multidisciplinary Collaboration" and this year we are proud to have 8 renowned research scientists from various fields to share their perspective on current and future research trends in their respective fields. I strongly believe their experiences and views would definitely benefit all of us in the long run. Therefore, I would like to take this opportunity to express my sincere gratitude for their time spent and their support given to our event.

Science is just simply amazing. I believe our true significance lies in our ability and our desire to understand and explore the beauty of our universe. By acquiring these understandings, we are able to reap it for the benefit of humanity. With Monash INITIATE I deeply hope participants are able to learn from each other, at same time gaining a better perspective and knowledge of various fields which might be able to be integrated into your own field for a much more effective and productive outcome.

“Harnessing wisdom & knowledge, enriching life of others”- B.H. Goh

I sincerely hope you will enjoy the two days of discussion and networking.

Dr. Goh Bey Hing
Biofunctional Molecule Exploratory Research Group (BMEX)
School of Pharmacy
Monash University Malaysia

WELCOME SPEECH

CONFERENCE ADVISOR

On behalf of the organizing committee, it is my great pleasure to extend a warm welcome to all the participants to attend The Inaugural Monash International Health Science and Technology Conference 2021 (Monash Initiate 2021). It was a bold decision to organise this meeting virtually during the COVID-19 pandemic, nonetheless. The conference managed to host over 100 local and international participants from Malaysian and foreign institutions, research institutions and industry partners.

The aim of this conference is to provide a platform for academics, researchers, and postgraduate students to share and discuss their recent research findings in the field of pharmaceutical sciences and pharmacy practice. With the theme of this conference entitled “Inspiring, Innovation via Multidisciplinary Collaboration” it is a great opportunity for researchers, policy makers and industry players to collaborate to provide solutions for a myriad of diseases and to improve the quality of life of human beings.

In this conference, we are honoured to have world class researchers from Australia and Malaysia to be with us as keynote and plenary speakers to share the latest developments in pharmaceutical sciences and pharmacy practice. In addition, we would like to express our gratitude to our sponsors including but not limited to NOVARTIS, DUOPHARMA, Xepa, and MC lab that have offered their generous contributions. Last but not least, I wish all the participants an enjoyable and memorable experience full of new learning and inspiring moments.

Dr. Khaw Kooi Yeong
Lecturer, School of Pharmacy
Monash University Malaysia

WELCOME NOTE

ORGANIZING COMMITTEE

It is with tremendous pleasure that we welcome you to our first virtual conference- Monash INITIATE 2021 (The Inaugural Monash International Health Science and Technology Conference). We hope your time with us over the next two days will be nothing short of excitement and self-enrichment.

This conference is curated to cover a wide range of topics, from fundamental to translational research, from microbiology, drug discovery to pharmacoeconomics. Not forgetting our post-conference workshop which will guide you on all that you need for a systematic review. With the conference theme “inspiring Innovation via Multidisciplinary collaboration, this is definitely a unique platform to learn and be inspired by our keynote and plenary speakers, communicate your research work, develop network with like-minded researchers from different disciplines, and generate meaningful future collaborations.

We are gratitude to all our sponsors, speakers, the scientific committee, and School of Pharmacy for their support in making this event a success. Most importantly, a huge thank you to all of you for diligently sharing your research findings and participating in this conference. We hope you have a great experience with us for the coming days!

With great love and respect,

Camille Keisha Mahendra
Chairperson of Monash Initiate 2021

ORGANISING COMMITTEE

Chairperson	Camille Keisha Mahendra
Secretary	Wong Yen Jun
Treasurer	Subramaniam Thanimalai
Editorial Board	Camille Keisha Mahendra Wong Yen Jun Geetha Maniam Catherine Loh Mei Pei
Marketing	Lim Han Yin Alene Yong Sze Jing Chen Ken Fong Farah Rehan
Virtual Conference Host	Ahmad Fawwaz Bin Mohd Raji

SCIENTIFIC COMMITTEE

Professor Gan Siew Hua
Dr. Goh Bey Hing
Dr. Khaw Kooi Yeong
Dr. Alan Lee Yiu Wah
Dr. Alice Chuah Lay Hong
Associate Professor Dr. Anton V. Dolzhenko
Dr. Chong Chun Wie
Dr. How Chee Wun
Dr. Ong Lin Kooi
Dr. Ronald Lee Fook Seng
Dr. Sathiya Maran
Dr. Thet Thet Htar
Dr. Usha Sundralingam

TABLE OF CONTENTS

AGENDA

Time (MYT)	DAY 1 (16 June 2021, Wednesday)		
8:30 AM	Open for Registration		
8:50AM	Introductory Videos of Monash University & School of Pharmacy		
9:00 AM	Opening Ceremony Professor Andrew Walker, President and Pro Vice-Chancellor *Monash University Malaysia*		
9:10 AM	Welcome Address Professor Gan Siew Hua, Head of School, School of Pharmacy *Monash University Malaysia*		
9:15 AM	Photography Session		
9:20 AM	Keynote Speaker - Professor Arthur Christopoulos *Monash University Australia* "Reciprocal relationships: The role of 'location' in novel drug discovery"		
10:10 AM	Mini Break		
10:15 AM	Plenary Speaker - Professor Poh Chit Laa *Sunway University* "Development of antiviral agents against Enterovirus 71"		
10:55 AM	Breakout Room Transition		
	Oral Presentation		
	Cancer Biology	Microbiology	Drug Discovery & Synthesis
11:00 AM	OP-CB-01	OP-MB-01	OP-DS-01
11:15 AM	OP-CB-02	OP-MB-02	OP-DS-02
11:30 AM	OP-CB-03	OP-MB-03	OP-DS-03
11:45 AM	OP-CB-04	OP-MB-04	OP-DS-04
12:00 PM	OP-CB-05	OP-MB-05	OP-DS-05
12:15 PM	OP-CB-06	OP-MB-06	OP-DS-06
12:30 PM	OP-CB-07		OP-DS-07
12:45 PM	OP-CB-08		

AGENDA

Time (MYT)	DAY 1 (16 June 2021, Wednesday)		
1:00 PM	Lunch		
2:00 PM	Plenary Speaker - Associate Professor Dr. Chan Kok Gan *University of Malaya* "From precision microbial genomics to drug discovery: Modern microbiology in the light of next generation sequencing"		
2:40 PM	Breakout Room Transition		
	Poster Presentation		
	Cancer Biology	Microbiology	Drug discovery & Synthesis
2:45 PM	PP-CB-01	PP-MB-01	PP-DS-01
2:55 PM	PP-CB-02	PP-MB-02	PP-DS-02
3:05 PM	PP-CB-03	PP-MB-03	PP-DS-03
3:15 PM		PP-MB-04	PP-DS-04
3:25 PM		PP-MB-05	PP-DS-05
3:35 PM		PP-MB-06	PP-DS-06
3:45 PM			PP-DS-07
3:55 PM			PP-DS-09
4:05 PM	Mini Break		
4:10 PM	Industry Speaker, Novartis Gene Therapies Dr. Nicole LaMarca Global Medical Director, Data Exploration and Generation Lead-SME		
5:00 PM	End of Day 1		

AGENDA

Time (MYT)	DAY 2 (17 June 2021, Thursday)		
8.30 AM	Open for Registration		
8:50 AM	Start of Event		
9:00 AM	Keynote Speaker - Professor Datuk Dr. Asma Ismail *President, Academy of Science Malaysia* "Boosting Malaysian research by linking science to economy"		
9:40 AM	Mini Break		
9:45 AM	Plenary Speaker – Dr. Michael Whittaker *Monash University Australia* "Soft matter enabled nanomedicines"		
10:25 AM	Breakout Room Transition		
	Poster Presentation		
	Drug Delivery & Nanotechnology	Neuroscience	Public Health & Pharmacy Practice
10:30 AM	PP-DD-01	PP-NS-01	PP-ID-01
10:40 AM	PP-DD-02	PP-NS-02	PP-ID-02
10:50 AM	PP-DD-03	PP-NS-03	PP-ID-04
11:00 AM	PP-DD-04	PP-NS-04	PP-ID-05
11:10 AM	PP-DD-05	PP-NS-05	PP-ID-06
11:20 AM	PP-NT-01	PP-NS-06	PP-ID-07
11:30 AM	Mini Break		
11:35 AM	Plenary Speaker - Professor Danny Liew *Monash University Australia* "New frontiers in pharmacoeconomics"		
12:15 PM	Mini Break		
12:20 pm	Plenary Speaker - Professor Nor Hadiani Ismail *Universiti Teknologi MARA* "Probing the chemistry of antidiabetic plants using metabolomics approach"		

AGENDA

Time (MYT)	DAY 2 (17 June 2021, Thursday)			
1:00 PM	Lunch			
	Oral & Poster Presentation			
	Drug Delivery & Nanotechnology	Neuroscience	Public Health & Pharmacy Practice	Additional
2:00 PM	OP-DD-02	OP-NS-01	OP-ID-02	OP-OT-01
2:15 PM	OP-DD-03	OP-NS-02	OP-PP-01	OP-OT-02
2:30 PM	OP-DD-04	OP-NS-03	OP-PP-02	OP-OT-03
2:45 PM	OP-NT-01	OP-NS-04	PP-ID-08	OP-OT-04
3:00 PM	OP-NT-02	OP-NS-05	PP-PP-01	OP-OT-05
3:15 PM	OP-NT-03	PP-NS-07	PP-PP-02	PP-OT-01
3:30 PM	OP-NT-04		PP-PP-03	PP-OT-02
3:45 PM	PP-NT-02		PP-PP-04	PP-OT-03
3:55 PM	Mini Break			
4:00 PM	Plenary Speaker – Dr. Sanjaya Kuruppu *Monash University Australia* "A stimulator of angiotensin converting enzyme-2 from a snake venom and its wide ranging therapeutic implications including in SARS-CoV-2 infection"			
4:40 PM	Prize Giving Session			
5:30 PM	End of Event			

frontiers

Partner In Pharmacology Call For Papers
Special Topic – Pharmacology Perspectives

Research Topic

The Inaugural Monash International Health Science and Technology Conference: Pharmacology Perspectives

Submit your abstract | Submit your manuscript | Participate

Overview | Articles | Authors | Impact

About this Research Topic

This Research Topic aims to collect selected Pharmacology-focused contributions to the **MONASH INITIATE 2021**, The Inaugural Monash International Health Science and Technology Conference with the theme "Inspiring Innovation via Multidisciplinary Collaboration", held in the School of Pharmacy of the Monash University Malaysia on June 16th-17th, 2021.

Novartis Gene Therapies

Delivering on the promise of cell and gene therapy for patients

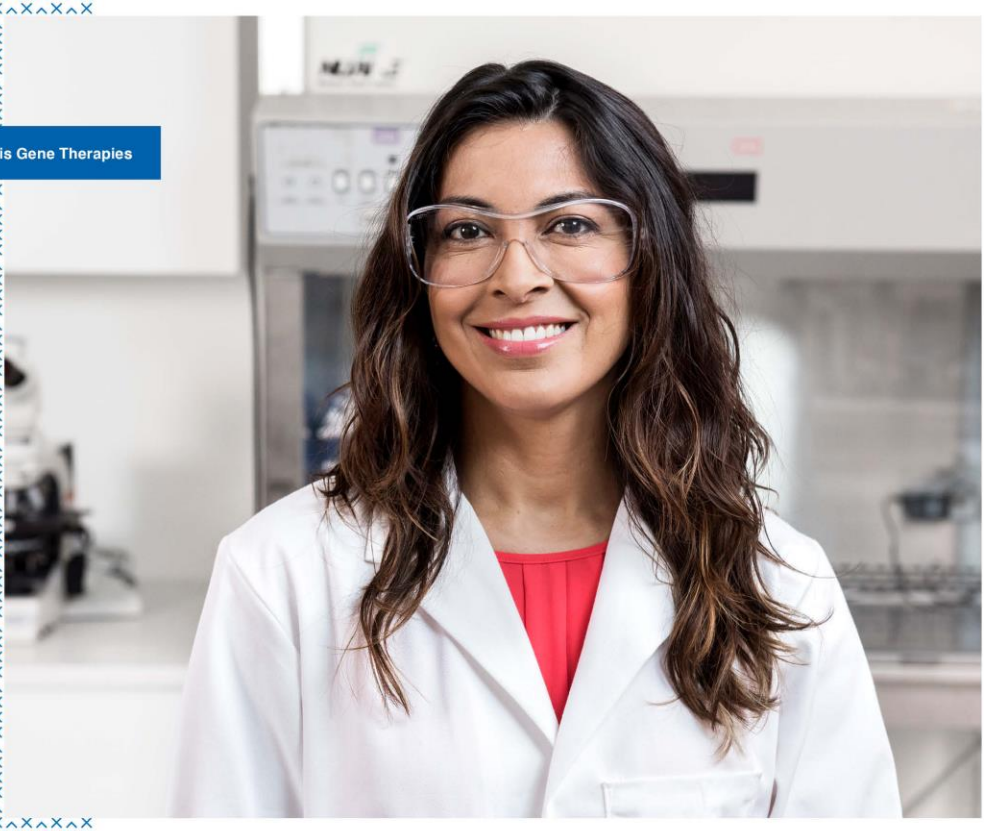
Novartis brings a revolutionary approach to treating patients through cell and gene therapy. By repairing cells at the genetic level, we can potentially halt a disease in its tracks or even reverse its progress through a one-time treatment versus the long-term therapies of conventional medicine. Our technology and innovation reimagines the term “personalised medicine”, offering hope and promise to many patients.

NOVARTIS | Reimagining Medicine

Novartis Corporation (Malaysia) Sdn. Bhd.
L22, Tower B, Plaza 33, No.1, Jalan Kemajuan, Seksyen 13, 46200 Petaling Jaya, Selangor Darul Ehsan, Malaysia.
Phone: +60 3 7948 1888 **Fax:** +60 3 7948 1818 **Website:** www.novartis.com

CGT.ADV.03/MY2104272656

Novartis Gene Therapies



Changing the practice of medicine

At Novartis, we harness the innovation power of science to address some of society's most challenging healthcare issues. Our researchers work to push the boundaries of science, broaden our understanding of diseases and develop novel products in areas of great unmet medical need. We are passionate about discovering new ways to extend and improve patients' lives.

NOVARTIS | Reimagining Medicine

Novartis Corporation (Malaysia) Sdn. Bhd.
L22, Tower B, Plaza 33, No.1, Jalan Kemajuan, Seksyen 13, 46200 Petaling Jaya, Selangor Darul Ehsan, Malaysia.
Phone: +60 3 7948 1888 **Fax:** +60 3 7948 1818 **Website:** www.novartis.com

CGT.ADV.01/MY2104272656

SPEAKERS PROFILE

KEYNOTE SPEAKER

Professor Arthur Christopoulos
Dean
Faculty of Pharmacy and Pharmaceutical Sciences
Monash University Australia

Arthur Christopoulos is Professor of Analytical Pharmacology and Dean of the Faculty of Pharmacy & Pharmaceutical Sciences, Monash University. His research focuses on novel paradigms of drug action at G protein-coupled receptors, in particular the discovery of allosteric modulators and biased agonists.

He has over 320 publications (h index 88); served on 8 international Editorial Boards; consults extensively for pharma; is a Councillor of the International Union of Basic and Clinical Pharmacology. He has received the American Society of Pharmacology and Experimental Therapeutics John J. Abel Award, the Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists Rand Medal, the British Pharmacological Society's Gaddum Memorial Award, the GSK Award for Research Excellence and a Doctor of Laws (University of Athens). In 2018, he was elected to the Australian Academy of Health and Medical Sciences. Since 2014-present, Clarivate Analytics have named him a Highly Cited Researcher in Pharmacology and Toxicology.

Reciprocal Relationships: The role of 'Location' in Novel Drug Discovery

G protein-coupled receptors (GPCRs) constitute the largest class of current drug targets but are still associated with a high attrition rate in translating fundamental preclinical discoveries into the clinic. In part, this may reflect a failure to appreciate and capture novel paradigms associated with drug action at GPCRs. Indeed, it is now well established that GPCRs possess spatially distinct and druggable allosteric sites that can be found at extracellular, transmembrane-spanning or intracellular domains. Targeting GPCR allosteric sites has the potential to lead to novel modes of GPCR subtype selectivity, signal-pathway-selective (biased) modulation and, importantly, a "titratability" to the allosteric effect that can be exploited to fine-tune drug responsiveness in specific tissues under altered physiology. Many of these theoretical advantages of allosteric drugs are only now starting to be rigorously explored in the context of disease, and this represents a significant next step for the field. Excitingly, structural biology studies are also starting to identify the molecular mechanisms that underlie the pharmacological effects of allosteric modulators and promise to facilitate structure-based allosteric drug discovery.

KEYNOTE SPEAKER

Professor Datuk Dr. Asma Ismail FASc
Ibnu Sina Professorial Chair Medicine
International Islamic University Malaysia
President, Academy of Sciences Malaysia

Prof. Datuk Dr. Asma Ismail is a woman of many firsts. Besides being the first female Vice-Chancellor of Universiti Sains Islam Malaysia and Universiti Sains Malaysia, she is the country's first female Director-General of Higher Education and the first female President of the Academy of Sciences Malaysia. She also serves as the first female Chairperson of the Malaysian Qualifications Agency (MQA).

Her educational background includes having a BSc (Biology) from the University of Nevada Reno, USA, M.A. (Microbiology) from Indiana University, USA and a Ph.D (Cellular and Molecular Biology) from UNR. Asma has 15 patents and commercialized world-wide, the rapid diagnostic test for typhoid called TYPHIDOT which was advocated by WHO. Her landmark contributions to Malaysia's higher education system include the establishment of the prestigious National Academic Award, the establishment of Research Universities in Malaysia and co-helming the development and implementation of The Malaysian Education Blueprint (Higher Education) 2013-2025.

Boosting Malaysian Research by Linking Science to Economy

Since the 6th Malaysia Plan, the government has recognised that the largest source of R&D wealth came from the public sector and that there is a need to transfer the indigenous technologies discovered by the public sector to the private sector. Till this day, we have yet to reap significant returns from the government's investments in science and technology despite the initiatives to improve industry-academia collaboration. The Malaysian research landscape needs a systemic change if we are serious about becoming a high tech nation. For change to happen we need to overcome the innovation chasm and bring academia and industry together. We can do this by linking R&D to economic development. This paper will address how researchers and industry players using the 10-10 MySTIE framework will help forge local industries to be more formidable through the development of products using indigenous technologies which, in turn, will impact the nation's economic recovery plan and enhance the quality of life of the Rakyat.

PLENARY SPEAKER

Associate Professor Dr. Chan Kok Gan FASc
Head of Microbiome Labs
ISB (Genetics & Molecular Biology)
Faculty of Science
University of Malaya

Dr. Chan Kok Gan is a Commonwealth Scholar, with rare combination of expertise in laws and microbiology. His H-index is 45, with citation >7720. He is a prolific authors (>385 SCI papers) and frequently publishes in high impact journals including *Nature, eLife, Nature Communications, Nucleic Acid Research, J. Bacteriology, BMC Genomics, GigaScience, mBio, Journal of Antimicrobial Chemotherapy*, just to name a few. He has co-authored several papers with Nobel Laureate Sir Richard Roberts on bacterial methylome. Dr. Chan is Fellow of the Academy of Sciences Malaysia and a few other fellowships from learned societies. He was awarded the Malaysia Toray Science Foundation Science and Technology Award in 2016. A novel genus, Chania multitudinisentens gen. nov., sp. nov., is named in honor of his achievement in microbiology. Dr. Chan serves as AHTEG Committee on biosafety law in CBD, advisory member for JRC (EC) on NGS and GMAC biosafety law member for the Malaysia government.

From Precision Microbial Genomics to Drug Discovery: Modern Microbiology in the Light of Next Generation Sequencing

Never the study of microbiology has been more exciting in our era. It is the best of time for modern microbiology research in the light of Next Generation Sequencing (NGS). With the advent of NGS, many discoveries once were thought impractical to pursue has become a routine practice. Gone were those days when it seemed like an endless treadmill of looking for a gene let alone to characterise a cluster of genes. NGS as a high throughput sequencing technology, it allows massive sequencing to be done in parallel, giving it a superb choice to understand the various life forms at the genomes, functional genomes and even microbiome level. In this paper, Kok-Gan will share his research work on the characterisation of quorum sensing and quorum quenching bacteria using OMICs approach, microbiome, to the discovery of next generation magic bullet which is non-antibiotic based, among others. In this paper, Kok-Gan will share how he has championed into genome biology more than a decade ago, starting from obtaining precise and complete microbial genomes to microbiome work.

PLENARY SPEAKER

Dr. Michael Whittaker
ARC Centre of Excellence in Convergent
Bio-Nano Science & Technology
Monash Institute of Pharmaceutical Sciences
Monash University Australia

Dr. Whittaker is currently a research only fellow within the ARC Centre of Excellence in Convergent Bio-Nano Science (CBNS) & Technology and Monash Institute of Pharmaceutical Sciences. He is expert in advanced polymerisation techniques and the design / synthesis / modification / characterisation of functional soft and hard matter.
He has explored the use of these materials to form functional and smart polymer materials, and hybrid organic/inorganic nanoparticles with precise architectures and properties. As well as providing fundamental insights and new methods for materials synthesis, his transdisciplinary research has focused on using these functional materials as building blocks for advanced functional nano/materials used in a range of high-end technologies: precision nanomedicines (therapeutic drug, DNA, RNA delivery, and clinical imaging applications), bio-coatings, antibacterial materials, polymer bioconjugates, and environmental remediation. He has a career total of over 185 research works and H-index = 52 (Google Scholar: GS LInk).

Soft Matter Enabled Nanomedicines

Synthetic functional materials designed specifically to respond to biological cues are the subject of intense research interest due to their possible application in drug delivery. These "smart" materials offer not only new avenues for overcoming some of the current limitations in drug delivery via nanomedicines, but also open pathways to new treatment strategies. I will highlight our current research in the following areas where effective collaboration has proved key to their success:

a) Nanocarriers for Improved Subcellular Targeting for Pain Relief,
b) Materials which Exploit Cell Communication Pathways to Manipulate the Tumoral Microenvironment and,
c) Designed Biomimetic Polymers as New Antimicrobial Materials.

PLENARY SPEAKER

Professor Poh Chit Laa
Distinguished Professor & Head
Centre for Virus and Vaccine Research
School of Sciences and Technology
Sunway University

Professor Poh Chit Laa is a Distinguished Professor and currently Head of the Centre for Virus and Vaccine Research at Sunway University. Professor Poh obtained her first-class BSc (Hons) and PhD in Science, majoring in Microbiology, from Monash University (Australia) before joining renowned institutions such as National University of Singapore for 25 years and she spent short periods of time at the Curtin University of Technology (Australia), Swinburne University (Australia) and University of Malaya. She is on the Editorial Committee of the Journal of Bioscience and Bioengineering, published by the Fermentation Society of Japan. She has published 126 ISI-cited journal papers and co-authored five book chapters. Her current research interests are focussed on the development of antiviral agents and novel vaccines against Enterovirus 71 causing hand, foot and mouth disease, dengue virus, influenza and SARSCo-V-2. She is collaborating with researchers from Cambridge University, UK and University of Queensland, Australia to develop synthetic peptide and nanovaccines against dengue and SARSCo-V-2. Other collaborations include, the development of novel vaccines against Enterovirus 71 and in vivo evaluation in murine model with University of Malaya. Together with researchers from University of Malaya, Prof Poh has two patents being granted entitled “Development of Enterovirus 71 antiviral peptides” and “Agents for the treatment of viral infections”.

Development of Antiviral Agents against Enterovirus 71

Viruses from the genus Enterovirus (EV) of the Picornaviridae family are known to cause respiratory diseases, encephalitis, myocarditis and hand, foot and mouth disease (HFMD). HFMD is a mild childhood disease caused mainly by Enterovirus 71and Coxsackievirus 16. EV-A71 has been proven to be a neurotropic virus capable of causing severe neurological syndromes with high fatalities in Asia. Currently, no antiviral treatment has been approved by the FDA to treat neurovirulent EV-A71 infections. Development of small chemical molecules which has high potency (nM range) and can interfere with viral entry has not met with success due to the emergence of resistant mutants or face off-target side effects.

Flavonoids from plants such as silymarin was recently shown to exert direct extracellular virucidal effects against EV-A71. However, resistance against silymarin was detected upon serial passaging of EV-A71 in the presence of silymarin. One of the solutions to avoid resistance against EV-A71 is to switch the inhibitory target from viruses to the host. A small 15 mer peptide derived from VP1 of EV-A71 was identified to have significant inhibition of EV-A71 in Rhabdomyosarcoma cells. Viral inhibition exerted by SP40 peptide was identified as cell protection and treatment of cells with SP40 peptide for 1 hour prior to infection could block the attachment EV-A71 to RD cells. The receptor with which SP40 peptide interacted to significantly inhibit EV-A71 infection has now been identified. However, the limitations of peptides such as poor bioavailability and short half life will need to be overcome by chemical modifications and nanotechnology. Out of the peptides identified in vitro to exhibit antiviral activity against EV-A71, only a few have been evaluated in vivo. There is a definite need to further study these peptides in vivo and apply chemical modifications for the development of more stable therapeutic antiviral peptides and nanocarriers to facilitate oral delivery.

PLENARY SPEAKER

Professor Danny Liew
Chair of Clinical Outcomes Research
School of Public Health and Preventive Medicine
Monash University Australia

Danny Liew is the Deputy Head of School (Education and Enterprise), Chair of Clinical Outcomes Research, and Co-Director of the Centre of Cardiovascular Research and Education (CCRE) at the School of Public Health and Preventive Medicine. He is also a consultant physician at the Alfred Hospital in Clinical Pharmacology and General Medicine. His research capacity and interests lie in clinical epidemiology, health services research and health economics.

New Frontiers in Pharmacoeconomics

A key aspect of pharmacoeconomics is the evaluation of the cost-effectiveness of drugs. This is a challenging area given rising demand from an ageing population, the rapid development of new drugs, their expense and the need to translate research findings for real-world application. In this presentation, Prof Liew will provide an overview of the current major issues confronted by the the healthcare system in terms of drug affordability and reimbursement, as well as novel ways in which these are being tackled.

PLENARY SPEAKER

Professor Dr. Nor Hadiani Ismail FASc
Director, Atta-UrRahman Institute for Natural Products Discovery (AuRIns)
Faculty of Applied Sciences
Universiti Teknologi MARA

Professor. Dr. Nor Hadiani Ismail is a professor of organic chemistry at the Faculty of Applied Sciences, Universiti Teknologi MARA, and currently is the director of Atta-ur-Rahman Institute for Natural Product Discovery (AuRIns). Prof. Dr. Nor Hadiani obtained her B Sc Honours Chemistry degree from University of Waterloo, Canada in 1986 and PhD from Universiti Putra Malaysia in 1999. Her PhD thesis was awarded Tan Sri Ong Kee Hui Postgraduate Medal for best thesis of the year by Institut Kimia Malaysia. Ever since, she had been a passionate researcher, investigating medicinal plants of Malaysia using cutting edge science and technologies. Among target diseases of her interest are malaria, dengue and diabetes. She is a dedicated teacher and enjoys delivering lectures for organic chemistry and spectroscopy courses. Her vibrant and productive research group consists of students pursuing final year, masters and PhD research projects. Prof Nor Hadiani was elected fellow of Institut Kimia Malaysia (IKM) in 2012 and fellow of Academy Science Malaysia (ASM) in 2020. She is currently serving as the president of Malaysian Natural Product Society (MNPS).

Probing the Chemistry of Antidiabetic Plants using Metabolomics Approach

Managing diabetes using medicinal plants is common practice. Even so evidence based science is necessary to safely bring this alternative into the mainstream diabetic management. In Malaysia, medicinal plants such as *Centella asiatica, Andrographis paniculata, Phyllanthus niruri, Momordica charantia* and several others are well known antidiabetic plants. Of our group's particular interest is *Ficus deltoidea*. Combining powerful analytical tools, high resolution liquid chromatography mass spectrometry (LCMS) and nuclear magnetic resonance spectroscopy (NMR), with multivariate analysis, we applied metabolomics approach to probe the chemistry of seven varieties of *F. deltoidea*, simultaneously detecting various metabolites for discrimination among the varieties. High potential varieties were identified upon exploration of the bioactive compounds using *in vitro* enzyme inhibitory assay. The effect of *F. deltoidea* extracts on urine metabolites of diabetic rats were also investigated. Our findings showed that treatment with certain *F. deltoidea* extracts were able to ameliorate the metabolic disorders of obese diabetic rats and make improvements towards the normal state.

PLENARY SPEAKER

Dr. Sanjaya Kuruppu
Senior Research Fellow
Department of Biochemistry & Molecular Biology
Monash University Australia

I completed my undergraduate degree in Biomedical Science (University of Auckland; 2001) and my PhD in Pharmacology (Monash University; 2006). My doctoral research focused on understanding how venoms mediate their toxic effects, and the efficacy of commercially available antivenoms in neutralising toxins in venoms. In 2007, I was awarded a post-doctoral training fellowship from the National Health & Medical Research Council of Australia. I undertook my post-doctoral training under the mentorship of Professor Ian Smith (Department of Biochemistry & Molecular Biology). I conducted research on enzymes that play an important role in cardiovascular and neurodegenerative disease, with a particular emphasis on their role as biomarkers. I am currently a group leader in the Monash Biomedicine Discovery Institute. My research now combines my expertise in venom toxins and enzyme biochemistry. I conduct research characterising venom peptides as novel drug leads for cardiovascular & neurodegenerative disease. This research program has been funded by the National Foundation for Medical Research & Innovation, US Alzheimer's Association, NIH, Monash University, Equity Trustees and philanthropic sources.

A Stimulator of Angiotensin Converting Enzyme-2 from a Snake Venom and its Wide Ranging Therapeutic Implications Including in SARS-CoV-2 Infection.

Angiotensin converting enzyme-2 (ACE-2) plays a protective role by converting the potent vasoconstrictor angiotensin II into angiotensin 1-7 which has vasodilatory, anti-inflammatory and anti-fibrotic effects (1). Elevated levels of angiotensin II have been implicated in the pathogenesis of cardiovascular (2) and neurodegenerative disease (3). Therefore, a stimulator of ACE-2 will be an excellent therapeutic lead these disease settings. ACE-2 is also the receptor for SARS-CoV-2 (4). A stimulator of ACE-2 which alters its structure can offer the dual advantage of preventing SARS-CoV-2 binding, while enhancing the protective effects of ACE-2 activity.

At present there are no clinically useful ACE-2 stimulators. Here, we report the discovery of the first stimulator of ACE-2 ('2A'), a 10 amino acid peptide derived from the venom of Bothrops asper. The maximum rate of reaction (Vmax) of ACE-2 is 44% greater in the presence of 2A compared with the enzyme alone. The levels of natural substrate angiotensin II decreased by 83±5% in the presence of ACE-2 + 2A, compared to 56±4% with ACE-2 alone, over 24 h. Molecular modelling predicts a change in active site conformation of ACE-2 in response to 2A. The altered conformation of ACE-2 is predicted to have reduced affinity for the spike protein S1 of SARS-CoV-2. Consistent with this, 2A significantly reduces SARS-CoV-2 infection in Vero cells, while completely preventing infection in human primary nasal epithelial cells. Our data indicate that 2A shows enormous potential as a novel therapeutic in the fight against SARS-CoV-2 infection. In addition, 2A can potentially be an excellent drug lead for diseases characterized by elevated levels of angiotensin II and therefore vasoconstriction, inflammation and fibrosis.

References

1. F. Jiang *et al.*, Angiotensin-converting enzyme 2 and angiotensin 1-7: novel therapeutic targets. *Nat Rev Cardiol* **11**, 413-426 (2014).
2. M. Paz Ocaranza *et al.*, Counter-regulatory renin-angiotensin system in cardiovascular disease. *Nat Rev Cardiol* **17**, 116-129 (2020).
3. P. G. Kehoe, The Coming of Age of the Angiotensin Hypothesis in Alzheimer's Disease: Progress Toward Disease Prevention and Treatment? *J Alzheimers Dis* **62**, 1443-1466 (2018).
4. J. Lan *et al.*, Structure of the SARS-CoV-2 spike receptor-binding domain bound to the ACE2 receptor. *Nature* **581**, 215-220 (2020).

DUOPHARMA BIOTECH BERHAD

Smarter Solutions. Healthier Life.

Duopharma Biotech Group ("Duopharma Biotech" or "the Company") began with the establishment of Duopharma (M) Sendirian Berhad in 1978. Duopharma Biotech was incorporated in 2000 and is today one of Malaysia's leading pharmaceutical companies listed on the Main Market of Bursa Malaysia Berhad.

Duopharma Biotech has core competencies in the pharmaceutical industry inclusive of Manufacturing, Research & Development and Commercialisation & Marketing of over 300 generic drugs such as Omesec and Prelica as well as Consumer Healthcare ("CHC") products including CHAMPS®, FLAVETTES®, PROVITON® and Uphamol, which are well-recognised and accepted by consumers in Malaysia, regionally and globally. The Company has also diversified into the biosimilars space with technology and commercialisation collaborations with credible and strong international partners.

Headquartered in Kuala Lumpur, Malaysia, Duopharma Biotech owns and operates three manufacturing plants in Klang, Bangi and Glenmarie, Selangor. Duopharma Biotech also has subsidiary companies in the Philippines and Singapore. A subsidiary of Duopharma Biotech Berhad has a representative office in Jakarta, Indonesia.

Flavettes® Uphamol PROVITON DAILY MULTIVITAMINS

CHAMPS EYE GLO Naturalle

DUOPHARMA BIOTECH BERHAD
Registration No: 200001021664 (524271-W)

Suite 18.06, Level 18, Kenanga International, No. 26, Jalan Sultan Ismail, 50250 Kuala Lumpur, Malaysia.
General line +603 2162 0218 Fax +603 2161 0507

SUCI 100% HALAL

DUOPHARMA

Visit halal4pharma.com for more information on halal pharmaceuticals

Restoring Health
Enhancing Life

At Xepa, ideas, people & technology work together to produce trusted, high quality affordable medicine. We are a pharmaceutical company with a distinct and true commitment.

World Class GMP

Xepa is awarded the EU GMP certificate on 1st September 2017. Our manufacturing process and quality system are in compliance with EU standards. The EU certificate covers both sterile and non-sterile dosage forms manufactured by us, namely tablets, capsules, liquids, oral suspensions, creams, ointments & sterile eye drops.

EU GMP

PIC/s GMP

TGA GMP
*TGA GMP Clearance for non-sterile dosage form

GDPMD

EN ISO 13485:2016
Certification for Manufacturing of Medical Devices

ISO/IEC 17025:2017
Certification for Analytical Laboratory

ISO 9001:2015
Certification for Quality Management System

Xepa sp

Xepa-Soul Pattinson (Malaysia) Sdn Bhd 196901000419 (8504-M)
1-5 Cheng Industrial Estate, 75250 Melaka, Malaysia
Tel: +606.335 1515 Fax: +606.335 5829

www.xepasp.com

Partnering for the **Future of Healthcare**

Collaborate to achieving **new breakthroughs**

We continuously seek pipeline partners to develop innovative products that resolve unmet medical needs.

We are interested in novel targets, innovative compounds and technologies for people living with serious chronic diseases.

From universities and biotech companies worldwide, to individual scientists, our ability to achieving new breakthroughs depends on working with you.

Xepa-Soul Pattinson (Malaysia) Sdn Bhd 196901000419 (8504-M)
1-5 Cheng Industrial Estate, 75250 Melaka, Malaysia
Tel: +606.335 1515 Fax: +606.335 5829

www.xepasp.com

LIST OF PRESENTERS

CANCER BIOLOGY

Oral Presenters		
Date: 16 June 2021 (Wednesday)		
No.	**Presenters**	**Time**
OP-CB-01	**Hii Ling Wei** Sphingosine Kinase 1 (SPHK1) Regulates the Survival of Human Breast Cancer Stem Cells and Non-stem Breast Cancer Cells through STAT1 Suppression	11:00 AM
OP-CB-02	**Dr. Tan Wen Nee** Potential of Essential Oils From Garcinia sp. as Therapeutic Agents	11:15 AM
OP-CB-03	**Hassan A Almoustafa** Preparation, Characterization and *In Vitro* Testing of a Targeted Nanoparticle Formulation for The Treatment of Cancer Metastasis	11:30 AM
OP-CB-04	**Nur Aininie binti Yusoh** Evaluation of the Single and Combined Effects of PARP Inhibitor Olaparib and Ruthenium Complex Ru-PIP in MDA-MB-231 Breast Cancer Cells	11:45 AM
OP-CB-05	**Salma Jabnoun** Bioassay Guided Fractionation and Cytotoxic Activity of Borago Officinalis Flowers	12:00 PM
OP-CB-06	**Dinh Thao Nhu** An Insight into the Anticancer Potential of Dietary Benzyl Isothiocyanate	12:15 PM
OP-CB-07	**Loh Jian Sheng** Simultaneous Proteasome And Autophagy Inhibition Synergistically Enhances Cytotoxicity Of Doxorubicin In Breast Cancer Cells	12:30 PM
OP-CB-08	**Xu Fan** Review: the Effects of Quercetin and Kaempferol in Colorectal Cancer Cell Lines	12:45 PM

Sphingosine Kinase 1 (SPHK1) Regulates the Survival of Human Breast Cancer Stem Cells and Non-stem Breast Cancer Cells through STAT1 Suppression

Ling-Wei Hii[1,2], Felicia Fei-Lei Chung[3], Chun Wai Mai[1,2], Chee-Onn Leong[1,2]

[1]Centre for Cancer and Stem Cell Research, International Medical University, Kuala Lumpur, Malaysia.
[2]School of Pharmacy, International Medical University, Kuala Lumpur, Malaysia.
.[3]Mechanisms of Carcinogenesis Section (MCA), Epigenetics Group (EGE) International Agency for Research on Cancer, World Health Organization, Lyon, France.
Correspondence: Chee-Onn Leong, cheeonn_leong@imu.edu.my

Introduction: Cancer stem cells (CSCs) are a subpopulation of cancer cells with enhanced capabilities of self-renewal, differentiation and tumour initiation, and confer resistance to conventional chemotherapy. Therefore, it is important to discover therapeutic targets which can be used to effectively eradicate CSCs and non-CSCs, in order to achieve complete cancer regression. **Objectives:** In this study, we explored the functional roles of SPHK1 in breast CSCs and non-CSCs. **Methods:** We exploited 3D mammosphere culture and RNA-interference (RNAi) approach to study the functional roles of SPHK1 in breast CSCs and non-CSCs. The mechanism of SPHK1-mediated cell survival in breast CSCs and non-CSCs was further delineated using shotgun proteomic analysis and validated through a gene-reconstitution strategy. We also investigated the combinatory effects of commercially available SPHK1 inhibitors and chemotherapy in breast CSCs and non-CSCs. **Results:** We demonstrated that RNAi-mediated knockdown of SPHK1 inhibits cell proliferation and induces apoptosis in both breast CSCs and non-CSCs, while ectopic expression of SPHK1 promotes the survival and mammosphere forming efficiency of breast CSCs. Subsequent downstream analyses suggested that STAT1 and IFN signalling are key targets of SPHK1, and we validated the important mechanism by which SPHK1 is able to enhance cancer cell survival through STAT1 suppression. Furthermore, we showed that SPHK1 inhibitors including FTY720 and PF543, are able to synergize doxorubicin sensitivity in targeting both breast CSCs and non-CSCs. **Conclusion:** In conclusion, we identified SPHK1 as a key regulator of cell survival and proliferation in breast CSC and non-CSCs, which can be an attractive therapeutic target for the design of future cancer treatment.

Keywords: Cancer stem cells, Sphingosine kinase, STAT1, Mammospheres, Drug synergism

Potential of Essential Oils From Garcinia sp. as Therapeutic Agents

Wen-Nee Tan[1], Woei-Yenn Tong[2], Nik Nur Syazni Nik Mohamed Kamal[3]

[1]Chemistry Section, School of Distance Education, Universiti Sains Malaysia, 11800 Penang, Malaysia.
[2]Universiti Kuala Lumpur, Branch Campus Malaysian Institute of Chemical and Engineering Technology, 78000 Melaka, Malaysia.
[3]Integrative Medicine Cluster, Advanced Medical and Dental Institute, Universiti Sains Malaysia, 13200 Penang, Malaysia.
Correspondence: Dr. Wen-Nee Tan, tanwn@usm.my

Introduction & Objectives: The genus *Garcinia* is belonging to the family of Clusiaceae (Guttiferae). It is widely distributed in Asia and Africa comprising more than 400 species. Plants from *Garcinia* are known for their traditional medicinal properties. The plants have been used to treat health-related problems such as inflammation, rheumatism, diarrhoea, infection, oxidative stress and obesity. The essential oils of different species of *Garcinia* in Malaysia were investigated in the present study along with their biological activity. **Methods**: Essential oils from *Garcinia* sp. were obtained by hydrodistillation and analysed using gas chromatography and gas chromatography-mass spectrometry. They were assessed using MTT assay against human breast cancer cells as well as broth microdilution assay on microorganisms. **Results**: The results revealed the dominance of sesquiterpenes in the essential oils. *In vitro* MTT assay showed that the essential oils induced anti-proliferative effects on cancerous cells. Additionally, the essential oils exhibited better inhibition on Gram-positive bacteria than Gram-negative bacteria. **Conclusion**: There is a need to further explore the essential oils from *Garcinia* sp. as this may lead to the discovery of a potential therapeutic agent.

Keywords: *Garcinia*, Essential oils, Hydrodistillation, Human breast cancer, Antimicrobial

Preparation, Characterization and *In Vitro* Testing of a Targeted Nanoparticle Formulation for the Treatment of Cancer Metastasis

Hassan Almoustafa[1], Mohammed Abdullah Mahdi Alshawsh[1], Zamri Bin Chik[1,2]

[1]Department of Pharmacology, Faculty of Medicine, Universiti Malaya.
[2]University of Malaya Bioequivalence and Testing Centre (UBAT), Faculty of Medicine, University of Malaya, 50603 Kuala Lumpur, Malaysia.
Correspondence: Associate Prof. Dr. Zamri Bin Chik, zamrichik@ummc.edu.my

Introduction: Poly lactic-co-glycolic acid (PLGA) nanoparticles (NPs) are intensively studied nano-carriers in drug delivery because of their biodegradability and biochemical characteristics. Polyethylene glycol (PEG) coating for nano-carriers gives them long circulation time in blood and makes them invisible to the reticuloendothelial system. Breast cancer cells have greater uptake of hyaluronic acid (HA) compared to normal cells as it binds to their overexpressed CD44 receptors. Hypoxia plays an important role in cancer metastasis. **Objectives:** Creating a simple and easy to scale up targeted nanoparticle formulation and test it in vitro on a hypoxia stressed highly metastatic cancer model. **Methodology:** PEG-PLGA nanoparticles coated with HA were formulated as targeted delivery system for doxorubicin using nanoprecipitation method, and characterized them for chemical composition, size, surface charge, shape and encapsulation efficiency. Then we tested them in vitro on hypoxia optimised metastatic breast cancer cells. **Results:** The nanoparticles were spherical with an average size of about 106±53 nm, a negative surface charge (-15 ±3 mV) and high encapsulation efficiency (73.3±4.1%). In vitro investigation with hypoxia elevated CD44 MDA-MB-231 cells showed HA targeted nanoparticles maintained their efficacy despite hypoxia-induced drug resistance unlike free doxorubicin and non-targeted nanoparticles. **Conclusion:** This study revealed a simple third generation nanoparticle formulation for targeted treatment of hypoxia-induced drug resistance in breast cancer metastatic cells. Further optimization is needed including In vivo efficacy and nanoparticle specific pharmacokinetic studies.

Keywords: Nano-carriers, Drug delivery, Breast cancer

Evaluation of the Single and Combined Effects of PARP Inhibitor Olaparib and Ruthenium Complex Ru-PIP in MDA-MB-231 Breast Cancer Cells

Nur Aininie Yusoh[1], Haslina Ahmad[1,2] and Chia Suet Lin[1,3]

[1]UPM-MAKNA Cancer Research Laboratory, Institute of Bioscience, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor Darul Ehsan, Malaysia.
[2]Department of Chemistry, Faculty of Science, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor Darul Ehsan, Malaysia.
[3]Department of Microbiology, Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor Darul Ehsan, Malaysia.
Correspondence: Haslina Ahmad, haslina_ahmad@upm.edu.my

Background: The successful development of Poly(ADP-ribose) polymerase (PARP) inhibitor Olaparib as single-agent treatment for breast cancer patients have marked the cornerstone in targeted cancer therapies. PARP enzymes are the key component of DNA repair process that are immediately activated in response to DNA replication stress. However, Olaparib treatment is limited to breast cancer patients with BRCA-mutated genes. In addition to this, single-agent treatment may also lead to rapid emergence of drug resistance. Recently, we have developed a new ruthenium(II) complex, [Ru(dppz)2PIP]2+ (dppz = dipyridophenazine, and PIP = 2-phenylimidazo[4,5-f][1,10]phenantroline) (or Ru-PIP) that have shown potentials as anti-cancer agent. We found that Ru-PIP led to stalled DNA replication fork resulting in the activation of DNA damage response (DDR) signaling. **Objective:** Therefore, the combination of Olaparib with Ru-PIP present a new rational strategy in treating BRCA wild type (WT) breast cancer as Olaparib will inhibit the repair of RuPIP-induced stalled replication fork leading to more efficient cancer cell killing. The aim of the present study is to evaluate this ideal synergistic pairing in BRCA-will type MDA-MB-231 breast cancer cells. **Methods:** Synergy was determined based on Chou and Talalay combination index (CI) method and further mechanistic studies were carried out to evaluate the identified combination using immunofluorescence study, cell cycle analysis and apoptosis assay. **Results:** The synergistic combination was found to inhibit the proliferation of MDA-MB-231 breast cancer cells through enhanced DNA damages which led to the induction of G2/M cell cycle arrest and apoptotic cell death. Most importantly, the identified combinations have minimal impact on normal NHDF cells. **Conclusion:** These findings provide evidence that the combination of Olaparib with Ru-PIP led to enhanced efficacy in BRCA-WT breast cancer cells killing and thus, demonstrate new promising therapeutic strategy to combat cancer. This identified drug combination merit further investigation in vivo.

Keywords: Combination, PARP inhibitor, Olaparib, Ruthenium, Cancer

Bioassay Guided Fractionation and Cytotoxic Activity of *Borago Officinalis* Flowers

Salma Jabnoun, Maryam Razmpoor, Dr. Adil Farooq Wali

Department of Pharmaceutical Chemistry, RAKCOPS, RAK Medical and Health Sciences University, Ras Al khaimah, UAE-11172
Correspondence: Salma Jabnoun, salma.17903015@rakmhsu.ac.ae

Introduction: *Borago officinalis* has been used for centuries in Arabian Peninsula (Persia) as traditional medicine for various ailments. Borage is a medicinal plant which has different usages in pharmaceutical, industrial and forage fields and is used in production of drinks and salads. **Objectives:** In this project we will investigate and validate scientifically various extracts and fraction of *Borago officinalis* for antiradical activity, and invitro- anticancer activity. **Methods:** The study was facilitated by collecting the plant material and subjected to crude extracts and fractions. The anticancer activity was examined by MTT assay against cancer cell lines MCF-7. The antioxidants activity was determined using the DPPH ABTS assay. **Results:** The methanolic extract from of *Borago officinalis* flowers was evaluated for their cytotoxic activity against human tumor breast cell lines (MCF-7). Cell viability was evaluated by MTT assay. The extract exhibited good cytotoxic activity shown through its low IC_{50} (34 ± 0.22 µg/ml) against the standard 5-Flououracil (9.23 ± 0.81 µg/ml). Methanolic extract using column chromatography yielded three fractions; ethyl acetate, n-butanol and water. Water fraction showed highest total phenolic content followed by n-butanol fraction and ethyl acetate fraction least in methanolic extract with 321 mg GAE/g, 300 mg GAE/g, 254 mg GAE/g and 218 GAE/g respectively. The flavonoid content was found to be highest in methanolic extract with 165 µg QE/g followed by water fraction with 123 µg QE/g, n-butanol fraction 115 µg QE/g and least in ethyl acetate fraction with only 86 µg QE/g. For DPPH assay and ABTS scavenging assay the activity was highest for water fraction. Water and butanol fractions exhibited good cytotoxic activity (IC_{50};12.01 ± 0.37 µg/ml and IC_{50}; 17.73 ± 0.45 µg/ml), methanolic extract had moderate activity (23.91 ± 0.98 µg/ml), while ethyl acetate fraction had no cytotoxic activity (100.32 ± 1.34 µg/ml). **Conclusion:** The presence of flavonoids and phenolic compound in extraction could be responsible for antioxidant activities and can be used in the management of the breast cancer due to oxidative stress and in the treatment of cancer. Our team is working on the isolation of bioactive moleclues in *Borago officinalis* which is responsible for the cytotoxicity; they can be considered as a good substrate for future SAR study and modifications to produce more potent cytotoxic derivatives.

Keywords: Breast cancer, *Borago officinalis*, Antioxidant, Cytotoxic, Medicinal plants.

An Insight into the Anticancer Potential of Dietary Benzyl Isothiocyanate

Thao Nhu Dinh[1], Marie-Odile Parat[2], Yong Sze Ong[1,*], Kooi Yeong Khaw[1,*]

[1]School of Pharmacy, Monash University Malaysia, Bandar Sunway, Selangor Darul Ehsan, Malaysia
[2]School of Pharmacy, University of Queensland, 20 Cornwall Street, Woolloongabba, QLD, 4102, Australia
Correspondence: Yong Sze Ong, Ong.YongSze@monash.edu; Kooi Yeong Khaw, khaw.kooiyeong@monash.edu

Introduction: Benzyl isothiocyanate (BITC) is one of the common isothiocyanates found in cruciferous vegetables such as broccoli, cabbage or watercress. Preclinical studies have documented its effectiveness in the prevention and treatment against several cancers. **Objectives:**This review aims to report and discuss the findings on anticancer activities of BITC and its several modes of action against 14 types of cancer. **Methodology:** A literature search was conducted using the keywords "BITC" and "anticancer" from PubMed, Google Scholar and CINAHL Plus to obtain relevant research articles. **Results:** BITC showed promising anticancer activities through modulation of various signalling pathways including intrinsic mitochondria-mediated, extrinsic death receptor apoptosis pathways as well as some signalling cascades involving MAPKs (p38, ERK1/2 and JNK1/2), NF-kB, Wnt/β-catenin and PTEN/PI3K/Akt molecules. For inhibition of cancer invasion, BITC was shown to modulate several metastatic (vimentin, E-cadherin and N-cadherin) and angiogenesis-related (MMP-2, -7 and -9) proteins. Interestingly, BITC is an autophagy activator in breast, colon, prostate and lung cancers via the modulation of several signalling pathways. BITC could also enhance the therapeutic effect of radiotherapy or other chemotherapeutic agents such as cisplatin, TRAIL and MβCD when used in combination. **Conclusion:** With the available pharmacology evidence, further research is needed to validate the pharmacokinetic profile and safety profile of BITC for further development and translation into cancer therapy or prophylaxis for human use.

Keywords: Natural compound, Chemopreventive, Chemotherapeutic

Simultaneous Proteasome and Autophagy Inhibition Synergistically Enhances Cytotoxicity of Doxorubicin in Breast Cancer Cells

Jian Sheng Loh[1], Nusaibah Abdul Rahim[2], Yin Sim Tor[3] and Jhi Biau Foo[1*]

[1]School of Pharmacy, Taylor's University, Subang Jaya, Selangor, Malaysia
[2]Faculty of Pharmacy, University of Malaya, 50603 Kuala Lumpur, Malaysia
[3]School of Biosciences, Taylor's University, Subang Jaya, Selangor, Malaysia
Correspondence: Jhi Biau Foo, JhiBiau.Foo@taylors.edu.my

Introduction and Objectives: Two protein degradation pathways exist to degrade intracellular proteins, namely ubiquitin–proteasome system (UPS) and autophagy. Studies have elucidated the involvement of UPS and autophagy in the development of doxorubicin resistance in breast cancer cells. Following anticancer treatments, autophagy acts either as cytoprotective mechanism to endure therapy-induced stresses or augment cell death induced by anticancer agents. This study aims to investigate the role of autophagy in breast cancer cells co-treated with doxorubicin and proteasome inhibitor. **Methodology:** The expression of autophagy protein (LC3A/B and Beclin-1) and UPS protein (ubiquitin) in MDA-MB-231 and MCF-7 cells following treatment with doxorubicin, ixazomib and/or hydroxychloroquine were determined by western blot analysis. The combinatorial effects of doxorubicin, ixazomib and hydroxychloroquine in MDA-MB-231 and MCF-7 cells were determined by cell viability assay. The combination index (CI) of the cell viability assay was calculated using the CompuSyn Software. **Results:** Doxorubicin and ixazomib co-treatment increased the expression of Beclin-1 (3.8-fold and 3.5-fold) and LC3-II proteins (13.5-fold and 1.9-fold) in MDA-MB-231 and MCF-7 cells, respectively. The triple-combination of doxorubicin and ixazomib with lysosomal inhibitor, hydroxychloroquine further increased the expression of LC3-II proteins by 45.0-fold and 16.5-fold in MDA-MB-231 and MCF-7 cells, respectively. These findings confirmed that doxorubicin and ixazomib co-treatment induced autophagy in MDA-MB-231 and MCF-7 cells. Cell viability assay showed that the triple-combination synergistically inhibited breast cancer cell growth, achieving CI as low as 0.575 and 0.126 in MDA-MB-231 and MCF-7 cells, respectively. The triple-combination also induced ubiquitinated proteins accumulation (2.5-fold and 3.0-fold) in MDA-MB-231 and MCF-7 cells, respectively. **Conclusion:** Autophagy induced by doxorubicin and ixazomib co-treatment serves cytoprotective role in breast cancer cells.

Keywords: Breast cancer, Autophagy, Ubiquitin-proteasome system, Doxorubicin

Review: The Effects of Quercetin and Kaempferol in Colorectal Cancer Cell Lines

Xu Fan[1], Nurhuda Mohamad Ansor[1]

[1]*Integrative Medicine Cluster, Advanced Medical and Dental Institute, Universiti Sains Malaysia, SAINS@Bertam, 13200 Kepala Batas, Pulau Pinang, Malaysia.*
Correspondence: Nurhuda Mohamad Ansor, nurhuda.ansor@usm.my

Introduction: Quercetin and kaempferol are two bioactive flavonoids present mainly in food sources. Their molecular structures resemble that of estrogen hence allow them to bind to estrogen receptors and lead to estrogenic activity. **Objectives:** To describe and synthesize evidence for the biological properties of quercetin and kaempferol on colon cancer cells. **Methodology:** A review of all the relevant papers known to the authors was conducted. **Results:** Available evidence suggests that quercetin and kaempferol are potential candidates in the fight against colorectal cancer. The development of colorectal cancer is suggested to be driven by estrogen exposure, hence phytoestrogens may act through hormonal mechanisms by binding to estrogen receptors that reduces the cancer risk. They may also act by altering processes involved in carcinogenesis. Researchers have suggested that phytoestrogens influence the intracellular environment through signaling pathways such as mitogen-activated protein kinase (MAPK) pathway. This result in modulating expression of key regulatory proteins including Akt and nuclear factor κB (NF-κB) that induces caspase-dependent apoptosis. Other phytoestrogen-affected pathways in colorectal cancer are VEGFR-2 and NF-κB signaling pathways. **Conclusion:** Quercetin and kaempferol can be recommended as therapeutic agents for lowering the risk of colorectal cancer.

Keywords: Colorectal cancer, Quercetin, Kaempferol, Apoptosis

Poster Presenters		
Date: 16 June 2021 (Wednesday)		
No.	**Presenters**	**Time**
PP-CB-01	**Dr. Wu Yuan Seng** Stellate Cells Promote Pancreatic Cancer Cell Proliferation via Reactive Oxygen Species-induced ERK1/2 and AKT Signaling Pathways	2:45 PM
PP-CB-02	**Assoc. Prof. Dr. Haslina Ahmad** Ruthenium Complex Ru-PIP in Combination with PARP Inhibitor Induces Synergistic Anti-cancer Activity in MCF7 Breast Cancer Cell Line	2:55 PM
PP-CB-03	**Rhubaniya Mahendran** The Anti-Proliferative Role of 15,16-Dihydrotanshinone I (DHTS) Extracted from Salvia miltiorrhiza in Autosomal Dominant Polycystic Kidney Disease (ADPKD)	3:05 PM

Stellate Cells Promote Pancreatic Cancer Cell Proliferation via Reactive Oxygen Species-induced ERK1/2 and AKT Signaling Pathways

Yuan Seng Wu[1], Rhanye Mac Guad[2], Vetriselvan Subramaniyan[3], Neeraj Kumar Fuloria[4], Shivkanya Fuloria[4] and Ivy Chung[5]

[1]Department of Biochemistry, School of Medicine, Faculty of Medicine, Bioscience and Nursing, MAHSA University, Selangor, Malaysia.
[2]Department of Biomedical Science and Therapeutics, Faculty of Medicine and Health Science, Universiti Malaysia Sabah, Sabah, Malaysia.
[3]Department of Pharmacology, School of Medicine, Faculty of Medicine, Bioscience and Nursing, MAHSA University, Selangor, Malaysia
[4]Faculty of Pharmacy, AIMST University, Kedah, Malaysia
[5]Department of Pharmacology, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia.
Correspondence: Yuan Seng Wu, sengwu_21@yahoo.com

Introduction: Pancreatic stellate cells (PSC), a prominent stromal cell type, contribute to the progression of pancreatic ductal adenocarcinoma (PDAC). We previously unveiled that the conditioned media of PSC (PSC-CM) induced higher reactive oxygen species (ROS) levels in PDAC cells; however, its mechanistic role is unknown. **Objectives**: We aim to investigate whether high ROS levels are required for PDAC cell proliferation by inducing extracellular signal-regulated protein kinases 1 and 2 (ERK1/2) and protein kinase B (AKT) signal transduction pathways, which are essential regulators of cancer cell survival and proliferation. **Methodology:** The effect of higher intracellular ROS levels induced by PSC-CM on PDAC cell proliferation was measured using MTT assay after treating with ROS inhibitors (tiron and N-acetylcysteine (NAC)). To examine the importance of ERK1/2 and AKT signaling pathways in PSC-CM-induced enhanced PDAC cell viability, their signals were reduced using U0126 (for ERK1/2) and LY294002 (for AKT) and examined the effect using MTT assay. Next, Western blotting technique was used to detect protein levels of both ERK1/2 and AKT induced by PSC-CM, as well as in the presence of tiron and NAC. **Results:** Inhibition of intracellular ROS production by tiron and NAC significantly reduced AsPC-1 and BxPC-3 cell proliferation in a dose-dependent manner. Besides, PSC-CM-mediated PDAC cell proliferation was also significantly reduced in a dose-dependent manner after treating with U0126 and LY294002. Both ERK1/2 and AKT protein levels induced by PSC-CM were diminished after tiron and NAC treatment as compared to control. **Conclusion:** Higher intracellular ROS levels induced by PSC-CM are required for PDAC cell proliferation via the activation of ERK1/2 and AKT signaling pathways.

Keywords: Stellate cells, Pancreatic cancer, Reactive oxygen species, ERK1/2, AKT

Ruthenium Complex Ru-PIP in Combination with PARP Inhibitor Induces Synergistic Anti-cancer Activity in MCF7 Breast Cancer Cell Line

Haslina Ahmad[1,2], Nur Aininie Yusoh[2] and Chia Suet Lin[2,3]

[1]Department of Chemistry, Faculty of Science, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor Darul Ehsan, Malaysia.
[2]UPM-MAKNA Cancer Research Laboratory, Institute of Bioscience, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor Darul Ehsan, Malaysia.
[3]Department of Microbiology, Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor Darul Ehsan, Malaysia.
Correspondence: Haslina Ahmad, haslina_ahmad@upm.edu.my

Background: We have developed a new ruthenium(II) metal-based complex, $[Ru(dppz)_2PIP]^{2+}$ (dppz = dipyridophenazine, and PIP = 2-phenylimidazo[4,5-f][1,10]phenantroline) (or Ru-PIP) that have shown potentials to serve as suitable alternatives to conventional platinum-based anti-cancer drugs. However, as in the case for the majority of anti-cancer drugs, single-agent treatment may lead to insufficient tumor suppression, intolerable side effects and drug resistance. We have previously found that single-agent Ru-PIP led to stalled replication fork and the activation of DNA damage response (DDR) signalling. Therefore, the utilization of Olaparib, a poly(ADP-ribose) polymerase (PARP) inhibitor alongside Ru-PIP present a rational combination strategy to combat cancer. This is because PARP enzymes are the key components in DNA repair process. Thus, the addition of Olaparib will inhibit the repair of RuPIP-induced stalled replication fork leading to more enhanced cancer cell killing. **Objective:** The present study is aimed to evaluate this rational drugs combination approach in MCF7 breast cancer cell lines. **Methods:** The reduction in cell viability following single agents and combinations treatment were determined using MTT assay and synergy was determined based on Chou and Talalay combination index (CI) method. Next, mechanistic studies were carried out to determine the underlying mechanisms of the synergistic effects observed using immunofluorescence study, cell cycle analysis, and apoptosis assay. **Results:** We found that the synergistic combination led to enhanced DNA double-strand breaks (DSBs), G2/M cell cycle arrest and ultimately, apoptotic cell death of MCF7 cells. Importantly, this combination had low cytotoxicity on normal NHDF cells. These findings provide evidence that the synergistic combination of Ru-PIP with PARP inhibitor Olaparib demonstrate significant superiority activity compared to single-agent treatments and thus present new promising therapeutic strategy to overcome current limitations in cancer treatment. **Conclusion:** Further studies will evaluate this combination *in vivo* and in dual drug delivery vehicles for precise cancer therapy.

Keywords: Ruthenium, Combination, PARP inhibitor, Olaparib, Cancer

The Anti-Proliferative Role of 15,16-Dihydrotanshinone I (DHTS) Extracted from *Salvia miltiorrhiza* in Autosomal Dominant Polycystic Kidney Disease (ADPKD).

Rhubaniya Mahendran[1], Soo Kun Lim[2], Chye Chung Gan[2],Kien Chai Ong[1], Kek Heng Chua[1], Hwa Chia Chai[1]

[1]Department of Biomedical Science, Faculty of Medicine, University of Malaya, 50603 Kuala Lumpur, Malaysia.
[2]Division of Nephrology, Department of Medicine, University Malaya Medical Centre, 50603 Kuala Lumpur, Malaysia.
Correspondence: Rhubaniya Mahendran, rhuban29@gmail.com

Introduction: Autosomal polycystic kidney disease (ADPKD) is a kidney disorder caused by mutations in polycystin proteins resulting in cystic formation in kidney. Tolvaptan, a vasopressin-2-receptor (V2R) antagonist, is the only FDA approved drug currently for ADPKD but it demonstrates serious side effects such as hepatotoxicity. Dihydrotanshinone I (DHTS) extracted from *Salvia miltiorrhiza* has been shown previously to stop proliferation in cancers. Given that ADPKD also involves cell proliferation, the present study aims to repurpose this natural compound for ADPKD treatment. **Methodology:** The cell viability of ADPKD cells (WT 9-12), normal kidney cells (HK2), and hepatocellular carcinoma cells, (HepG2, positive control cell line) treated with various concentration of DHTS, metformin and tolvaptan (positive control drugs) was assessed using crystal violet viability assay on day 3 and day 6 of treatment. The cells were treated daily (Model 1), every two days (Model 2), and every three days (Model 3). The DHTS concentration(s) that significantly reduced the WT 9-12 cell viability with minimal inhibitory effect on HK2 cells (≤50%) will be further analyzed with sulforhodamine B (SRB) cytotoxic assay and real time cell analyser (RTCA). **Results:** 5uM and 10uM DHTS treated cells from the Model 2 significantly inhibited the WT 9-12 viability in both preliminary studies and the SRB assay with minimal cytotoxic effects, ≤50% on HK2. (RTCA results will be obtained before conference). **Conclusion:** DHTS showed promising anti-proliferation effects on ADPKD cell in this study. Although the side effects of DHTS is yet to be determined, this natural compound can be gentler alternative than tolvaptan for ADPKD treatment.

Keywords: ADPKD, Treatment, DHTS, Proliferation, Viability

LIST OF PRESENTERS

MICROBIOLOGY

Oral Presenters		
Date: 16 June 2021 (Wednesday)		
No.	**Presenters**	**Time**
OP-MB-01	**Dr. Emelia Osman** Potential E. bieneusi Infection Markers for Diagnosis of Extraintestinal Microsporidiosis in HIV/AIDS Patients	11:00 AM
OP-MB-02	**Rafidah binti Lani** Protective Effect of Flavonoids against Chikungunya Virus-Induced Apoptosis	11:15 AM
OP-MB-03	**Darsshen Ramana A/L Kathirasan** Comparison of Antibacterial Effects of Manuka Honey with Malaysian Honey	11:30 AM
OP-MB-04	**Chung Wan Yean** Metabolic Responses of *Klebsiella pneumoniae* upon Exogenous Metabolites Feeding using Genome-Scale Metabolic Modeling	11:45 AM
OP-MB-05	**Dr. Yasodha Sivasothy** *Alpinia pahangensis* Ridley : A Rich Source of Labdane Diterpenes and Bis-Labdanic Diterpenes	12:00 PM
OP-MB-06	**Yousef Saeed Mohammad Abu Za'ror** The Association of BCL11A, HMIP-2, and XmnI Polymorphisms and Fetal Hemoglobin Level Among Anemic Pregnant Women in Hospital Universiti Sains Malaysia (HUSM)	12:15 PM

Potential *E. bieneusi* Infection Markers for Diagnosis of Extraintestinal Microsporidiosis in HIV/AIDS Patients

Nurul Shazalina Zainudin[1], NurulHasanah Othman[2], Rahmah Noordin[2], Asmahani Azira Abdu Sani [3],Wan Mohd Aizat, Wan Kamaruddin[4], Emelia Osman[1]

[1]Department of Parasitology & Medical Entomology, Faculty of Medicine, Universiti Kebangsaan Malaysia, Bandar Tun Razak, 56000, Cheras, Kuala Lumpur.
[2]Institute for Research in Molecular Medicine, Universiti Sains Malaysia, 11800, Penang, Malaysia
[3]Malaysia Genome Institute, Jalan Bangi, 43000, Kajang, Selangor, Malaysia
[4]Institute of Systems Biology, Universiti Kebangsaan Malaysia, 43600, UKM Bangi, Selangor, Malaysia
Correspondence: Emelia Osman, emelia.osman@ukm.edu.my

Introduction: *Enterocytozoon bieneusi* is the most common microsporidia species responsible for lethal diarrhoea in immunocompromised patients. In extraintestinal microsporidiosis cases, the pathogens may not be detected in stool and there's no available method to directly diagnose the infection in blood or plasma. **Objective of the study:** This study aims to detect circulating *E. bieneusi* protein(s) in sera of HIV/AIDS patients. **Methodology:** Hundred blood samples were collected form HIV patients and screened for *E. bieneusi* using PCR. The positive samples were subjected to shotgun mass spectrometry analysis to identify circulating microsporidia proteins. Bioinformatic analysis was carried out to characterize the identified proteins. **Result:** Out of 100 HIV/AIDS blood samples screened for microsporidia DNA, 7 were positive for *E. bieneusi*. Mass spectrometry identified three significant *E. bieneusi* circulating proteins, namely uncharacterized protein (B7XJ00), actin (B7XHF2), and uncharacterized protein (B7XIN4). **Discussion and conclusion:** Our results exhibited that circulating microsporidia proteins are present in the plasma of immunocompromised patients. These proteins may be utilised as potential infection markers for diagnosis of extraintestinal microsporidiosis. The diagnostic performance of these markers should be addressed prospectively.

Keywords: *E. bieneusi*, HIV, Proteomics, Circulating proteins, Microsporidiosis

Protective Effect of Flavonoids Against Chikungunya Virus-Induced Apoptosis

Rafidah Lani[1,2], Boon Teong Teoh[2], Sing Sin Sam[2], Keivan Zandi[3], Sazaly AbuBakar[2]

[1]*Department of Medical Microbiology, Faculty of Medicine, Universiti Malaya 50603 Kuala Lumpur*
[2]*Tropical Infectious Diseases Research & Education Centre (TIDREC), Universiti Malaya 50603 Kuala Lumpur*
[3]*Laboratory of Biochemical Pharmacology, Department of Pediatrics, Emory University, Atlanta, GA, 30322*
Correspondence: Sazaly Abu Bakar, sazaly@um.edu.my

Introduction Chikungunya virus (CHIKV) pathogenesis is mainly attributed by the virus-induced cell death or apoptosis. While studies have shown that other viruses utilized apoptosis pathway to delay or escape their downfall, CHIKV just simply maneuvers the pathway to release its infectious progeny. **Objectives** Flavonoids exhibited anti-apoptotic activity against other viruses. This in vitro study aims to evaluate the protective effects of two flavonoids which in previous studies have shown anti-CHIKV activity, against CHIKV-induced apoptosis. **Methodology** The hallmarks of apoptosis were observed by infecting human hepatocellularcarcinoma (Huh7) cells with CHIKV and post-treatment with fisetin or silymarin. Apoptosis inducer and inhibitor; cisplatin and Z-VAD-FMK respectively, were used as controls. Downstream experimental techniques such as plaque assay, DNA fragmentation assay, immunofluorescence (IFA) assay, flow cytometry, western blotting and qRT-PCR were employed. **Results** As the viral titer decreased as indicated by reduced pfu/ml, reduced anti-E2 puncta and viral RNA copy number upon flavonoids treatment, the hallmarks of apoptosis were also diminished. This is shown by less fragmented DNA, less condensed DNA and fragmented nuclei in IFA, recovery of sub-G1 population in DNA cell cycle and low expression of Bcl-2 and PARP cleavage compared to the CHIKV control. **Conclusion** Fisetin and silymarin demonstrate protective effect against CHIKV-induced apoptosis at moderately low concentration. Together with previously published data on anti-CHIKV activity, this highlights promising progress towards antiviral against CHIKV.

Keywords: Infectious diseases, Arbovirus, Chikungunya, Antivirals, Flavonoids

Comparison of Antibacterial Effects of Manuka Honey with Malaysian Honey

Darsshen Ramana Kathirasan, SA Abbas, Dr. Ashok, Dr. Karthik

Faculty of Pharmacy, Quest International University
Correspondence: darsshen@gmail.com

Introduction: The honey is a natural product that has been used as a sweetener, food preservative and most importantly it serves as a therapeutic agent which has been used to treat all kinds of bacterial infections. Secondly, honey has over 200 compounds that are sugars, amino acids, vitamins, minerals, phenolic acid, flavonoids and antioxidants that serve as a flavouring agent and therapeutic agent. There are some studies that state that infectious disease and antibiotic resistance disease can be eradicated by using honey together with antibiotics. **Objective:** The objective of this study is to compare the effectiveness of Manuka and Tualang at different concentrations against different species of bacteria and also to compare the physicochemical properties of Manuka and Tualang honey on inhibiting the growth of different species of bacteria. **Method:** The method of this study is done by determining the efficacy of honey is by using pH testing and the following method is by using agar dilution method to determine the potency of different honey under different concentrations exhibiting its antimicrobial effects on different species of bacteria. The agar dilution method is a quantitative method because it was used to identify the growth of different species of bacteria which is *S. aureus, P. aeruginosa* and *E. coli* under different concentrations of Tualang and Manuka honey. **Result:** The result shows that both honeys have the pH around 5 which is acidic to inhibit the growth of bacteria. **Conclusion:** In conclusion, honey from different regions exhibits different levels of antibacterial properties against all three bacteria isolates. The action of Manuka and Tualang honey on inhibiting the bacterial growth depends on the main active ingredients present. The Manuka honey has a very high concentration of methylglyoxal rated using the unique Manuka Factor (UMF) while Tualang honey is rich with phenolic compounds that have the same potency against various bacterial species.

Keywords: *In vitro* study, Manuka honey, Methylglyoxal, Unique Manuka Factor (UMF), Agar dilution method

Metabolic Responses of *Klebsiella pneumoniae* upon Exogenous Metabolites Feeding using Genome-Scale Metabolic Modeling

Wan Yean Chung[1], Yan Zhu[2], Mohd Hafidz Mahamad Maifiah[3], Naveen Kumar Hawala Shivashekaregowda[4], Eng Hwa Wong[5*], Nusaibah Abdul Rahim[6*]

[1]School of Pharmacy, Taylor's University, 47500 Subang Jaya, Selangor, Malaysia; [2], Infection & Immunity Program and Department of Microbiology, Biomedicine Discovery Institute, Monash University, Victoria, Australia; [3]International Institute for Halal Research and Training (INHART), International Islamic University Malaysia (IIUM), 53100 Jalan Gombak, Selangor, Malaysia; [4]Center for Drug Discovery and Molecular Pharmacology (CDDMP), Faculty of Health and Medical Sciences, Taylor's University, 47500 Subang Jaya, Selangor, Malaysia; [5]School of Medicine, Taylor's University, 47500 Subang Jaya, Selangor, Malaysia; [6]Faculty of Pharmacy, University of Malaya, 50603 Kuala Lumpur, Malaysia

Correspondence: Eng Hwa Wong, enghwa.wong@taylors.edu.my; Nusaibah Abdul Rahim, nusaibah.abdulrahim@um.edu.my

Introduction: Antimicrobial resistance threatens the effective prevention and treatment of a wide range of infections. To combat multidrug resistant pathogens with limited newer antibiotics available, combination therapy with non-antibiotic adjuvants such as metabolites is a promising approach. **Objective:** This study aimed to investigate the metabolic responses of *Klebsiella pneumoniae* upon exogenous metabolites feeding. **Methodology:** Genome-scale metabolic models (GSMMs) of three *K. pneumoniae* American Type Culture Collection (ATCC) isolates were constructed using Carveme tool. Constraint-based modelling and flux analysis of *K. pneumoniae* were conducted using COBRApy. Seven metabolites were selected based on previous metabolomic studies and GSMMs findings. They are phenylpyruvate, D-ribose 5-phosphate, uridine 5'-diphospho-N-acetylglucosamine, *sn*-glycerol 3-phosphate, orotate, 3-phosphoglycerate and 3-phosphohydroxypyruvate. The bacterial growth of the models was predicted on various nutrients. Flux changes in *K. pneumoniae* metabolic responses upon metabolite feeding was studied and analysed. The metabolites that perturbed the key metabolic pathways of *K. pneumoniae* such as amino acid, carbohydrate and cell envelope biosynthesis and affecting bacterial growth were identified based on the GSMMs prediction. **Results:** From the three GSMMs constructed for the *K. pneumoniae* ATCC isolates, the predicted bacterial exponential growth rate at 0.92, 2.09, 1.60 h^{-1} in M9, Mueller-Hinton and Luria-Bertani medium, respectively were determined using flux balance analysis. Addition of phenylpyruvate resulted in the highest flux changes of gluconeogenesis among other metabolites tested. Feeding of phenylpyruvate, D-ribose 5-phosphate and uridine 5'-diphospho-N-acetylglucosamine also caused an increase of flux of the pentose phosphate pathway (PPP). The tricarboxylic acid (TCA) cycle fluxes were upregulated under phenylpyruvate treatment. Stimulated TCA cycle resulted in higher NADH and ATP production in oxidative phosphorylation which may potentially stimulate the uptake of antibiotics. **Conclusion:** The upregulated fluxes of gluconeogenesis, PPP and TCA cycle upon phenylpyruvate treatment suggests that phenylpyruvate may be a possible novel candidate in antibiotic combination therapy.

Keywords: Antimicrobial, GSMM, Drug discovery, Metabolite

Alpinia pahangensis Ridley: A Rich Source of Labdane Diterpenes and Bis-Labdanic Diterpenes

Yasodha Sivasothy[1], Halijah Ibrahim[2], Khalijah Awang[3]

[1]*School of Pharmacy, Monash University Malaysia, Jalan Lagoon Selatan, Bandar Sunway, 47500 Subang Jaya, Selangor*
[2]*Institute of Biological Sciences, Faculty of Science, University Malaya, 50603 Kuala Lumpur*
[3]*Department of Chemistry, Faculty of Science, University Malaya, 50603 Kuala Lumpur*
Correspondance: *Yasodha.Sivasothy@monash.edu*

Introduction: *Alpinia pahangensis* Ridley (Zingiberaceae) is an endemic wild ginger distributed mainly in the lowlands of selected areas in Pahang, Peninsular Malaysia. It is a moderately sized perennial aromatic herb with linear-oblong shaped leaves and an inflorescence borne terminally on each frond. The flowers are orchid-like with attractive crimson coloured lips. The rhizome oil of *A. pahangensis* exhibited a strong inhibitory activity against all tested *Staphylococcus aureus* strains with MIC values being lower than 1 µg/µL. therefore making it a promising antibacterial agent from a renewable source. **Objectives:** In the present work, the dichloromethane extract of the rhizomes *of A. pahangensis* was investigated in an effort to discover new potential natural antibacterial agents. **Methodology:** The dried and powdered rhizomes were extracted with dichloromethane following which the extract was subjected to various chromatographic and spectroscopic techniques in order to isolate and characterise its secondary metabolites. The antibacterial assay of selected secondary metabolites against food-borne pathogens were evaluated using the broth microdilution technique. **Results:** 16 labdane-type diterpenes were isolated and characterized from the rhizomes of *A. pahangensis*: a novel bis-labdanic diterpene with an unprecedented skeleton, pahangensin D, two new bis-labdanic diterpenes, pahangensin A and C, a new labdane diterpene, pahangensin B along with 12 known labdane diterpenes. Selected analogues exhibited moderate inhibitory activity against *Staphylococcus aureus*, *Bacillus cereus* and *Bacillus subtilis*. **Conclusion:** The moderate antibacterial activity of pahangensin A against *Staphylococcus aureus*, *Bacillus cereus* and *Bacillus subtilis*, and pahangensin B against *Bacillus cereus*, makes them promising candidates as antibiotics to treat infections and illness due to food-borne pathogens. Pahangensin A and B can also be employed as natural preservatives against food-borne pathogens or for delaying or reducing food spoilage in the food industries.This in turn will extend the shelf life of food, maintain their safety, nutritional quality, functionality and palatability.

Keywords: *Alpinia pahangensis* Ridley, Zingiberaceae, Labdane diterpenes, Bis-labdanic diterpenes, Antibacterial activity

The Association of *BCL11A*, *HMIP-2*, and *XmnI* Polymorphisms and Fetal Hemoglobin Level Among Anemic Pregnant Women in Hospital Universiti Sains Malaysia (HUSM)

Yousef Saeed Mohammad Abu Za'ror [1], Nur Salwani Bakar[1], Maryam Azlan[1] & Zefarina Zulkafli[2,3]

[1]School of Health Sciences, [2]School of Medical Sciences & [3]Hospital USM, Health Campus, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan.

Introduction: Anemia is one of the most common problems for women during pregnancy. In normal adults, fetal hemoglobin (HbF) level ranged between 0.1 and 2.3%. Genetic variations in *BCL11A, HMIP* and *XmnI* genes have influenced the synthesis of HbF. **Objectives:** This study aimed to assess HbF status among anemic pregnant women in Hospital Universiti Sains Malaysia (HUSM) and determine its association with single nucleotide polymorphism (SNP) in *BCL11A*, *HMIP,* and *XmnI* genes. **Materials and Methods:** To exclude the hereditary cause of HbF by mutation at β globin gene cluster, samples with high HbA2 level (>3.2%) and normal HbA2 level (<3.2%) were screened using Multiplex ARMS and GAP-PCR to detect β and δβ thalassemia respectively. Samples with no mutation at the β globin gene cluster were further genotyped for SNPs in genes: *BCL11A* (rs1186868, rs6545816 and rs1427407**)**, *HMIP* (rs9376090), and *XmnI* (rs7482144), using real-time PCR and sequencing analysis. Finally, the association between the studied SNPs and the HbF levels were determined. **Results:** In this study, 11% (18/164) patients accounted for HbF levels ≥ 1%. The HbF and Hb level showed strong positive correlation (r = 0.61). Out of 22 samples, 15 mutations at the β globin gene and 0 mutation at the $\delta\beta$ globin gene were detected. The data obtained showed a significant difference between HbF level of patients with and without β and δβ mutation. Patient stratification among those with no mutation in β globin gene cluster (n=28), minor allele frequency (MAF) for the studied SNPs as follows: rs1186868 (MAF=0%), rs9376090 (MAF=19.6%), rs6545816 (MAF= 37.5%), rs7482144 (MAF= 33.9%), and rs1427407 (MAF=73.25%). By comparing homozygous dominant and heterozygous + homozygous recessive genotypes, there was no significant association between all studied SNPs and the HbF levels. **Conclusion:** The association between the SNPs and HbF level was not detected in this study.

Keywords: Fetal hemoglobin, Anemia, Single nucleotide polymorphism

Poster Presenters		
Date: 16 June 2021 (Wednesday)		
No.	**Presenters**	**Time**
PP-MB-01	**Izzati Muhammad** Low Occurrence of Bacteria on the Lift Buttons of a Public Hospital Executing Weekly Covid-19 Decontamination	2:45 PM
PP-MB-02	**Rafidah binti Lani** In silico Studies of Fisetin and Silymarin as Novel Chikungunya Virus Non-structural Proteins Inhibitors	2:55 PM
PP-MB-03	**Chin King Lim** Development of Quantitative Reverse-Transcription Polymerase Chain Reaction for the Detection of Zika Virus	3:05 PM
PP-MB-04	**Nor Syaza Syahirah binti Amat Junaidi** Phenotypic and Genotypic Profiles of Clinical Methicillin-resistant Staphylococcus aureus Isolates from Hospital Angkatan Tentera Tuanku Mizan (HATTM), Kuala Lumpur	3:15 PM
PP-MB-05	**Nadia Iryani Najri** Expression Profile of microRNAs in Serum Samples of DENV-4 Infected Dengue Patients	3:25 PM
PP-MB-06	**Rabia Mrehil Ali Elsalami** A Review on the Antibacterial Activities of Secondary Metabolites derived from *Streptomyces* sp.	3:35 PM

Low Occurrence of Bacteria on the Lift Buttons of a Public Hospital Executing Weekly Covid-19 Decontamination

Izzati Muhammad[1], Raja Noor Zaliha Raja Abd Rahman[3], Niza Samsuddin[1], Norhidayah Kamarudin[2], Norsyuhada Alias[1]

[1]Department of Biomedical Science, Kulliyyah of Allied Health Sciences, International Islamic University Malaysia (IIUM), Malaysia
[2]Department of Pathology and Laboratory Medicines, Kulliyyah of Medicine, IIUM, Malaysia
[3]Department of Microbiology, Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia, Malaysia
Correspondence: Norsyuhada Alias, norsyuhada_alias@iium.edu.my

Introduction The ongoing pandemic of coronavirus disease 2019 (COVID-19) had led to serious changes in the way of handling common touch objects. Since these objects had the potential to become fomite, the Malaysian Ministry of Health had implement sanitation and decontamination as a must routine especially for public spaces such as hospitals to prevent any chances of getting the nosocomial infection. However, there was little to no publication on the effect of these implementations on common touchable surfaces in Malaysia. **Objectives** This research was conducted to quantify the bacteria isolated from the interior and exterior lift buttons of a public hospital in Kuantan, Pahang that performed weekly Covid-19 cleaning and decontamination. **Methodology** Sampling using cotton swabs was conducted thrice with two weeks intervals from March to April 2021 on the lift buttons in the main building of the hospital by purposive sampling technique (n=50). The samples were processed in the laboratory as per standard microbiological procedures. **Results** The average percentage of bacterial occurrence was 34.8%. Bacteria on the interior lift buttons were more abundant than on the exterior lift buttons with 440 and 120 CFU/mL, respectively. The distribution of bacteria on the lift buttons was skewed towards Gram-positive bacteria (84.1%) when compared to Gram-negative bacteria (15.9%), wherein cocci-shaped bacteria dominating with 79.6% occurrence. **Conclusion** The low quantity of bacteria on the lift buttons showed that the weekly routine decontamination was effective. The decontamination method is ideal to be applied at public places to minimise the occurrence of contaminants.

Keywords: Lift button, Hospital, Fomite, Nosocomial infection, Bacteria

In silico Studies of Fisetin and Silymarin as Novel Chikungunya Virus Non-structural Proteins Inhibitors

Rafidah Lani[1,2], Fatima Ezzahra Agharbaoui[3], Pouya Hassandarvish[2], Boon Teong Teoh[2], Sing Sin Sam[2], Keivan Zandi[4], Noorsaadah Abd Rahman[3], Sazaly AbuBakar[2]

[1]Department of Medical Microbiology, Faculty of Medicine, Universiti Malaya 50603 Kuala Lumpur
[2]Tropical Infectious Diseases Research & Education Centre (TIDREC), Universiti Malaya 50603 Kuala Lumpur
[3]Department of Chemistry, Faculty of Science, Universiti Malaya 50603 Kuala Lumpur
[4]Laboratory of Biochemical Pharmacology, Department of Pediatrics, Emory University, Atlanta, GA, 30322
Correspondence: Sazaly Abu Bakar, sazaly@um.edu.my

Introduction The year 2013 marks the first autochthonous case of chikungunya virus (CHIKV) infection in the Americas and also marks CHIKV transmission beyond its endemic region since it was first isolated in Tanzania in 1952. Incapacitating and persistent joint pain with socio-economic burden caused by CHIKV have raised urgency for developing vaccine and antiviral against the virus. **Objective** Two flavonoid compounds; fisetin and silymarin, exhibited in vitro anti-CHIKV activity in previous findings. This study is to explore the dynamics and stability of interaction between the compounds and two CHIKV non-structural proteins (nsP2 and nsP3) as targets for antiviral. **Methodology** The topological surface areas and partition coefficients of compounds were calculated using Molinspiration server. Preparation of proteins and ligands was conducted using Discovery Studio 2.5, Chimera 1.14 software and AutoDock Tools 1.5.6. Molecular dockings were performed using AutoDock Vina software and potential binding pockets were validated by docking with native co-crystallized ligand and using MetaPocket 2.0 server. Molecular dynamics simulation, trajectory analysis and binding free energy calculation were performed using PMEMD.CUDA, CPPTRAJ module and MM-PBSA protocol available from Amber14 suite. **Results** Fisetin is of favour over silymarin in establishing interaction with CHIKV non-structural proteins, particularly nsP3.This finding is strengthened by a good membrane permeability possessed by fisetin as well its ability to establish stable interaction with key residues of important functions in both nsP2 and nsP3 compared to silymarin. Fisetin adeptly established higher prevalence of hydrogen bond with few residues than the opposites as demonstrated by silymarin. The outcomes coincided with our previous experimental findings. **Conclusion** This study highlights the features of fisetin and silymarin involved in their interactions with selected CHIKV non-structural proteins as important factors contributing to their capacity in inhibiting the proteins to function efficiently thus, incapacitate CHIKV replication machinery.

Keywords: Infectious diseases, Arbovirus, Chikungunya, Antivirals, Flavonoids

Development of Quantitative Reverse-Transcription Polymerase Chain Reaction for the Detection of Zika Virus

Kim-Ling Chin[1], Sing-Sin Sam[1], Sazaly AbuBakar[1,2], Boon-Teong Teoh[1]

[1]*Tropical Infectious Diseases Research & Education Centre (TIDREC), Universiti Malaya, 50603 Kuala Lumpur, Malaysia.*
[2]*Department of Medical Microbiology, Faculty of Medicine, Universiti Malaya, 50603 Kuala Lumpur, Malaysia.*
Corresponding author: Boon-Teong Teoh, boonteong@um.edu.my

Background: Zika virus (ZIKV) infection has become a serious public health concern following the epidemic outbreaks of severe neurological disorders reported in Pacific and Americas since 2016. However, the diagnosis of human ZIKV infection is confounded by nonspecific clinical symptoms. Until now, the available primers and probes of qRT-PCR do not cover the wider genetic diversity and geographical distribution of all ZIKV strains. **Objective:** The objective of this study is to develop a qRT-PCR assay for accurate detection of both Asian and African ZIKV infection. **Methods:** A TaqMan minor groove binding (MGB) probe-based qRT-PCR assay was designed based on conserved ZIKV sequence region in NS2B gene and evaluated for its sensitivity and specificity. We further assessed the clinical applicability of qRT-PCR assay for detection ZIKV RNA in total of 18 spiked simulated clinical samples. **Results:** The qRT-PCR assay was able to detect both Asian and African ZIKV strains without cross-reacting with other *arboviruses*. The results of present study reflected a greater sensitivity of the designed qRT-PCR assay (sensitivity = 93.3%) than the reference assay, Zika Virus Polyprotein gene genesig® Standard Kit (Primerdesign Ltd, United Kingdom) (sensitivity = 66.7%). **Conclusion:** qRT-PCR assay developed in this study is a useful diagnostic tool for detection of ZIKV infection in Asia or African, where ZIKV co-circulate with other *arboviruses,* including Dengue virus, Chikungunya virus and Yellow Fever virus.

Keywords : Zika Virus (ZIKV), TaqMan minor groove binding (MGB) probe, qRT-PCR

Phenotypic and Genotypic Profiles of Clinical Methicillin-resistant *Staphylococcus aureus* Isolates from Hospital Angkatan Tentera Tuanku Mizan (HATTM), Kuala Lumpur

Nor Syaza Syahirah Amat Junaidi[1], Nik Noorul Shakira Mohamed Shakrin[1,2], Mohammad Fahmi Daman Huri[3], Ahmad Zakuan Kamarudin[3], Mohd Nasir Mohd Desa[4,5], Wan Md Zin Wan Yunus[2]

[1]Fakulti Perubatan dan Kesihatan Pertahanan, Universiti Pertahanan Nasional Malaysia, Kem Sungai Besi, 57000 Sungai Besi, Kuala Lumpur, Malaysia.
[2]Centre of Tropicalization, Universiti Pertahanan Nasional Malaysia, Kem Sungai Besi, 57000 Sungai Besi, Kuala Lumpur, Malaysia.
[3]Jabatan Patologi, Hospital Angkatan Tentera Tuanku Mizan, 53300 Kuala Lumpur, Malaysia.
[4]Department of Biomedical Science, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang, Malaysia.
[5]Laboratory of Halal Science Research, Halal Products Research Institute, Universiti Putra Malaysia, Serdang, Malaysia.
Correspondence: Nik Noorul Shakira Mohamed Shakrin, shakira@upnm.edu.my

Introduction: After years of its discovery, methicillin-resistant *Staphylococcus aureus* (MRSA) still become the most important human pathogen in both hospitals and community settings worldwide. Ongoing monitoring of MRSA antibiotic susceptibility profiles is crucial for effective treatment and prevention of resistance emergence in MRSA. **Objectives:** This retrospective study aimed to determine the phenotypic and genotypic profiles of MRSA isolates from Hospital Angkatan Tentera Tuanku Mizan (HATTM), Kuala Lumpur for a period of one year (January 2019 until December 2019) and its association with demographic data and types of specimens. **Methodology:** Standard bacteriological method was used for the isolation of *Staphylococcus aureus* from various clinical specimens. Antibiotics susceptibility of the isolates was determined using the Kirby-Bauer disc diffusion method. Simultaneous detection of 16S rRNA, *nuc*, and *mecA* genes of the isolates were done by multiplex polymerase chain reaction (MPCR). Collected data were analyzed using the latest version of the Statistical Product and Service Solutions (SPSS) software. **Results:** Eighty-six (0.01%) of MRSA were isolated from various types of specimens (n=6004). Of these, 63 (73.26%) isolates were hospital-acquired MRSA (HA-MRSA) and the rest (n=23, 26.74%) were community-acquired MRSA (CA-MRSA). There was a statistically significant association between MRSA acquisition with gender and invasiveness of the isolates ($p<0.05$). The majority of the MRSA isolates were recovered from the medical ward (n=35), mostly were HA-MRSA (n=31, 88.57%). Sixty-five (75.58%) of the MRSA isolates were multidrug-resistant. None of the isolates showed reduced susceptibility nor resistance to vancomycin, linezolid, and novobiocin. The MPCR yields expected amplicons for all the targeted genes; 16sRNA, *nuc*, and *mecA* in all isolates (n=86). **Conclusion:** This study confirmed that vancomycin-resistant *S. aureus* has not yet been established in HATTM and highlights the importance of the judicious use of antibiotics.

Keywords: *Staphylococcus aureus*, MRSA, Antibiotic resistance, Hospital-acquired MRSA, Community-acquired MRSA.

Expression Profile of microRNAs in Serum Samples of DENV-4 Infected Dengue Patients

Nadia Iryani Najri[1,2], Vijay Kumar Subbiah[2], Noor Hydayaty Mohd Yusuff[2], Zulina Mazlan[3], Rashidah Mohammad[4] and Mohammad Zahirul Hoque[1*]

[1] Department of Pathobiology & Medical Diagnostics, Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia.
[2] Biotechnology Research Institute, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia
[3] Department of Pathology, Women and Children's Hospital, Ministry of Health Malaysia, Kota Kinabalu, Sabah, Malaysia
[4] Public Health Department, Ministry of Health Malaysia, Kota Kinabalu, Sabah, Malaysia
** Corresponding author email: drzahir@ums.edu.my*

Introduction: Dengue virus is a mosquito-borne arbovirus under the genus of Flaviviridae which has a significant global public health concern. It has four distinct serotypes i.e. DENV-1, DENV-2, DENV-3 and DENV-4. There has been a keen interest to identify circulating DENV serotype-specific microRNAs in patient's serum. MicroRNAs (miRNAs) are a class of small non-coding RNA molecules which play a major role in many of the biological and cellular processes, including infection and immune response. We have previously published reports on the differential miRNA expression in serotype specific DENV-1 and DENV-3 infection. **Objectives:** Here we investigate the microRNA expression profiles in the serum samples of DENV-4 serotype patients. **Methods:** Samples were collected from clinical samples in a total of 30 patients with DENV-4 serotype infection and 30 apparently healthy individuals as controls. The serum RNAs was isolated from these subjects and subjected to high-throughput small RNA (sRNA) sequencing. Total RNA was isolated and small RNA sequencing was performed using Illumina MiSeq high-throughput next generation sequencing platform to identify deferentially expressed miRNAs with non-infected controls. **Results:** After trimming and quality control of the sequence reads, we have identified 35 miRNAs which were expressed in DENV-4 while, 9 miRNA were downregulated and 26 were upregulated in serotype 4. Our preliminary findings suggested the significant contribution of the alterations in the miRNA levels to the dengue. Next, we used the stem-loop reverse transcription-quantitative PCR (RT-qPCR) method to validate the expression of the dysregulated miRNAs observed in DENV-4. **Conclusion:** The results of our study may provide vital information on our understanding of differential expression of miRNA and serve as a promising biomarker candidate against dengue viral infection. These data could be used as an attractive tool for novel therapeutic approaches.

Keywords: MicroRNAs (miRNAs), DENV-4 serotype, Expression profile

A Review on the Antibacterial Activities of Secondary Metabolites Derived from *Streptomyces* sp.

Rabia M Elsalami[1], Yaman W Kassab[1], Mahani Mahadi[1], Kok-Yong Chin[2], Noraziah M Zin[3*], Najwa Mohammad[1*]

[1]*Department of Pharmaceutical Science, Faculty of Pharmacy, University of Cyberjaya.*
[2]*Department of Pharmacology, Faculty of Medicine, University Kebangsaan Malaysia.*
[3]*Centre for Diagnostic, Therapeutics & Investigates Studies, Faculty of Health Sciences, University Kebangsaan Malaysia.*
Correspondence: *Noraziah M Zin, noraziah.zin@ukm.edu.my; Najwa Mohammad, najwa@cyberjaya.edu.my*

Background: The wide spread of infectious diseases due to resistant pathogens is a global threat that led to numerous deaths annually. Many factors have led to the development of antibiotic resistance among various pathogens strains. Therefore, the need to discover new bioactive compounds is overwhelming. *Streptomyces* genus represents a potential and valuable biological source for a large number of antibiotics and other bioactive metabolites. This genus has been isolated from different sources including terrestrial as well as marine habitats. **Objective:** To systematically evaluate articles that focus on *Streptomyces* isolates as a source of bioactive compounds with antibacterial activities. Articles published on PubMed and Science Direct databases between 2015-2020 were included. **Method:** PRISMA guidelines were followed, 67 studies were screened according to the inclusion/exclusion criteria and 26 papers were eventually included. **Results:** It was noticed that *Streptomyces* & its derived compounds have gained more attention recently as most studies were published in 2020. Fifty percent of the *Streptomyces sp.* studied was terrestrial, while the rest were from marine origin. Of the terrestrial species, 61% were found in soil and 31% in plants. Different parameters were used to assess the antibacterial activity of *Streptomyces*-derived compounds. Minimum inhibitory concentration (MIC) was the most commonly measured parameter (69%). Some studies used more than one parameter to test whether the compound is bacteriostatic or bactericidal. With regards to pathogens, both gram-positive and gram-negative bacteria were included. Moreover, 46% and 54% of the selected studies were focused on inhibiting the multidrug- resistant bacteria (MDR) and non-MDR, respectively. In **conclusion**, both crude & purified compounds were found to have antibacterial effects. Furthermore, with the rapid emergence of MDR, it is increasingly important to switch the compass toward isolating novel classes of antimicrobial compounds. For this reason, more investigative studies are needed to induce novel secondary metabolites production from *Streptomyces* biosynthetic silent gene cluster.

Keywords: *Streptomyces,* secondary metabolites, Bioactive compounds, Pathogens, Antibacterial activity, *In vitro.*

Esco Lifesciences Group is a world-leading life science company that offers tailored solutions to fit the needs of laboratories in various industries.

Pharmaceutical Equipment

Isolators

HPI GPPI

Downflow booth

DFB

Pass Boxes

EPB DPB

Lead-shielded Biological Safety Cabinet
(for Radiopharmaceutical Handling)

LA2-_ A _-E-C

Cold Storage Equipment

HR1-140S HR1-400T

HF2-140S HF2-400T

HF2-400S HF2-700T

UUS-B

Thermostatic Equipment

OFA

INA

CCL

IFA

WE PROVIDE A ONE-STOP SOLUTION FROM INSTALLATION TO DECOMMISSIONING OF YOUR EQUIPMENT!
Esco Services takes professional pride in ensuring compliance with legal guidelines and ISO standards while helping your company minimize disruption or downtime of equipment.

- Installation and Operational Qualification
- Repair, Maintenance, and Replacement
- Decontamination
- Annual Recertification Testing and Calibration

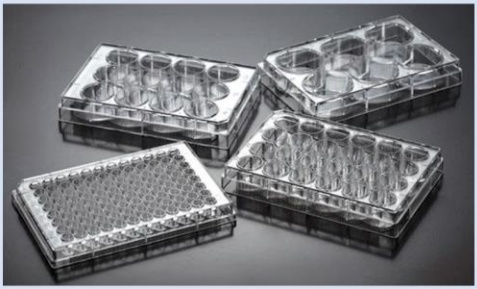
@esco.my
@escomalaysia
@escolifesciences
@escolifesci
@esco

ESCO MICRO (M) SDN. BHD.
No. 15, Jalan Sungai Buloh 27/101A
Persiaran Klang, HICOM 27 Industrial Park
40400 Shah Alam, Selangor, Malaysia
Tel: +603-5103 8480 • Fax: +603-5614 3385
Website: http://my.escoglobal.com

BIOFIL®







Any Purchase of RM1500 and above for Jet-Biofil Items

Will Get a discount of RM100 for next purchase

We strive to ensure every customer gets a joyful experience with us.

We are specialized in Lab Consumables, Chemicals, Safety Equipment, Lab Equipment.

www.mclab.com.my

For more info, kindly email to sales.mclab@gmail.com

- Discount valid for 3 months after purchase
- MC Lab reserves all rights
- Promo valid till End of July

MC

LIST OF PRESENTERS

DRUG DISCOVERY & SYNTHESIS

Oral Presenters		
Date: 16 June 2021 (Wednesday)		
No.	**Presenters**	**Time**
OP-DS-01	**Sakiinah Hasan** The Effects of Tualang Honey on Sperm Profile in High Cholesterol Diet Induction Animal Model	11:00 AM
OP-DS-02	**Assoc. Prof. Dr. Endang Kumolosasi** Fresh Soy Milk and its Compounds Induced Apoptosis in Human Leukemic Cell Lines and Peripheral Blood Mononuclear Cells (PBMC)	11:15 AM
OP-DS-03	**Phuna Zhi Xin** Fabrication, *In vitro* Characterization and Drug Release Kinetics of Curcumin and Piperine loaded PLGA Nanocrystals	11:30 AM
OP-DS-04	**Maria Apriliani Gani** Synthetic and Natural Hydroxyapatite: Characteristics and *In Vivo* Performance	11:45 AM
OP-DS-05	**Dr. Suciati** *In Vitro* Acetylcholinesterase Inhibitory Activity of Isoagelasine C Isolated from a Marine Sponge *Agelas nakamurai*	12:00 PM
OP-DS-06	**Tan Ke Han** Structure-based Drug Design and Discovery of Quinazoline-based Epidermal Growth Factor Receptor Tyrosine Kinase (EGFR-TK) Inhibitors	12:15 PM
OP-DS-07	**Dr. Juni Ekowati** Microwave Assisted Synthesis of Ferulic Acid Derivates as Potential Antithombotic Candidate	12:30 PM

The Effects of Tualang Honey on Sperm Profile in High Cholesterol Diet Induction Animal Model

Sakiinah Hasan[1], Mohd Afzal Alias[1], Roslina Abdul Rahim[1], Naznin Muhammad[2], Norzamzila Abdullah[2] & Redzuan Nul Hakim Abdul Razak[3]

[1]Department of Basic Medical Science, Kulliyyah of Medicine, IIUM.
[2]Department of Pathology and Laboratory Medicine, Kulliyyah of Medicine, IIUM.
[3]Department of Basic Medical Science, Kulliyyah of Nursing, IIUM.
Correspondence: sakiinahh@gmail.com

Introduction: Hypercholesterolaemia and obesity are recognized factors associated with male infertility. They have been shown to reduce semen quality, change the sperm proteomes and also contribute to erectile dysfunction. However, currently there is limited therapy available. Tualang honey (TH) is a type of Malaysian polyfloral wild honey produced by the rock bee (*Apis dorsata*) proven to exert both anti-inflammatory and anti-oxidative effects. **Objective:** This study aimed to determine the effects of TH on the sperm profile in an animal model with chronic exposure to high cholesterol diet. **Methodology:** Thirty male Sprague Dawley rats 2 weeks of age weighing 200 - 250 gm were divided into two groups, the high (12%) cholesterol diet (12% CD; n=24) and standard diet (SD; n=6) and were fed for 16 weeks. After 16 weeks, SD group was continued with SD for 4 weeks while the rats in the 12% CD group were divided into four groups. The first group was continued with only 12% CD while the other 3 groups in addition to the 12% CD were given TH supplement at different doses (1.2, 2.4 and 3.0g/kg/day) for 4 weeks. Sperm profile analysis from the caudal epididymis was performed for all groups at the end of the 4 weeks. **Results:** After 20 weeks of 12% CD, the sperm concentration, the percentage of total sperm motility, progressive motility and viability reduced significantly compared to the SD group ($p<0.001$). On the contrary, all TH supplemented groups demonstrated significant improvement in the sperm parameters ($p<0.001$). The higher the dosage of TH given, the higher were improvements in sperm parameters ($p<0.001$). **Conclusion:** TH supplementation using an animal model with chronic exposure to high cholesterol diet improved the sperm profile parameters. Based on our findings, there is a need to further explore the potential TH in improving male infertility associated with hypercholesterolaemia and obesity.

Keywords: High cholesterol diet, Tualang honey, Sperm profile

Fresh Soy Milk and its Compounds Induced Apoptosis in Human Leukemic Cell Lines and Peripheral Blood Mononuclear Cells (PBMC)

Qalidah Mohamad Ali[1], Endang Kumolosasi[1], Mohd Makmor Bakry[2]

[1]Drug and Herbal Research Centre, [2] Centre of Quality Management of Medicine, Faculty of Pharmacy, University Kebangsaan Malaysia, Kuala Lumpur, Malaysia.
Correspondence: Endang Kumolosasi, e_kumolosasi@ukm.edu.my

Introduction: Leukemia is a type of blood cancer occurred among adult and children and characterized by abnormal growth of white blood cells. Major components of soybeans, namely daidzein and genistein, can suppress the growth and division of cancer cells. **Objectives:** To investigate the apoptosis effect of fresh soy milk and its constituents on human leukemic cells and peripheral blood mononuclear cells (PBMC). **Methodology:** The effect of fresh soy milk and its constituents on apoptosis was determined using flow cytometry analysis. The PBMC from healthy donors were isolated by performing density gradient centrifugation and cytotoxicity of the compounds was evaluated by MTT assay. **Results:** The MTT test found that genistein and coumestrol have the IC_{50} value of 4.99 µM and 6.8 µM respectively against the U937 cell line and 5.40 µM and 7.64 µM against Jurkat cells. While daidzein has an IC_{50} value of 6.88 µM in K562. Meanwhile, the fresh soy milk shows IC_{50} values of 19.62%, 28.48% and 27.67% against U937, Jurkat and K562 cells, respectively. Coumestrol induced significant apoptosis in K562, U937 cells with $p \leq 0.01$ for these cell lines and $p \leq 0.05$ for Jurkat cells. Daidzein induced significant apoptosis ($p \leq 0.05$) in K562 and U937 while genistein was active against K562, Jurkat and U937 cells with $p \leq 0.01$. Treatment with fresh soy milk induced significant apoptosis in both K562 and PBMC with $p \leq 0.0001$ and $p \leq 0.05$ respectively, meanwhile no significant apoptosis caused by compounds towards PBMC were obtained. **Conclusion:** The coumestrol, daidzein and genistein induce apoptosis in human leukemic cells but safe to PBMC. Induction of apoptosis by fresh soy milk in K562 and PBMC may be associated with the presence of the tested compounds in fresh soymilk.

This project was funded by the Ministry of Higher Education with No. FRGS/1/2018/SKK09/UKM/02/2

Keywords: Fresh soy milk, Phytoestrogen, Apoptosis, Human leukemic cells, Peripheral blood mononuclear cells

Fabrication, *In vitro* Characterization and Drug Release Kinetics of Curcumin and Piperine loaded PLGA Nanocrystals

Zhi Xin Phuna[1], Bibhu Prasad Panda[2], Naveen Kumar Hawala Shivashekaregowda[3], Priya Madhavan*[1]

[1] School of Medicine, Faculty of Health & Medical Sciences, Taylor's University, Malaysia. No.1, Jalan Taylor's, 47500 Subang Jaya, Selangor.
[2] Department of Pharmaceutical Technology, School of Pharmacy, Faculty of Health & Medical Sciences, Taylor's University, Malaysia. No.1, Jalan Taylor's, 47500 Subang Jaya, Selangor.
[3] Department of Pharmaceutical Chemistry, School of Pharmacy, Faculty of Health & Medical Sciences, Taylor's University, Malaysia. No.1, Jalan Taylor's, 47500 Subang Jaya, Selangor.
**Correspondence: Priya Madhavan, Priya.Madhavan@taylors.edu.my*

Introduction: Curcumin and piperine have been recognized for their beneficial properties that are not limited to antioxidant, anti-inflammatory, anti-microbial, anti-cancer and anti-neoplastic effects. In combination, curcumin and piperine have shown to exert *in vitro* synergistic neuroprotective effect and *in vivo* suppression of hepatocellular carcinoma. Nevertheless, both compounds are notoriously known for low bioavailability due to low solubility and poor dissolution rate that can greatly influence their therapeutic efficacy. **Objectives:** This study aimed to improve the solubility and dissolution rate that could indirectly enhance the bioavailability of curcumin and piperine by fabricating them into dual-loaded PLGA nanocrystals stabilized by the stabilizer. **Methodology:** Curcumin and piperine dual-loaded nanocrystals were prepared using the solvent evaporation technique. The mean particle size, entrapment efficiency, *in vitro* release profile and release kinetics were studied. Additionally, characterization was performed using Fourier-transform infrared spectroscopy, differential scanning calorimetry and transmission electron microscopy. **Results:** The average particle size of curcumin-piperine nanocrystals was 119.4±2.485 nm, with 99.76% entrapment efficiency for curcumin and 89.05% for piperine. The zeta potential was measured at -24.9±1.63 mV and the polydispersity index was 0.195±0.0056. The solubilities of curcumin and piperine nanocrystals showed an increase up to 63.44 and 5.04 folds respectively, as compared to their respective pure compounds. Besides that, the dissolution rate of curcumin-piperine nanocrystals significantly improved compared to the pure compounds, where it showed a fast and prolonged release. The kinetic release was in line with first-order release kinetics and Fickian diffusion release mechanism. **Conclusion:** The findings proved that the curcumin-piperine nanocrystals displayed an enhanced solubility and dissolution rate, resulting in higher bioavailability as compared to pure compounds. The nanocrystals also displayed a fast release initially, followed by the sustained release that could be explored to enhance the therapeutic efficacy of both compounds synergistically.

Keywords: Curcumin, Nanocrystals, Piperine, PLGA.

Synthetic and Natural Hydroxyapatite: Characteristics and *In Vivo* Performance

Maria Apriliani Gani[1], Aniek Setiya Budiatin[2], Chrismawan Ardianto[2], Junaidi Khotib[2]

[1]*Doctoral Program of Pharmaceutical Sciences, Faculty of Pharmacy, Universitas Airlangga, Indonesia*
[2]*Department of Pharmacy Practice, Faculty of Pharmacy, Universitas Airlangga, Indonesia*
Correspondence: Aniek Setiya Budiatin, anieksb@yahoo.co.id

Introduction: One of the biomaterials used to treat bone defects due to traffic accidents is hydroxyapatite (HA). HA can be obtained from synthetic versions or extracted from natural sources such as bovine hydroxyapatite (BHA). **Objectives:** This study compared BHA and HA powder characteristics and the osteoconductivity of BHA-based and HA-based scaffolds *in vivo.* **Methodology:** The BHA and HA powder were characterized by scanning electron microscope connected with energy dispersive X-Ray spectroscopy (SEM-EDX) and Fourier-transform infrared spectroscopy (FTIR). Each powder was formulated with gelatin as a bone scaffold to prevent premature degradation *in vivo*. The compressive strength of the scaffolds was examined by an autograph. The bone defect model was carried out on the femur area of Wistar rats. The rats were implanted with BHA-based and HA-based scaffolds and one control group with no scaffold. After 7, 14, and 28 days, the bone was taken and radiologically and histologically evaluated with X-Ray Rontgen and hematoxylin-eosin staining, respectively. **Results:** The BHA powder showed larger pores than HA. The particle shape of BHA was hexagonal while HA was round. The Ca/P ratio of BHA and HA powder was 1.73 ± 0.01 and 1.46 ± 0.06, respectively. BHA powder showed a carbonate functional group on the FTIR spectra, while HA was not. The BHA-based scaffold had higher compressive strength than the HA-based scaffold. The administration of BHA-based scaffold increased bone cells and bone growth at the defect area compared to HA-based and no scaffold administration. **Conclusion:** The BHA-based scaffold has beneficial characteristics and *in vivo* performance compared to the HA-based scaffold. Thus, the BHA-based scaffold is an osteoconductive biomaterial, which can be potentially used for orthopedic implants.

Keywords: Bovine hydroxyapatite, Carbonated hydroxyapatite, Porous biomaterial, Osteoconductivity

In Vitro Acetylcholinesterase Inhibitory Activity of Isoagelasine C Isolated from a Marine Sponge *Agelas nakamurai*

Andhika Dwi Aristyawan[1], Aty Widyawaruyanti[2,3], Suciati[2,3*]

[1]*Postgraduate Program in Pharmaceutical Sciences, Faculty of Pharmacy, Universitas Airlangga, Surabaya, 60115, East Java, Indonesia.*
[2]*Department of Pharmaceutical Sciences, Faculty of Pharmacy, Universitas Airlangga, Surabaya, 60115, East Java, Indonesia.*
[3]*Center for Natural Product Medicine Research and Development, Institute of Tropical Diseases, Universitas Airlangga, Surabaya, 60115, East Java, Indonesia.*
Correspondence: Suciati, suciati@ff.unair.ac.id

Introduction: Alzheimer's disease (AD) is a neurodegenerative disorder, which is the most common cause of dementia. One of the strategies for the treatment of AD is the use of acetylcholinesterase inhibitors (AChEi) as cholinergic deficiency is a common feature in the early stage of AD and other mild cognitive impairments. The oceans with their unique and wide range of biodiversity, producing unusual metabolites, emerge as a good source for new therapeutic agents, including acetylcholinesterase inhibitor. In our previous study, the methanolic extract of *Agelas nakamurai* demonstrated activity as AChEi. **Objectives:** To isolate and characterize compound with acetylcholinesterase inhibitory activity from *A. nakamurai.* **Methodology:** The isolation of isoagelaine C was carried out based on a bioassay-guided isolation procedure. The structure of isoagelasine C was determined based on ^{1}H and ^{13}C NMR spectroscopy and mass spectrometry analyses. The specific rotation of the compound was also measured to determine the configuration. The acetylcholinesterase inhibitory assay was conducted by using the modified Ellman's method. **Results:** Isoagelasine C was isolated as a major peak in the HPLC profile at a retention time of 44 min. The UV profile of the isolated compound showed strong peaks at 210 and 269 nm, which suggested the presence of a pyrrole-2-carbonyl ring. This data was further supported by ^{1}H NMR and ^{13}C NMR spectra. The sample exhibited a molecular ion at *m/z* 422.3280 $[M]^{+}$ in mass spectrometry. The isolated compound showed $[\alpha]^{20}_{D}$ +28.0 (MeOH, c 0.25). These data are similar to that reported for a diterpene alkaloid isoagelasine C. The isolated compound inhibited AChE enzyme with IC_{50} value of 30.68± 1.30 µg/mL. **Conclusion:** The diterpene alkaloid isoagelasine C from *A. nakamurai* can be a good candidate for acetylcholinesterase inhibition.

Keywords: Alzheimer's disease, *Agelas nakamurai,* isoagelasine C, Acetylcholinesterase inhibitor, Marine sponge

Structure-based Drug Design and Discovery of Quinazoline-based Epidermal Growth Factor Receptor Tyrosine Kinase (EGFR-TK) Inhibitors

Tan Ke Han[1], Chin Sek Peng[1], Heh Choon Han[1]

[1]Deparment of Pharmaceutical Chemistry, Faculty of Pharmacy, University of Malaya
Correspondence: Tan Ke Han, tankehan321@gmail.com; Heh Choon Han, silverbot@um.edu.my

Introduction: Quinazoline-based tyrosine kinase inhibitor (TKI) such as gefitinib is first-line targeted therapy for cancer including non-small cell lung cancer. However, mutations of the targeted epidermal growth factor receptor tyrosine kinase (EGFR-TK) have been reported as a mechanism of resistance towards the TKIs. To counter the resistance problem, the design and discovery of the small molecule inhibitors for EGFR-TK are in need. **Objectives:** This study aims to understand the binding mechanism of standard EGFR-TKI gefitinib and apply the finding in designing quinazoline-based compounds that can overcome the resistance caused by T790M/L858R double mutations in EGFR-TK (mutant). **Methodology:** Gefitinib in complex with the wild-type (PDB ID:2ITY) and mutant EGFR-TK underwent molecular dynamics (MD) simulations and analysed to reveal the binding mechanism, free energy of binding, and hydrogen bonding occupancy. The insight from the analyses was then applied to the design of the quinazoline-based compounds. The designed compounds were docked to both wild-type and mutant EGFR-TK to generate the starting structure for the subsequent MD simulations. The same set of analyses were performed on the trajectories and compared with the gefitinib-EGFR-TK complexes. **Results:** MMPBSA calculations showed that the binding affinity of the designed compounds is comparable to that of gefitinib. Compound 4.7 was observed to stabilize the N-lobe of mutant EGFR-TK, which participates in the dimerization of EGFR-TK. Both the designed compounds interact with wild-type and mutant EGFR-TK via additional hydrogen bond interactions with ASP855, which implies a slightly different binding mechanism or stabilizing interactions. **Conclusion:** This study proves that the designed compounds can bind to both wild-type and mutant EGFR-TK comparably with gefitinib and may potentially solve the resistance of gefitinib in the future.

Keywords: Molecular docking, Molecular dynamics simulation, Quinazoline-based derivatives, Wild-type EGFR-TK, T790M/L858R EGFR-TK.

Microwave Assisted Synthesis of Ferulic Acid Derivates as Potential Antithombotic Candidate

Juni Ekowati[1], Tutuk Budiati[2], Frida Putri Nur Islami[1], Kholis Amalia Nofianti[1], Kholidah Febriani[1], Tiara Puspa Asriningrum[1], Takayasu Yamauchi[2]

[1] Department of Pharmaceutical Sciences Faculty of Pharmacy Airlangga University, Surabaya Indonesia.
[2]Laboratory of Synthetic chemistry Faculty of Pharmacy Hoshi University, Tokyo Japan
Correspondence: Juni Ekowati , juni-e@ff.unair.ac.id

Introduction: One of the causes of a high prevalence of death from cardiovascular diseases is thromboembolism. This is triggered by uncontrolled platelet aggregation, which causes complications and death. The main medication for this disease are antithrombotic, including antiplatelet drugs. The problem becomes more complicated because of the resistance to the treatment by currently used medicines and side effects of these medicines. **Objectives:** This study aims to synthesize ferulic acid derivates (FAD1-5) and to evaluate their potency as antithrombotic candidates. **Methodology:** Ferulic acid (FAD1) was synthesized through Knoevenagel reaction using a base catalyst. After that, ferulic acid was modified at the phenolic hydroxy group through acylation with some acid chlorides to afford FAD2-5. All reactions were performed under microwave irradiation at a power of 40 Watt. The products were analyzed using HRMS, IR, ^{1}H and ^{13}C NMR spectroscopy. The antithrombotic activity was evaluated *in vivo* using mice as an animal model. The activity assessed on the andrographolide basis of clotting time and bleeding time was compared with effect of aspirin at 80 mg dose. **Results:** The yield of ferulic acid obtained from the Knoevenagel reaction was 80%. The clotting time and bleeding time after treatment with FAD1 were longer than in the negative control group (CMC-Na) but shorter than the positive control group (aspirin). The yields of ferulic acid derivatives (FAD2-5) were 65-90%. The clotting time after treatment with FAD2-5 was 165 -275 sec, whereas the bleeding time was 360-620 sec. Three derivates of ferulic acid (FAD2-4) were more effective than aspirin in the clotting time test, but only two derivates of ferulic acid (FAD4-5) outperformed aspirin in the bleeding time test. **Conclusion:** Ferulic acid derivates can be synthesized by acylation under microwave irradiation. The longer the carbon chain of acyl moiety, the smaller were the yields. The results showed that all ferulic acid derivates have antithrombotic activity. Acylation of ferulic acid increased the antithrombotic activity.

Keywords: Cardiovascular disease, Medicine**,** Ferulic acid**,** Microwave irradiation**,** Nucleophilic acyl substitution

Poster Presenters		
Date: Date: 16 June 2021 (Wednesday)		
No.	**Presenters**	**Time**
PP-DS-01	**Dr. Mohd Afzal Alias** Tualang Honey Supplementation Attenuates the Lipid Profile In High Cholesterol Diet Induced Non-Alcoholic Steatohepatitis Animal Model	2:45 PM
PP-DS-02	**Yusuf Oloruntoyin Ayipo** Pharmacological Potentials of Some Major Phytochemicals from *Aframomum melegueta* as Inhibitors of Cyclooxygenase-2: *In silico* Study	2:55 PM
PP-DS-03	**Dr. Janice Chan Sue Wen** *Andrographis paniculata* (Burm. f.) Wall. ex Nees, Andrographolide, and Andrographolide Analogues as SARS-CoV-2 Antivirals? A Scoping Review.	3:05 PM
PP-DS-04	**Shantini Vijayabalan** Presentation Title: Amelioration of Cognitive Impairment and Neurodegeneration by Curcumin and Piperine in Rat Model of Streptozotocin-induced Experimental Dementia of Alzheimer Disease-like Condition	3:15 PM
PP-DS-05	**Christine Law Shing Wei** Design and Development of Small Molecule Cholinesterase Inhibitors for the Treatment of Alzheimer's Disease	3:25 PM
PP-DS-06	**Umarqayum Abu Bakar** In silico Prediction of Diosmin and Orientin as Potential H1N1 Influenza Virus Inhibitors	3:35 PM
PP-DS-07	**Shraddha M Gupta** In-silico Identification and Characterization of Indene Analogues Targeting Acetylcholinesterase for Alzheimer's Disease	3:45 PM
PP-DS-09	**Meyyammai Swaminathan** Anti-hyperglycemic Activity of *Swietenia macrophylla* Seed Extract in Diabetic GK Rats	3:55 PM

Tualang Honey Supplementation Attenuates the Lipid Profile In High Cholesterol Diet Induced Non-Alcoholic Steatohepatitis Animal Model

Mohd Afzal Alias[1], Roslina Abdul Rahim[1], Naznin Muhammad[2], Nor Zamzila Abdullah[2], Norlelawati A. Talib[2]

[1]Department of Basic Medical Science, Kulliyyah of Medicine, IIUM.
[2]Department of Pathology and Laboratory Medicine, Kulliyyah of Medicine, IIUM.
Correspondence: Mohd Afzal Alias, afzalalias@iium.edu.my

Introduction: Hypercholesterolaemia, insulin resistance and metabolic syndrome are the key features for Non-alcoholic Steatohepatitis (NASH) disease. Non-pharmaceutical approaches, particularly nutritional counselling and diet prescription to reduce body weight remain the main recommendation for NASH management. Tualang honey (TH) has been proposed to improve lipid profiles and hence, may be beneficial in NASH management. **Objectives:** This study aimed to investigate the effects of TH at three different dosages on lipid profiles of rats given a 12% high cholesterol diet (HCD). **Methodology:** Thirty male Sprague Dawley rats were fed with 12% HCD for 16 weeks. After 16 weeks, the rats were divided into four groups. The first group (Group A - control) was given distilled water while the rats in the remaining three groups, were treated with 1.2 g/kg (Group B), 2.4 g/kg (Group C) and 3.0 g/kg (Group D) doses of TH daily for four consecutive weeks. Rats in all groups were changed to a normal diet during this period. At the end of four weeks of TH treatment, blood samples were collected from the rats via the retro-orbital sinus and lipid profiles were analysed. **Results:** The total cholesterol was reduced in all groups treated with TH (Group B, 1.52±0.192 mmol/L; Group C, 1.62± 0.319 mmol/L; Group D, 1.68±0.164 mmol/L) compared to the control (Group A, 1.84±0.134 mmol/L). The lowest triglyceride level (0.98±0.356 mmol/L) was found in rats treated with 3.0 g/kg/day of TH (Group D). The LDL/HDL ratio was found to be the lowest in rats treated with 2.4 g/kg/day of TH (Group C). **Conclusion:** Supplementation of TH in addition to diet prescription may enhance the lipid profile in HCD rats as compared to diet prescription alone, independent of TH dosage.

Keywords: Non-alcoholic steatohepatitis, Tualang honey, Hypercholesterolaemia, High cholesterol diet

Pharmacological Potentials of Some Major Phytochemicals from *Aframomum melegueta* as Inhibitors of Cyclooxygenase-2: *In Silico* Study

Yusuf Oloruntoyin Ayipo[1,2*], Halimah Funmilayo Babamale[3], Mohd Nizam Mordi[1]

[1] *Centre for Drug Research, Universiti Sains Malaysia, 11800, Pulau Pinang, Malaysia.*
[2] *Department of Chemical, Geological and Physical Sciences, Kwara State University, Malete, P. M. B. 1530, Ilorin, Nigeria.*
[3] *School of Chemistry, Universiti Sains Malaysia, 11800, Pulau Pinang, Malaysia.*
Correspondence: Ayipo Y. O., yusuf.ayipo@kwasu.edu.ng

Introduction: The cyclooxygenases 1 & 2 (cox-1 & cox-2) are multipurpose enzymes, which primarily function in the catalytic conversion of arachidonic acid into prostaglandins (PGs) and other hormone-like compounds controlling blood flow and inflammation. The inhibitory effects against cox-2 constitute essential prophylaxis and treatment of several ailments including inflammation, mild and acute pain, fever and neoplasmic syndromes. The conventional drugs that inhibit the enzyme to impede PG production are mostly non-steroidal anti-inflammatory drugs such as aspirin, ibuprofen and meloxicam suffering from various side effects, including insomnia, diarrhea and sinusitis. Thus, the identification of cox-2 inhibiting phytochemicals from vast and safer natural resources becomes imperative. **Objective:** This study presents an *in silico* pharmacological profiling of some major phytochemicals from *A. melegueta* as potent cox-2 inhibitors. **Methodology:** Using glide docking simulation, the inhibitory potentials of the phytochemicals were evaluated against the crystal structure of cox-2 (PDB 4PH9). The bioactivity, physicochemical and toxicological profiles, and mutagenicity of the phytochemicals were predicted using PASS online, SwissADME and VEGA ToxRead tools. **Results:** From molecular docking simulation, caryophyllene, humulene, 5.alpha-androstan-16-one, [1,3]benzodioxolo[5,6-c]phenanthridine and d-norandrostane(5.alpha.14.alpha) demonstrate stronger/competitive inhibitory potentials with respective docking scores of -7.657, -7.160, -8.930, -8.152 and -8.459 kcal/mol compared to ibuprofen and meloxicam with -8.306 and -6.163 kcal/mol respectively. They are predicted as anti-inflammatory agents with drug-like ADMET profiles and, low expected toxicity and mutagenicity. **Conclusion:** The easily accessible phytochemicals are predicted to be promising for further translational designs into effective cox-2 inhibitors.

Keywords: Prostaglandin, Cox-2, Inflammation, Ligand-receptor docking, *Aframomum melegueta*

Andrographis paniculata (Burm. f.) Wall. ex Nees, Andrographolide, and Andrographolide Analogues as SARS-CoV-2 Antivirals? A Scoping Review.

Xin Yi Lim[1], Janice Sue Wen Chan[1], Terence Yew Chin Tan[1], Bee Ping Teh[1], Mohd Ridzuan Mohd Abd Razak[1], Saharuddin Mohamad[2,3] and Ami Fazlin Syed Mohamed[1]

[1] Herbal Medicine Research Centre, Institute for Medical Research, National Institutes of Health, Ministry of Health Malaysia, 40170 Shah Alam, Selangor Darul Ehsan, Malaysia
[2] Bioinformatics Programme, Faculty of Science, Institute of Biological Sciences, University of Malaya, Kuala Lumpur, Malaysia
[3] Centre of Research for Computational Sciences and Informatics for Biology, Bioindustry, Environment, Agriculture and Healthcare, University of Malaya, Kuala Lumpur, Malaysia
Correspondence: Janice Sue Wen Chan, janice.cs@moh.gov.my

Introduction: In light of the COVID-19 pandemic, the plant *Andrographis paniculata* and its phytoconstituent andrographolide are identified as potential antiviral agents against SARS-CoV-2. Thus, we aim to evaluate scientific evidence of SARS-CoV-2 antiviral activity of *A. paniculata*, andrographolide, and its analogues. **Methodology:** A total of five electronic databases (MEDLINE, Web of Science, LILAC, Google Scholar, and Cochrane Central) and several healthcare agency websites were utilised to search for studies published from January 2020 to January 2021. Those conforming to the inclusion criteria were selected for data extraction. **Results:** Twelve studies (10 *in silico*, one *in vitro* and one combined *in silico* and *in vitro* studies) were included. 11 studies were on molecular modelling of 14 phytochemical compounds binding to the virus's spike protein-ACE-2-receptor complex, RdRp enzyme, $3CL^{pro}$, PL^{pro} and nucleocapsid protein which prevent viral attachment, replication and other host-pathogen interactions. Two *in vitro* studies; one reported $3CL^{pro}$ inhibitory activity of andrographolide lesser than that of disulfiram; another Vero cell-based study reported potential SARS-CoV-2 inhibitory activity of andrographolide (IC_{50} = 2.31 µg/mL) and *A. paniculata* extract (IC_{50} = 68.06 µg/mL). **Discussion:** The predicted ability of andrographolide and its analogues intervening at multiple pathways of the SARS-CoV-2 pathogenesis may be advantageous. **Conclusion**: Andrographolide and its analogues should be further evaluated *in vivo* to substantiate their potential SARS-CoV-2 antiviral effects.

Keywords: COVID-19, Andrographolide, *Andrographis paniculate,* Antiviral, SARS-CoV-2

Amelioration of Cognitive Impairment and Neurodegeneration by Curcumin and Piperine in Rat Model of Streptozotocin-induced Experimental Dementia of Alzheimer Disease-like Condition

Shantini Vijayabalan[1], Zhi Xin Phuna[2], Mohd. Farooq Shaikh[3], Saatheeyavaane Bhuvanendran[4], Aditya Arya[2], Priya Madhavan[2]

[1]School of Pharmacy, Faculty of Health and Medical Sciences, Taylor's University, Subang Jaya, Kuala Lumpur, 47500, Malaysia.
[2]School of Medicine, Faculty of Health and Medical Sciences, Taylor's University, Subang Jaya, Kuala Lumpur, 47500, Malaysia.
[3]Neuropharmacology Research Laboratory, Jeffrey Cheah School of Medicine and Health Sciences, Monash University, 47500, Bandar Sunway, Malaysia
[4]Brain Research Institute (BRIMS), Jeffrey Cheah School of Medicine and Health Sciences, Monash University, 47500, Bandar Sunway, Malaysia
Correspondence: Shantini Vijayabalan, v.shantini92@gmail.com

Introduction: Alzheimer disease (AD) is a broadly recognised neurodegenerative disorder, characterised by progressive neuronal loss with amyloid β-peptide (Aβ) plaques and intraneuronal neurofibrillary tangles that build up between nerve cells. Though there are several medications or drugs currently used in treating AD, their beneficial impacts on AD progress remains debatable due to their adverse effects. **Objectives**: In this study, a combined nutraceutical effect of curcumin and piperine was assessed using the intracerebroventricular streptozotocin (ICV-STZ) -induced AD disease-like condition in rats. **Methodology**: AD-like condition was bilaterally injected streptozotocin, i.e. STZ (3 mg/kg, ICV). STZ induced AD rats were treated with curcumin (400 mg/kg/day, p.o.) and piperine (100 mg/kg/day, p.o.) individually for 21 days. They were similarly tested in combination, i.e. low dose and high dose. Therapeutic effects on learning and memory levels were assessed by passive avoidance and Morris water maze tests. Then sacrifice for biochemical and histopathological assays. **Results:** The tested plant compounds significantly attenuated the rat's memory and learning impairment induced by streptozotocin in Morris water maze and passive avoidance tests. Histopathological studies of hippocampus and cortex by Hematoxylin-eosin (HE) and Congo red stains showed inhibition of neuronal damage and Aβ plaque formation, respectively, with tested plant compounds compared to the control group, STZ (3 mg/kg, ICV). Ameliorate biochemical anomalies in treated groups. **Conclusion:** The present study suggests that taken together, these natural plant compounds exhibited an improved effect on memory and inhibited Aβ plaques in the brain tissues. Thus, it could potentially serve as a remedial target for ameliorating neurodegenerative disease-related cognitive disorders, especially AD.

Keywords: Curcumin, Piperine, Alzheimer, amyloid β, cognitive function

Design and Development of Small Molecule Cholinesterase Inhibitors for the Treatment of Alzheimer's Disease

Christine Law[1], Yeong Keng Yoon[1,2]

[1]*School of Science, Monash University Malaysia.*
[2]*Tropical Medicine and Biology multidisciplinary platform, Monash University Malaysia.*
Correspondence: Dr. Yeong Keng Yoon, yeong.kengyoon@monash.edu

Introduction: Alzheimer's disease (AD) is a neurodegenerative disorder, characterized by a progressive decline in cognitive and non-cognitive functions. To date, cholinesterase inhibitors (ChEIs) are one of the two treatments prescribed to alleviate the symptoms of AD. They ameliorate cholinergic deficit by blocking acetylcholinesterase (AChE) from hydrolyzing acetylcholine, a neurotransmitter essential for synaptic neurotransmission. AChE has been the main focus in the development of ChEIs as it contributes to about 95% of the overall cholinesterase activity in the brain. However, studies in recent years have reported the crucial role of butyrylcholinesterase (BChE) in AD brain as the disease progresses. **Objective:** This study aims to develop blood-brain barrier (BBB) permeable and non-cytotoxic BChE inhibitors based on the lead compound identified in a previous study. **Methodology:** A series of novel benzimidazoles (BZD001-7) were successfully synthesized *via* multi-step organic synthesis. Subsequently, they were tested for their anti-cholinesterase activity using Ellman's assay. Interactions of hit compound in the active site of cholinesterases were rationalised through *in silico* docking studies. Passive BBB permeability and cytotoxic effects of hit compound were then evaluated by performing PAMPA and MTT assay, respectively. **Results:** BZD001-7 were found to be highly potent and selective against equine BChE (IC_{50} = 1.067-7.864 μM). When tested against the human isoform of BChE, BZD003 exerted mixed inhibition, with an IC_{50} of 5.9 μM. *In silico* docking studies demonstrated that BZD003 was able to fit into the active gorge of BChE to form hydrogen bonds with several key amino acid residues. Lastly, BZD003 was predicted to have high BBB permeability with no significant neuro- and hepato-toxic effects. **Conclusion**: BZD003 warrants further studies as a potential AD therapeutic agent.

Keywords: Alzheimer's disease, Benzimidazole, Butyrylcholinesterase inhibitor.

In Silico Prediction of Diosmin and Orientin as Potential H1N1 Influenza Virus Inhibitors

Umarqayum Abu Bakar[1], Pouya Hassandarvish[2] , Saiful A. Karsani[1] & Jasmine E. Khairat[1]

[1] Institute of Biological Sciences (ISB), Faculty of Science, Universiti Malaya, Kuala Lumpur, Malaysia.
[2] Tropical Infectious Diseases Research and Education Centre (TIDREC), Universiti Malaya, Kuala Lumpur, Malaysia.
Correspondence: Umarqayum Abu Bakar, umarqayum@um.edu.my

Introduction: Every year there will be 3 to 5 million serious seasonal influenza cases globally, leading to an estimate of 290 000 to 650 000 deaths per year. At present, increasing cases and rapid mutation of virus resulted in resistance against antivirals and vaccines and shortages of stock. There has been extensive interest in developing safe, effective and selective antiviral drugs against the influenza A virus (N1H1). Natural products with numerous known therapeutic benefits are abundant in Malaysia. **Objectives:** This project was conducted to explore the potential antiviral activity of diosmin and orientin using molecular docking. **Methodology:** The compounds were docked against structural proteins of H1N1 influenza virus using Autodock Vina. To visualize the interactions between each protein and ligands, the Discovery Studio Visualization tool was used. **Results:** The compounds form a drug-receptor complex with three targeted proteins and demonstrate strong and stable interactions in the binding pocket. **Conclusion:** It appears that diosmin and orientin could be of interest to be developed further into effective anti-influenza drugs.

Keywords: Influenza virus; H1N1; Antiviral drugs; Molecular docking.

In-silico Identification and Characterization of Indene Analogues Targeting Acetylcholinesterase for Alzheimer's Disease

Shraddha M Gupta*[1,2], Ashok Behera[1], Neetesh Jain[2]

1.DIT University, Faculty of Pharmacy, Dehradun, India-248009
2.Oriental University, Faculty of Pharmacy, Indore, India-453555
Correspondence: Shraddha M Gupta, Shraddha.27981@gmail.com

Introduction: Alzheimer's disease (AD) is a multifactorial neurodegenerative disorder mainly characterized by progressive deterioration of memory and impaired cognitive function. The most promising approach for symptomatic relief of AD is to inhibit acetylcholinesterase (AChE). The diverse amide analogs of sulindac were possessed greatly reduced COX-related inhibition and displayed in vivo antioxidant activity. The sulindac derivatives may be used for the treatment of neuroinflammation in Alzheimer's disease. *Torpedo californica* acetylcholinesterase (TcAChE) has been an attractive target of drug discovery for the search of therapeutics against AD. In the recent past, TcAChE became a target for the investigation of new potential therapeutics. **Methods:** Based on this approach, an in-house library of forty-five Sulindac derivatives were constructed and allowed to be docked against TcAChE (PDB ID: 1EVE), using Pyrex 0.9.2 (Auto Dock Vina). The drug-likeness was predicted through Lipinski's rule of five, Veber's rule and Muegge's rule. Further, the extra precision molecular re-docking was carried out to refine the docking results and the best three complexes were passed for molecular dynamics simulations over 30 ns in order of understanding the TcAChE dynamics and its behaviour in complex with the ligand which corroborate the outcomes of virtual screening. **Results:** The present study showed promising docking scores on Auto-Dock Vina algorithms for (ligand SD-24: -13.1, -12.6; ligand SD-30: -12.6, -12.5and; ligand SD-42: -12.5, -11.8) respectively. The high RMSF fluctuations, RoG of around 0.2 nm and the binding free energy were favourable in each case. The complex formed by the SD24, SD30 and SD42 compounds with AChE formed 2 to 4 satisfactory intermolecular H bonds during the MD simulation. It is predicted that ligands in the active site of AChE can create strong interactions. **Conclusion:** The present showed promising docking scores on Auto-Dock Vina algorithms and MDS. These analogues can be further explored for in vitro AChE inhibitions validation by Ellman's microplate assay.

Keywords: Alzheimer's, Sulindac, Molecular Dynamics simulations, Auto-Dock Vina

Anti-hyperglycemic Activity of *Swietenia macrophylla* Seed Extract in Diabetic GK Rats

Meyyammai Swaminathan[1], Mariam Ahmad[1], Khairul Niza Abdul Razak[1], Syed Azhar Syed Sulaiman[2], Vikneswaran Murugaiyah[1]

[1]School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, 11800, Malaysia.
[2]Advanced Medical and Dental Institute, Universiti Sains Malaysia, Bertam, Penang, 13200, Malaysia.
Correspondence: Assoc. Prof. Mariam Ahmad; mariam@usm.my

Introduction: *Swietenia macrophylla* (family Meliaceae) is one of three species in the genus, *Swietenia* found in neotropics. It is a deciduous tree commonly known as "sky fruit" as the fruit seems to be pointing to the sky. It is also planted widely in Southern Asia and the Pacific region. The plant extracts have been widely used traditionally as antioxidant, antidiabetic, antimicrobial, anti-inflammatory, anti-HIV, antiulcer, antifungal, antimalarial and anti-diarrhoeal agents. **Objectives**: The objective of the study is to determine a suitable dose of *S. macrophylla* seed extract for sub-acute 14 days treatment on diabetic GK rats. Subsequently, the anti-hyperglycemic activity of *S. macrophylla* seed extracts on diabetic rats will be investigated. **Methodology:** Two doses of *S. macrophylla* seed ethanol extract (SMEE) treatments, 250mg/kg and 500mg/kg were given orally(once), to investigate the anti-hyperglycemic effects on fasting blood glucose levels (FBGL). Positive control rats were treated with Glibenclamide (10mg/kg) while negative control rats were treated with 4% Tween 80. **Results:** The results showed that FBGL of 500 mg/kg treated group were reduced consistently until the 5th hour and were sustained up to the 7th hour, wherein the 250 mg/kg group had an increased FBGL at 7th hour, which might be an indication of the diminishing effect of the treatment. Thus, the pattern shows 500mg/kg dose of SMEE would be a better option over 250mg/kg as an anti-hyperglycemic agent as it maintained lower blood glucose levels in diabetic rats up to 7 hours. The reduction of FBGL for 500 mg/kg group was similar to the glibenclamide treated rats. **Conclusion:** The findings of the present study indicated the potential anti-hyperglycemic effect of *S. macrophylla* seed ethanol extract (SMEE), especially at a dose of 500mg/kg.

Keywords: *Swietenia macrophylla*, Seed extract**,** Anti-hyperglycemic activity, Diabetes mellitus

LIST OF PRESENTERS

DRUG DELIVERY & NANOTECHNOLOGY

Oral Presenters		
Date: 17 June 2021 (Thursday)		
No.	**Presenters**	**Time**
OP-DD-02	**Dr. Gerard Lee Lo See** Enhanced Nose-to-brain Delivery of Tranilast Using Liquid Crystal Formulations	2:00 PM
OP-DD-03	**Dr. Dewi Isadiartuti** Formation of The p-methoxycinamic acid-β-cyclodextrin Inclusion Complex Using Solvent Drop Grinding Method	2:15 PM
OP-DD-04	**Dr. Usha Sundralingam** Improving Oral Bioavailability of Medicinal Herbal Compounds Through Lipid-based Formulations – A Scoping Review	2:30 PM
OP-NT-01	**Wong Zheng Wei** An Optical Nanobiosensor for the Sensitive Detection of miRNA in Breast Cancer	2:45 PM
OP-NT-02	**Chu Chee Chin** Antiaging Potential of Sunscreen Formulated From Nanostructured Lipid Carrier and Palm Oil Tocotrienol-rich Fraction	3:00 PM
OP-NT-03	**Soumyadeep Basak** Fabrication of Nanofiber-based Hanging Permeable Inserts and Biological Applications Thereof	3:15 PM
OP-NT-04	**Stella Tan Li Kar** Formulation and Characterisation of Nanostructured Lipid Carriers Co-Encapsulated Zerumbone and Superparamagnetic Iron Oxide	3:30 PM

Enhanced Nose-to-brain Delivery of Tranilast Using Liquid Crystal Formulations

Gerard Lee Lo See[1], Florencio Arce Jr.[1], Sabrina Dahlizar[2], Akie Okada[3], Muhammad Fikri Bin Mohd Fadli[4], Ichiro Hijikuro[5], Shoko Itakura[3], Masanori Katakura[3], Hiroaki Todo[3], Kenji Sugibayashi[3]

[1]Department of Pharmacy, University of San Carlos, Cebu City, the Philippines.
[2]Department of Pharmacy, Faculty of Health Science, Syarif Hidayatullah State Islamic University, Indonesia.
[3]Graduate School of Pharmacy and Pharmaceutical Sciences, Josai University, Saitama, Japan.
[4]School of Pharmacy, Management and Science, University, Selangor, Malaysia
[5]Farnex Inc., Tokyo Institute of Technology, Yokohama Venture Plaza, Yokohama, Japan
***Correspondence:** Professor Kenji Sugibayashi, sugib@josai.ac.jp*

Introduction: Introduction: Intranasal administration is poised as a competent method in delivering drugs to the brain, because the nasal route has a direct link with the central nervous system bypassing the formidable blood-brain barrier. C17-monoglycerol ester (MGE) and glyceryl monooleate (GMO) as liquid crystal (LC)-forming lipids possess desirable formulation characteristics as drug carriers for intranasally administered drugs. Objective: This study investigated the effect of LC formulations on the pharmacokinetics of tranilast (TL), a lipophilic model drug, and its distribution in the therapeutic target regions of the brain in rats. **Methods:** The anatomical biodistribution of LC formulations was monitored using micro-computed tomography tandem in vivo imaging systems. **Results:** MGE and GMO effectively formed LC with suitable particle size, zeta potential, and viscosity supporting the delivery of TL to the brain. MGE and GMO LC formulations enhanced brain uptake by 10- to 12-fold and 2- to 2.4- fold, respectively, compared with TL solution. The olfactory bulb had the highest TL concentration and fluorescent signals among all the brain regions, indicating a direct nose-to-brain delivery pathway of LC formulations. **Conclusion:** LC-forming lipids, MGE and GMO, are potential biomaterials in formulations intended for intranasal administration.

Keywords: Intranasal drug delivery, Liquid crystals, *In vivo* imaging, Tranilast

Formation of The p-methoxycinamic acid-β-cyclodextrin Inclusion Complex Using Solvent Drop Grinding Method

Dewi Isadiartuti, Juni Ekowati, Abhimata Paramanandana

Department of Pharmaceutical Science of faculty Pharmacy Universitas Airlangga Surabaya, Indonesia.
Correspondence: Dewi Isadiartuti, email address: dewi-i@ff.unair.ac.id

Introduction: Low water solubility is a challenge in the development of pharmaceutical preparations. p-methoxycinnamic acid is a compound that can be isolated from the rhizome of the kencur plant (*Kaempferia galanga* Linn), which is a bioactive compound that has low water solubility. The formation of inclusion complexes using β-cyclodextrin host compounds is an alternative in overcoming it. One method that can be used is solvent drop grinding. The duration of grinding in the solvent drop grinding method will affect the results obtained. **Objectives:** The research aimed to determine the physical characteristics and dissolution of inclusion complex made using the solvent drop grinding method with different grinding times. **Methodology:** p-methoxycinnamic acid and β-cyclodextrin with a molar ratio of 1: 1 added with ethanol solvent were ground using a high energy milling device with a variation of the grinding time of 0.5 to 3 hours. The results obtained were characterized by particle size, DTA, XRD and dissolution. The dissolution was carried out in 500 mL of distilled water at 37 ± 0.5 °C using a 75 rpm paddle stirrer dissolution apparatus. The dissolved p-methoxycinamic acid level determined by a UV spectrophotometer at its maximum wavelength. **Results** and **Conclusion:** The results showed that there were changes in physical characteristics and dissolution of changes in grinding time. The formation of the inclusion complex p-methoxycinnamic acid-β-cyclodextrin made by the solvent drop grinding method with the milling time duration of 2 hours provides the greatest dissolution compared to the other milling time durations.

Keywords: Inclusion complex, β-cyclodextrin, Solvent drop grinding, Characterization, Dissolution

Improving Oral Bioavailability of Medicinal Herbal Compounds Through Lipid-based Formulations – A Scoping Review

Oi Jin Tan [a, †], Hooi Leong Loo [a, †], Gayathiri Thiagarajah [b], Uma Devi Palanisamy [b], Usha Sundralingam [a *]

[a] School of Pharmacy, Monash University Malaysia, Bandar Sunway, Subang Jaya, Malaysia;
[b] Jeffrey Cheah School of Medicine and Health Sciences, Monash University Malaysia, Bandar Sunway, Subang Jaya, Malaysia
* Corresponding author: Dr. Usha Sundralingam, (Email: usha.sundralingam@monash.edu).

Background: Although numerous medicinal herbal compounds demonstrate promising therapeutic potential, their clinical application is often limited by their poor oral bioavailability. Hence, various lipid-based formulations have been developed and trialed to circumvent this barrier. ***Purpose:*** This scoping review aims to comprehensively describe the effect of lipid-based formulations on herbal compounds' oral bioavailability. ***Methods:*** A systematic search was conducted across three electronic databases (Medline, Embase and Cochrane Library) between January 2010 and January 2021 to identify relevant studies. The articles were rigorously screened for eligibility. Data from eligible studies were then extracted and collated for synthesis and descriptive analysis using Covidence. ***Results:*** A total of 109 studies were included in the present review: 105 animal studies and four clinical trials. Among the formulations investigated, 50% were emulsions, 34% lipid particulate systems, 12% vesicular systems, and 4% were other types of lipid-based formulations. Within the emulsion system classification, self-emulsifying drug delivery systems were observed to produce the best improvements in oral bioavailability, followed by mixed micellar formulations. The introduction of composite lipid-based formulations and the use of uncommon surfactants such as sodium oleate in emulsion preparation was shown to consistently enhance the bioavailability of herbal compounds with poor oral absorption. Interestingly, the lipid-based formulations of magnesium lithospermate B and *Pulsatilla chinensis* produced an absolute bioavailability greater than 100%. With respect to chemical conjugation, D-α-tocopheryl polyethylene glycol 1000 succinate (TPGS) was the most frequently used and significantly improved the bioavailability of it is phytoconstituents. ***Conclusion:*** Our findings suggest that there is no distinct lipid-based formulation more superior than the other. Bioavailability improvements were largely dependent on the nature of the phytoconstituents. This scoping review, however, provides a comprehensive summary of the most up-to-date evidence of lipid-based formulations of herbal compounds and their relative bioavailability. We conclude that a systematic review and meta-analysis between bioavailability improvements of individual phytoconstituents (such as kaempferol, morin and myricetin) in various lipid-based formulations will provide a more rigorous association. Such a review will be highly beneficial for both researchers and herbal manufacturers.

Keywords: Scoping review, Lipid-based formulation, Oral bioavailability, Herbal compounds, Phytoconstituents.

An Optical Nanobiosensor for the Sensitive Detection of miRNA in Breast Cancer

Zheng Wei Wong[1], and Siu Yee New[1]

[1]*School of Pharmacy, Faculty of Science and Engineering, University of Nottingham Malaysia, Semenyih, 43500 Malaysia*
Correspondence: Dr. New Siu Yee; SiuYee.New@nottingham.edu.my

Introduction: Breast cancer accounts for 30% of all female cancers and 15% of all cancer-related mortalities. Early detection is known to improve the prognosis and overall survival-rate of breast cancer. Hence, extensive research has been focused on microRNAs (miRNAs) as diagnostic and prognostic biomarkers, for their regulatory role in post-transcriptional gene expression. In breast cancer patients, the expression of miRNA-155 is commonly upregulated as compared to healthy individuals.
Objective: To develop a nanobiosensor to detect miRNA-155, comprising hybridization chain reaction (HCR) and DNA-stabilized silver nanoclusters (AgNCs), that serve as an enzyme-free amplification strategy and label-free fluorescent detection probes, respectively.
Methodology: Under constant mild conditions, DNA hairpin probes were mixed with miRNA-155 to initiate HCR. Reduced silver salt was subsequently added to form fluorescent AgNCs. The performance of HCR was validated through gel electrophoresis. The fluorescence emission from AgNCs was analysed qualitatively and quantitatively with UV-transilluminator and spectrofluorometer, respectively.
Results: The HCR-AgNCs nanobiosensor exhibited dual-emissive fluorescence species, and a ratiometric analysis led to a highly accurate and sensitive nanobiosensor, without any system leakage and false-positive occurrence. The detection of miR-155 could be completed in just 2 hours under constant 32 ^{o}C HCR incubation, and showed high-selectivity towards miRNA-155, with capabilities of discriminating single-base mismatch. Furthermore, the HCR-AgNCs nanobiosensor displayed high sensitivity with a wide linear range between 100 fM and 10 nM, and a LOD of 7 fM. In real sample analysis, the nanobiosensor exhibited exceptional reproducibility and stability when tested with diluted human serum samples.
Conclusion: In lieu of current breast cancer and miRNA detectors, the HCR-AgNCs nanobiosensor displayed relatively better performance at a miniscule fraction of cost, effort and time required. Furthermore, the direct and highly-responsive HCR-AgNCs nanobiosensor potentially offers a non-invasive and safe approach towards the clinical detection miRNA-155 and point-of-care early diagnosis of breast cancer.

Keywords: Biosensor, Breast cancer, Hybridization chain reaction, MicroRNA, Silver nanoclusters

Antiaging Potential of Sunscreen Formulated from Nanostructured Lipid Carrier and Palm Oil Tocotrienol-rich Fraction

Chee Chin Chu[1], Zafarizal Aldrin Bin Azizul Hasan[2], Chin Ping Tan[3], Kar Lin Nyam[1]

[1]Department of Food Science with Nutrition, Faculty of Applied Sciences, UCSI University, Kuala Lumpur, 56000, Malaysia
[2]Consumer Product Development Unit, Advanced Oleochemical Technology Division, Malaysian Palm Oil Board, Bandar Baru Bangi, Kajang, Selangor 43000, Malaysia
[3]Department of Food Technology, Faculty of Food Science and Technology, University Putra Malaysia, Serdang, Selangor 43400, Malaysia.
Correspondence: Kar Lin Nyam, nyamkl@ucsiuniversity.edu.my

Introduction: The consequences of chronic exposure to ultraviolet (UV) radiation are related to photoaging and photo-carcinogenesis due to increased oxidative stress. Sunscreen becomes necessary to combat the side effects of UV radiation. Thus, there is a tremendous rise in the cosmetic market with products having a dual activity of photoprotection and antiaging. **Objectives**: The aim of the study was to investigate the antiaging potential of sunscreen formulated from nanostructured lipid carrier and palm oil tocotrienol-rich fraction (NLC-TRF sunscreen). **Methodology:** The antioxidant activity of the sample was evaluated by 2,2-diphenyl-1-picrylhydrazyl (DPPH) and 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid) assays. Besides, collagenase, elastase and matrix metalloproteinase-1 (MMP-1) inhibition activities, hydrogen peroxide inhibition effect and protein expression for type I collagen were studied. Also, the mRNA expression of fibroblast growth factor (FGF), vascular-endothelial growth factor (VEGF), transforming growth factor-β1 (TGF-β1), type I collagen (COL1A1), elastin (ELN), MMP-1, MMP-2, and tissue inhibitor matrix metalloproteinase-1 (TIMP-1) involved in fibroblast growth, differentiation and migration were evaluated by real-time polymerase chain reaction (qPCR). **Results:** The results suggested that there is a potential of NLC-TRF sunscreen in effective DPPH (1.78 ± 0.06 mg TE/g sample) and ABTS (7.70 ± 0.06 mg TE/g sample) radical scavenging activities. Furthermore, it also demonstrated anti-hydrogen peroxide activity, effective enzymatic activity against collagenase, elastase and MMP-1 that showed potential in preventing extracellular matrix (ECM) component degradation. Also, a significant increase in protein expression for type I collagen (3.47-fold) and fibroblast regeneration genes (FGF (2.12-fold), VEGF (1.91-fold), TGF-β1 (2.84-fold), TIMP-1 (1.42-fold), ELN (2.13-fold)) were observed after 24 hours of sample treatment. **Conclusion:** These findings support the therapeutic potential of NLC-TRF sunscreen in skin cell regeneration and prevent photoaging.

Keywords: Nanostructured lipid carrier (NLC), Tocotrienol-rich fraction (TRF), Antiaging, Sunscreen, Gene expression.

Fabrication of Nanofiber-based Hanging Permeable Inserts and Biological Applications Thereof.

Soumyadeep Basak[1†], Vinay Kumar[1†], Gopinath Packirisamy *[1, 2]

[1] *Department of Biotechnology, Indian Institute of Technology Roorkee, Roorkee -247667, Uttarakhand, India.*
[2] *Nanobiotechnology Laboratory, Centre for Nanotechnology, Indian Institute of Technology Roorkee, Roorkee -247667, Uttarakhand, India.*
(†- These authors equally contributed)
**Correspondence: Dr. P. Gopinath, Professor.*
E.mail: gopi@bt.iitr.ac.in; genegopi@gmail.com

Introduction: Hanging cell culture inserts, also called modified Boyden chambers, provide a free-standing, multi-chamber cell culture platform for various co-culture studies such as migration of cells, drug transport, metabolism, etc. However, the commercially available cell culture inserts are costly and provide limited flexibility regarding polymer material and pore sizes. Moreover, the commercial inserts are two-dimensional multi-porous membrane-based devices that cannot offer optimum in-vitro cellular behavior without the expensive biological coatings. **Objectives:** Herein, we report the fabrication of porous, multifunctional, nanofiber-based hanging cell culture inserts using vertical electrospinning. Moreover, we have also studied the effect of autoclaving on the morphology and biological behavior of silk fibroin nanofibrous scaffolds. **Methods:** We have observed that the 2-200 µL micropipette tip's 1 cm base portion fit perfectly into the 96-well tissue culture plates, making it suitable to be used as a hanging cell culture insert. Thus, the base portions of 2-200 µL micropipette tips were used as a grounded collector to fabricate the nanofiber mat upon it directly. As opposed to the plastic-based non-biological polymers (PET, PTFE, etc.) used in commercial inserts fabrication, we have used a protean biopolymer, silk fibroin. 12 and 15 % Silk fibroin and 4% polyvinyl alcohol (PVA) blend was used for the nanofiber fabrication. The nanofiber mats' characterization was performed using Fe-SEM, TEM, FTIR, XRD, AFM, and Contact angle analysis. **Results:** Due to the inherent thermostability and exceptional mechanical properties of silk fibroin, we could autoclave the fabricated inserts before cell culture and observed better MCF-7 breast cancer cell viability and cell adhesion properties of the scaffolds. **Conclusion:** Therefore, the study reports the fabrication of biomaterial-based, nanofibrous cell culture inserts, which are low-cost, autoclavable, tunable porosity, easy to prepare, and readily available alternative for various cell culture experiments.

Keywords: Hanging permeable inserts, Nanofibers, Biopolymer

Formulation and Characterisation of Nanostructured Lipid Carriers Co-Encapsulated Zerumbone and Superparamagnetic Iron Oxide

Li Kar Stella Tan[a], Jhi Biau Foo[a], Yong Sze Ong[b] and Chee Wun How[b]

[a] *School of Pharmacy, Taylor's University, Subang Jaya, Selangor, Malaysia*
[b] *School of Pharmacy, Monash University, 47500 Bandar Sunway, Selangor, Malaysia*
Correspondence: Dr. Foo Jhi Biau, jhibiau.foo@taylors.edu.my

Background and Objective: Zerumbone (ZER) was implicated as promising chemopreventive agent against various cancers. Poor solubility and bioavailability of ZER has been overcome by incorporating it into nanostructured lipid carriers (NLC) but clinical trials with this compound have been rarely reported due to lack of selectivity. Hence, utilisation of superparamagnetic iron oxide nanoparticle (SPION) in ZER-NLC can be a potential approach to achieve site specific targeting for a better efficacy. Objective of this study is to develop and optimise enhanced drug delivery system for ZER. **Methods:** ZER-SPION-NLC was formulated using ultrasonication and optimised by response surface methodology (RSM). ZER was extracted by hydrodistillation and investigated by NMR and HPLC while SPION was synthesised by co-precipitation and analysed for magnetic property. Optimised ZER-SPION-NLC was characterised on particle size, polydispersity index (PDI), zeta potential, loading capacity (LC) and encapsulation efficiency (EE). DSC was performed to characterise state of ZER and lipid modification. **Results:** Extracted ZER showed 97% purity while SPION showed 55.18 emu/g magnetivity. ZER-SPION-NLC has average diameter of 123.76 ± 0.78 nm, PDI of 0.21 ± 0.01, zeta-potential of -9.55 ± 0.50mV, ZER LC of 20 ± 0.0002% and ZER EE of 100 ± 0.0003%. DSC study revealed that ZER was in amorphous state in NLC. **Conclusion:** ZER and SPION can be co-encapsulated into NLC and could serve as a potential strategy to achieve specific targeting in cancer treatment via co-magnetic targeting.

Keywords: Zerumbone, Superparamagnetic iron oxide nanoparticle, Nanostructured lipid carrier

Poster Presenters		
Date: 17 June 2021 (Thursday)		
No.	**Presenters**	**Time**
PP-DD-01	**Dr. Retno Sari** Formulation and Evaluation of Chitosan-Aloe vera Film as Wound Dressing: The Effect of Chitosan Type and Concentration	10:30 AM
PP-DD-02	**Dr. Dewi Melani Hariyadi** Solid Lipid Microparticles of Quercetin: Preparation and Characterization	10:40 AM
PP-DD-03	**Dr. Noorma Rosita** Effect of Poloxamer 188 on Characteristics of Chitosan-Epigallocatechin Gallate (EGCG) Microspheres	10:50 AM
PP-DD-04	**Kumara B.N.** Stimuli Responsive ON-OFF-ON Photoluminescent Graphene Quantum Dots For Biotracking and Delivery of Drug	11:00 AM
PP-DD-05	**Dias Permeisari** Future Insight of Pharmacological Therapy for AKI Event Post-Cardiopulmonary Bypass Surgery	11:10 AM
PP-NT-01	**Dr. Andang Miatmoko** Chitosan Layer Affects Cellular Uptake and Distribution of Niosomes Containing Ursolic Acid	11:20 AM
PP-NT-02	**Dr. Maria Lucia A.D Lestari** Solidification of Hesperetin Nanosuspension via Wet Granulation Method	3:45 PM

Formulation and Evaluation of Chitosan- *Aloe vera* Film as Wound Dressing: The Effect of Chitosan Type and Concentration

Retno Sari[1], Arianti Zaenina Cahyani[2], Esti Hendradi[3]

[1,2,3]*Faculty of Pharmacy, Universitas Airlangga*
Correspondence: Retno Sari, retno-s@ff.unair.ac.id

Introduction: Chitosan is a polysaccharide consisting of glucosamine and N-acetylglucosamine which can be used as wound healing and film-forming polymer. Aloe vera has a main component, glucomannan which has activity such as anti-inflammatory, antibacterial agent and can be used to improve the effect of chitosan as wound healing. Film wound dressing has benefited such as improved patient compliance, transparent, flexible, and simple application. **Objectives:** The objective study was to determine the effect of chitosan type and concentration on the physical characteristic of chitosan-Aloe vera film as a wound dressing. **Methodology:** The films were made using two types of chitosan 50 cps and 100 cps with various concentrations (1,0 – 2,0%). The solvent casting method was applied to prepare the film and propylene glycol was added as a plasticizer. The evaluation was performed include organoleptic, thickness, pH, moisture content, and swelling index. The statistical analysis was done using ANOVA factorial design ($\alpha = 0.05$). **Results:** The results showed that the addition of different types of chitosan significantly increased the thickness of the films within the range of 257 mm to 327 mm with a significance value p 0,014<0,05 and decreased the moisture content from 18,37% to 12,70% with a significance value p 0,000<0,05. The chitosan concentration affected the pH of the film (p 0,000<0,05), decreased the moisture content with significance value (p 0,001<0,05). The swelling index increased as the chitosan concentration raised from 1,0 % to 2,0 % with significance value (p 0,000<0,05). The result of ANOVA analysis with factorial design proved that there was an interaction between the type and concentration of chitosan which affected the moisture content (p 0,002<0,05) as well as the swelling index (p 0,001<0,05). **Conclusion:** The addition of chitosan with different types affected film thickness and moisture content. The addition of chitosan concentration affected film pH, moisture content, and swelling index. The interaction between chitosan type and concentration affected moisture content and swelling index of chitosan -aloe vera film.

Keywords: Chitosan, *Aloe vera*, Film, Formulation, Wound dressing

Solid Lipid Microparticles of Quercetin: Preparation and Characterization

Dewi Melani Hariyadi[1*], Noorma Rosita[1], Mahardian Rahmadi[2]

[1]*Department of Pharmaceutical Sciences, Faculty of Pharmacy, Universitas Airlangga, Surabaya-Indonesia*

[2]*Department of Pharmacy Practice, Faculty of Pharmacy, Universitas Airlangga, Surabaya-Indonesia*

**Corresponding author: Dewi Melani Hariyadi, email: dewi-m-h@ff.unair.ac.id*

Introduction. High number of cases of pulmonary diseases to the lungs in Indonesia has received attention in the health systems in the world. Pulmonary diseases by inhalation route over oral provide advantages such as high surface area with rapid absorption due to high vascularization, avoid first pass effects, therapeutic effects can be achieved at much lower doses, as well as targeted drug can be administered and reduce side effects. Solid Lipid Microparticles (SLM) is a pulmonary delivery system that is compatible, physicochemical stable and allows large-scale production at relatively low costs. **Objectives.** This research studies the potential development of Quercetin SLM that can deliver Quercetin effectively. The aim is to study effect of concentration of poloxamer in the SLM on the characteristics of SLM the delivery system. **Methodology.** Quercetin SLM was prepared using emulsification technique to avoid the use of organic solvents. SLM formed was freeze dried at -50 C. Quercetin SLM formulas used poloxamer polymer with different concentrations of 0.2%; 0.3% and 0.4% and are called F1, F2 and F3. Quercetin SLM evaluation included determination of yield, moisture content (MC), particle size distribution, morphology using Scanning Electron Microscopy (SEM), entrapment efficiency (EE) and drug loading. **Results.** Results obtained for the three formulas were 41.21%, 47.77% and 46.26% respectively, the MC and morphology of all formulas showed less than 2% and particles were spherical with size of 1-5 µm. For drug loading, it was obtained 4.99%, 10.57%, and 11.25% and entrapment efficiency was 25.52%, 63.63% and 66.59% for F1, F2 and F3, respectively. **Conclusion.** The increase in polymer concentration increased drug loading, yield and entrapment efficiency which meet the criteria of the pulmonary and airway delivery system based on size and morphology. It can be concluded that the physical characteristics of the SLM Quercetin are suitable for pulmonary delivery and potential for aerosols characteristics for the lungs.

Keywords: SLM, Quercetin, Characteristics

Effect of Poloxamer 188 on Characteristics of Chitosan-*Epigallocatechin Gallate* (EGCG) Microspheres

Yuyun Nailufah[1,2], Dewi Melani Haryadi[1], *Noorma Rosita*[1]*

[1] Pharmaceutical Sciences Department, Faculty of Pharmacy Universitas Airlangga, Surabaya, East Java, Indonesia.
[2]Pharmacy study program, Faculty of medicine, University of Hang Tuah, Surabaya, East Java, Indonesia.
*Correspondence: Noorma Rosita, noorma-r@ff.unair.ac.id

Introduction: E*pigallocatechin gallate* (EGCG), which is found in *Camellia sinensis* leaves, is known to have very high antioxidant activity. Antioxidants can neutralize free radicals and repair oxidative damage to biological molecules. The weakness is that it is unstable, therefore its application is pursued in the form of microspheres. The effect of components have been known to affect the characteristics of microspheres, such as yield, entrapment efficiency, drug loading, particle size and distribution. One of component of microspheres is stabilizer such as poloxamer 188. The characteristics of microspheres affect the effectiveness and stability. **Objectives:** To determine the effect of poloxamer 188 on characteristics of the EGCG-Chitosan microspheres (yield, entrapment efficiency, drug loading, particle size and distribution). **Methodology:** EGCG-Chitosan microspheres with 3% EGCG, 1% chitosan, poloxamer 188 (0; 2,5; 5%) and tripolyphosphate (TPP) as crosslinkers were made using the ionotropic gelation method. Microspheres that were formed were then freeze dried in -80°C for 30 hours. Results of microspheres were evaluated for morphology using SEM (Scanning Electronic Microscope). Determination of yield, drug loading and encapsulation efficiency (EE) used spectrophotometer UV Vis. Particle size and distribution was observed using an optical microscope.
Results: The usage 2.5% poloxamer 188 produced chitosan-EGCG microspheres with the best characteristics, indicated by the highest EE and drug loading of 47.09% ± 2.76 and 26.17 ± 0.06 respectively, meanwhile the yield was relatively no different than those without Poloxamer 188. **Conclusion:** In the manufacture of 3% EGCG microspheres with 1% chitosan and 0.1% TPP as crosslinker, the usage of 2.5% poloxamer 188 as stabilizers produced the best characteristics.

Keyword: EGCG, Poloxamer, Microspheres, Polymer

Stimuli Responsive On-off-on Photoluminescent Graphene Quantum Dots for Biotracking and Delivery of Drug.

B.N. Kumara[1], Rashmi Shambhu[2], K. Sudhakara Prasad[1,3]*

[1]Nanomaterial research laboratory [NMRL], Nano Division, Yenepoya Research Centre, Yenepoya [Deemed to be University], Deralakatte, Mangalore 575 018, India
[2]Department of Ophthalmology, Yenepoya Medical College, Yenepoya [Deemed to be University], Deralakatte, Mangalore 575 018, India. [3]Centre for Nutrition Studies, Yenepoya [Deemed to be University], Deralakatte, Mangalore 575 018, India.
**Correspondence: K.S. Prasad, E mail: ksprasadnair@yenepoya.edu.in*

Introduction: Photoluminescent graphene quantum dots (PL-GQDs) are quasi-spherical carbogenic nanomaterials extensively used in numerous biomedical applications due to versatile properties such as high aqueous solubility, biocompatibility, and multi-functionalization possibility to carry drug of interest with bio imaging capabilities. In general, cytotoxic semiconductor fluorescent materials are used for drug delivery and bio imaging applications. **Objectives:** To synthesise, functionalise, easy entrapment of the drug of interest and stimuli responsive drug delivery with minimal cytotoxicity through *in-vitro* biological study. **Methodology:** Herein, we have prepared non-cytotoxic PL-GQDs through simple sonication cum reflux method, and further loading of the drug in presence of a biopolymer composites with stimuli responsive characteristics. The as-developed PL-GQD nanocomposites were characterized by various spectral, surface morphological, *in-vitro* biological and drug release studies. **Results:** Interestingly, the recovery of PL of GQDs were noticed under stimuli response through an On-Off-On phenomenon, which not only proved successful deliver of the drug but also provided possibility of tracking the same. The cytotoxicity and live dead staining assays proved that; the prepared nanocomposites were non-cytotoxic in nature. **Conclusion**: PL-GQDs could be used as On-Off-On modality to endow simultaneous delivery and tracking of the drug of interest. Possible to curtail the utilization of cytotoxic materials for drug delivery and tracking.

Keywords: Graphene quantum dot, Photoluminescence, Stimuli response, Drug delivery, Bioimaging and tracing.

Future Insight of Pharmacological Therapy for AKI Event Post-Cardiopulmonary Bypass Surgery (Based on PK/PD Approach)

Dias Permeisari [1], Arina Dery Puspitasari [1,2], Kun Arifi Abbas [3,4]

[1]Department of Pharmacy Practice, Faculty of Pharmacy, Universitas Airlangga, Surabaya, Indonesia
[2]Univesitas Airlangga Hospital, Surabaya, Indonesia
[3] Dr.Soetomo General Hospital, Surabaya, Indonesia
[4] Department of Anesthesiology and Reanimation, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia
Correspondence: Arina Dery Puspitasari, arinadery@ff.unair.ac.id

Introduction: Cardiopulmonary bypass surgery caused several organ damaged by some mechanisms. The several organ functions which commonly impacted by CPB are brain, pulmonary, liver, and kidney (with the highest incidence rate 20-30%). The phenomenon was provoked the anesthesiologist, perfusionist, and clinical pharmacist take some pharmacological interventions to prevent the incident of AKI. **Objectives:** The aim of our review was to analyze some researches have been conducted and determine the most reliable treatment for AKI-CPB by PK/PD approach. **Methods:** This review was obtained by searching for RCT study, systematic review, and meta-analysis of AKI treatment. **Results:** There are some effective agents (fenoldopam, furosemide, mannitol, and nitric oxide) for AKI treatment post cardiopulmonary bypass surgery if those agents reached the target plasma concentration and met the appropriate physiological condition. **Conclusion:** The drugs require method or technological process of administering to control and achieve the target concentration in plasma to effectively prevent the incident of AKI post-CPB.

Keywords: AKI treatment, CPB, Pharmacokinetics, Pharmacodynamics

Chitosan Layer Affects Cellular uptake and Distribution of Niosomes Containing Ursolic Acid

Andang Miatmoko[1,2,*], Shofi Ameliah Safitri[1], Fayruz Aquila[1], Devy Maulidya Cahyani [1], Berlian Sarasitha Hariawan[1], Eryk Hendrianto[2], Esti Hendradi[1], Retno Sari[1]

[1] Department of Pharmaceutical Sciences, Faculty of Pharmacy, Universitas Airlangga, Nanizar Zaman Joenoes Building, Campus C Mulyorejo, Surabaya, 60115, Indonesia
[2] Stem Cell Research and Development Center, Universitas Airlangga, Institute of Tropical Disease Center Building 2nd Floor, Campus C Mulyorejo, Surabaya, 60115, Indonesia
Correspondence: Andang Miatmoko, andang-m@ff.unair.ac.id

Introduction: Ursolic Acid exhibits anti-hepatocarcinoma and hepatoprotective activities, thus promising as an effective oral cancer therapy. However, its poor solubility and permeability lead to low oral bioavailability as well as anticancer efficacy. **Objectives:** This study aimed to evaluate the effect of chitosan addition on cellular uptake, cytotoxicity, and oral biodistribution of niosomes containing Ursolic Acid. **Methodology:** Ursolic Acid niosomes were prepard with Span 60-Cholesterol-Ursolic Acid at molar ratio of 3:2:10, respectively, by using thin layer hydration method, and then chitosan solution was added into the niosomes to produce Ursolic Acid Niosomes coated with Chitosan. The in vitro cellular uptake and cytotoxicity assay were then studied on HeLa and Huh7it cells. Furthermore, the in vivo biodistribution was evaluated by oral administration of Coumarin-6-labelled Nio-UA and Nio-UA-CS in mice induced with N-nitrosodiethylamine. **Results:** The results showed that the addition of chitosan layer in Ursolic Acid niosomes resulted in less spheroidal vesicles than that of without chitosan coating. The addition of chitosan layers into Ursolic Acid niosomes produced higher cytotoxicity in HeLa cells than without chitosan, however, there was no improvement observed for Huh7it cells. Moreover, chitosan layers improved the cellular uptake, which clathrin-mediated endocytosis may determine the cellular transport of Ursolic Acid niosomes. In the in vivo study, the addition of chitosan produced higher intensities of Coumarin-6-labelled Ursolic Acid niosomes specifically in liver than those of without Chitosan addition. **Conclusion:** It can be concluded the addition of chitosan improved cellular uptake and cytotoxicity in the HeLa cells as well as oral biodistribution of Ursolic Acid niosomes.

Keywords: Ursolic acid, Cancer, Niosomes; Chitosan, Cellular uptake and biodistribution

Solidification of Hesperetin Nanosuspension via Wet Granulation Method

Maria Lucia A.D Lestari[1], Wahda Djuddah[1]

[1]*Department of Pharmaceutical Science, Faculty of Pharmacy Universitas Airlangga, Surabaya, Indonesia.*
Correspondence: Maria Lucia A.D Lestari, maria-lestari@ff.unair.ac.id

Introduction: Nanosuspension is drug in nanometer size dispersed in a solution of stabilizing agent such as surfactant and aimed to increase dissolution of poorly soluble drugs. Nevertheless, drug nanosuspension has to be converted into solid form to maintain its stability and better acceptance for the patients. Up to this date, freeze drying and spray drying were the methods of choice to solidify nanosuspensions. However, such processes require special instruments and additional stage to produce tablets. Wet granulation is considered as an alternative technique to solidify drug nanosuspensions with simple tools and the dried nanosuspension obtained can be directly compressed into tablets. **Objectives:** This study investigated the utilization of wet granulation method to solidify nanosuspension using hesperetin (HPT) as a drug model. **Methodology:** HPT (13% w/v) was dispersed on 90 mL solution of sodium dodecyl sulphate (SDS) 0.7% w/v and milled using yttrium-stabilized zirconium beads 0.5 mm to obtain nanosuspension size 200 nm. The nanosuspension was added with PVP K-30 and used to granulate mixture of MCC PH101/lactose (1 : 1) and sodium starch glycolate. Suspension of HPT-SDS and granules containing it were also prepared. Dissolution studies were conducted to study the release of HPT up to 180 min using buffer phosphate pH 6.8 as dissolution medium. **Results:** Dissolution study showed 100% release of HPT from nanosuspension within 90 min whilst the HPT suspension was only 71% then 80% after 180 min. This shown the superiority of nanosuspension compared to suspension due to particle size. Granules of HPT nanosuspension showed 95% of HPT was released within 90 min whilst HPT released from granules of HPT suspension was 65%. **Conclusion:** The wet granulation process was able to preserve the HPT in nanometer domain as proven by its high dissolution rate which was still in line with its nanosuspension form.

Keywords: Nanosuspension, Hesperetin, Dissolution, Wet granulation

AKOYA BIOSCIENCES

- Single Cell, Spatial Analysis for Discovery Biology.
- Uncover Cancer Immunotherapy Biomarkers .

Park SYSTEMS

- Atomic Force Microscopy System for Nano-resolution of surface topography and 3D profiling.
- Measurement of surface roughness, adhesion, young modulus, stiffness, conductivity, electric force and more.

cyto smart

- Live Cell Imaging System
- Live Insight in Cell Health & Growth Rates.

logos biosystems

- Automated Fluorescence Cell Counter
- Excellence of Counting Both Brightfield & Fluorescence.

Kakuhunter

- Planetary Mixer that can do mixing and degassing in a wide range of materials from low to high viscosity.
- Uniform dispersion of liquids and solvent made from fine powder.

GenScript Make Research Easy

Service Provided to Make Research Easy:

- Gene Synthesis
- Peptide Synthesis
- Protein Synthesis
- CRISPR Services

Nabertherm MORE THAN HEAT 30-3000 °C

- Furnace technology with the capabilities of heating up to 1800°C for a standard muffle furnace.
- Determination of non-volatile or non-combustible proportion of the sample and ash content determination in materials.

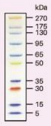
Gaia Science

Gaia Science (M) Sdn Bhd

No 60, Jln Puteri 5/5, Bandar Puteri, 47100 Puchong, Selangor

T: 603-80653889 F: 603-80653989 E: marketing@gaiascience.com.my

GenScript Make Research Easy

Separate	 SurePage Pre-cast Gels	 Protein Standards
Transfer	 eBlot™ L1 Protein Transfer System	 eStain™ L1 Protein Staining System
Wash & Incubate	 eZwest™ Lite Automated Western Device	

One-stop Protein Analysis Solution

18+ Years Experience	**300,000+** Customers Globally
No.1 Gene Synthesis Supplier	**4,000,000+** Projects Delivered
160+ Countries and Regions	**40,300+** Citations by Papers

www.genscript.com

Contact number: +65 3159 1898
Email: ap.marketing@genscript.com
1 Fusionopolis Place, Galaxis, Singapore 138522

MONASH University

MALAYSIA

MONASH INITIATE 2021: A Virtual Conference

The Inaugural Monash International Health Science and Technology Conference

16 June 2021 - 17 June 2021

9am - 5pm

PARTNER IN DRUG DISCOVERY

ACS Chemistry for Life® MALAYSIA CHAPTER

ACS American Chemical Society Monash University Malaysia International Student Chapter

PARTNER IN PHARMACOLOGY CALL FOR PAPERS

SPECIAL TOPIC - PHARMACOLOGY PERSPECTIVES

frontiers

LIST OF PRESENTERS

NEUROSCIENCE

Oral Presenters		
Date: 17 June 2021 (Thursday)		
No.	**Presenters**	**Time**
OP-NS-01	**Dr. Norsyifa binti Harun** Mitragynine Attenuates Naloxone-precipitated Morphine Withdrawal using Schedule-controlled Behaviour in Rats	2:00 PM
OP-NS-02	**Assoc. Prof. Dr. Zurina Hassan** Comparison of Methadone, Buprenorphine and Clonidine Treatments in Mitigating Mitragynine Withdrawal Rats and its Safety Profile	2:15 PM
OP-NS-03	**Ann Mary Bestus** Developing the Therapeutic Potential of Semaphorin 5A in Human Glioblastomas	2:30 PM
OP-NS-04	**Nurdarina Ausi binti Zulkifli** Tualang Honey Protects against Kainic-Acid induced Neurotoxicity via Modulation of EAAT2 Expression	2:45 PM
OP-NS-05	**Hidani Hasim** Tualang Honey and its Silver Nanoparticles Ameliorates Hippocampal Oxidative Injury in Kainic Acid-Induced Rats	3:00 PM

Mitragynine Attenuates Naloxone-precipitated Morphine Withdrawal using Schedule-controlled Behaviour in Rats

Norsyifa Harun[1], Illa Syafiqah Johari[1]

[1]Centre for Drug Research, Universiti Sains Malaysia 11800 Gelugor, Penang, Malaysia
Correspondence: Norsyifa Harun, norsyifaharun@usm.my

Introduction: Opioid abuse and addiction have become a major global concern. Although the commonly prescribed opioid dependence medication such as buprenorphine can reduce opioid withdrawal symptoms however, it is often associated with compliance issues and side-effects. Kratom (*Mitragyna speciosa* Korth) is a plant species that is gaining global attention as an alternative self-treatment for pain as well as management of opioid dependence and withdrawal. **Objective:** The present study aims to investigate the potential therapeutic effect of the main indole alkaloid of *Mitragyna speciosa*, mitragynine in comparison to buprenorphine in alleviation of food-maintained operant responding in morphine dependent rats. **Methodology:** Using schedule-controlled behavioural task, rats were initially trained to respond under fixed-ratio (FR) 10 schedule of reinforcement. One group of rats was administered morphine twice daily for 14 consecutive days while the other group was treated with vehicle. Following chronic treatment with morphine, naloxone (1 mg/kg, i.p.) was administered 2 hours after the morning injection of morphine at day 15. The rats were tested with a randomised series of injections: vehicle, 1, 10 and 30 mg/kg mitragynine and 0.1, 0.3 and 1.0 mg/kg buprenorphine when each substitution dose was administered 30 mins after naloxone injection. **Results:** Mitragynine in higher doses (10 and 30 mg/kg) attenuated the naloxone-precipitated morphine withdrawal effects while smaller doses of buprenorphine (0.3 and 1.0 mg/kg) were required to alleviate these effects. **Discussion and conclusion:** The present finding indicates that mitragynine can alleviate the physiological symptoms associated with morphine withdrawal with a relatively lower potency than that of buprenorphine which represent the desired characteristic of novel pharmacotherapeutic intervention for managing opioid use disorder.

Keywords: Opioid, Mitragynine, Morphine, Withdrawal, Rats

Comparison of Methadone, Buprenorphine and Clonidine Treatments in Mitigating Mitragynine Withdrawal Rats and its Safety Profile

Rahimah Hassan[1], Sasidharan Sreenivasan[2], Christian P. Müller[3], Zurina Hassan[1]*

[1] Centre for Drug Research, Universiti Sains Malaysia, 11800 Minden, Penang, Malaysia.
[2] Institute for Research in Molecular Medicine, Universiti Sains Malaysia, 11800 Minden, Penang, Malaysia.
[3] Section of Addiction Medicine, Department of Psychiatry and Psychotherapy, University Clinic, Friedrich-Alexander-University Erlangen-Nuremberg, Schwabachanlage 6, 91054 Erlangen, Germany
Correspondence: zurina_hassan@usm.my

Background: Kratom or *Mitragyna speciosa* Korth has been widely used to relieve the severity of opioid withdrawal and addiction when limited access to opioid. However, several studies have reported that kratom can cause dependence following chronic consumption. Yet, there is currently no formal treatment for kratom dependence. In this study, methadone, buprenorphine and clonidine were selected to mitigate mitragynine withdrawal model. The toxicity effects of the treatments were also evaluated via haematology, biochemical and histopathology profiles. **Methods:** Methadone (1.0 mg/kg), buprenorphine (0.8 mg/kg) and clonidine (0.1 mg/kg) were intraperitoneally administered over four days as a replacement treatment in mitragynine withdrawal model. The treatments were abruptly stopped on day 5. The effectiveness of the replacement treatments was assessed based on the behavioural scoring. Toxicological profiles of the treatments were also evaluated from the blood and organs. **Results:** All treatments were significantly attenuated the withdrawal signs in mitragynine withdrawn rats with minimal toxicity effects observed via haematological, biochemical and histopathological profiles. **Conclusions:** These data suggest that the available prescribe medications (methadone, buprenorphine and clonidine) capable in alleviating withdrawal signs in mitragynine withdrawn rats.

Keywords: Mitragynine, Withdrawal, Replacement, Methadone, Buprenorphine, Clonidine

Developing the Therapeutic Potential of Semaphorin 5A in Human Glioblastomas

Ann Bestus[1] and Alan Lee[2]

[1, 2] Monash University Malaysia, Selangor, Malaysia. .
Correspondence: Dr. Alan Yiu Wah Lee, alan.lee@monash.edu

Introduction: Glioblastomas are the most malignant form of brain cancers due to their high invasiveness and resistance to chemo- and radiotherapy. Accumulating evidence suggests that semaphorins and plexins play important roles in tumor growth, migration, metastasis, and vascularization. Our previous studies have demonstrated that semaphorin 5A (Sema5A) inhibits glioma cell migration, invasion and proliferation through its receptor plexin-B3. Analysis of human glioblastoma specimens revealed a marked decline in the expression levels of Sema5A protein from low to high grade, suggesting a correlation between its loss of function and tumor progression. **Objectives:** This study aims to explore the potential of developing human Sema5A extracellular domain (hSema5AED) as a therapeutic agent by identifying the minimal region that confers anti-tumorigenic effects. **Methods:** The potency of systematically truncated N- and C-terminal fragments of hSema5AED proteins in counteracting the progression of human glioblastomas was evaluated by various cell-based assays. **Results:** Surprisingly, TSP1 domains at the C-terminus of Sema5AED were found to exhibit the strongest suppression of cancer properties of glioblastoma cells. Supplementation with the Sema and the PSI domains however, failed to provide additive anti-cancer effects. **Conclusion:** Taken together, our results suggest that TSP1 domains are pivotal in mediating the tumor suppressor functions of Sema5A, which are of optimal size for further development into therapeutics against glioblastomas.

Keywords: Glioblastoma, Semaphorin 5A, Systematic truncation.

Tualang Honey Protects against Kainic-Acid induced Neurotoxicity via Modulation of EAAT2 Expression

Nurdarina Ausi Zulkifli[1], Sirajudeen KNS[2], Muzaimi Mustapha[1], Anani Aila Mat Zin[3], Hidani Hashim[4], Suk Peng Tang[5]

[1]Department of Neurosciences, School of Medical Sciences, Health Campus, Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia
2Department of Basic Medical Sciences, Kulliyyah of Medicine, International Islamic University Malaysia, Bandar Indera Mahkota, Kuantan, Pahang, Malaysia
[3]Department of Pathology, School of Medical Sciences, Health Campus, Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia
[4]Department of Chemical Pathology, School of Medical Sciences, Health Campus, Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia
[5]Department of Pharmacology, School of Medical Sciences, Health Campus, Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia
Correspondence: Suk Peng Tang, sukpeng@usm.my;
Sirajudeen KNS, knssiraj@iium.edu.my

Introduction: The defect in glutamate transporter EAAT2 causes accumulation of extracellular glutamate and excitotoxicity. **Objective:** This study aimed to investigate the neuroprotective effect of Tualang honey (TH) on kainic acid (KA)-induced excitotoxicity by assessing the EAAT2 expression in rats cerebellum and striatum. **Methodology:** The four groups of male Sprague Dawley rats (n=12 per group) were pre-treated orally with distilled water (control and KA), TH (1.0 g/kg; TH+KA) and topiramate (40 mg/kg; TPM+KA) for five times at 12 hours interval. The rats were injected subcutaneously with KA (15 mg/kg; Groups KA, TH+KA and TPM+KA) or normal saline (control) 30 minutes after the last oral treatment. Open-field test was performed before the rats were sacrificed at 24 hours (n=6/group) or 5 days (n=6/group) post KA administration. Cerebellum and striatum were collected for histological and EAAT2 assessment. **Results:** Locomotor activity was increased in all KA-treated groups after 5 days. The number of viable cells and EAAT2 expressions were significantly lower in the striatum and cerebellum at 24 hours following KA administration. However, pre-treatment with TH increased the number of viable neurons and EAAT2 expression in both regions. **Conclusion:** Pre-treatment with TH showed protection against KA-induced neuronal changes in the striatum and cerebellum of rats via modulation of EAAT2 expression.

Keywords: Tualang honey, Kainic acid, Striatum, Cerebellum, EAAT2

Tualang Honey and its Silver Nanoparticles Ameliorates Hippocampal Oxidative Injury in Kainic Acid-Induced Rats

Hidani Hasim[1], Sirajudeen Kuttulebbai Naina Mohamed Salam[2], Pasupuleti Visweswara Rao[3], Sangu Muthuraju[4], Mohd Asnizam Asari[5]

[1]Department of Chemical Pathology, School of Medical Sciences, Universiti Sains Malaysia, Health Campus, 16150 Kubang Kerian, Kota Bharu, Kelantan, Malaysia.
[2]Department of Basic Medical Sciences, Kulliyyah of Medicine, International Islamic University Malaysia, Bandar Indera Mahkota, 25200 Kuantan, Pahang, Malaysia.
[3]Department of Biomedical Sciences and Therapeutics, Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah, 88400, Kota Kinabalu, Sabah, Malaysia.
[4]Department of Pharmacological and Pharmaceutical Sciences, College of Pharmacy, University of Houston, Houston 77204, TX, United States of America.
[5]Department of Anatomy, School of Medical Sciences, Universiti Sains Malaysia, Health Campus, 16150 Kubang Kerian, Kota Bharu, Kelantan, Malaysia.
Correspondence: Mohd Asnizam Asari, asnizam@usm.my;
Sirajudeen Kuttulebbai Naina Mohamed Salam, knssiraj@iium.edu.my

Introduction: Kainic acid (KA) mediated excitotoxicity was shown to be associated with oxidative stress in rats brain. Tualang honey (TH) was reported to have protective effect on it but no study has explored on its silver nanoparticles (THSN). **Objectives:** To investigate the effects of TH and THSN on the KA-induced oxidative damage in rats' hippocampus. **Methodology:** Sprague-Dawley rats (n=48) were randomized into eight groups: (i) control, (ii) THSN (10mg/kg), (iii) THSN (50mg/kg), (iv) KA only, (v) KA+TH, (vi) KA+THSN (10mg/kg), (vii) KA+THSN (50mg/kg), and (viii) KA+Topiramate. Based on their respective groups, rats were pretreated orally with either distilled water, THSN (10 or 50 mg/kg body weight), TH (1.0 g/kg body weight), or Topiramate (40 mg/kg body weight), for five times at 12 hours intervals. Saline or KA (15 mg/kg body weight) were injected subcutaneously 30 min after last oral treatment. The rats were sacrificed 24 hours post KA induction and hippocampus was harvested. Total nitrate/nitrite (NOx), catalase (CAT) and glutathione (GSH) were measured using commercially available ELISA kits. **Results:** Pretreatments with TH and THSN significantly ($p>0.05$) reduced the elevation of NOx level and increasing the reduction of CAT and GSH level in the rats' hippocampus induced by KA, as compared to KA only group. **Conclusion:** This study suggests that the pretreatment with TH and THSN have potential protective role in ameliorating oxidative stress in the hippocampus of KA-induced rats via its antioxidant property.

Keywords: Tualang honey, Silver nanoparticles, Kainic acid, Rat hippocampus, Oxidative stress.

Poster Presenters		
Date: 17 June 2021 (Thursday)		
No.	**Presenters**	**Time**
PP-NS-01	**Faris Hazwan bin Nazar** Establishing of Zebrafish as a Model to Study Scopolamine-induced Amnesia	10:30 AM
PP-NS-02	**Dr. Tan Jen Ki** Global Metabolomic Profiling in the Brian of Scopolamine-induced Cognitive Deficit Zebrafish	10:40 AM
PP-NS-03	**Arina Dery Puspitasari** Evaluation of Potentially Inappropriate Medications (PIMs) in Nervous System Diseases using Beers Criteria	10:50 AM
PP-NS-04	**Dr. Chrismawan Ardianto** The Effect of Curcumin and Quercetin on Allodynia Response and MC4R-POMC mRNA Expression in the Spinal Cord of Mice with Oxaliplatin-induced Peripheral Neuropathy	11:00 AM
PP-NS-05	**Choo Suet Yee** Potential Neuroprotective Effects of Metallothionein Against Rotenone and Metal-Induced Toxicity in Human SH-SY5Y Cells	11:10 AM
PP-NS-06	**Fatin Hilyani Mohamad** The Effects of Zolpidem on Learning and Memory of Induced Ischaemic Injury in SD Rats	11:20 AM
PP-NS-07	**Mohamad Anuar Ahad** Effects of Bioactive Fraction from *Clitoria Ternatea* Root Extract on Cognitive Functions in Rat Model of Chronic Cerebral Hypoperfusions	3:15 PM

Establishing of Zebrafish as a Model to Study Scopolamine-induced Amnesia

Faris Hazwan Nazar[1], Suzana Makpol[1], Seong Lin Teoh[2], Jen Kit Tan[1]

[1]Department of Biochemistry, Faculty of Medicine, Universiti Kebangsaan Malaysia, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, Malaysia.
[2]Department of Anatomy, Faculty of Medicine, Universiti Kebangsaan Malaysia, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, Malaysia.
Correspondence: Tan Jen Kit, jenkittan@ukm.edu.my

Introduction: Zebrafish is gaining popularity as a model in cognitive dysfunction. The use of scopolamine as an amnestic agent remains questionable because the drug induces side-effects such as anxiolytic behaviour which could affect the cognitive test. **Objective:** This study aimed to investigate the effect of scopolamine on cognitive performance, locomotor activity, and anxiolytic behavior of zebrafish. **Methodology:** The amnestic model was induced by treating the fish with 100, 200, and 400 µM scopolamine for 1 h via aqueous immersion. The cognitive performance of 6-month-old fish (n=12 males and 12 females per group) was assessed by T-maze test, while both locomotor activity and anxiolytic behavior were evaluated using novel tank diving test. **Results:** In the T-maze test, untreated fish preferred the non-punish arm after training, demonstrating the fish has learning ability. Fish treated with scopolamine in all concentrations had reduced entry in the non-punish arm, suggesting impairment of cognition by scopolamine. Novel tank diving test showed no significant difference in swimming speed and total distance traveled between all scopolamine doses with control, but both parameters were increased by 400 µM scopolamine compared with 100 µM. Fish treated with 400 µM scopolamine spent a long time in the top region of the tank than control, implying the anxiolytic effect of scopolamine at a higher dose. **Conclusion:** This study establishes a scopolamine-induced cognitive decline model in zebrafish. Scopolamine (200 µM) elicits an amnesic effect without affecting locomotor activity and emotion. Cognitive data should be interpreted with caution to avoid bias due to the drug's effects on locomotion and emotion.

Keywords: Amnesia, Scopolamine, Zebrafish, Cognitive behaviors

Global Metabolomic Profiling in the Brian of Scopolamine-induced Cognitive Deficit Zebrafish

Jen Kit Tan[1], Faris Hazwan Nazar[1], Suzana Makpol[1], Seong Lin Teoh[2]

[1]Department of Biochemistry, Faculty of Medicine, Universiti Kebangsaan Malaysia.
[2]Department of Anatomy, Faculty of Medicine, Universiti Kebangsaan Malaysia.
Correspondence: Jen Kit Tan and jenkittan@ukm.edu.my

Introduction Identification of metabolic perturbations related to cognitive impairment could be useful for biomarker discovery and mechanistic studies. Metabolomics is an unbiased approach to investigate metabolites at the level of system biology. **Objectives** This study was aimed to determine the global changes of metabolites in the brain of scopolamine-induced memory deficit zebrafish. **Methodology** The cognitive-impaired model was established based on previous literature by treating the wild-type zebrafish (n=6 males and 6 females) with 200 µM scopolamine for 1 hour through aqueous immersion. Control fish underwent the same procedure without scopolamine. Whole-brain was dissected and extracted with methanol. Metabolite extract was analyzed by LCMS/MS. Data were pre-processed with Compound Discoverer. MetaboAnalyst was used to perform the statistical analysis. Metabolites were annotated using mzCloud database. **Results** A total of 1,564 and 813 molecular features were detected in positive and negative ion modes, respectively; while 220 metabolites were identified from these features. Concentrations of 96 features were significantly different, but only 17 of these were annotated. Significant metabolites include acetylcholine, arecoline, phytoceramide, and phytosphingosine. Metabolite levels were affected by scopolamine doses and sex differences. **Conclusion** This study presents the metabolic alternations in the zebrafish brain of a scopolamine-induced cognitive impairment model. These changes warrant further functional validation on cognitive function. The findings could be translated for a better understanding of neurodegenerative disorders such as Alzheimer's disease.

Keywords: Cognitive impairment, Metabolomics, Scopolamine, Zebrafish.

Evaluation of Potentially Inappropriate Medications (PIMs) in Nervous System Diseases using Beers Criteria.

Arina D Puspitasari[1,2], Khusnul Fitri Hamidah[2], Liziyyannida[3], Budi Suprapti[1,2], Prihatma Kriswidyatomo[4,5], Mahardian Rahmadi[1,2]

[1]Department of Pharmacy Practice, Faculty of Pharmacy, Universitas Airlangga, Surabaya, Indonesia
[2]Department of Pharmacy, Universitas Airlangga Teaching Hospital, Surabaya, Indonesia
[3]Master Program of Clinical Pharmacy, Faculty of Pharmacy, Universitas Airlangga, Surabaya, Indonesia
[4]Anesthesiology and Reanimation Department, Faculty of Medicine, Universitas Airlangga
[5]Anesthesiology and Reanimation Department, Universitas Airlangga Teaching Hospital, Surabaya, Indonesia
Correspondence: Arina D Puspitasari, arinadery@ff.unair.ac.id

Introduction: Some medications can affect the changes in the nervous system that are common in geriatric patients. Beers Criteria is a tool for monitoring the potentially inappropriate treatment (PIM) and the most widely used explicit lists of PIMs for geriatric patients. **Objectives:** This study aimed to evaluate the PIM and to identify the most PIM classifications that use in nervous system diseases geriatric patients in the emergency room using Beers' criteria 2019. **Methodology:** The medications in the prescriptions of patients above 60 years of age, get therapy in the emergency room with a yellow or red triage level, their dosage regimen respective of their diagnosis were analyzed. Each medication was then checked with Beers list tables and any adverse drug event (ADE) due to PIM was identified. The number of drug Beers Criteria list tables per prescription was also analyzed. All statistical analyses were carried out using Statistical Package for Social Sciences (SPSS) software version 20.0 for WINDOWS. **Results:** Based on the Beers criteria 2019, 79 out of 96 (82,3%) prescriptions had at least one PIM prescribed. A sum of 270 medications was prescribed. Among which, 143 PIMs were identified. Most commonly prescribed PIMs category 3 (19,1%), category 5 (11,9%), and category 2 (9,3%). **Conclusion:** The study shows a high prevalence of prescribing PIMs in emergency room geriatric patients. Most PIM classifications are PIM use in older adults due to drug-disease or drug-syndrome interactions that may exacerbate the disease or syndrome.

Keywords: Beers criteria, Emergency room, Geriatry, Health risk, Potentially inappropriate medications.

The Effect of Curcumin and Quercetin on Allodynia Response and MC4R-POMC mRNA Expression in the Spinal Cord of Mice with Oxaliplatin-induced Peripheral Neuropathy

Chrismawan Ardianto*, Luke Wongso, I Nengah Budi Sumartha, Khoirotin Nisak, Aniek Setiya Budiatin, Diah Ayu Wakita Trimanda, Risda Maulida, Mahardian Rahmadi, Junaidi Khotib

[1]Department of Pharmacy Practice, Faculty of Pharmacy, Universitas Airlangga. Correspondence: Chrismawan Ardianto, chrismawan-a@ff.unair.ac.id

Introduction: Chemotherapy-induced Peripheral Neuropathy (CIPN) may emerge during cancer therapy using chemotherapeutic agents such as oxaliplatin. Allodynia is one of the symptoms affecting patient's psychological well being and quality of life. The use of curcumin and quercetin potentially suppress CIPN not only by peripheral, but also central effect. Thus, we focused on the effect of curcumin and quercetin on CIPN through changes in central nervous system. **Objectives:** The present study aimed to examine the effect of curcumin and quercetin on the allodynia response in CIPN. **Methodology:** Mice were injected intraperitoneally with oxaliplatin 3 mg/kg once in 2 days for a week followed by curcumin or quercetin injection for 7 days. Behavioral test with the von Frey filaments was conducted during the study. The expression of cortical caspase protein and melanocortin system were measured. **Results:** Quercetin and curcumin increased the CIPn-induced lowering in pain threshold. Moreover, the drug administration suppressed cortical caspase expression and modulates spinal MC4 receptor and POMC expression in lesser extent. **Conclusion:** The present study indicates that curcumin and quercetin ameliorate allodynia response in CIPN. Further, it is suggested that the amelioration effect is mediated by cortical apoptosis and possibly involved spinal melanocortin system.

Keywords: CIPN, Cancer, Oxaliplatin, Curcumin, Allodynia

Potential Neuroprotective Effects of Metallothionein Against Rotenone and Metal-Induced Toxicity in Human SH-SY5Y Cells

Suet Yee Choo[1], Seong Lin Teoh[2], Wei Ling Lim[1]

[1]Department of Biological Sciences, School of Medical and Life Sciences, Sunway University
[2]Department of Anatomy, Universiti Kebangsaan Malaysia Medical Centre
Correspondence: Choo Suet Yee, 15016645@imail.sunway.edu.my

Introduction: Parkinson's disease (PD) is characterized by depletion of dopaminergic neurons in the substantia nigra and reduction of dopamine levels in the striatum. Exposure to agricultural pesticides, toxins and metals has been found to induce oxidative stress and toxicity in the brain, associated with the PD pathogenesis. Metallothionein (MT) is a family of metal ion-binding proteins which scavenges free radicals and toxic metal in the nervous system. Although studies have reported the protective role of MTs in neurodegenerative diseases, the underlying mechanism of neuroprotective effects of MT isoform 2 (MT-2) has not been fully studied in PD-associated pathogenesis. **Objectives:** This project aims to elucidate the protective effects of recombinant human Metallothionein-2 (hMT-2) protein against rotenone- and metal-induced toxicity in human SH-SY5Y cells as an *in vitro* PD model. **Methodology:** SH-SY5Y cells were differentiated with retinoic acid. Cells were then exposed to rotenone and copper (II) sulfate ($CuSO_4$) to induce toxicity and cell death. Cell viability assay, oxidative stress analysis, Hoechst staining and apoptosis detection assay were further conducted to assess the neuroprotective potential of h-MT2 treatment against rotenone- and $CuSO_4$-induced effects in SH-SY5Y cells. **Results:** Differentiated SH-SY5Y cells exposed to rotenone and $CuSO_4$ exhibited decreased viability, increased ROS production and increased apoptotic events, establishing the *in vitro* model associated with PD pathogenesis. Further pre-treatment of hMT-2 was shown to improve cell survival and ameliorate the rotenone- and $CuSO_4$-induced oxidative stress and toxicity in SH-SY5Y cells. **Conclusion:** These results suggest that exogenous hMT-2 treatment may provide neuroprotection against cellular toxicity related to the pathogenesis of PD in SH-SY5H cells.

Keywords: Parkinson's disease, Metallothionein-2, SH-SY5Y cells, Neuroprotection

The Effects of Zolpidem on Learning and Memory of Induced Ischaemic Injury in SD Rats

Fatin H. Mohamad[1], Ahmad Tarmizi Che Has[1], Zurina Hassan[2]

[1]Department of Neurosciences, School of Medical Sciences, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia.
[2]Center for Drug Research, Universiti Sains Malaysia, 11800, Penang, Malaysia.

Introduction: The hippocampus, which is crucial for the learning and memory mechanisms, is extremely sensitive towards brain injuries such as ischaemia. In recent years, there have been significant reports on the positive effects of the imidazopyridine drug, zolpidem in improving clinically relevant cognitive functions in patients with stroke. Zolpidem is known to modulate the inhibitory action of γ-aminobutyric acid or GABA neurotransmitter by binding at the same site as benzodiazepines on GABA (A) receptors. **Objectives**: Therefore, to further investigate the effects of zolpidem on learning and memory of patients with stroke, induced chronic cerebral hypoperfusion was induced in SD rats through permanent bilateral occlusion of common carotid arteries to mimic the global ischaemic injury. **Methods**: The model will induce neuronal injury with cognitive deficits but without motor dysfunctions or seizures. After 14 days, the rats were given treatment of different concentrations 0.1, 1.0, 2.0 and 4.0mg/kg of zolpidem. These animals were then subjected to animal behavioural studies using Morris Water Maze and Automated Open-field Test in comparison to control rats. **Results**: Both 1.0 and 2.0mg/kg zolpidem showed positive memory improvement in Morris Water Maze whilst 2.0 and 4.0mg/kg resulted in significant effects in Automated Open-field Test. **Conclusion**: These results suggested potential therapeutic effects of zolpidem in improving learning and memory process in brain injuries such as ischaemic stroke.

Keywords: Zolpidem, PBOCCA, Ischaemia

Effects of Bioactive Fraction from *Clitoria Ternatea* Root Extract on Cognitive Functions in Rat Model of Chronic Cerebral Hypoperfusions

Mohamad Anuar Ahad[1], Nelson Chear Jeng-Yeou[1], Vikneswaran Murugaiyah[2], Lim Gin Keat[3], Ahmad Tarmizi Che Has[4], Zurina Hassan[1*]

[1]Centre for Drug Research, Universiti Sains Malaysia, 11800 Gelugor Penang
[2]School of Pharmaceuticals Sciences, Universiti Sains Malaysia, 11800 Gelugor Penang
[3]School of Chemical Sciences, Universiti Sains Malaysia, 11800 Gelugor Penang
[4]Department of Neurosciences, School of Medical Sciences, 15200, Kota Bharu Kelantan
**Correspondence: Zurina Hassan email: zurina_hassan@usm.my*

Introduction: Chronic cerebral hypoperfusion is the consequence of persistent reduced cerebral blood flow (CBF) to the brain, which is believed to be a significant cause of dementia-related to cerebrovascular diseases. Prolonged episodes of decreased CBF led to alterations of normal cellular function, resulting in a loss of neuronal integrity and subsequently caused cognitive decline. **Objective:** In the current study, we performed fractionation of *Clitoria ternatea* root (CTR) extract to produce a bioactive fraction that is useful to enhance the cognitive functions in chronic cerebral hypoperfused (CCH) rat model. **Methods:** The CTR extract was separated using normal flash column chromatography All the fractions were screened for their activities through *in vitro* anti-cholinesterase assay. The result shows combined F5+6 fraction namely as *Clitoria ternatea* root fraction (CTRF) produced potent inhibition against AChE (% inhibition: 77.19±2.4) and BUChE (% inhibition: 87.59±1.82%) compared with others. Therefore, this fraction was further investigated for its cognitive enhancing property using different behavioral studies: open-field test (OFT), passive avoidance task (PAT) and Morris water maze (MWM). The CCH rat model was developed by permanently occluded both common carotid arteries (PBOCCA). The rats were divided into five groups: (G1) Sham+veh., (G2) P+veh., (G3) P+CTRF10mg/kg, *p.o*, (G4) P+CTRF20mg/kg, *p.o* and (G5) P+CTRF40mg/kg, *p.o.* **Results:** The result of OFT shows insignificant effects of CTRF on motor and exploratory behavior of the rats. In the PAT, acute post-training administration CTRF (40mg/kg) exhibited the most significant increase in step-through latency as compared to the untreated group (P+veh.). In the MWM, the result shows P+veh spent longer time to locate the hidden platform as compared to Sham+veh. Acute post-training administration of CTRF (40mg/kg) exhibited the most significant reduction in escape latency from day 3 to 5 against P+veh and almost similar to Sham+veh. During the probe trial session, P+CTRF (40mg/kg) showed significantly longer time spent in the targeted quadrant as compared with P+veh. **Conclusion:** In conclusion, bioactive fraction from CT root extract develops nootropic effects in CCH rat and has a potential to be developed as a smart drug for the treatment of dementia-related to cerebrovascular diseases.

Keywords: *Clitoria ternatea,* Chronic cerebral hypoperfusion, Vascular dementia, Cognitive functions

LIST OF PRESENTERS

PUBLIC HEALTH & PHARMACY PRACTICE

Oral Presenters		
Date: 17 June 2021 (Thursday)		
No.	**Presenters**	**Time**
OP-ID-02	**Datu Mohd Amyril bin Abduludin** Exploratory Factor Analysis of CP2OHS Questionnaire	2:00 PM
OP-PP-01	**Assoc. Prof. Dr. Malina Jasamai** Are Your Cosmetic Products Safe?	2:15 PM
OP-PP-02	**Ali Ahmed** Barriers and Enablers for Adherence to Antiretroviral Therapy among People Living with HIV/AIDS in the Era of COVID-19: A Qualitative Experience from a Low Middle-Income Country.	2:30 PM

Exploratory Factor Analysis of CP2OHS Questionnaire

Datu Mohd Amyril Abduludin [1] Normastura Abd Rahman[1]

Munirah Mohd Adnan[1] Muhamad Saiful Bahri Yusoff[2]
[1]School of Dental Sciences, Universiti Sains Malaysia, 16150 Kubang Kerian Kelantan
[2]School of Medical Sciences, Universiti Sains Malaysia, 16150 Kubang Kerian Kelantan
Correspondence: Datu Mohd Amyril Abduludin, amyril_albiruni@yahoo.com

Introduction: Access to oral health care services for people with disabilities continues to be an issue. The accessibility measuring tool is limited or not exclusive to children with cerebral palsy (CP). Accessibility of children with CP to oral health care services (CP2OHS) is a new questionnaire that was developed and exploratory factor analysis (EFA) is a preferable procedure in determine and refining meaningful underlying constructs. **Objectives:** This objective of this study is to determine the internal structure of the CP2OHS questionnaire. **Methodology:** The caregivers of children with CP who have registered with the Kelantan Department of Welfare are invited to participate in the study and complete the CP2OHS questionnaire via telephone interview. EFA and reliability analysis are utilized to understand the structure of correlations among measured variables on the particular constructs. **Results:** The caregivers of 106 children with CP are taking part in the study. The final model of the CP2OHS questionnaire in the EFA has 28 items with factor loading > 0.4, and loaded across five factors namely Abilities to Perceive, Ability to Seek, Ability to Reach, Ability to Pay and Ability to Engage. Three domain appear to have Cronbach's Alpha above 0.7 which are Ability to Perceive (α = 0.834), Ability to Seek (α = 0.822), and Ability to Pay (α = 0.725). Both Ability to Reach (α = 0.679) and Ability to Engage (α = 0.597) presented with Cronbach's Alpha below the recommended value of 0.7. **Conclusion.** The process of implementing appropriate and successful measures to increases access to oral health care services requires knowledge of the barriers. The CP2OHS questionnaire can be integrate for the detailed assessment of perceived access to oral health care services. The application of the measure may enhance understanding and recognized the barriers to access oral health care services by the caregiver of children with CP.

Keywords: Cerebral palsy, Oral health care, Access, Factor analysis

Are Your Cosmetic Products Safe?

Mazlina Mohd Said, Nur Aqilah Idayu Azman, Thanapakiam Ganeson and Malina Jasamai

Drugs & Herbal Research Centre, Faculty of Pharmacy, Universiti Kebangsaan Malaysia, Jalan Raja Muda Abdul Aziz, 50300, Kuala Lumpur, Malaysia
Correspondence: Malina Jasamai, malina@ukm.edu.my

Introduction: Cosmetic products have become essential items and they are available in different formulations intended for various uses. Many cosmetic products have been found to contain high levels or banned heavy metals and prescription drugs. Some of these materials are intentionally added to cosmetic products to enhance certain claimed effects. **Objectives:** This review focuses on adulterants in cosmetic products, methods of analysis and the regulatory system of cosmetic products. **Methodology:** A literature search was carried out on articles published from January 2015 to December 2020 using Google Scholar, Medline & Ovid, Science Direct, Wiley Online Library and Scopus. The data extracted were the first authors' names, the years of publication, categories of cosmetic products, product categories (raw materials or finished products), types of adulterants, analytical methods and regulations on cosmetic products. **Results:** Lipsticks, eyes shadows and face creams are the most commonly adulterated cosmetic produstcs. Heavy metals such as arsenic, cadmium, lead, mercury and nickel and prescription drugs such as hydroquinone, tretinoin, antibiotics, sex hormones and steroids are the main adulterants. Atomic absorption spectrometry (AAS) and flame atomic absorption spectrometer (FAAS) are common techniques to analyse heavy metals while high performance liquid chromatography (HPLC) is used to analyse prescription drugs. The regulatory framework for cosmetic producs vary somewhat between countries. **Conclusion:** Heavy metals and precriptions drugs are common adulterants in cosmetic products. Spectroscopic methods are mostly used to analysed heavy metals whereas chromatographic methods are used for prescription drugs.

Keywords: Adulterants, Cosmetic products, Analytical techniques, Heavy metals, Prescription drugs

Barriers and Enablers for Adherence to Antiretroviral Therapy among People Living with HIV/AIDS in the Era of COVID-19: A Qualitative Experience from a Low Middle-Income Country.

Ali Ahmed[1], Juman dujaili[1], Alice Chuah Lay Hong[1], Furqan Hashmi[2], Ahmed Awaisu[3], Nathorn Chaiyakunapruk[1,4]

[1]School of Pharmacy, Monash University, Jalan Lagoon Selatan, Bandar Sunway, 47500 Subang Jaya, Selangor, Malaysia
[2]University College of Pharmacy, University of the Punjab, Allama Iqbal Campus, 54000, Lahore Pakistan
[3]College of Pharmacy, QU Health, Qatar University, P.O. Box 2713, Doha, Qatar
[4]College of Pharmacy, University of Utah, Salt Lake City, UT, USA
Correspondence: Mr. Ali Ahmed, ali.ahmed@monash.edu

Introduction: With increased availability of safe antiretroviral therapy (ART) in recent years, achieving optimal adherence and patient retention is becoming the biggest challenge in the people living with HIV (PLWH). Care retention is influenced by several socio-economic and socio-cultural factors. COVID-19 related measures that restrict movement may negatively impact access to HIV care and treatment. **Objective:** We aim to explore barriers and facilitators to adherence to ART among PLWH in Pakistan during COVID-19 pandemic. **Methodology:** Semi-structured interviews were conducted among 18 PLWH from November 2020 to February 2021 in local language (Urdu). Interviews were audio recorded and a bilingual expert (English, Urdu) transcribed verbatim, coded for themes, sub-themes and analysed using phenomenology approach for thematic content analysis. **Results:** Stigma and discrimination, fear of disclosure of HIV, economic constraints, forgetfulness, religion (Ramadan, spiritual healing), adverse drug reactions, lack of social support, alternative therapies, fear of limited care of COVID-19 infection due to HIV status and COVID-19 lock-down were identified as barriers affecting the retention in HIV care. While positive social support, family responsibilities, use of reminders, beneficial impact of ART, telephone consultations, courier delivery and long-term delivery of drugs during COVID-19 were identified as facilitators of HIV retention. **Conclusion:** Improving adherence and retention requires the integration of enhanced access to treatment with improved employment and social support. Healthcare providers need to be supported to better equip patients with ART problems. Cooperation between different organizations is needed to facilitate patient retention in HIV care and to improve the clinical outcomes of PLWH. There is also a need to disseminate HIV and COVID-19 information to improve HIV stigma knowledge among families and communities.

Key words: People living with HIV/AIDS, Antiretrovirals, Facilitators, Retention, Pakistan.

Poster Presenters		
Date: 17 June 2021 (Thursday)		
No.	**Presenters**	**Time**
PP-ID-01	**Salah Al Shehade** Liver Dysfunction and COVID-19	10:30 AM
PP-ID-02	**Rhanye Mac Guad** Development and Validation of a Structured Survey Questionnaire on Knowledge, Attitude, Preventive Practice, and Treatment-Seeking Behaviour Regarding Dengue Among the Resident Population of Sabah, Malaysia: An Exploratory Factor Analysis	10:40 AM
PP-ID-04	**Muhammad Asyraf bin Salleh & Nurul 'Ain binti Abu Bakar** Psychological Effects among B40 Post Hospitalized COVID-19 Patients	10:50 AM
PP-ID-05	**Haily Liduin Koyou** Changes of Haematological and Biochemical Parameters among COVID-19 Patients in Kuala Lumpur General Hospital Malaysia	11:00 AM
PP-ID-06	**Faizul Akmal bin Abdul Rahim** Vertical Distribution of Dengue Vectors in High-rise Residences in Kuala Lumpur	11:10 AM
PP-ID-07	**Mohd Farihan Bin Md Yatim** Invention of An Automated Mosquito Blood Feeder for *Aedes aegypti* Blood Feeding	11:20 AM
PP-ID-08	**Mohd Amierul Fikri bin Mahmud** Characteristics of Aedes Breeding Containers at Public Parks in Kuala Lumpur, Malaysia	2:45 PM

Poster Presenters		
Date: 17 June 2021 (Thursday)		
No.	**Presenters**	**Time**
PP-PP-01	**Dr. Farida Islahudin** A Clinical Tool to Predict Adherence Among Chronic Kidney Disease Patients	2:55 PM
PP-PP-02	**Fahmi Dimas Abdul Azis** Management Analysis Side Effects of Elevated Liver Function Test in Drug-Resistant Tuberculosis with Short Term Therapy and Individual Therapy	3:05 PM
PP-PP-03	**Dr. Hanni P Puspitasari** Community Awareness of Natural Products Usage: a Qualitative Study in East Java Province, Indonesia	3:15 PM
PP-PP-04	**Dr. Yuni Priyandani** Pharmaceutical Care for Tuberculosis Patients in Primary Healthcare Centers in Surabaya, Indonesia	3:25 PM

Liver Dysfunction and COVID-19

Salah Al Shehade[1], Raghdaa Hamdan Al Zarzour[1*], Vikneswaran Murugaiyah[1], Mohammed A. Alshawsh[2]

[1]Discipline of Pharmacology, School of Pharmaceutical Sciences, Universiti Sains Malaysia, 11800 USM Penang, Malaysia.
[2]Department of Pharmacology, Faculty of Medicine, University of Malaya, 50603 Kuala Lumpur, Malaysia.
***** Correspondence: *Raghdaa Hamdan Al Zarzour, raghdaa@usm.my*

Introduction & Objective: With a mortality rate of around 3%, 2019 coronavirus disease (COVID-19) has become a global threat to human well-being. At the same time, liver dysfunction looks to be an alarming challenge for COVID-19 patients.Therefore, we aimed to estimate the relationship between COVID-19 infection and non-alcoholic fatty liver diseases (NAFLD), which may have important clinical implications. **Method**: A comprehensive literature search was performed on PubMed, Scopus, Dimensions, and Google scholar, to find published articles that reported clinical characteristics of COVID-19 patients with liver dysfunction, specifically NAFLD. **Results:** studies showed that patients with NAFLD had a higher risk of COVID-19 progression estimated by (44.7%) compared to the (6.6%) that presents the occurrence percentage of COVID-19 among those who are not NAFLD patients. On the other hand, COVID-19 has caused a remarkable liver injury in many cases. It was shown that the levels of liver enzymes such as aspartate transaminase (AST) and gamma-glutamyl transferase (GGT) were elevated among COVID-19 patients. Likewise, abnormal levels of aminotransferase were observed in sever COVID-19 condition. Although the mechanism of liver injury among COVID-19 patients is still unknown, the accumulation of cytotoxic T lymphocytes was the best believed factor to cause this deterurative effect. Other theories suggested that the virus enters the target cell by binding to the angiotensin-converting enzyme 2 (ACE2) receptor. This could justify the liver dysfunction as ACE2 is found in biliary cells. Furthermore, liver dysfunction might contribute to the hypoxia that associate with respiratory disorders. **Conclusion**: Take into consideration the increasing global prevalence of NAFLD, a large proportion of the population could be at risk of severe COVID-19 progression. However, due to the wide variation in liver dysfunction observations among COVID-19 patients, further precis investigations are strongly needed to rule out the possibility of drug-induced liver damage.

Keywords: Coronavirus, COVID-19, Liver dysfunction, Liver injury, Non-alcoholic fatty liver disease.

Development and Validation of a Structured Survey Questionnaire on Knowledge, Attitude, Preventive Practice, and Treatment-Seeking Behaviour Regarding Dengue Among the Resident Population of Sabah, Malaysia: An Exploratory Factor Analysis

[1,2]Rhanye Mac Guad, [3]Shamala Devi Sekaran, [2]Maw Shin Sim, [4]Yuan Seng Wu, [5]Meram Azzani, [6]Nornazirah Azizan

[1]Department of Pharmaceutical Life Sciences, Faculty of Pharmacy, Universiti Malaya, Kuala Lumpur 50603, Malaysia
[2]Department of Biomedical Science and Therapeutics, Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah, Kota Kinabalu 88400, Malaysia
[3]Faculty of Medicine and Health Science, No.1, Jalan Menara Gading, UCSI Heights 56000 Cheras, Kuala Lumpur, Malaysia
[4]Department of Biochemistry, School of Medicine, Faculty of Medicine, Bioscience and Nursing, MAHSA University, Selangor, 42610 Malaysia
[5]Department of Community Medicine, School of Medicine, Faculty of Medicine, Bioscience and Nursing, MAHSA University, Selangor 42610, Malaysia
[6]Department of Pathobiology and Medical Diagnostic, Faculty of Medicine and Health Science, Universiti Malaysia Sabah, Kota Kinabalu 88400, Malaysia
Correspondence: Rhanye Mac Guad, rhanye@ums.edu.my

Background: Several studies have reported a significant association of knowledge, attitude and preventive practice (KAP) and dengue infection. **Objectives**: This study aimed to assess and develop a reliable and valid KAP survey on dengue that is suitable for the resident population of Sabah, Malaysia. **Methods**: A community-based cross-sectional study was conducted from October 2019 to February 2020 involving 468 respondents. Information on the socio-demographic characteristics of the participants (six items), their KAP (44, 15 and 18 items on knowledge, attitude and practice, respectively) and treatment-seeking behaviour (five items) towards dengue was collected using a structured questionnaire. Data analysis was performed using SPSS and R software in the R Studio environment. The knowledge section was analysed by two-parameter logistic item response theory using ltm package. The construct validity and reliability of items for sections on attitude, practice and treatment-seeking behaviour were analysed using psy package. **Results**: For the knowledge section, only 70.5% (31/44) of items were within or close to the parameter acceptable range of -3 to +3 of difficulty. In terms of discrimination, 65.9% (29/44) of items were within or close to the acceptable range of 0.35 to 2.5, and 24 items (54.5%) failed to fit the 2-PL IRT model ($P < 0.05$) after assessing by goodness-of-fit analysis. Only eight items were reliable and retained in the attitude section with a Kaiser-Meyer-Olkin (KMO) test value of > 0.7, while based on the communalities, 11 items in the attitude section were excluded due to very low h2, factor loading values and low correlation with the total (< 0.5). The practice section was found suitable for factor analysis because the KMO value was > 0.7. **Conclusions**: The final KAP items were reliable and valid to be use as a questionnaire reference when conducting future similar studies among the population of Sabah.

Keywords: KAP, Dengue, Survey, Validation, Sabah Malaysia

Psychological Effects Among Low-income Post Hospitalized Covid-19 Patients

Muhammad Asyraf Salleh[1], Nurul 'Ain Abu Bakar[1],' Mohd Nazil Salleh[1]

[1]PICOMS International University College
Correspondence: Mohd Nazil Salleh, drmohdnazil@picoms.edu.my

Introduction: World Health Organization (WHO) declared the worldwide spread of the infection disease COVID-19 as a pandemic on the 11th March 2020. The spread of new COVID-19 virus outbreak will face social and economic disruption, political challenges as well as severe impact on mental health. During the crisis, positive patients were admitted and quarantined at the designated COVID19 hospitals to prevent the infections. However, spending time and dilemma during quarantine has imposed psychological and an emotional effect on the patients is unknown. **Objectives**: In this study, we explore the psychological effects among low-income post COVID-19 patients from July to September 2020 after the pandemic's onset. **Methods**: We recruited a cross sectional study from 100 confirmed low-income post COVID-19 patients and DASS 21 was applied to assess mental health. The survey collected data on sociodemographic and self-administrated structured questionnaire with close questions. Descriptive statistical analysis was analysed using SPSS version 26. **Results**: A total of 100 respondents were involved, 44% was severe trauma, 37% normal, 13% mild trauma and 6% moderate trauma on the psychological impact respectively. There were increased of depression (1.54 $\pm$ 1.04), stress (1.45 $\pm$ 1.05) and anxiety (1.15 $\pm$ 0.97) symptoms throughout the study. Our result shown that the family (3.37 + 0.66) is the main factors of psychological impact followed by daily life (2.87 $\pm$ 0.75), emotion (2.80 $\pm$ 0.85), environment (2.76 $\pm$ 0.79) and physical (2.57 $\pm$ 0.87) accordingly. These findings also shows that spending time and communicate with the family and friends are strongly agreed followed by living normal life and positive coping skills in the solutions of adaptations towards psychological effects. **Conclusion**: In conclusion, this study found that the COVID-19 pandemic has severe impact on psychological and emotional towards low-income post COVID-19 patients and provide urgent intervention strategies to avoid uncertainty problems in the ongoing COVID-19 pandemic.

Keywords: Low-income, COVID-19, Psychological effect, Anxiety, Depression

Changes of Haematological and Biochemical Parameters Among Covid-19 Patients in Kuala Lumpur General Hospital Malaysia

Haily Liduin Koyou[1], Chia Zhen Zhan[2], Muhammad Asyraf Salleh[1], Mohd Nazil Salleh[1]

[1]PICOMS International University College, Malaysia
[2]Kuala Lumpur General Hospital, Malaysia
Correspondence: Mohd Nazil Salleh, drmohdnazil@picoms.edu.my

Introduction: The COVID-19 pandemic caused by SARS-CoV-2 has become a global health crisis. As the mid-April 2021, more than 148 million people have been infected and nearly 3 million have died. Most patients infected by SARS-CoV-2 present with novel coronavirus pneumonia. Acute respiratory tract infection is frequent in early symptoms, and some patients quickly progress to acute respiratory distress syndrome, acute respiratory failure, or other severe secondary complications. **Objective:** The aim of this study was to identify the changes of haematological and biochemical parameters in COVID-19 patients. **Methodology:** Samples were collected and analysed the data of 145 patients who were laboratory confirmed as SARS-CoV-2 infection. This retrospective study was done on all age group of patients were hospitalized at the Kuala Lumpur General Hospital Malaysia. The mean (SD) age was 38.19 (20.03), 64.9% male and 35.1% female. The laboratory diagnosis included full blood count, coagulation test, liver function test, lipid profile analysis and renal profile analysis. **Result:** Study revealed increased level of total serum protein (14%) and D-dimer (38.5%). Other than that, significant highest level of serum albumin (73.6%), serum globulin (75%) and fibrinogen (69.2%) respectively. Subsequently, decreased level in lymphocyte (18.6%), basophil (24.8%), eosinophil (17.9%), haemoglobin (14.5%), haematocrit (15.9%), mean cell volume (43.3%), blood urea (16.4%), sodium (12.1%), potassium (14%) and chloride (25.7%) accordingly. Meanwhile, the total red blood cell count was unexpectedly increased 34.5% crossed all patients. **Conclusion:** These findings suggest, infection with SARS-CoV-2 level of lymphocyte, basophil, eosinophil, haemoglobin, haematocrit, mean cell volume and renal profile were impaired in varying degree, while having reverse impact on total red blood cell count, high blood protein and hypercoagulation which were more obvious.

Keywords: SARS-CoV-2, COVID-19, Laboratory diagnosis, High blood protein, Hypercoagulation

Vertical Distribution of Dengue Vectors in High-rise Residences in Kuala Lumpur

Faizul Akmal Abdul Rahim[1], Mohd Farihan Md Yatim[1], Mohd Amierul Fikri Mahmud[1], Hanipah Shahar[2]

[1]Institute for Public Health, Ministry of Health Malaysia
[2]Entomology and Pest Unit, Federal Territory of Kuala Lumpur & Putrajaya Health Department, Ministry of Health Malaysia
Correspondence: Faizul Akmal bin Abdul Rahim, faizul.abdrahim@moh.gov.my

Introduction: Dengue has become a major public health issue in Malaysia with the increasing trends of reported cases occurred annually. High-rise residences were blamed as *Aedes* mosquito habitats due to the high number of dengue cases reported. **Objectives:** This study aimed to identify the key breeding containers of *Aedes* mosquito and to determine the vertical distribution of *Aedes* mosquito in high-rise residences in Kuala Lumpur. **Methodology:** Mosquito larvae surveillance was conducted in thirteen selected dengue outbreak high-rise residential buildings located in Kuala Lumpur between January to December 2018. Both indoors and outdoors water-holding containers were inspected for the presence of mosquito larvae. The floor levels were divided by four categories, which is from ground floor to fourth floor, from fifth floor to ninth floor, from tenth to fourteen floor, and from fifteen to nineteen floor. All collected mosquito larvae were identified the species, location found, and the types of breeding containers. **Results:** A total of 113 water-holding containers were recorded as positive for dengue vector, and were dominated by *Aedes aegypti*. The result indicated five main breeding containers in these study sites were drains (23.9%), toilet flushes (15.9%), pails (13.3%), puddles (12.4%), and plastic containers (8.8%).The locations found range from the ground floor to the seventeen floor, and were higher indoors (63.7%) than outdoors (36.3%). The one-way ANOVA analysis showed that there were no statistically significant differences in the number of *Aedes* mosquito breeding containers between the floor categories [$F(3,51)=1.723, p=0.175$]. **Conclusion:** The findings from this study were useful in providing guidelines for health service providers to inspect *Aedes* mosquito breeding habitats on each floor of high-rise buildings when dengue outbreak occurred, furthermore educating residents to eliminate potential *Aedes* mosquito breeding containers indoors and outdoors.

Keywords: *Aedes*, Dengue, High-rise residences, Vertical distribution

Invention of an Automated Mosquito Blood Feeder for *Aedes aegypti* Blood Feeding

Mohd-Farihan, M.Y. [1,2], Aishah-Hani. A. [2], Faizul-Akmal. A.R. [1], & Amierul-Fikri. M. [1]

[1] *Centre for Communicable Diseases Research, Institute for Public Health, Institutes of Ministry of Health, Malaysia.*
[2] *Department of Parasitology and Medical Entomology, Faculty of Medicine, Universiti Kebangsaan Malaysia.*
Correspondence: Mohd Farihan Md Yatim, farihanmy@moh.gov.my

Introduction: Establishment of mosquito colony in laboratory is essential to provide sufficient samples for mosquito research. Generally, live animals are used to blood feeding these mosquitoes. However, this technique is proven to be expensive, inconvenient and unethical. As an alternative, blood feeder device was invented to feed these mosquitoes in a technique known as artificial blood feeding. **Objectives:** The aim of the study is to develop an advance automated mosquito blood feeder to feed *Ae. aegypti* colony in laboratory. This device should be capable to provide constant and accurate temperature to mimic blood temperature of live animal. **Methodology:** The invented device known as Digital Thermo Mosquito Blood Feeder, or DITMOF was built using components such as digital temperature controller and thermal sensor to ensure accurate temperature setting. Citrated cattle blood was used as blood source to feed *Ae. aegypti* while Parafilm-M was used as blood feeding membrane for *Ae. aegypti* to land and feed. For each replicate, 20 mated female mosquitoes were exposed for 30 minutes. Total 10 replicates were performed. As to measure blood temperature during feeding period, three repeated temperature readings at 1, 15 and 30 minutes interval were recorded. **Results:** The *Ae. aegypti* blood feeding rate ± standard error (SE) recorded was 72.00% (± 2.60). Meanwhile, the mean±SE blood temperatures at 1, 15 and 30 minutes feeding interval were 36.7°C (±0.17), 36.1°C (±0.09) and 35.8°C (±0.03) respectively. Average temperature during entire blood feeding session was 36.2°C. **Conclusion:** The invented device shows a good prospect for *Ae. aegypti* colony development. More than 70% mosquitoes was successfully fed and the blood feeding temperature was successfully maintained similar to live animal body temperature (35°C to 37°C) during entire feeding period. Thus, this device should be further explored to compare feeding performance with live animal and to feed other mosquito species.

Keywords: Artificial blood feeding, DITMOF, Mosquito blood feeder, Mosquito colony, Parafilm-M.

Characteristics of Aedes Breeding Containers at Public Parks in Kuala Lumpur, Malaysia

Mohd Amierul F Mahmud[1], Faizul Akmal Abd Rahim[1], Mohd Farihan MD Yatim[1], Hanipah Shahar[2]

[1]Institute For Public Health, National Institute of Health, Ministry of Health Malaysia.
[2]Health Department of Kuala Lumpur, Ministry of Health Malaysia.
Correspondence: Mohd Amierul Fikri Bin Mahmud, amierulfikri@gmail.com

Introduction : Numerous studies on *Aedes* breedings have been conducted at residential area, neglecting places like public parks despite their potential in providing good shelter for dengue vectors. **Objectives :** This study aimed to investigate the characteristics of *Aedes* breeding containers at main public parks in Kuala Lumpur. **Methodology :** This study was conducted at eight main public parks in Kuala Lumpur from January to September 2018. Entomological survey was done in three cycles; January to March, April to June and July to September 2018. All *Aedes* larvae were identified and positive containers were categorized into specific characteristics (location, material, cover lids status, sun exposure, water status and water type). **Results :** A total of 2,330 *Aedes* larvae were collected from 379 positive containers with mean larvae recorded 89.62(± 21.80). *Aedes* breedings were found mostly at outdoor location (81.2%) compared to indoor. Most of the breedings were recorded for containers made of plastic materials (67.8%). Highest breeding were also found in containers with ineffective lid status (48.4%). Positive breedings were recorded mainly among water containers that were partially exposed to the sun (56.4%). Containers with clean water (81.3%) recorded higher positive for *Aedes* larvae compared with polluted water. *Aedes* breedings were also identified highest among containers with mixed water type (43.3%). **Conclusion :** This study provided a baseline data for local authorities focusing on characteristics of *Aedes* breeding containers for further planning of dengue prevention and control activities at public parks.

Keywords: *Aedes*, Public park, Dengue

A Clinical Tool to Predict Adherence Among Chronic Kidney Disease Patients

Farida Islahudin[1], Tengku Nur Izzati Tengku Abd Kadir[1,2], Muhammad Zulhilmi Abdullah[1]

[1]Quality Management of Medicines, Faculty of Pharmacy, University Kebangsaan Malaysia, Jalan Raja Muda Abdul Aziz 50300 Kuala Lumpur.
[2] Pharmacy Department, Hospital Sultanah Nur Zahirah, Kuala Terengganu, Malaysia
Correspondence: Farida Islahudin, faridaislahudin@ukm.edu.my

Introduction: Chronic kidney disease (CKD) patients are prescribed multiple lifetime medications. However, at present healthcare professionals are unable to ensure continuously optimised adherence, due to the inability to predict adherence changes in patients with CKD. Objective: This work aims to develop a tool to predict adherence in CKD patients to ensure optimised continuity of care. **Methodology:** This was a multi-centred study, conducted in tertiary hospitals in Malaysia. A questionnaire was used to collect patient characteristics, assess adherence and knowledge of each medication. CKD patients prescribed at least one medication were included (n=1012). The model was developed based on two-thirds (n=677), and validated using one-third (n=335) of the data. **Results:** A multivariate analysis (n=677) demonstrated that number of medications ($p<0.001$), number of co-morbidities ($p=0.015$), complementary alternative medicine use ($p=0.003$), and knowledge scores ($p<0.001$) were predictors of adherence. Beta coefficient values were then used to determine scores based on the predictors (scores ranged between 0 and 7). A higher score indicated a higher risk for adherence (OR: 2.41; 95% CI: 2.112–2.744; $p \leq 0.001$). The area under the receiver operating characteristic (ROC) curve was of good accuracy (ROC: 0.867, 95% CI: 0.840–0.896; $p < 0.001$). Validation ($n = 335$) of the developed scores, was of good accuracy (ROC: 0.812, 95% CI: 0.765–0.859; $p <0.001$). There was no significant difference in predicting adherence based on the constructed scores between two-thirds and one-third of the data ($p=0.11$, Zvalue: 1.62, standard error: 0.034). **Conclusion:** The developed predictor score could be used to identify CKD patients at risk of non-adherence to ensure optimised adherence management.

Keywords: Adherence, Kidney, Medication

Management Analysis Side Effects of Elevated Liver Function Test in Drug-Resistant Tuberculosis with Short Term Therapy and Individual Therapy

Fahmi Dimas Abdul Azis[1,2], Arina Dery Puspitasari[3], Bambang Subakti[3], Umi Fatmawati[4], Soedarsono[5]

[1] Master Program of Clinical Pharmacy, Faculty of Pharmacy, Universitas Airlangga, Surabaya, Indonesia
[2] STIKES Hafshawaty Pesantren Zainul Hasan, Probolinggo, Indonesia
[3] Department of Pharmacy Practice, Faculty of Pharmacy, Universitas Airlangga, Surabaya, Indonesia.
[4] Department of Pharmacy, Dr. Soetomo General Hospital, Surabaya, Indonesia
[5]Department of Pulmonology and Respiratory Medicine, Faculty of Medicine, Universitas Airlangga, Dr. Soetomo General Hospital, Surabaya, Indonesia Airlangga
Correspondence: Arina Dery P, arinadery@ff.unair.ac.id

Background – Anti-Tuberculosis Drugs are one of the most common groups of hepatotoxicity causes worldwide. Globally, hepatotoxicity would occur when Tuberculosis (TB) therapy accounts for more than 7% of all side effects. Several risk factors for the development of hepatotoxicities such as age, sex, body mass index (BMI), and acetylation status have been investigated in previous studies. The Ministry of Health issued guidelines for the management of drug-resistant TB in which there is the management of hepatotoxic events. And so, yearly evaluated its guideline. **Objective –** To observe seeing the accuracy of management carried out when side effects occur in Drug-Resistant TB therapy with short-term and individual regimens. **Method –** The research method is a retrospective study. The sampling method is total sampling method and the analysis method is descriptive method. Patients with HIV and historical liver injury excluded. In this study, patients with Drug-resistent Tuberculosis after antituberculosis treatment used isoniazid, pirazinamid, ethionamide, and fluoroquinolone being our samples. Clinical parameters and liver function test were SGOT and SGPT. **Results –** A total sample of 129 patients met the inclusion and exclusion criteria in Dr. Soetomo General Hospital, Surabaya, Indonesia. The results showed that the prevalence of hepatotoxic side effects was 54 cases. During treatment in both the short-term and individual regimens, there were 40 patients (74.07%) had stage 1 hepatotoxic, the second was 11 patients (20,37%) in stage 2 and three patients (5.55%) in stage 3. No life-threatening patients. **Conclusions –** Management carried out to overcome these side effects is in accordance with the Ministry of Health's guidelines on Drug-Resistant TB**.**

Keywords: Infectious disease, Adverse effect, Drug-Resistant tuberculosis, Drug induce hepatotoxicity

Community Awareness of Natural Products Usage: A Qualitative Study in East Java Province, Indonesia

Hanni P Puspitasari[1], Aina S Yuliyani[1], Aqila A Rahma[1], Faridatus Sholikah[1], Mufarrihah[1], Ana Yuda[1], Anila I Sukorini[1], Neny Purwitasari[2]

[1]Department of Pharmacy Practice, Faculty of Pharmacy, Universitas Airlangga, Surabaya, Indonesia
[2]Department of Pharmaceutical Science, Faculty of Pharmacy, Universitas Airlangga, Surabaya, Indonesia
Correspondence: Hanni P Puspitasari, hanni-p-p@ff.unair.ac.id

Introduction: As a biodiversity country, Indonesia has a great opportunity to synthesize various medicinal natural products. The government has classified medicinal natural products into three groups: jamu, empirically proven natural medicines; standardised herbal medicines that has been scientifically proved through pre-clinical studies; and phytopharmaca that has been clinically proved. Up to September 2020, the number of registered jamu, standardized herbal medicines and phytopharmaca was 11.000, 71, and 24, respectively. Although the literature has shown that two community groups (women and older people) were likely to consume or provide natural medicines to family members, our preliminary survey in four purposively selected areas in East Java Province indicated a low proportion of natural product users among the two groups. **Objectives**: To investigate awareness of natural products usage among women and older people. **Methodology**: A qualitative study was designed to interview purposively selected women and older people who had participated in the preliminary survey. All interviews were audio-recorded, transcribed *ad verbatim*, and thematically analysed in terms of informant's perception of safety and efficacy of natural products. **Results:** Data saturation were reached after interviewing three women and seven older people. Almost all informants were not aware of medicinal natural products, including their classification. The term "natural medicines" was understood as traditionally made potion from raw materials of medicinal plants available in the surrounding area. Users of medicinal natural products believed that such medicines are safe based on scientific studies. On the contrary, the non users felt that traditionally made medicinal potion are safer because they have no side effects. Moreover, most informants were not aware of registered medicinal natural products. **Conclusion:** Unawareness of natural products may lead to limited use of them. There is a need to increase community knowledge about the safety use of natural medicines.

Keywords: Natural products, Community, Awareness

Pharmaceutical Care for Tuberculosis Patients in Primary Healthcare Centers in Surabaya, Indonesia

Yuni Priyandani[1], Abdul Rahem[1], Umi Athiyah[1], M.B.Qomaruddin[2], Kuntoro[2]

[1]Faculty of Pharmacy, Universitas Airlangga.
[2]Faculty of Public Health, Universitas Airlangga.
Correspondence: Yuni Priyandani, yuni-p@ff.unair.ac.id

Introduction: In Indonesia, tuberculosis (TB) cases rank third in the world. East Java Province is ranked second and Surabaya ranked first in East Java. Pharmacist could play an important role in antituberculosis drug therapy of TB patient. **Objectives:** This study was aimed to determine the pharmaceutical care services carried out by pharmacists, including providing information on drug use to TB patients, in primary healthcare centers in Surabaya. **Methodology:** This cross-sectional study applied self-reported questionnaire as the research instrument that was administered to a total of 249 TB patients at primary health care centers in Surabaya. Completing this questionnaire was accompanied by the researcher after the patient received an explanation before approval and filled out informed consent. Data collection was carried out for 3 months from July to September 2018. The data analysis using Statistical Product and Service Solutions (SPSS) version 18 for Windows. **Results:** Tuberculosis patients use fixed-dose combination (FDC) of rifampin, isoniazid, pyrazinamide and ethambutol for the treatment of TB. Based on research data, there were 152 (61.04%) patients received information from nurses and 31 (12.45%) patients received information from pharmacists. **Conclusion:** Pharmacists must increase their role in pharmaceutical care for tuberculosis patients in primary healthcare centers.

Keywords: Pharmaceutical care, Tuberculosis patient, SDGs

LIST OF PRESENTERS

ADDITIONAL TRACK

Oral Presenters		
Date: 17 June 2021 (Thursday)		
No.	**Presenters**	**Time**
OP-OT-01	**Dr. Noor Akmal binti Muhamat** The Effectiveness of Mobile Application Prototype (Gigiku Sihat) in Improving Dietary Habit and Oral Hygiene of Pre-school Children and the Nutrition and Oral Health Knowledge, Attitude and Practice of the Parents in Tumpat, Kelantan Topic type: Nutrition and Oral Health	2:00 PM
OP-OT-02	**Putri Sabrina binti Mohamed Yusoff** The Diagnostic Value of Blood-based PCR for identification of extraintestinal microsporidiosis in immunocompromised patients Topic type: Infectious disease/ parasitology	2:15 PM
OP-OT-03	**Siti Khadijah binti Abdullah** Mechanistic Insights into the Mode of Action of Anti-inflammatory Agents. Topic type: Immunology	2:30 PM
OP-OT-04	**Nur Atiqah Auni binti Razali** The Correlation of Small Dense Low Density Lipoprotein with Clinical Factors Between Metabolic Syndrome and Non-Metabolic Syndrome Subjects in Selangor Topic type: Health and Wellness	2:45 PM
OP-OT-05	**Tee Khim Boon** Liquid Chromatography Mass Spectrometry Based Metabolomics of Andrographis paniculata 2000mg Capsule In Urine Samples Of Healthy Volunteers Topic type: Pharmacology	3:00 PM

The Effectiveness of Mobile Application Prototype (Gigiku Sihat) in Improving Dietary Habit and Oral Hygiene of Pre-school Children and the Nutrition and Oral Health Knowledge, Attitude and Practice of the Parents in Tumpat, Kelantan

Noor Akmal Muhamat[1], Ruhaya Hasan[1], Norkhafizah Saddki[1]

[1]School of Dental Sciences, Universiti Sains Malaysia.
Correspondence: Ruhaya Hasan, ruhaya@usm.my

Introduction: Epidemiological survey in Malaysia had reported that caries prevalence of preschool children in Kelantan remains the highest over 10 years from year 2005. Dietary and oral hygiene habits should be considered when assessing caries risk in young children. Aiming parental nutrition and oral health knowledge, attitudes and practices (KAP) might also be valuable in the deterrence of oral health problem. **Objectives:** To compare the cariogenic food frequency (CFF) and dental plaque index scores of pre-school children as well as nutrition and oral health KAP of their parents before and after Gigiku Sihat intervention program. **Methodology:** An intervention study was conducted among 55 children aged 4 to 6 years old and their parents at KEMAS pre-schools in Tumpat, Kelantan. Self-administered questionnaires was used to measure CFF and nutrition and oral health KAP. Oral hygiene status was determined using Simplified Oral Hygiene Index (OHI-S). A mobile application prototype (Gigiku Sihat) developed in Bahasa Malaysia with features such as graphics, videos and push notifications used for the intervention. Measurement of variables were done at baseline, 6 and 12 weeks follow-up after the intervention. Repeated measures ANOVA was used and the significance level was set at $p<0.05$. **Results:** There was an increase in the CFF score of the pre-school children from baseline to follow-up, but in total, it was not significantly different ($p=0.109$). Positively, OHI-S score had a significant decrease ($p=0.000$). As for the parents, there was a significant increase for knowledge ($p=0.005$), attitude ($p=0.000$) and practice ($p=0.010$) scores. **Conclusion:** Gigiku Sihat was effective in improving the pre-school children oral hygiene, as well as their parents nutrition and oral health KAP. Future studies need to address the additional features that might be needed in a mobile application to further improve the dietary habit of pre-school children.

Keywords: Mobile application; Nutrition; Oral health; Pre-school; Parents.

The Diagnostic Value of Blood-based PCR for Identification of Extraintestinal Microsporidiosis in Immunocompromised Patients

Putri Sabrina Mohamed Yusoff [1], Norsyahida Arifin[2], Petrick Periyasamy[3], Nor Rafeah Tumian[3], Fuad Ismail[4], Raja Zahratul Azma Raja Sabudin[5], Rahmah Noordin[2], Noor Wanie Hassan[1], Emelia Osman[1]

[1] Department of Parasitology and Medical Entomology, Faculty of Medicine, Universiti Kebangsaan Malaysia, 56000 Cheras, Kuala Lumpur, Malaysia.
[2] Institute for Research in Molecular Medicine (INFORMM), Universiti Sains Malaysia, 11800 Penang, Malaysia.
[3]Department of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, 56000 Kuala Lumpur, Malaysia.
[4] Department of Radiotherapy and Oncology, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, 56000 Kuala Lumpur, Malaysia.
[5] Department of Pathology, Faculty of Medicine, Universiti Kebangsaan Malaysia, Jalan Yaacob Latiff, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, Malaysia.
Correspondence: Emelia Osman, emelia.osman@ukm.edu.my

Introduction: Diagnosis of extraintestinal microsporidiosis is challenging due to its nonspecific clinical presentation. Since the infection may involve multiple body sites, detection of the pathogen requires examination of body tissues and fluids. Molecular detection of microsporidial DNA by blood-based polymerase chain reaction (PCR) has been suggested as an alternative and non-invasive method to ease the diagnosis of the infection. **Objectives:** This study aims to investigate the diagnostic value of blood-based PCR for the detection of extraintestinal microsporidia, as well as to determine the co-existence of the pathogen in stool and blood samples of immunocompromised patients. **Methodology:** A total of 42 matched stool and blood samples were collected from HIV-infected and chemotherapy-treated patients. Stool samples were screened microscopically for the detection of microsporidia spores, followed by blood and stool PCR assays for identification of *Enterocytozoon bieneusi* and *Encephalitozoon spp*. **Results:** Out of 42 stool samples, 14 were positive (33.3%) for microsporidia spore by microscopic examination. Stool and blood PCR were successfully amplified *E. bieneusi* DNAs in 4.8% (2/42) and 9.5% (4/42) of these specimens respectively. However, none of the DNA-positive stool samples was positive by blood PCR. Interestingly, 4 samples were positive by blood PCR but negative by both stool microscopy and PCR. Overall, circulating microsporidia DNA in blood samples were detected in 19.0% (8/42) of the patients, suggesting extraintestinal infection. **Conclusion:** *E. bieneusi* was detected as the sole species causing extraintestinal infection in immunocompromised patients. There is no co-existence of microsporidia in both blood and stool samples observed via PCR, suggesting the exclusive diagnostic value of blood-PCR for the diagnosis of extraintestinal microsporidiosis.

Keywords: Microsporidia, Extraintestinal, Blood, Stool, PCR

Mechanistic Insights Into the Mode of Action of Anti-inflammatory Agents.

Siti Khadijah Abdullah[1], Gokula Mohan,[1] Taznim Begam Mohd Mohidin[1]

[1]Institute of Biological Sciences, Faculty of Science, Universiti Malaya, Kuala Lumpur, Malaysia.
Correspondence: TBM Mohidin, taznim@um.edu.my

Introduction: Standard therapy for the treatment of inflammatory conditions, either for short-term or long-term purposes are nonsteroidal anti-inflammatory drugs (NSAIDs) and glucocorticoids drug. These drugs do not resolve the underlying problems but rather provide symptomatic relief or mitigate the progression of the disease while causing adverse effects like gastric ulcers and osteoporosis. On the other hand, Schiff bases have been shown to possess effective anti-inflammatory activity but the molecular mechanism is not well understood. **Objectives:** Hence, this research focused on identifying the molecular mechanism by which novel Schiff base compounds inhibit the TNFα-induced NF-κB signaling pathway. **Methods:** Twenty compounds (C1-C20) were subjected to cytotoxicity studies using MTT assay, followed by screening of C13-C20 in inhibiting the expression of early pro-inflammatory genes in TNFα-induced HEK293T by RT-qPCR. C15 was further subjected to cell fractionation and immunoblot analysis. **Results:** We found that C15 was able to downregulate the expression of a set of pro-inflammatory genes (*TNFa*, *IL8*, *IL6*, *A20*, *ICAM*, and *CCL5*) in HEK293T and HeLa S3 cells. Furthermore, cell fractionation and immunoblot analysis showed that C15 reduced IκBα protein degradation and inhibited p65 protein translocation into the nucleus in both cell lines. **Conclusion:** We conclude that C15 inhibits TNFα-induced NF-κB signaling pathway via these mechanisms and its potential in reducing inflammation *in vivo* should be explored next.

Keywords: Schiff bases, Anti-inflammatory, TNFα-induced NF-κB signaling pathway.

The Correlation of Small Dense Low Density Lipoprotein with Clinical Factors Between Metabolic Syndrome and Non-Metabolic Syndrome Subjects in Selangor

Nur Atiqah Auni Razali[1*], Nur Amirah Shibraumalisi[2], Zaliha Ismail[3], Thuhairah Hasrah Abdul Rahman[1*]

[1]*Department of Pathology. Faculty of Medicine, UiTM Sg Buloh. Jalan Hospital, 47000, Sg. Buloh, Selangor*
[2]*Department of Primary Care Medicine, Faculty of Medicine, UiTM Selayang. Jalan Prima Selayang 7, 68100, Batu Caves, Selangor*
[3]*Department of Public Health Medicine, Faculty of Medicine, UiTM Sg Buloh. Jalan Hospital, 47000, Sg. Buloh, Selangor*
**Corresponding author email: thuhairah@uitm.edu.my, auniirazalii@gmail.com*

Introduction: The prevalence of Metabolic Syndrome (MetS) continues to rise with subsequent increase in the risk of cardiovascular disease. Small dense low density lipoproteins (sdLDL-c) is one of the atherogenic lipid that have recently been shown to be a better risk predictor for atherosclerosis. Therefore, this study aims to compare the serum levels of sdLDL-c between MetS and non-MetS subjects and determine the correlation between sdLDL-c and risk factors of MetS. **Methodology:** Fifty-five MetS (male= 28, female=27) and 55 non-MetS (male=26,female=29) subjects diagnosed by JIS criteria 2009 were recruited using systematic random sampling between July 2020 until January 2021. Demographic details and anthropometric measurements were recorded and blood samples were analyzed for total cholesterol, triglycerides (TG), high-density lipoprotein cholesterol (HDL-c) and direct LDL-c concentration on an automated platform c501 (Roche Diagnostics, Germany) and applied to the sdLDL equation by (Srisawasdi et al., 2011) to derive sdLDL-c level. **Results**: sdLDL-c level was higher among MetS compared to non-MetS (Mean±SD: 1.14±0.44mmol/L vs 0.87±0.38mmol/L, $p<0.05$). sdLDL-c showed weak positive correlation with TG and HDL-c in MetS ($r=0.53, p<0.05$) and non-MetS ($r=0.37, p<0.05$) respectively. **Conclusion:** sdLDL-c is elevated among subjects with MetS and shows positive correlation with TG, suggesting that MetS with elevated TG may be at higher coronary artery disease risk.

Keyword: sdLDL-c, Metabolic syndrome, Direct LDL, Lipid profile, Automated platform

Liquid Chromatography Mass Spectrometry Based Metabolomics of *Andrographis paniculata* 2000mg Capsule In Urine Samples Of Healthy Volunteers

Tee Khim Boon[1,2], Luqman Ibrahim[3], Najihah Mohd Hashim[4,5], Mohd Zuwairi Saiman[6], Zaril Harza Zakaria[2], Kasful Asra Sakika[5,7], Syaza Fatnin Hisham[1,3], Azwa Mansor[3], *Hasniza Zaman Huri[1,8]

[1] *Department of Clinical Pharmacy and Pharmacy Practice, Faculty of Pharmacy, Universiti Malaya, Kuala Lumpur, Malaysia.*
[2] *Ministry of Health Malaysia, Kuala Lumpur, Malaysia.*
[3] *Department of Medicine, Faculty of Medicines, Universiti Malaya, Kuala Lumpur, Malaysia.*
[4] *Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Universiti Malaya, Kuala Lumpur, Malaysia.*
[5] *Centre for Natural Products Research and Drug Discovery, Universiti Malaya, Kuala Lumpur, Malaysia.*
[6] *Institute of Biological Science, Faculty of Science, Universiti Malaya, Kuala Lumpur, Malaysia.*
[7] *Institute for Advanced Studies, Universiti Malaya, Kuala Lumpur, Malaysia.*
[8] *Clinical Investigation Centre, Universiti Malaya Medical Centre*
**Corresponding author: Hasniza Zaman Huri, hasnizazh@um.edu.my*

Introduction: Pharmacometabolomics is an emerging approach to explore the pharmacological effects and adverse effects in early drug development program. Integrating of metabolomics and pharmacokinetics in multi-components drug able to identify various pharmacological effects from multi-components herbal medicines. LCMS-based metabolomics study for *Andrographis paniculata* in human is not available. **Objectives:** The study aim to explore the human metabolic pathways in urine samples after administered of *Andrographis paniculata* 2000mg capsules in healthy volunteers. **Method:** The research protocol is approved by the ethics committee. Eligible subjects were administered *Andrographis paniculata* 2000mg capsules under fasting conditions. The urine samples (six samples for pre-dose and six samples for 0-4 hours post-dose) were processed according to global metabolomics methods and analyzed using LCMS-QTOF with reverse phase column in both positive and negative mode. Statistical analysis was performed using MetaboAnalyst. The processing steps involved MS spectral processing, normalization, batch correction, chemometric analysis, fold change and t-test to identify the significant compounds. The compounds were matched with the KEGG library to predict human metabolic pathways. **Results and discussion:** Galactose metabolism, arachidonic acid metabolism, pentose and glucuronate interconversions and linoleic acid metabolism significantly (P-value < 0.05) observed from the two urine samples group. *Andrographis paniculata* and the derivatives significantly decreased galactitol accumulation *in vivo* rat study which could described the relation of galactose metabolism in healthy volunteers. The enzyme inhibitory assay conducted demonstrated anti-inflammatory effect of cyclooxygenase-2 is related to arachidonic acid metabolism, similar metabolism was found in this study. Ubiquinone and other terpenoid-quinone biosynthesis have the highest impact in the urine sample analysis, this implied the terpenoid compounds were absorbed into the body and excreted through urine. **Conclusion:** LCMS-based metabolomics study able to demonstrate several pharmacodynamics effects which are comparable to the *in vivo* rat study, enzyme inhibitory assay and transcriptomic study of *Andrographis paniculata*.

Acknowledgement: The author would like to acknowledge University of Malaya for providing research grant number IIRG005-2019, Clinical Investigation Centre, University Malaya Medical Centre and Ministry of Health Malaysia.

Abbreviation: LCMS-QTOF Liquid Chromatography Mass Spectrometry Quadrupole Time-of-flight, KEGG: Kyoto Encyclopedia of Genes and Genomes.

Poster Presenters		
Date: 17 June 2021 (Thursday)		
No.	**Presenters**	**Time**
PP-OT-01	**Marleena Mamat** Determination of Creatine and Guanidinoacetate in Dried Blood Spot by Tandem Mass Spectrometry for Inborn Errors of Creatine Metabolism and Transport Topic type: Biochemistry	3:15 PM
PP-OT-02	**Yap Siew Hwei** Plasma D-amino Acids are Associated with Markers of Immune Activation and Functional Aging Topic type: Translational Science	3:25 PM
PP-OT-03	**Nur Athirah binti Othman Basri** A Review on *Hirudinaria Manilensis* and *Hirudo Medicinalis* in Medical Leech Therapy Topic type: Hirudotherapy	3:35 PM

Determination of Creatine and Guanidinoacetate in Dried Blood Spot by Tandem Mass Spectrometry for Inborn Errors of Creatine Metabolism and Transport

Marleena Mamat[3], Nur Khairunisa Md. Affandi[1] , Farah Adibah Rajami[1] , Salina Abd. Rahman[2] , Ismarulyusda Ishak[3] , Anasufiza Habib[1] , Asmah Hamid[3]

[1] Biochemistry Unit, Specialised Diagnostic Centre, Institute for Medical Research, Jalan Pahang, Kuala Lumpur, National Institute of Health, Setia Alam Selangor, Malaysia, Ministry of Health Malaysia.
[2] IEM & Genetic Unit, Nutrition, Metabolism, Cardiovascular Centre, Institute for Medical Research, National Institute of Health, Setia Alam Selangor, Malaysia, Ministry of Health Malaysia.
[3] School of Diagnostic Health and Applied Sciences, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia.
Correspondence: Associate Professor Asmah Hamid, asmah0901@ukm.edu/my

Introduction, Inborn Errors of Creatine Metabolism and Transport (IECMT), consist of three disorders involved in creatine biosynthesis and transport. Biochemical markers detection for IECMT relies on the analysis of two main metabolites in biological fluids: creatine (Cr) and guanidinoacetate (GAA). This disease cause low Cr on brain magnetic resonance spectroscopy (MRS); however MRS is not readily available for clinical diagnosis. Thus, biochemical tests are still required to determine the underlying subtypes of IECMT. Currently, biochemical diagnosis of IECMT is not available in Malaysia. **Objectives,** To develop, validate, compare method by tandem mass spectrometry (MS/MS) and establish normal reference ranges for determination of Cr and GAA in dried blood spot (DBS) for screening of IECMT. **Methodology,** 3 mm of DBS (equivalent to 2.81 µL blood) was put into 96-well polypropylene microtiter plate. Samples were extracted using methanol-water solution containing deuterated D3-Cr and 13C2-GAA followed by derivatization as butyl-esters. A Micromass Quattro macro TMS coupled with Waters 2795 Alliance HPLC was used to perform the analysis. Forty DBS samples were run using Symmetry ® C18 column (control technique) and Flow Injection Analysis (new technique) in positive electrospray ionization (ESI+) mode. We analysed 1320 hospitalize subjects with no neurological symptoms from day 1 to 20 years old to obtain age related control values. **Results** The analysis was very fast for both techniques, 1.2 minutes (control technique) and 0.4 minutes (new technique) respectively using MS/MS. Analytical separation, accuracy, precision and linearity of the assay were adequate. Recoveries ranged from 90% to 110%, bias ± 10%, repeatability and reproducibility variation for each analyte were less than 20%. Passing-Bablok regression analysis showed linear relationship between the two techniques and no statistically significant difference were observed **Conclusion.** We have successfully developed and validated a rapid, simple and robust method applicable for screening of IEMCT using DBS.

Keywords: Creatine, Guanidinoacetate, Dried blood spot, Inborn Errors of Creatine Metabolism and transport (IEMCT), Tandem Mass Spectrometry (MS/MS)

Plasma D-amino acids are associated with markers of immune activation and functional aging

Siew Hwei Yap[1,5], Cheng Siang Lee[1], Aogu Furusho[2], Chiharu Ishii[2], Syahirah Shaharudin[1], Nurul Syuhada Zulhaimi[1], Adeeba Kamarulzaman[1,5], Shahrul Bahyah Kamaruzzaman[5], Masashi Mita[3], Kok Hoong Leong[4], Kenji Hamase[2], Reena Rajasuriar[1,6]

[1]Centre of Excellence for Research in AIDS (CERiA), University of Malaya, Malaysia; [2]Graduate School of Pharmaceutical Sciences, Kyushu University, Japan;
[3]KAGAMI Inc., Japan;
[4]Department of Pharmaceutical Chemistry, Faculty of Pharmacy, University of Malaya;
[5]Department of Medicine, Faculty of Medicine, University of Malaya.
[6]Peter Doherty Institute for Infection and Immunity, Melbourne University, Victoria, Australia.
Correspondence: Name: Yap Siew Hwei, Email: siewhwei88@gmail.com

Background: D-amino acid (D-AA) residues have been found in tissues in the elderly, suggesting their role in aging. However, the biological relevance of plasma D-AA remain unknown. Here, we investigated D-AA levels in people living with HIV, a disease model for accelerated aging, and uninfected controls; and explored their association with markers of of immune activation, organ function and age-related conditions. **Method:** A total of 119 subjects (HIV-infected = 60; controls = 59) were recruited at University Malaya Medical Centre, Malaysia. HIV-related parameters were extracted from medical records while assessments for geriatric syndromes were performed by trained personnel. An integrated three-dimensional HPLC system was used to measure D- and L-isoforms of asparagine (Asn), serine (Ser), alanine (Ala) and proline (Pro) in plasma and presented as %D-AA. Markers of immune activation were measured in plasma. Kidney and liver functions were expressed as estimated glomerular filtration rate (eGFR) and fibrosis-4 (FIB-4) scores, respectively. Veterans Aging Cohort Study (VACS) scores was calculated to estimate 5-year mortality risk. Mann-Whitney and Spearman rank correlation coefficients were used for statistical analysis. **Results:** The median (IQR) age for HIV-infected and uninfected groups were 41 (29-64) and 31 (29-64) years, respectively. All measured D-Asn, D-Ser, D-Ala and D-Pro were strongly correlated with age in both groups. Kynurenine/tryptophan ratio was positively correlated with %D-AAs in all participants. %D-AAs were also correlated with kidney and liver function, and VACS scores especially in uninfected controls. %D-Asn and %D-Ser were associated with the presence of cognitive and functional impairment, polypharmacy and polypathology in HIV-uninfected controls. These associations were however lost when controlling for age, suggesting an age-associated accumulation of D-AA rather than an independent effect. **Conclusion:** These findings suggest plasma D-AAs which accumulate with age, may be intricately linked to the process of inflammaging through mechanisms which remain to be defined.

Keywords: D-amino acids, HIV, Inflammaging, Aging

A Review on *Hirudinaria Manilensis* and *Hirudo Medicinalis* in Medical Leech Therapy

Nurul Aini Ahmad[1] ,Nur Athirah Othman Basri[1], Nur Sa'adah Ab Rahman[1], Amir Sharifuddin Nordin[1], ,Jamaliah Mohd Isa[1], Norfarah Ashiqin Baharuddin Anthony[1]

[1]PICOMS International University College, Malaysia
Correspondence: Wan Azizi Wan Sulaiman, drwanazizi@picoms.edu.my

Introduction: *Hirudo medicinalis* and *Hirudinaria manillensis* are the different species of medicinal leeches that are well-known for their benefits to treat vascular disorders as an alternative medicine practices. These two species are originated from different part of the world. *H. medicinalis* is famous around the Europe meanwhile *H. manillensis* can be found in Southeast Asian region. **Objectives:** This study was done to describe the anatomical structures and medical application differences between these two species of medicinal leeches as they are originated from different part of the world. This study also emphasized on the sterilization techniques for leech therapy. **Methodology:** This study involved comparison of anatomical structures, microflora, bioactive compounds, clinical usage and sterilization techniques between *H. manillensis* and *H. medicinalis.* **Results:** There were significant differences of external anatomy features observed on body pattern, colour of the body, size of the body, size of the sucker, body length and width, mouth, number of teeth and eyes, absence of papillae and number of annuli respectively. Microflora of the gut for both species were dominant by *Aeromonas spp*. However, *Aeromonas jandaeii* and *Aeromonas hydrophila* also found in the gut of *H.medicinalis*. Bioactive compound of Hirudin was isolated in both species, however there was only *H.manillensis* shown Hirudin variants components. Antibiotics were used in sterilization techniques and the suitable antibiotics that have been reported was Ciprofloxacin. Sterilization was done by feeding the leeches with the antibiotics or soaking them in antibiotic solutions. However, soaking technique more practical and easy to perform.Both species was medicaly important in treatment of osteoarthritis, surgical complications, cardiovascular complications, varicose veins, haemorrhoids and various joint ailments. **Conclusion**: Further studies need to be performed to ensure the standard sterilization techniques can be established without effecting their viability and blood sucking efficiency to feed the blood after sterilization is done.

Keywords: Medicinal leeches, *Hirudo medicinalis, Hirudinaria manillensis,* Sterilization technique, Microflora

WE ARE RECRUITING!

We are from the American Chemical Society Monash University Malaysia International Student Chapter (ACS MUM ISC) and we'd love to have you grow with us as an ACS commuinty here at Monash University!

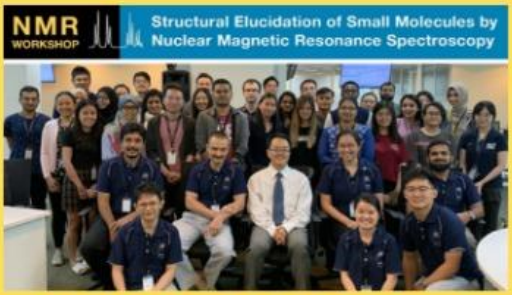
Why join us?

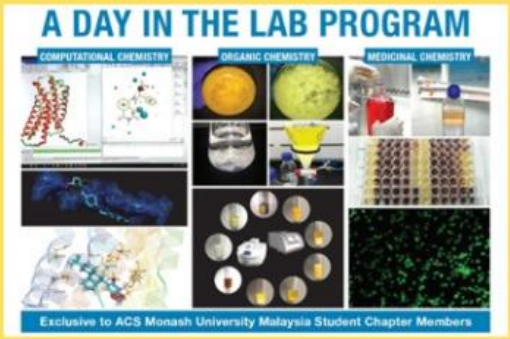
- **Exciting scientific programs**
- **Exclusive privileges in our events**
- **Network with the Chemistry community and members from various background**
- **Develop leadership skills**
- **Getting our merchandises at a discounted price**

Scan to register:

Membership Fees:
Undergraduate RM20
Postgraduate RM40

Past events:





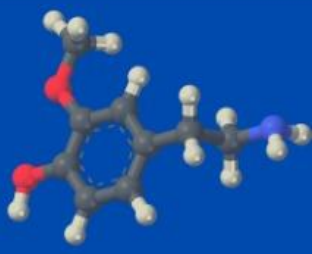
ACS Chemistry for Life®
AMERICAN CHEMICAL SOCIETY
Mo N As H
MALAYSIA
International Student Chapter

Contact us:

acs_mum_isc

acs_mum_isc

acs.mum.isc@gmail.com



ACKNOWLEDGEMENTS

Our heartfelt thanks to distinguished Guests, Speakers, Panelist, Presenters, Participants, Committee members, support staff and individuals.

Special thanks to Partners and Sponsors

PARTNERS

ACS Chemistry for Life® MALAYSIA CHAPTER

ACS American Chemical Society Monash University Malaysia International Student Chapter

frontiers

DIAMOND SPONSOR

NOVARTIS

GOLD SPONSORS

DUOPHARMA

Xepa sp

SILVER SPONSORS

ESCO LIFESCIENCES GROUP

MC

BRONZE SPONSORS

Gaia Science

GenScript Make Research Easy

NeoScience Your Life Partner in Science