BULLETIN 2024

Monthly Research Presentation (MRP)

SCHOOL OF MEDICAL SCIENCES
PUSAT PENGAJIAN SAINS PERUBATAN

MEET OUR
TOP MANAGEMENT

TABLE OF CONTENTS

FROM THE DEANS

Professor Dr. Abdul Razak Sulaiman

Assalamualaikum & Salam Sejahtera

May Allah shower us with His mercy, grace, and blessings.

I extend my heartfelt gratitude to Assoc. Prof. Dr. Asrenee Abdul Razak, Deputy Dean (Research), and her team for their exceptional efforts in organizing the Monthly Research Presentation (MRP) and publishing the 2024 e-bulletins. Your dedication has been instrumental in showcasing the remarkable achievements of USM researchers.

Over recent years, USM researchers have made impressive progress. Publications in high-impact journals and significant grant acquisitions highlight a positive trajectory in research excellence. However, these metrics only partially capture the depth of our work. The consistently outstanding quality of research and presentations at MRP reflects the broad expertise across fundamental, clinical, and innovative research domains.

Our academics excel in impactful fundamental and translational research, community engagement, and collaborations with industry partners. These accomplishments demonstrate USM's steadfast commitment to its vision and goals, contributing meaningfully to society.

This e-bulletin aims to celebrate the exceptional contributions of our researchers and inspire future generations. It showcases our shared mission to advance knowledge and foster innovation.

Once again, my heartfelt congratulations to the organizing team. I am confident that School of Medical Sciences will continue to achieve new heights, delivering research that benefits society and drives progress.

Thank you

Prof. Dr. Abdul Razak Sulaiman
Dean
School of Medical Sciences
Universiti Sains Malaysia

FROM THE DEPUTY DEANS

Assoc. Professor Dr.Asrenee Abdul Razak

Assalamualaikum & Salam Sejahtera

Dear AP Dr. Kueh Yee Cheng, Dr. Nazihah Binti Mohd Yunus, and Respected Members of the Organizing Committee,

It is with great admiration that I congratulate you on the successful organization of the Monthly Research Presentation (MRP) and the meticulous efforts behind the publication of the 5th MRP bulletin for 2024. Your dedication has created a valuable avenue for academic excellence and collaboration within our community.

As scholars, our purpose extends far beyond meeting professional benchmarks. We aim to inspire curiosity, ignite discussions, and broaden perspectives by sharing the results of our research. The MRP stands as an essential platform for academics to present their discoveries and promote innovation. With the strong support of PPSP's leadership, this initiative not only fosters a culture of intellectual exchange but also highlights opportunities for impactful collaborations and the development of groundbreaking research supported by dedicated funding streams.

I would like to express my sincere gratitude to the remarkable speakers who devoted their time and expertise to this endeavor, enriching the bulletin with their insightful contributions. The MRP has proven to be an effective medium for generating thought-provoking discussions and connecting researchers from various fields. I encourage everyone to engage with this platform and utilize its potential to advance both individual and collective research goals.

In closing, I wish all readers a meaningful journey as they explore the knowledge shared in this bulletin. May it spark new ideas, foster collaboration, and strengthen your commitment to the pursuit of scientific discovery.

Thank you.

Assoc. Prof. Dr. Asrenee Ab Razak
Deputy Dean (Research & Innovation)
School of Medical Sciences
Universiti Sains Malaysia

FROM THE CHAIRS

Assoc. Professor Dr. Kueh Yee Cheng

Biostatistics & Research Methodology Unit

Dr. Nazihah Mohd Yunus

Human Genome Center

Assalamualaikum & Salam Sejahtera

On behalf of the organizing committee, we sincerely thank you for placing your trust in us to organize MRP 2024. Your steadfast support and encouragement have been key to the success of this event.

We extend special thanks to our MRP advisor, Assoc. Prof. Dr. Asrenee Ab Razak, Deputy Dean of Research & Innovation, for her invaluable guidance. Our sincere appreciation also goes to the Dean, Prof. Dr. Abdul Razak Sulaiman, and the Deputy Deans for their steadfast support and encouragement. Furthermore, we are deeply grateful to the emcees and speakers for their dedication, efforts in chairing sessions, delivering talks, and preparing synopses. Last but not least, our heartfelt thanks go to the fantastic MRP team for their relentless hard work and commitment.

Research meetings like MRP are pivotal for academics and researchers, providing opportunities to present and discuss the relevance of their discoveries while fostering valuable academic and interpersonal connections that may lead to future collaborations. Beyond offering access to the latest scientific findings, MRP serves as a critical platform for networking, visibility, and potential partnerships.

The 5th MRP bulletin stands as a testament to the collective expertise and dedication of the speakers from various PPSP departments in 2024. We trust this bulletin will serve as a valuable resource for readers, furthering the university's mission of transforming higher education for sustainable futures.

With your continued support, we hope MRP will thrive for years to come, fostering a culture of innovation and collaboration within our academic community.

Thank you once again for your unfailing support.

Assoc. Prof. Dr. Kueh Yee Cheng
Chairperson MRP 2024

Dr. Nazihah Mohd Yunus
Deputy Chairperson MRP 2024

OUR MRP TEAM

Session 2024

MRP GOALS


MRP GOALS
1
To motivate researcher to publish their research in high impact journal
2
To give opportunity for researrcher to share their research & innovation
3
To emphasize on research with certain grants award
4
To encourage research collaboration
5
To introduce good researchers in PPSP

List of EMCEES

January

PROF. DR KAMARUL IMRAN MUSA

Department of Community Medicine

February

ASSOC. PROF. DR. MAHANEEM MOHAMED

Department Of Physiology

March

ASSOC. PROF. DR. WAN FAIZIAH WAN ABDUL RAHMAN

Department Of Pathology

April

ASSOC. PROF. DR. TUAN HAIRULNIZAM B. TUAN KAMAUZAMAN

Department of Emercengy Medicine

MRP EMCEES

May

ASSOC. PROF. DR IMRAN AHMAD

Department of Family Medicine

June

PROF. CHAN YEAN YEAN

Department of Medical Microbiology & Parasitology

JULY

PROF. DR. SHATRIAH ISMAIL

Department of Ophthalmology & Visual Science

August

ASSOC. PROF. DR. MOHD NAZRI HASSAN

Department of Hematology

September

ASSOC. PROF. DR. MUZAIMI MUSTAPHA

Department of Neurosciences

October

ASSOC. PROF. DR. MUHAMAD SAIFUL BAHRI YUSOFF

Director, Centre for Development of Academic Excellence (CDAE)

List of SPEAKERS

January 01

- Dr. Afiq Izzudin A Rahim
- Assoc. Prof. Dr. Tuan Hairulnizam B. Tuan Kamauzaman

February 02

- Assoc. Prof. Dr Mohd Asnizam Asari
- Dr Norzila Ismail/ Ms. Taif Kareem Khalaf

March 03

- Prof. Dr. Andee Dzulkarnaen Zakaria
- Dr. Tengku Ahmad Damitri Al-Astani Tengku Din
- Assoc. Prof. Dr. Md Salzihan Md Salleh

April 04

- Prof. Dato' Dr. Nik Hisamuddin Nik Ab. Rahman
- Dr. Muhammad Faeid Othman

May 05

- Assoc. Prof. Dr Zaharah Sulaiman
- Nor Akma Binti Mat Junoh @ Yunus

SPEAKERS

June 06

- Profesor Dr. Zakuan Zainy Bin Deris
- Assoc. Prof. Dr. Azian Binti Harun

July 07

- Assoc. Prof. Dr. Norhafiza Binti Mat Lazim
- Dr. Shahidatul Adha Binti Mohamad

August 08

- Dr Wan Norlina Wan Azman
- Profesor Dr. Zilfalil Bin Alwi

Serptember 09

- Dr. Mohd Nor Azim Bin Ab Patar
- Dr. Sharifah Zubaidiah Syed Jaapar

October 10

- Assoc. Prof. Dr. Muhamad Saiful Bahri Bin Yusoff
- Professor Dr Kamarul Aryffin Bin Baharuddin
- Assoc. Prof. Dr. Zul Izhar Bin Mohd. Isma
- Dr. Nurhanis Syazni Roslan

DETAILS *of* PRESENTATION

QR code for video recording

or click HERE

Division of RESEARCH & INNOVATION
SCHOOL OF MEDICAL SCIENCES, USM presents

MONTHLY RESEARCH PRESENTATION

January Rotation: DIGITAL SCIENCES & HEALTH PROFESSIONS Cluster

Date: Thursday, January 25, 2024 Time: 0810-0910

WEBINAR NUMBER 2514 511 2694 PASSWORD mrpjan2024

Presenter 1

DR. AFIQ IZZUDIN A. RAHIM
(Department of Community Medicine)

Thumbs Up or Down? Patients' Voices on Facebook Fuel AI-driven Hospital Care in Malaysia

Presenter 2

Smart Medical Oxygen Tank Monitoring Device

ASSOC. PROF. DR. TUAN HAIRULNIZAM BIN TUAN KAMAUZAMAN
(Department of Emergency Medicine)

Chairperson

Head of Cluster
DIGITAL SCIENCES & HEALTH PROFESSIONS

PROFESSOR DR. KAMARUL IMRAN BIN MUSA
(Department of Community Medicine)

All are invited

CPD Point (MMA & USM) is provided

JOIN BY VIDEO SYSTEM

Dial 2514 511 2694@usm-cmr.webex.com
You can also dial 210.4.202.4 and enter your webinar number.

JOIN BY PHONE

+60-3-9212-7625 Malaysia Toll
Access code: 2514 511 2694

Dr Afiq Izzudin Bin A Rahim
drafiqrahim@usm.my

Thumbs Up or Down? Patients' Voices on Facebook Fuel AI-Driven Hospital Care in Malaysia

Embark on a journey into the cutting-edge realm of healthcare quality assessment with this groundbreaking research. Dr. Afiq Izzudin Bin A Rahim presents a pioneering study on the development and application of a Machine Learning Sentiment Analyzer and Quality Classifier (MLSAQC) tailored to analyze hospital patient satisfaction from Facebook reviews in Malaysia.

Delve into a comprehensive exploration of the intersection between healthcare, social media, and machine learning. The research commences with an in-depth review of literature, unraveling the intricacies of patient satisfaction surveys, social media data analysis, SERVQUAL dimensions, machine learning for sentiment analysis, and the correlation of hospital accreditation with patient satisfaction. This review serves as the cornerstone for the conceptual framework and methodology employed in the study.

The methodology unfolds in two distinct phases, each brimming with innovation and technological prowess. Phase 1 witnesses the birth of MLSAQC, a marvel of modern technology designed to classify SERVQUAL dimensions and conduct sentiment analysis of Facebook reviews. Phase 2 unleashes the power of MLSAQC to dissect patient satisfaction and dissatisfaction factors from the Facebook reviews of selected hospitals in Malaysia.

Prepare to be astounded by the findings, as MLSAQC emerges triumphant in its ability to automatically classify SERVQUAL dimensions and sentiments from Facebook reviews, unearthing invaluable insights into patient satisfaction and dissatisfaction factors. The study fearlessly confronts limitations, shedding light on the need for further refinement of the MLSAQC model and the formidable challenges of data collection from social media platforms.

As the dissertation draws to a close, a captivating discussion ensues, unraveling the implications of the findings, charting the course for future research, and offering compelling recommendations for healthcare practitioners and policymakers. This study stands as a beacon of hope, illuminating the path to healthcare quality improvement through the innovative application of machine learning techniques to analyze patient satisfaction from social media data.

Prepare to be captivated by the potential of MLSAQC as it unlocks the secrets hidden within social media data, offering a transformative tool for healthcare quality assessment. Join the ranks of those who dare to push the boundaries of possibility and embrace the future of healthcare quality assessment.

Assoc. Prof. Dr. Tuan Hairulnizam B. Tuan Kamauzaman
hairulnizam@usm.my

SMART MEDICAL OXYGEN TANK MONITORING DEVICE

Medical oxygen is a cornerstone of healthcare treatment. The reliability of oxygen delivery systems is paramount, as any interruption or inaccuracy can have serious life-threatening consequences. Manual monitoring requires staff to routinely check the oxygen levels, a task that can be burdensome especially in pre-hospital care. The manual process of calculating the remaining time of oxygen tank is labour intensive and prone to human error. The equation for determining the remaining time is as follow:

$$O2 \text{ remaining time (min)} = [\text{remaining psi} \times \text{tank factor}] / \text{flow rate (L/min)}$$

Smart Medical Oxygen Tank Monitoring Device (SMOTMD) aims to automate this calculation. By incorporating high-precision oxygen sensors and microcontrollers, this device can provide real-time monitoring of oxygen tank levels, significantly preventing out-of-gas scenario. The device utilizes state-of-the-art sensors to measure oxygen concentration accurately and relay this information continuously to a central monitoring system. SENSATA PTE7300-34DN-0B200BN pressure sensor and Honeywell flow sensors are incorporated in SMOTMD. The accuracy of the sensors is utmost important to ensure the reliability of the calculated O2 remaining time. We determined that the errors between the SMOTD and analog pressure gauges have a mean value of 4.609 and a standard deviation of 2.0929. The errors are normally distributed, by the Anderson-Darling normality test. The descriptive statistics and visualizations offer a comprehensive overview of the error distribution, showing that the variation in errors is within an acceptable range. The consistent pattern observed across the 30 data sets indicates reliable performance of the digital gauges with errors remaining within 10% of the analog reading.

We proceeded to determine if SMOTMD could predict the O2 tank runtime within acceptable error margin. We plotted the lap time of both displayed and actual O2 runtime because the calculated time is instantaneous based on the sampled pressure and flow readings (Figure 1). Getting the lap time difference minimizes the effect of varying flow rates. Based on the lap time difference, it is found that the SMOTMD has 1.95% error on the estimated lap time, suggesting that the SMOTMD is extremely accurate in displaying the instantaneous O2 runtime.

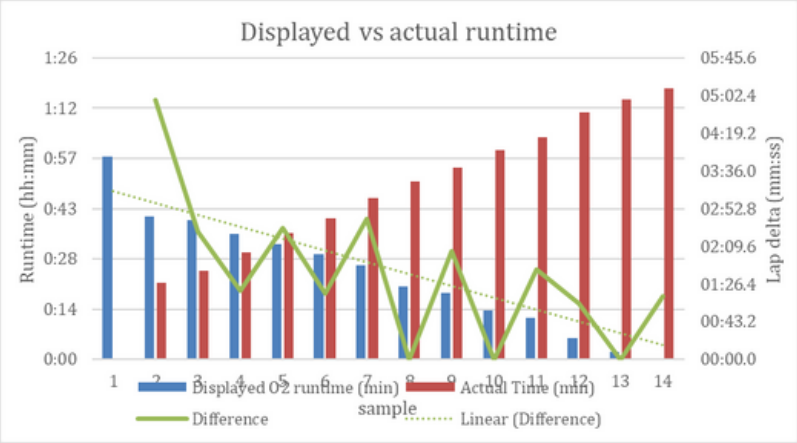


Figure 1: *The combo chart of the O2 runtime comparison between SMOTMD and actual time*

The comprehensive design and fabrication approach, combining FDM and SLA 3D printing technologies, ensures that the SMOTMD is robust, accurate, and reliable. The final setup of SMOTM is as shown in Figure 2. SMOTMD have also successfully passed SIRIM tests including functionality test, insulation resistance test, pressure test, drop test, weight drop impact test, dry heat test, change of temperature test, resonance frequency detection test, sine sweep vibration test, mechanical shock test and tensile strength test (REPORT NUMBER: 2024MA0816). SMOTMD is classified as Medical Device under Seksyen 2, Akta Peranti Perubatan 2012 (Akta737) by the Ministry of Health Medical Device Authority.

Figure 2: *Final setup of SMOTMD applied to a typical oxygen tank.*

Division of
RESEARCH & INNOVATION
SCHOOL OF MEDICAL SCIENCES, USM
presents

MONTHLY RESEARCH PRESENTATION

QR code for video recording

or click HERE

February Rotation: HONEY & NATURAL PRODUCT SCIENCES Cluster

Date: Thursday, February 29, 2024 Time: 0810-0910

WEBINAR NUMBER 2513 239 4132 PASSWORD mrpfeb2024

Presenter 1

DR. NORZILA ISMAIL

MS. TAIF KAREEM KHALAF

(Department of Pharmacology)

Unlocking The Therapeutic Potential: Investigating Pereskia Bleo for Augmenting NK Cell Activity Against MDA MB 231 Breast Cancer Cells

Presenter 2

Neuroprotective Effects and Mechanism of Tualang Honey Silver Nanoparticles on Kainic Acid-induced Neurodegeneration in Rat Hippocampus

ASSOC. PROF. DR. MOHD ASNIZAM ASARI

(Department of Anatomy)

Chairperson

Head of Cluster
HONEY & NATURAL PRODUCT SCIENCES

ASSOC. PROF. DR. MAHANEEM MOHAMED
(Department of Physiology)

All are invited

CPD Point (MMA & USM) is provided

JOIN BY VIDEO SYSTEM

Dial 2513 239 4132@usm-cmr.webex.com
You can also dial 210.4.202.4 and enter your webinar number.

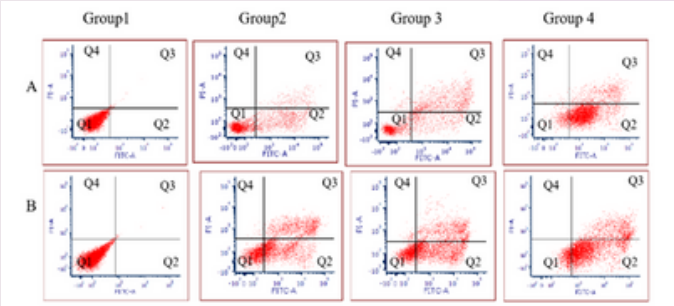
JOIN BY PHONE

+60-3-9212-7625 Malaysia Toll
Access code: 2513 239 4132

Dr. Norzila Ismail (*norzila_ismail@usm.m*) **&**
Ms. Taif Kareem Khalaf (*taif@uowasit.edu.iq* ; *taif@student.usm.my*)

Unlocking the Therapeutic Potential: Investigating Pereskia bleo for Augmenting NK Cell Activity Against MDA-MB-231 Breast Cancer Cells

Natural Killer (NK) cells are a crucial component of the body's immune system, playing a pivotal role in defending against viral infections and cancer. Interestingly, several medicinal plants have been identified to possess immunomodulatory properties that can enhance NK cell activity. Compounds found in plants have been shown to stimulate NK cell function, thereby bolstering the body's ability to combat pathogens and cancer cells. Harnessing the power of these medicinal plants not only offers a natural approach to supporting immune health but also underscores the intricate relationship between nature and human well-being, highlighting the potential for botanical interventions in promoting immune system vitality. Five dilutions of the methanol extract of Pereskia bleo leaves (MEPB) (60, 30, 15, 7.5, and 3.75 µg/ml) were used to assessed NK cells cytokines in healthy blood donors (n=3) by ELISA. For further purification, NK cells were assessed by flow cytometry used antibodies (CD56 and CD3). The NK cells were manually counted by a haemocytometer in blood from healthy (n=3) and Triple-negative breast cancer patient donors (n=3). Apoptotic levels were determined by apoptosis assay and expression of NK cells-mediated pathways (IFN-γ, perforin, and granzyme B). All the concentration of MEPB leaves has shown remarkable potency in stimulating the activity of crucial blood cells, notably NK cells. The concentration of (7.5 µg/ml) of MEPB leaves prompts the upregulation of essential immunomodulatory factors, such as interleukin (IL)-18, IL-12, IFN-γ, perforin, and granzyme B, pivotal for robust immune responses against pathogens and cancerous cells. Furthermore, it effectively inhibits the production of immunosuppressive factors like IL-10 and IL-8, thereby bolstering the body's defense mechanisms. The ELISA data analysis revealed a notable disparity in the number of Natural Killer (NK) cells between cancer patients and healthy individuals, with cancer patients exhibiting a lower count. Flow cytometry analysis demonstrated that approximately 87.09±0.043% of the CD3-CD56+ cell population comprised NK cells. Lastly, plant extract at 7.5 µg/ml caused a significant increase in apoptosis by inducing NK cells- IFN-γ expression, and NK cells-cytotoxic granules (perforin and granzyme B) on MDA-MB-231 breast cancer cells. Based on current findings, it can be suggested that MEPB leaves causes cellular death via triggering apoptosis through NK cells- mediated pathways, which should be further explored for the identification of active compounds responsible for these observed effects. Therefore, MEPB can be used in the pharmaceutical development of anticancer agents for breast cancer therapeutics.



Assoc. Prof. Dr. Mohd Asnizam Asari
asnizam@usm.my

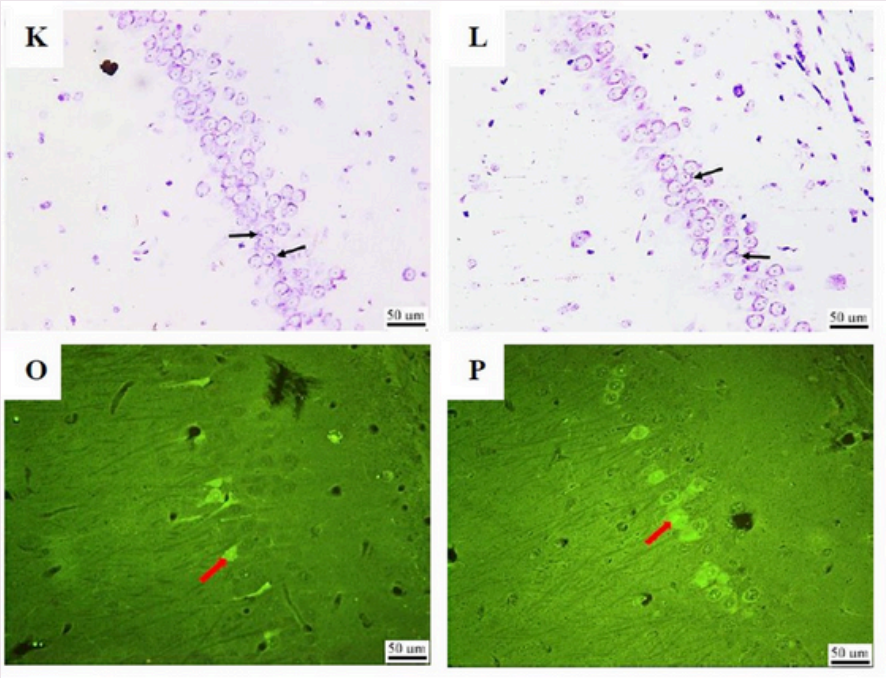
Neuroprotective Effect and Mechanism Of Tualang Honey- Silver Nanoparticle On Kainic Acid-Induced Neurodegeneration In Rat Hippocampus

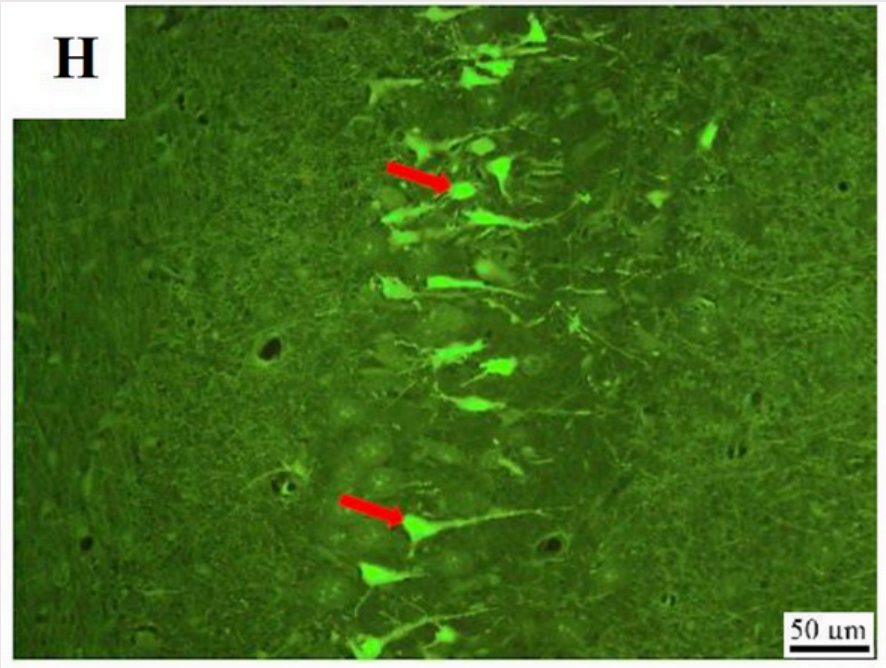
Neurodegeneration is a feature of many chronic disorders of the central nervous system that result in the deterioration of neuronal structure and function. Experimental induction of excitotoxicity-mediated neurodegeneration by kainic acid (KA) has been associated with various mechanisms, including oxidative stress, excessive inflammatory response, and apoptosis. Tualang honey (TH), which contains a powerful natural antioxidant, is increasingly studied as an alternative prevention for several neurodegenerative diseases. Despite the numerous studies highlighting the benefits of TH, the application of silver nanoparticles synthesised from TH remains limited. Thus, this research aimed to evaluate the neuroprotective effects of Tualang honey- silver nanoparticles (THSN) against KA-induced neurodegeneration in the rat hippocampus. THSN was synthesised and characterised by UV-Visible (UV-Vis) spectroscopy, X-ray Diffraction (XRD), Fourier Transform Infrared (FTIR) spectroscopy, Field Emission Scanning Electron Microscope (FESEM), and Transmission Electron Microscope (TEM).

A total of 288 male Sprague Dawley rats were randomised into three experimental phases (including behavioural assessment, biochemical measurement, and histological studies). In each phase, 96 rats were randomly divided into eight major groups (n = 12/major group): control, THSN 10 mg, THSN 50 mg, KA only, KA + TH, KA + THSN 10 mg, KA + THSN 50 mg, and KA + Topiramate (TPM). Each major group was subdivided into 24 h and five days subgroups, comprising 16 subgroups (n = 6/subgroups). The rats were given distilled water, TH (1.0 g/kg), THSN (10 mg/kg or 50 mg/kg), or TPM (40 mg/kg) orally, five times at 12 h intervals. Subcutaneous injections of saline solution or KA (15 mg/kg) were given 30 min after the last oral treatments. Before the animals were euthanised, behavioural assessments were conducted using the open field test and a novel object recognition test. Biochemical, toxicological, and histological analyses were performed on the hippocampus at 24 h and 5 days following KA induction.

KA administration on rats resulted in seizures, alteration in locomotor activity, and memory impairment. Additionally, KA increased oxidative stress (as evidenced by significant increases in MDA, PCO, and NOx levels and significant decreases in CAT, SOD, GSH and TAS levels), TNF-α level (neuroinflammatory marker), caspase-3 activity (apoptosis marker), and subsequent neurodegeneration in the hippocampus. The result for renal and liver function test showed that THSN caused no significant toxic effect on animals.

Notably, TH and THSN pre-treatment increased the seizure latency, improved memory deficits, and reduced oxidative stress, neuroinflammation, apoptosis, and neuronal damage of rats' hippocampus in the KA-induced neurodegeneration model. In conclusion, TH and THSN exerted their neuroprotective effects against KA-induced neurodegeneration via antioxidant, anti-inflammatory, and anti-apoptotic properties. Further clinical studies need to be conducted to establish TH and THSN as a potential neuroprotective agent.





QR code for video recording

or click HERE

RESEARCH & INNOVATION DIVISION
School of Medical Sciences
Universiti Sains Malaysia
presents

MONTHLY RESEARCH PRESENTATION

via webex by cisco

by

Date Thursday, March 21, 2024 **Time** 0810 - 0910

WEBINAR NUMBER **2513 398 1015** PASSWORD **mrpmac2024**

Presenter 1

Colorectal Cancer Research: Landscape in USM

PROFESSOR DR. ANDEE DZULKARNAEN BIN ZAKARIA
(Department of Surgery)

Presenter 2

Frontiers in Breast Cancer Research USM: Promising Paths

DR. TENGKU AHMAD DAMITRI AL-ASTANI TENGKU DIN
(Department of Chemical Pathology)

Presenter 3

NGS in Cancer Research: USM Perspective

ASSOC. PROF. DR. MD SALZIHAN MD SALLEH
(Department of Pathology)

Chairperson

Head of Cancer Research & Oncology (CRO) Cluster

ASSOC. PROF. DR. WAN FAIZIAH WAN ABDUL RAHMAN
(Department of Pathology)

JOIN BY VIDEO SYSTEM

Dial 2513 398 1015@usm-cmr.webex.com
You can also dial 210.4.202.4 and enter your webinar number.

JOIN BY PHONE

+60-3-9212-7625 Malaysia Toll
Access code: 2513 398 1015

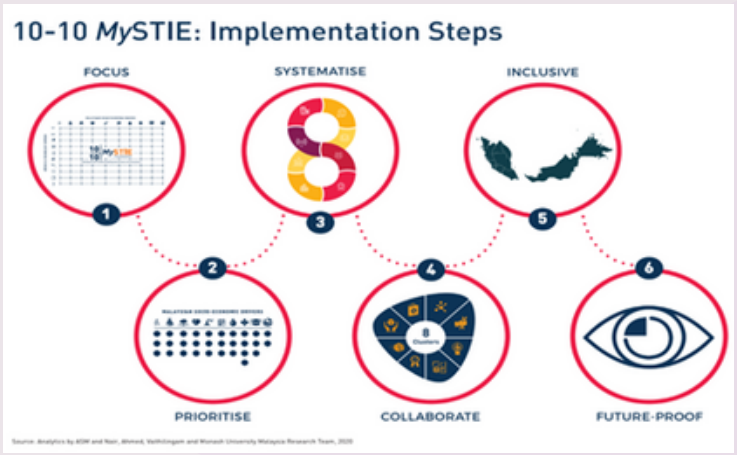
All are invited

CPD Point (MMA & USM) is provided

Profesor Dr. Andee Dzulkarnaen Zakaria
andee@usm.my

Colorectal Cancer Research: Landscape in USM

The evolution of colorectal surgery treatment and management of colorectal malignancy was developing rapidly in which, beyond the conventional traditional methods till current updates, technology and practice were introduced to manage this common malignancy disease, mainly to give maximum benefit to patients, especially in painless and faster recovery and yet prolonged survival and to reduce the complications from the treatments and recurrence. From research based on fundamental evidence to translational and clinical application, it has been applied to current practice to treat this colorectal cancer. The progression from past, present and future for colorectal cancer research at USM will be highlighted. Three pillars of research for our unit come from student project dissertations, internal and external study collaboration and lastly from an industrial agency clinical trial plus "What's next" theme. All in all, this output was translated by numerous scientific publications and clinical applications in our hospital.



Dr. Tengku Ahmad Damitri Al-Astani Tengku Din
damitri@usm.my

Frontiers in Breast Cancer Research at USM: Promising Paths

The University of Science Malaysia (USM) stands at the forefront of breast cancer research, boasting a diverse and interdisciplinary team comprising experts from esteemed health departments and schools, including Chemical Pathology, Pathology, Surgery, Psychiatry, Oncology, Family Medicine, Medical Education, Public Health of PPSP, School of Health Sciences, INFORMM, and IPPT. This collective expertise is dedicated to conducting rigorous clinical studies, in vivo experiments, and in vitro investigations aimed at advancing the realms of early detection and treatment efficacy in breast cancer. Central to USM's research endeavors is the establishment of the Breast Cancer Awareness and Research Unit (BestARi) at Hospital USM, serving as a pivotal nexus for collaborative discourse and strategic planning of future research trajectories.

The research pursuits at USM encompass a meticulous exploration of potential biomarkers for early breast cancer detection, with focused examinations on microRNA and metabolomics derived from various biological sources such as tissues, urine, and blood specimens. Furthermore, precision medicine studies are diligently conducted to tailor chemotherapy regimens based on individual patient characteristics, thereby optimizing treatment outcomes. The integration of artificial intelligence (AI) technologies facilitates the comprehensive analysis of diverse breast cancer imaging modalities alongside demographic and clinical data, enhancing diagnostic precision. Concurrently, ongoing module development efforts center on evaluating patient resilience, with a specific emphasis on integrating counseling methodologies to extend emotional and psychological support to individuals navigating the complexities of breast cancer diagnosis and treatment.

USM's academic commitment extends to in-depth genetic investigations targeting relapse patterns in triple-negative breast cancer patients, with the overarching goal of refining prognostic strategies and treatment efficacy. Grounded in a comprehensive care approach, USM endeavors to cultivate a supportive ecosystem that nurtures holistic engagement between breast cancer patients and their families throughout the treatment continuum. These scholarly pursuits underscore USM's unwavering dedication to pioneering advancements in breast cancer research and care, promising enhanced patient outcomes and well-being in the academic landscape.

Assoc. Prof Dr. Md Salzihan Bin Md Salleh
salzihan@usm.my

Next Generation Sequencing (NGS) in cancer research. USM perspective

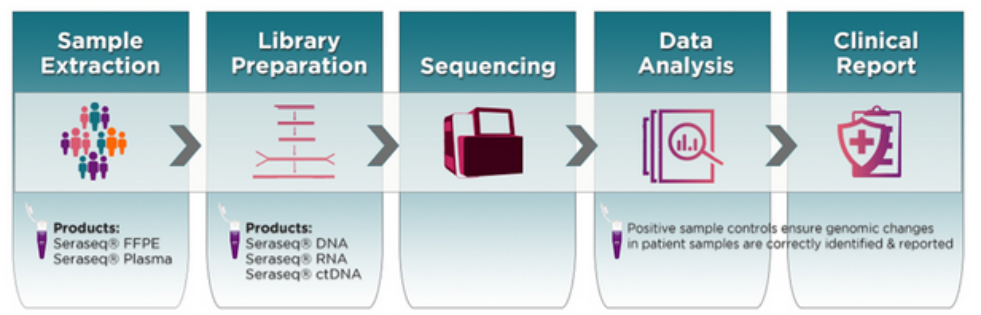
NGS is a cutting-edge technology in genomic science because it enables rapid and cost-effective sequencing of genomes, exomes, and transcriptomes in a multi-level avenue for clinical application in the medical field, such as in molecular screening and monitoring of cancer outcomes.

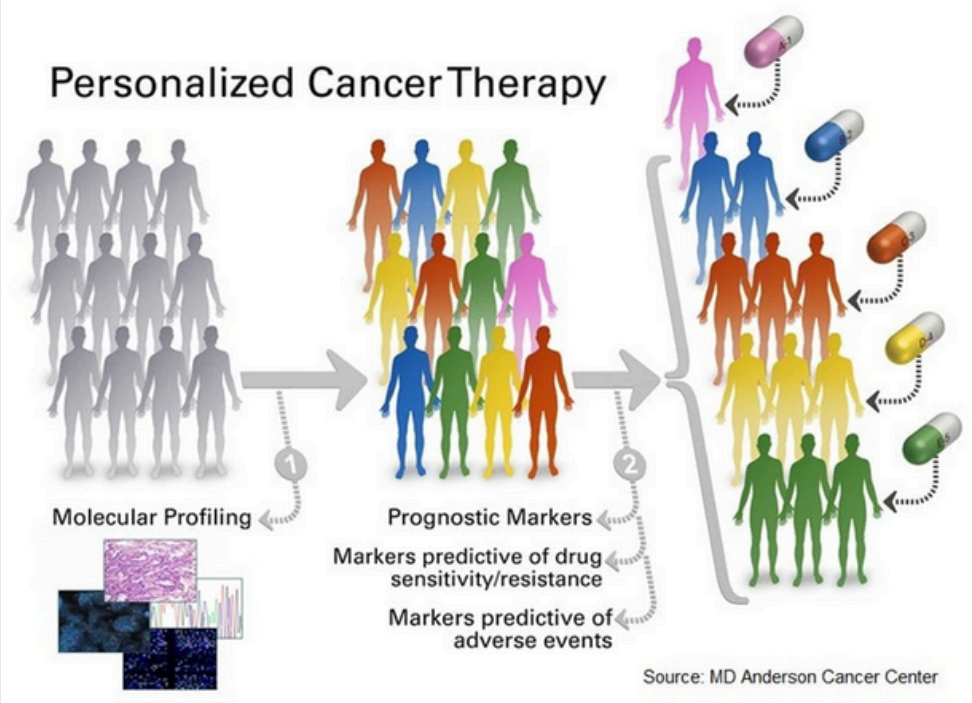
USM is a frontrunner in clinical sciences, and through this research will open opportunities for personalized precision medicine to uncover genetic markers to predict disease risk and fashion treatment plans, enable novel drug discoveries that target crucial driver genes, applied in OMIC science to analyse nuclei acid component to explain the resistance and biodiversity of tumour migrating cells in cancers, and lastly, as precision guide on the use of targeted inhibitors on mutated genes such as anti-KRAS, anti-BRAF etc. The research will not only revolutionise the oncology sector but will also improve the diagnosis and prognosis of cancer.

NGS involves two basic phases: the DNA isolation phase from desirable samples (FFPE, blood, or fresh tissue) and the sequencing phase. The latter involves four steps namely achieving a quality library with a desirable peak between 150-450bp, loading into the sequencer for sequencing by synthesis and generating a fastQ data format, bioinformatics data analysis and interpretation, and lastly; validation on existing online databases such as dbSNP, Franklin by Genoox, Varsome, EnsembI etc.

Interestingly, scintillating and remarkable discoveries were revealed at the tail end of the research, proving NGS can identify early-stage cancers by detecting circulating tumour DNA (ctDNA) in blood or tissue samples, providing precise tumour characterisation for specific mutations and amino acids alterations, and assessing cancer development risk based on genetic predilection. Putting all these findings together, through NGS, we can identify specific gene mutations that can be targeted with specific cancer therapies, and also predict the patient's response to these specific treatments based on their genetic profile.
How ready are we in our fight against cancer? how aggressively do we want to fight the cancer menace? We must be prepared to incorporate NGS wholly into our routine clinical management of cancer patients, uncovering the mechanism of cancer and mutagen resistance to evade treatment from chemotherapeutics agents. This study drives the development of innovative therapies, especially targeted therapies.

Through the success of the research in providing a comprehensive insight into the genetic landscape of cancer, NGS has potentially transformed cancer care by providing patients with promising precision therapies with good outcomes and advancing our understanding of this complex disease as well.


Sample Extraction
Library Preparation
Sequencing
Data Analysis
Clinical Report
Products:
Seraseq® FFPE
Seraseq® Plasma
Products:
Seraseq® DNA
Seraseq® RNA
Seraseq® ctDNA
Positive sample controls ensure genomic changes in patient samples are correctly identified & reported


Personalized Cancer Therapy
1
2
Molecular Profiling
Prognostic Markers
Markers predictive of drug sensitivity/resistance
Markers predictive of adverse events
Source: MD Anderson Cancer Center

RESEARCH & INNOVATION DIVISION
School of Medical Sciences
Universiti Sains Malaysia
presents

MONTHLY RESEARCH PRESENTATION

via webex by CISCO

QR code for video recording

or click HERE

Date Thursday, April 25, 2024 **Time** 0810 - 0910

WEBINAR NUMBER **2516 012 0111** PASSWORD **mrpapr2024**

Presenter 1

The Application of GIS in Injury Research

PROF. DATO' DR. NIK HISAMUDDIN NIK AB. RAHMAN
(Department of Emergency Medicine)

Presenter 2

Comparing Low Volume Versus Conventional Volume of Polyethylene Glycol for Bowel Preparation During Colonoscopy: A Randomised Controlled Trial

DR. MUHAMMAD FAEID OTHMAN
(Department of Surgery)

Chairperson

Head of Trauma, Surgical & Critical Care Cluster

ASSOC. PROF. DR. TUAN HAIRULNIZAM B. TUAN KAMAUZAMAN
(Department of Emergency Medicine)

JOIN BY VIDEO SYSTEM Dial 2516 012 0111@usm-cmr.webex.com
You can also dial 210.4.202.4 and enter your webinar number.

JOIN BY PHONE +60-3-9212-7625 Malaysia Toll
Access code: 2516 012 0111

All are invited

CPD Point (MMA & USM) is provided

Professor Dato' Dr. Nik Hisamuddin Nik Ab. Rahman
hisamuddin@usm.my

The Application of GIS in injury Research

The idea that place and location can influence health is a very old and familiar concept in Western Medicine. As far back as the time of Hippocrates, (460-370 BC), the father of Modern Medicine, physicians have observed that certain diseases seem to occur in some places and not in others. Frequently, attempts to understand why certain diseases seem to only occur in certain places and not others has led to new insights into the nature of the disease itself . One of the historic findings occurred in mid 1800s in London during the outbreak of Cholera. Dr John Snow, an anesthesiologist, found that there was a unique geographical distribution of the disease outbreak that follows the pattern of water piping and irrigation in particular area of the city that matched the area of cases. The September 1854 cholera outbreak was centered in the Soho district, close to Snow's house. Snow mapped the 13 public wells and all the known cholera deaths around Soho, and noted the spatial clustering of cases around one particular water pump on Broad Street (now called Broadwick Street). He examined water samples from various wells under a microscope, and confirmed the presence of an unknown bacterium in the Broad Street samples. Despite strong scepticism from the local authorities, he had the pump handle removed from the Broad Street pump and the outbreak quickly subsided. Snow subsequently published a map of the epidemic to support his theory.

This classic mapping study has been the historic milestone into the GIS mapping in health in modern days. As the study of epidemiology (epi=among; demos=people; logos=study) matured, simultaneously this is followed by the discipline of Medical Geography (defined as the branch of Human Geography) concerned with the geographic aspects of health (status) and health care (systems). Naturally, the definition of epidemiology is measurement of 'frequency', 'distribution', 'determinants' of disease in a given population. All of these require GIS application to make the information easy to understand, interpret and take action. Generally, the objectives of a GIS are the management (acquisition, storage and maintenance), analysis (statistical and spatial modeling), and display (graphics and mapping) of geographic data. GIS is a valuable tool to assist in health research, in health education, and in the planning, monitoring and evaluation of health programs and health system.. It has been utilised in the field of disaster medicine (flooding and forest fire), disease outbreak (Covid 19, cholera, HIVs and dengue), injury (firearm, road safety and domestic violence) and many others.

With regards to road traffic injury management, Geographical Information System (G.I.S) is new powerful computing tool for managing large amounts of heterogeneous data and would be invaluable in addressing sections of roads with prevalent road traffic crash occurrences. The G.I.S. software can be used to create data layers of the above mentioned attributes and spatial distributions at every identified crash spot in the following manner:

i) Location map showing crashes spots
ii) Digital Terrain Model at the crashes spots
iii) Road traffic crashes distribution by types i.e. fatal, serious and slight injuries and time (day light or night).

This information forms a basis for determining:

a) whether the vertical and or horizontal alignment needs to be re-designed and or a full rehabilitation of the road done, and or
b) a road intersection needs to be improved so that grade separation can be introduced and or
c) the road furniture needs to improved to avoid road users making ambiguous decisions when obtaining services from the road facility.

Thus using this tool, several combinations of spatial information can be analyzed through the combination of different layers, in the process of reducing road traffic crashes on our roads. This new technology is a powerful tool which will facilitate fast retrieval of information and is easy to update when the need arises. In addition to that it has the capability of adopting to the changing needs of the road planners and engineers in the process of these stakeholders would want to re-design the road transport facility for the safety of its users.

The GIS application has so much to offer in all health sectors that will assist the providers in analyzing the need for healthcare, access to health care, evaluating inequalities in access, locating health services and determining the general epidemiology of any disease. Even though the use of GIS in health has shown an exponential growth, it remains the field slow to grow and mature. However it remains a powerful tool for researchers in medicine to utilize to improve the health of our communities.

Dr Muhammad Faeid Othman
faeid@usm.my

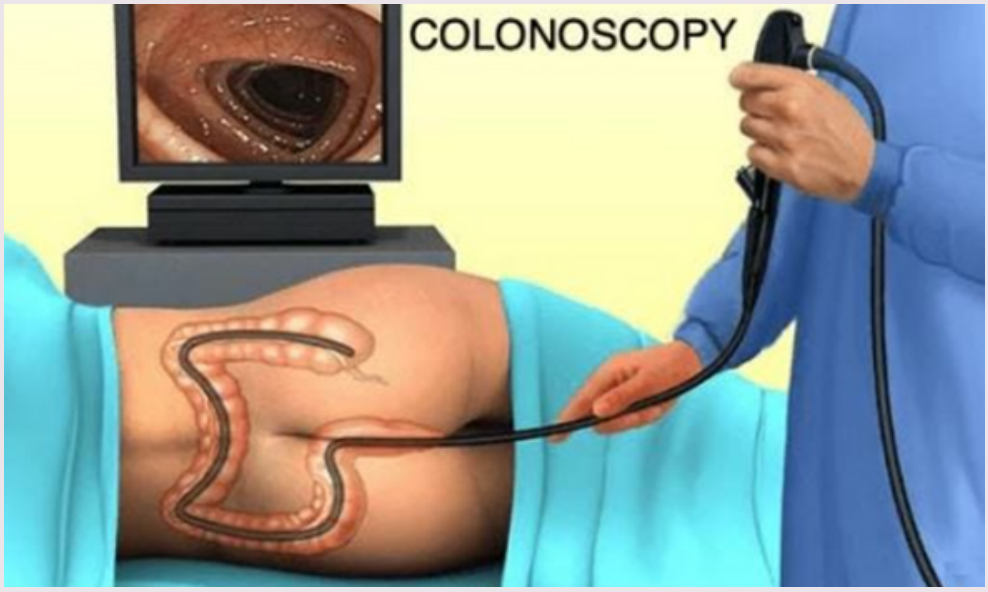
Comparing Low Volume Versus Conventional Volume of Polyethylene Glycol for Bowel Preparation during Colonoscopy: A Randomised Controlled Trial

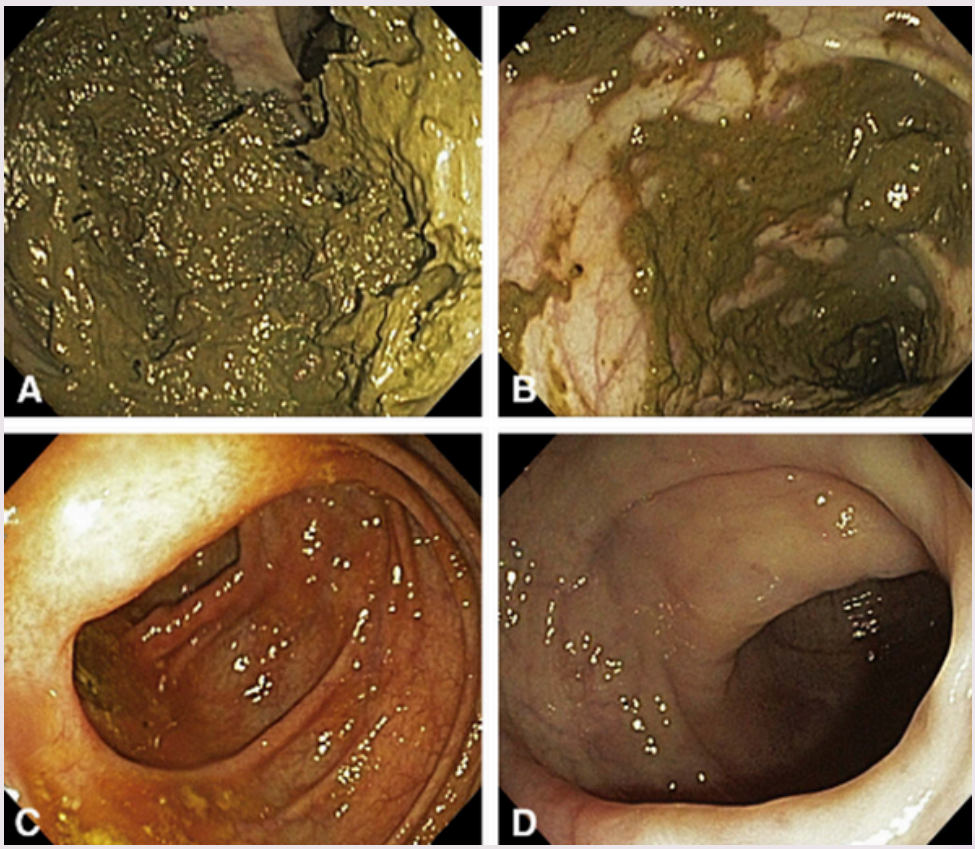
The overall incidence of colorectal cancer is increasing in Asia, especially in the rapidly developing countries of Southeast Asia, such as Malaysia. Colonoscopy is the preferred technique for evaluating the colonic and distal ileal mucosa for diagnosing and treating colorectal cancer. High-quality colonoscopy has been associated with favourable patient outcomes in colorectal cancer. Furthermore, the success of colonoscopy is linked to attaining cecal intubation and the adenoma detection rate, which directly corresponds to the quality of bowel preparation. To achieve good quality bowel preparation before colonoscopy, adequate cleansing of the colonic wall of the stool and staining fluid is needed, for which the two most widely used formulations are polyethylene glycol (PEG) and sodium phosphate (NaP). Polyethene glycol (PEG) solution is widely used as a colonoscopic bowel cleaning agent, although some patients are intolerant due to the need to ingest large solution volumes and unpleasant taste. A low-volume solution may enhance patient tolerability and compliance in bowel preparation.

Therefore, we conducted a randomised controlled trial to compare the effectiveness of two different volumes of PEG solution for colon preparation before colonoscopy. Accordingly, this study compared the effectiveness of two different PEG volumes for bowel preparation before colonoscopy in terms of bowel cleanliness, completeness of colonoscopy, patient tolerability and colonoscopy duration. Using a prospective randomised controlled single-blinded study design, 164 patients scheduled for colonoscopy were allocated to two groups (n = 82 patients in each) to receive either the conventional PEG volume (3 L, control group) or the low volume (2 L, intervention group). The Boston Bowel Preparation Scale (BBPS), a validated scale for assessing bowel cleanliness during colonoscopy, was used to score bowel cleanliness in three colon segments. Secondarily, colonoscopy completeness, tolerability to drinking PEG and the duration of colonoscopy were compared between the groups.

There were no statistically significant differences between the two intervention groups in terms of bowel cleanliness ($P = 0.119$), colonoscopy completion ($P = 0.535$), tolerability ($P = 0.190$) or the amount of sedation/analgesia required (midazolam, $P = 0.162$; pethidine, $P = 0.708$). Only the duration of colonoscopy differed between the two groups (longer duration in the control group, $P = 0.039$).

In conclusion, low-volume (2 L) PEG is as effective as the standard 3 L solution in bowel cleaning in bowel preparation before the colonoscopy.


COLONOSCOPY


A
B
C
D

QR code for video recording

or click HERE

RESEARCH & INNOVATION DIVISION
School of Medical Sciences
Universiti Sains Malaysia
presents

MONTHLY RESEARCH PRESENTATION

via webex by cisco

Cluster

Date Thursday, May 30, 2024 **Time** 0810 - 0910

WEBINAR NUMBER **2519 290 8934** PASSWORD **mrpmay2024**

Presenter 1

Breastfeeding Advocacy & Support: Strengthening The Clinical & Community Engagement Research

ASSOC. PROF. DR. ZAHARAH SULAIMAN
(Women's Health Development Unit)

Presenter 2

Obesity Management in Malaysia: Are The Services Meeting Community Needs?

DR. NOR AKMA BINTI MAT JUNOH @ YUNUS
(Department of Family Medicine)

Chairperson

Co-Head of Public Health, Aging & Lifestyle Cluster

ASSOC. PROF. DR. IMRAN BIN AHMAD
(Department of Family Medicine)

JOIN BY VIDEO SYSTEM

Dial 2519 290 8934@usm-cmr.webex.com
You can also dial 210.4.202.4 and enter your webinar number.

JOIN BY PHONE

+60-3-9212-7625 Malaysia Toll
Access code: 2519 290 8934

All are invited

CPD Point (MMA & USM) is provided

Assoc. Prof. Dr. Zaharah Sulaiman
zaharah@usm.my

Breastfeeding advocacy and support: Strengthening the clinical and community engagement research.

Public health programs that promote and advocate for breastfeeding are essential to improving the health of both mothers and infants. This executive summary examines the complex terrain of promoting and assisting breastfeeding, highlighting the significance of enhancing research efforts in both clinical and community involvement in this field.

Breastfeeding provides many health benefits for mother and child, including lowering the risk of infections and chronic illnesses and enhancing mother-child bonding. Despite several apparent benefits, global breastfeeding rates remain below the recommended standards. Breastfeeding advocacy aims to overcome problems and make the proper settings available for breastfeeding mothers. This is through revising laws, creating conducive environments for mothers to nurse, and challenging paradigms that hinder breastfeeding.

Clinical research is vital to understanding the physiological details of the lactation process and matters concerning milk composition and newborns' feeding behaviour. Such research gives practical clinical guidelines to healthcare providers enabling them to render knowledgeable care and support to breastfeeding mothers even though there are still specific gaps in our understanding, including complex issues like the factors behind the difficulty of lactating and the preference of different demographics when breastfeeding.

The community engagement study seeks to identify how these sociocultural, economic, and environmental factors drive these behaviours concerning breastfeeding. This study addresses the issues through community stakeholders' reviews, seeks ways to deal with obstacles, and provides a culturally appropriate approach to encourage breastfeeding. Community engagement means that breastfeeding support activities should be customized according to the community's needs and implemented so that target communities can be reached.

Collaboration between the researchers of clinical and community engagement is imperative for the advancement of the advocacy and support programs of breastfeeding. Through utilising information from both disciplines, scientists can develop comprehensive models that consider the complex nature of biological, sociocultural, and environmental factors that affect breastfeeding outcomes.

In addition to that, it becomes necessary to develop research partnerships among researchers, healthcare providers, policymakers, and community-based organizations to facilitate the conversion of research findings into applicable policies and strategies.

In summary, promoting and supporting breastfeeding requires a multimodal strategy incorporating community engagement and clinical research. By establishing a connection between research and practical application, we may develop settings that empower and facilitate all women to breastfeed effectively, so enhancing the health and welfare of both newborns and mothers.

Dr. Nor Akma Mat Junoh @ Yunus
norakmayunus@usm.my

Obesity management in Malaysia: Are the services meeting community needs?

Obesity is a major health concern globally. International literature shows that people with obesity receive insufficient support from healthcare sources and services, with widespread miscommunication between patients and healthcare practitioners on obesity management. Malaysia has the highest obesity prevalence in the Southeast Asian region, with half of the adult population having excess body weight. Considering the high prevalence of obesity in Malaysia and the widespread issues in obesity management globally, Dr Nor Akma's PhD project explored the perceptions of obesity management in Peninsular Malaysia from patients' and healthcare providers' perspectives.

This research aimed to explore whether local obesity management services meet the needs of adults with obesity in Peninsular Malaysia. Guided by pragmatism, this research explored patients' and health practitioners' perspectives on obesity and obesity management in Peninsular Malaysia. A hermeneutic phenomenological qualitative study guided by the Socioecological model was conducted to explore the lived experience of adults with obesity and their perspectives on environmental influences on obesity. Informed by Levesque's framework of access to healthcare, a descriptive qualitative study was conducted to understand patients' experiences of accessing healthcare for obesity and their perspectives on behaviour changes following the care. To explore practitioners' perspectives on obesity healthcare, a cross-sectional online survey was conducted, informed by the Attribution Theory and COM-B model.

The studies found discrepancies between patients' needs and practitioners' perspectives on obesity management in Malaysia. Patients appreciate practitioner-initiated weight discussions but struggle with their weight loss efforts. They need more support in self-regulatory skills, personalised advice, and practical and motivational communication from healthcare practitioners. In contrast, practitioners feel that patients lack the motivation to lose weight. Current obesity management approaches do not adequately address patients' needs and facilitate behaviour change, and weight stigma is evident in health care. Over-focusing on weight loss has been shown to exacerbate patient self-stigma. While practitioners indicated that they are motivated and have the capability to engage in obesity management, they agreed that the health system does not provide sufficient support to patients. Practitioners need more support in the form of obesity management training and multidisciplinary obesity services. In addition, there are limited physical opportunities in current obesity management services that need to be addressed.

In conclusion, current obesity management services in Malaysia do not yet meet the needs of patients with obesity, which echoes the same gap internationally. Obesity management in Malaysia can be enhanced to tailor to the needs and sociocultural values of Malaysian patients. Patients have already experienced high levels of stigmatisation from society and self-stigmatisation within themselves. What they need from healthcare, therefore, is non-judgmental guidance and support that does not stigmatise them further.

RESEARCH & INNOVATION DIVISION
School of Medical Sciences
Universiti Sains Malaysia
presents

MONTHLY RESEARCH PRESENTATION

via webex by cisco

QR code for video recording

or click HERE

Cluster

Date Thursday, June 27, 2024 **Time** 0810 - 0910

WEBINAR NUMBER **2512 775 7027** PASSWORD **mrpjune2024**

Presenter 1

Elucidating The Genetic Variants of Type VI Secretion System 5 (T6SS-5) in Clinical and Environmental Strains of B. pseudomallei and their Potential Correlation with the Clinical Course of the Human Disease

PROFESSOR DR. ZAKUAN ZAINY BIN DERIS
(Department of Medical Microbiology & Parasitology)

Presenter 2

Medical Mycology Research: Opportunities and Challenges

ASSOC. PROF. DR. AZIAN BINTI HARUN
(Department of Medical Microbiology & Parasitology)

Chairperson

Head of ADVANCED BIOMEDICAL TECHNOLOGY Cluster

PROFESSOR CHAN YEAN YEAN
(Department of Medical Microbiology & Parasitology)

JOIN BY VIDEO SYSTEM

Dial 2512 775 7027@usm-cmr.webex.com
You can also dial 210.4.202.4 and enter your webinar number.

JOIN BY PHONE

+60-3-9212-7625 Malaysia Toll
Access code: 2512 775 7027

All are invited

CPD Point (MMA & USM) is provided

Professor Dr. Zakuan Zainy Deris
zakuan@usm.my

ELUCIDATING THE GENETIC VARIANTS OF THE TYPE VI SECRETION SYSTEM 5 (T6SS-5) IN CLINICAL AND ENVIRONMENTAL STRAINS OF Burkholderia pseudomallei AND THEIR POTENTIAL CORRELATION WITH THE CLINICAL COURSES OF THE HUMAN DISEASES

Burkholderia pseudomallei is endemic in Southeast Asia and tropical Australia. Despite increased knowledge about this neglected pathogen, the fatality rate of its infections remains high, partly due to the pathogen's ability to live intracellularly. One of the main virulence factors for internalization and intracellular survival of the pathogen is the Type Six Secretion System-5 (T6SS-5) (**Figure 1**). The aims of this study were to investigate the genetic variants of T6SS-5 B. pseudomallei and their potential correlation with clinical outcomes of the infections.

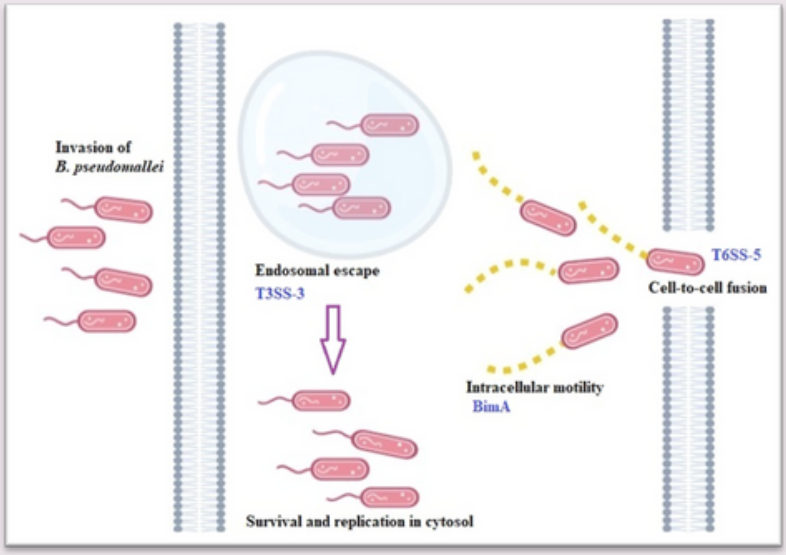


Figure 1: *B. pseudomallei initiates its intracellular life cycle by attachment and invasion into the host cells, followed by rapid escape from endosomal vacuole via T3SS3 expression. Once in the cytosol, intracellular motility of B. pseudomallei is facilitated by BimA polymerization of host cell actin. Upon contact with host cell membranes, B. pseudomallei induces cell to cell fusion through T6SS-5 action which result in subsequent multi-nucleated giant cells formation. (© Noreafifah Semail, PhD Thesis).*

This study employed multiplex PCR and whole genome sequencing (WGS) to analyze genetic variations in T6SS-5. Both univariate and multivariate analysis were used to determine the association between genetic variance and clinical presentations/outcomes of the disease.

The T6SS-5 gene cluster with locus tags of BPSS1493 to BPSS1511 in the chromosome 2 of B. pseudomallei (**Figure 2**). Three multiplex PCR assays were developed to detect 18 genes within the T6SS-5 cluster; Assay 1: tssC-5, tagD-5, tssA-5, hcp-5, tssB-5, tssF-5, vgrG-5; Assay 2: tssL-5, tssJ-5, tssG-5, virA-5, tagB-5, tagAB-5; Assay 3: clpV-5, tssE-5, tssM-5, virG-5, tssK-5. Primers designed for T6SS-5 genes were specific to B. pseudomallei. Optimal primer concentrations ranged from 2.5 to 20.0 µM, with an annealing temperature of 61°C. Detection limits were 10^3 CFU/ml (Assay 1), 10^8 CFU/ml (Assay 2), and 10^7 CFU/ml (Assay 3). The assays demonstrated 100% accuracy in initial evaluations. Among 88 clinical and 2 environmental isolates, 83% (73/88) of clinical and all environmental isolates carried all 18 target genes. Variations were noted in tssE-5, tssM-5, virG-5, and tssK-5 genes, but no significant correlation with clinical presentations and outcomes was found.

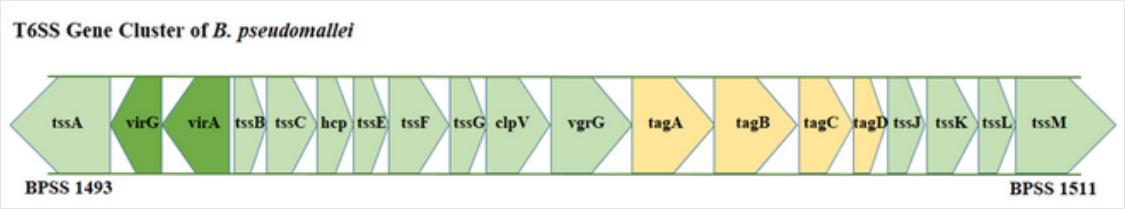


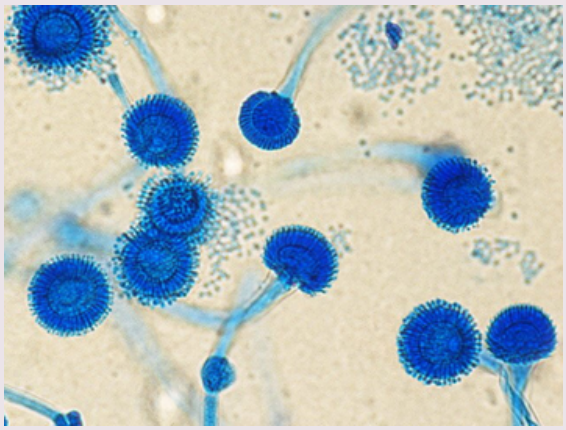
Figure 2: *Genetic map of the T6SS-5 gene cluster with locus tags of BPSS1493 to BPSS1511 in the chromosome 2 of B. pseudomallei. Grey, green and purple colour indicate tss genes, regulatory genes and tag genes respectively. (© Noreafifah Semail, PhD Thesis).*

WGS analysis of 18 isolates revealed 1495 single nucleotide polymorphisms (SNPs) in the T6SS-5 gene cluster, with the highest mutations in clpV-5. Significant associations were found between non-synonymous SNPs in clpV-5, tssM-5, tssA-5, and tagAB-5 and bloodstream infections. Additionally, 149 indel mutations were identified, primarily in tssA-5, clpV-5, tagAB-5, tagC-5, and tssM-5. However, there was no significance association observed between indels mutations of these genes with the clinical presentations and outcomes of melioidosis.

In conclusion, this study highlights the complexity of melioidosis pathogenesis and the importance of T6SS-5 as a virulence determinant, as well as the need for further research to unravel this virulence determinant. Looking to the conserved region in T6SS-5 gene cluster and the important of the protein expressed by this gene, T6SS-5 can be exploited as an important target for antimicrobial activity and vaccine development.

Assoc. Prof. Dr. Azian Harun
azian@usm.my

Medical Mycology Research: Opportunities & Challenges



Mycoses are infections in human and animal caused by pathogenic fungi. Approximately 6.5 millions of annual incidence of invasive fungal infections has been reported, resulting in 3.8 millions death worldwide. Among the most important fungal pathogens include Aspergillus fumigatus, Cryptococcus neoformans, Candida albicans, and the emerging drug resistant species such as Candida auris.

Many challenges are faced in medical mycology area. Scarcity of reliable, nationwide epidemiological data poses challenges in management planning of these infections in our population. A systematic nationwide epidemiological data, particularly on the clinical epidemiology, risk factors and antifungal susceptibility profiles, need to be collected and analyzed. Nationwide studies must be properly designed, using standardized antifungal susceptibility test protocol and breakpoints. Such data will be applied in strategic planning in combatting fungal infections not only in Malaysia, but also at the regional and international level.

The fungal diagnostics are progressing rapidly for the better, in which various approaches have been utilized, including novel PCR assays, T2 Candida, microfluidic chip technology, next generation sequencing, new generation biosensors, nanotechnology-based tools and artificial intelligence-based models. Accessibility to rapid and reliable methods for diagnosis of invasive mycoses is often limited to major hospitals. Molecular diagnostics in invasive mycoses, though rapidly progressing, still lacks standardization which is important to enable interlaboratory usage and comparison. Therefore, novel molecular assays are being developed and evaluated to aid in the diagnosis of fungal infections.

Given the scarcity of new antifungal agents in the pipelines, emergence of antifungal resistance is another major challenge particularly in immunocompromized patients. Drug discovery studies are often time-consuming and costly. Nevertheless, it is important to consistently search for antifungal drug candidates to ensure the sustainability of safe and effective antifungal treatment.

Research in medical mycology is increasingly important due to the significant increase in invasive mycoses, as has been emphasized by the WHO. The funding authority at institution and national levels need to be made aware of the importance of addressing emerging fungal infection and its impact of the population. Collaborations among the institutions, locally and globally, is highly recommended as it may result in more robust, inclusive and conclusive research outcomes.

QR code for video recording

or click HERE

RESEARCH & INNOVATION DIVISION
School of Medical Sciences
Universiti Sains Malaysia
presents

MONTHLY RESEARCH PRESENTATION

via webex by cisco

Cluster

Date Thursday, July 25, 2024 **Time** 0810 - 0910

WEBINAR NUMBER **2510 092 8796** PASSWORD **mrpjuly2024**

Presenter 1

The Pivotal Roles of Oncogenic Viruses in Head & Neck Malignancy: From Bench to the Bedside!

ASSOC. PROF. DR. NORHAFIZA BINTI MAT LAZIM
(Department of Otorhinolaryngology-Head & Neck Surgery)

Presenter 2

VEGF Levels in Tears and Serum of Age-Related Macular Degeneration Patients

DR. SHAHIDATUL ADHA BINTI MOHAMAD
(Department of Ophthalmology & Visual Science)

Chairperson

Head of VISUAL, SINUS, ALLERGY & AUDITORY SCIENCE Cluster

PROFESSOR DR. SHATRIAH BINTI ISMAIL
(Department of Ophthalmology & Visual Science)

JOIN BY VIDEO SYSTEM

Dial 2510 092 8796@usm-cmr.webex.com
You can also dial 210.4.202.4 and enter your webinar number.

JOIN BY PHONE

+60-3-9212-7625 Malaysia Toll
Access code: 2510 092 8796

All are invited

CPD Point (MMA & USM) is provided

Assoc. Prof. Dr. Norhafiza Mat Lazim
norhafiza@usm.my

The Pivotal Role of Oncogenic Viruses in Head & Neck Malignancy: From Bench to the Bedside

In recent years we have witnessed a rising incidence of virally driven cancers such as oropharyngeal squamous cell carcinoma (OPSCC) and Nasopharyngeal Carcinoma (NPC). These cancers are significant as they possess distinct tumour biology and these influences management plan.

The Human papilloma Virus (HPV) especially the HPV 16 and HPV 18 are the high risk HPV in setting of OPSCC and the Epstein Barr Virus (EBV) is strongly linked to the NPC. The EBV biomarkers such as VCA, EA has been used as screening and diagnostic tool for NPC patients. In setting of HPV, the HPV positive OPSCC is commonly seen in young male patient, who is non-smoker, and comes from higher socioeconomic status. Interestingly these patients with HPV (+) tumor have better prognosis and survival rates. Thus, the de-intensification therapy should be further explored in order to reduce the treatment associated morbidity but at the same time maintaining comparable treatment outcomes. This brings the

As the HPV resides in the oral cavity and there is an easy conduit from oral cavity to the salivary glands, we postulated that this HPV may also be present in salivary glands and causes carcinogenesis. The treatment for benign and malignant salivary glands is vastly different. The malignant tumour tends to recur, and the surgery is typically challenging. The risk of facial nerve sacrification is high, added with morbidities from the needed neck dissections. Thus, this research project aim is to identify the HPV status in relation to hypermethylation of the TSG (MGMT & DAPK) in the salivary glands tumour, and this could be used as the finding novel biomarkers in order to diagnose the tumour early, to differentiate the benign vs the malignant type, and to possibly to reverse the process of carcinogenesis from the very beginning.

Dr. Shahidatul Adha Mohamad
shieda@usm.my

Vascular Endothelial Growth Factor (VEGF) Level in Tear and Serum of Age-related Macular Degeneration Patients

Age-related macular degeneration (AMD) is an important cause of irreversible central blindness worldwide, with clinical presentations ranging from asymptomatic in early stages to severe vision loss in advanced AMD. Late AMD, characterized by neovascularization and fluid leakage, is often driven by increased vascular endothelial growth factor (VEGF) levels. This study aimed to evaluate VEGF concentrations in tears and serum of AMD patients and exploring associated factors influencing these levels.

A total of 108 subjects were enrolled, including 72 AMD patients (36 early and 36 late AMD) and 36 controls, with a mean age of 64.3 ± 8.3 years. Basal tear fluid was collected using ophthalmic Schirmer strips, and serum samples were obtained from venous blood. VEGF levels were quantified using a Human VEGF ELISA kit (LEGEND MAXTM, Biolegend, Inc.).

Our analysis revealed a higher proportion of males in the late AMD group (61.1%), with significant associations identified between AMD and cigarette smoking, alcohol consumption, and chronic renal disease. Age correlated significantly with tear VEGF levels, whereas smoking and diabetes mellitus (DM) were associated with serum VEGF levels. Notably, hypertension and dyslipidemia showed no significant links with AMD in this study. We observed a significantly elevated tear VEGF levels in AMD patients, with the highest levels in late AMD (292.88 ± 73.89 pg/ml, $p<0.001$) compared to early AMD (161.15 ± 36.73 pg/ml) and controls (117.56 ± 16.66 pg/ml) (Table 1). Similarly, serum VEGF levels were significantly higher in late AMD (260.10 ± 76.47 pg/ml, $p<0.001$) compared to early AMD (154.90 ± 39.09 pg/ml) and controls (152.11 ± 36.08 pg/ml). Further analysis showed a significant positive correlation between tear and serum VEGF levels ($p<0.001$, $r=0.795$) among AMD patients (Figure 1).

Additionally, we found that tear VEGF levels demonstrated high sensitivity and specificity in predicting AMD severity, with cut-off values identified for early AMD (128 pg/mL) and late AMD (208.5 pg/mL). Serum VEGF, however, did not yield predictive cut-off values, suggesting its limited utility as a biomarker for AMD progression.

In conclusion, tear VEGF levels appear promising as a non-invasive biomarker for AMD progression, offering high sensitivity and specificity compared to serum VEGF. Further validation through large-scale cohort studies is warranted to confirm these findings and establish clinical utility in AMD management.

Variable	VEGF (pg/mL)				
	Early AMD (n=36)	Late AMD (n=36)	Control (n=36)	F statistics (*df*)	*p*-value*
Tear (Mean ± SD)	161.15 ± 36.73	292.88 ± 73.89	117.56 ± 16.66	84.16 ± 2.98	<0.001
Serum (Mean ± SD)	154.90 ± 39.09	260.10 ± 76.47	152.11 ± 36.08	34.12 ± 2.98	<0.001

Table 1: *Comparison of mean VEGF levels between the groups. *ANCOVA test applied after adjustment for age, sex, race, smoking and alcohol consumption, and comorbidities. (p<0.05 was considered significant)*

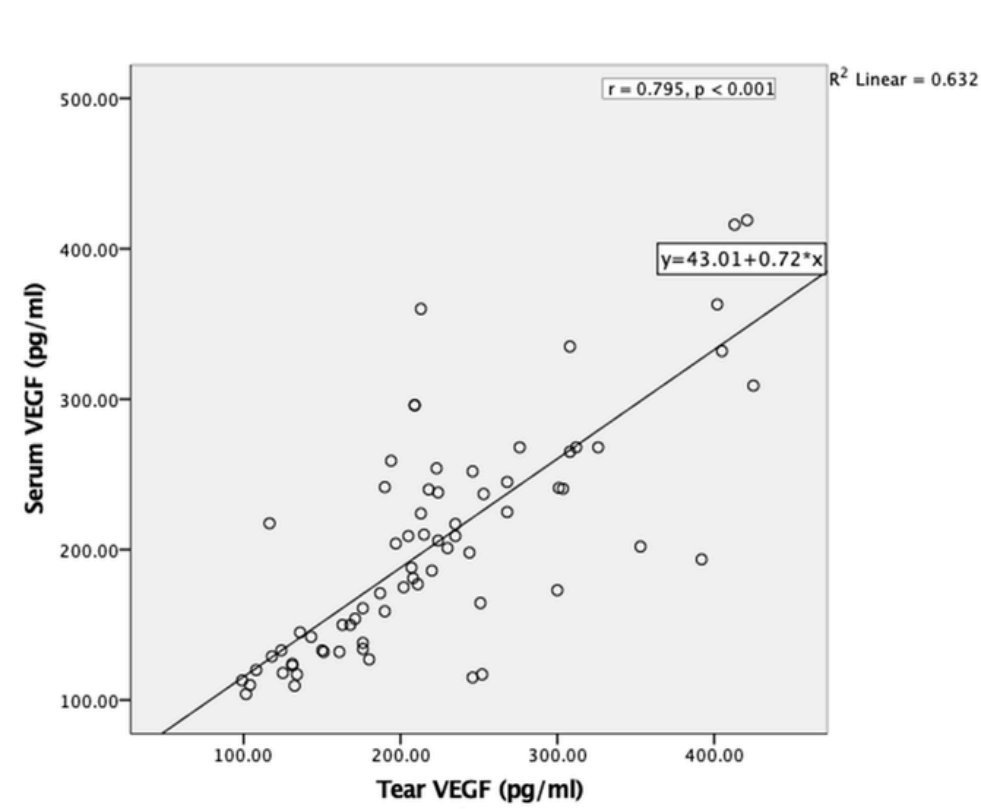


Figure 1: *Pearson correlation analysis shows that the tear VEGF level in AMD patients was positively correlated to the serum level (r = 0.795, p < 0.001).*

QR code for video recording

or click HERE

RESEARCH & INNOVATION DIVISION
School of Medical Sciences
Universiti Sains Malaysia
presents

MONTHLY RESEARCH PRESENTATION

via webex by cisco

RESEARCH CLUSTER

Date Thursday, August 29, 2024 **Time** 0810 - 0910

WEBINAR NUMBER **2516 034 5248** PASSWORD **mrpaug2024**

Research Cluster August Rotation: GENOMICS & LIFE SCIENCES

Presenter 1

Alpha-1-Antitrypsin in Covid-19

DR. WAN NORLINA WAN AZMAN
(Department of Chemical Pathology)

Presenter 2

The Future of Genomics In Healthcare: My Journey from Bedside to Benchside to Boardroom

PROFESSOR DR. ZILFALIL BIN ALWI
(Human Genome Center)

Chairperson

ASSOC. PROF. DR. MOHD NAZRI BIN HASSAN
(Department of Hematology)

JOIN BY VIDEO SYSTEM Dial 2516 034 5248@usm-cmr.webex.com
You can also dial 210.4.202.4 and enter your webinar number.

JOIN BY PHONE +60-3-9212-7625 Malaysia Toll
Access code: 2516 034 5248

All are invited
CPD Point (MMA & USM) is provided

Dr. Wan Norlina Wan Azman
dr_wannorlina@usm.my

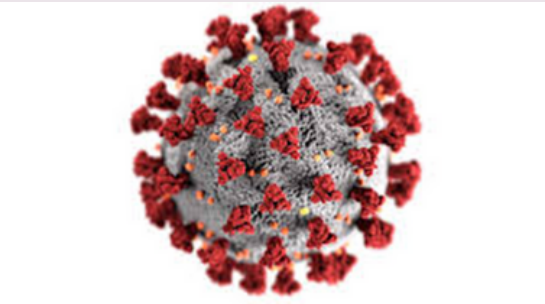
Alpha-1 antitrypsin in COVID-19

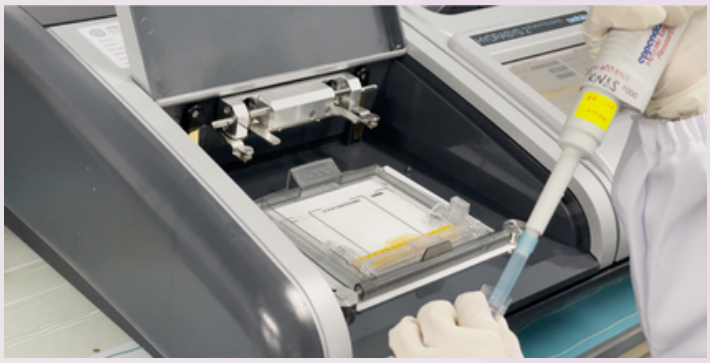
Coronavirus Disease 2019 (COVID-19) is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The likelihood of experiencing adverse outcomes—such as admission to a critical care unit, orotracheal intubation, or mortality—has been linked to several risk factors. As a result, timely interventions are crucial to prevent complications and fatalities.

Human alpha-1 antitrypsin (A1AT) is a 52-kDa glycoprotein synthesized in the liver that circulates within the bloodstream, serving as a natural inhibitor of various proteases. Adequate A1AT activity prevents proteolytic tissue damage (Bristow et al., 1998). Individuals with specific hereditary mutations in A1AT often exhibit reduced levels of this protein, which elevates their risk for serious health issues, particularly emphysema (Chapman et al., 2015). The therapeutic administration of pure A1AT protein has demonstrated benefits for those suffering from A1AT deficiency.

Alpha-1-antitrypsin (A1AT) has the potential to inhibit the entry of SARS-CoV-2 into host cells by obstructing the spike (S) protein through the action of TMPRSS2 (Rodríguez-García et al., 2023). Individuals with a normal SERPINA1 gene are classified as protease inhibitor MM (PiMM), while the two most common abnormal A1AT alleles are Z and S. The genotypes PiZZ, PiSZ, and some PiMZ are linked to A1AT deficiency (AATD).

Research demonstrates that individuals with AATD are 8.8 times more likely to develop symptomatic COVID-19 compared to the general population. Some studies highlight a robust epidemiological association between A1AT deficiency and increased rates of COVID-19 infection, hospitalization, severe illness, and mortality.
Given that AATD presents a genetic risk factor for COVID-19, while prevalent within our community, it is underdiagnosed. Hence, the role of A1AT necessitates further investigation, as current studies on this compelling relationship still need to be expanded. The vaccination of this population must be prioritized. Furthermore, it is essential to ensure that specialized treatment for COVID-19 is readily accessible to these individuals.





Professor Dr. Zilfalil Bin Alwi
zilfalil@usm.my

The Future of Genomics in Healthcare: My Journey from Bedside to Benchside to Boardroom

Throughout my journey from bedside to benchside and now to boardroom, I have witnessed the transformative potential of genomics in healthcare. The integration of genetic research into clinical practice is poised to revolutionize how we diagnose, treat, and prevent diseases. As we look to the future, it is crucial to continue advancing our understanding of the human genome, fostering global collaborations, and ensuring that these scientific breakthroughs translate into tangible health benefits for all.

Throughout my career as a clinical geneticist, I have translated these endeavors into a number of global initiatives. In november 2022, I was awarded and appointed to lead the UNESCO Chair on Human Genetics of Thalassemia, marking the first such chair in human genetics awarded by UNESCO. This chair focuses on human genetics, with a specific emphasis on Thalassemia, one of the most prevalent genetic disorders worldwide. The primary objective of the UNESCO Chair in Human Genetics of Thalassemia is to advance knowledge and capacity building in human genetics, particularly in low- and middle-income countries (LMICs), using thalassemia as a model genetic disorder. Through this, we aim to contribute to reducing the global burden of genetic diseases.

Prior to receiving the UNESCO Chair, I was appointed as a member of the Board of Directors for the Human Variome Project (HVP). Since 2011, the HVP has collaborated with UNESCO as an official NGO partner. The HVP has since expanded to establish two major initiatives, focusing on common diseases in both LMIC (thalassemia and other hemoglobinopathies) and high-income countries (breast cancer). To address the challenges facing the management of thalassemia, the Global Globin Network (GGN) was established, bringing together scientists, researchers, and academicians from 32 countries to apply recent advances in human genetics. The GGN serves as an ideal platform for international collaboration, fostering partnerships between countries categorized as high-income (HIC) and LMIC, with the ultimate goal of bridging the genomics divide.

Additionally, I have been appointed as a member of the World Health Organization's (WHO) Technical Advisory Group on Genomics (TAG-G). Recognizing the critical role of genomics in healthcare, WHO established this group to accelerate access to genomic technologies for global health by providing technical guidance and recommending priority activities for WHO. This role allows me to contribute to shaping global health policies and strategies in genomics, ensuring that the benefits of genetic research are translated into practical healthcare solutions applicable on a global scale.


BEDSIDE
BENCHSIDE
BOARDROOM
World Health Organization
Zilfalil BIN ALWI

QR code for video recording

or click HERE

RESEARCH & INNOVATION DIVISION
School of Medical Sciences
Universiti Sains Malaysia
presents

MONTHLY RESEARCH PRESENTATION

via webex by CISCO

NEUROSCIENCES, MENTAL HEALTH & REHABILITATION (NMR) Cluster

Date Thursday, Sept. 26, 2024 **Time** 0810 - 0910

WEBINAR NUMBER **2515 605 0063** PASSWORD **mrpsept2024**

Presenter 1

Ex Vivo Rat Model of Contusion Spinal Cord Injury

DR. MOHD NOR AZIM BIN AB PATAR
(Department of Neurosciences)

Presenter 2

A Phenomenological Study of Sexual & Gender Minority Among Malay Women

DR. SHARIFAH ZUBAIDIAH SYED JAAPAR
(Department of Psychiatry)

Chairperson

Co-Head of NEUROSCIENCES, MENTAL HEALTH & REHABILITATION Cluster

ASSOC. PROF. DR. MUZAIMI MUSTAPHA
(Department of Neurosciences)

JOIN BY VIDEO SYSTEM

Dial 2515 605 0063@usm-cmr.webex.com
You can also dial 210.4.202.4 and enter your webinar number.

JOIN BY PHONE

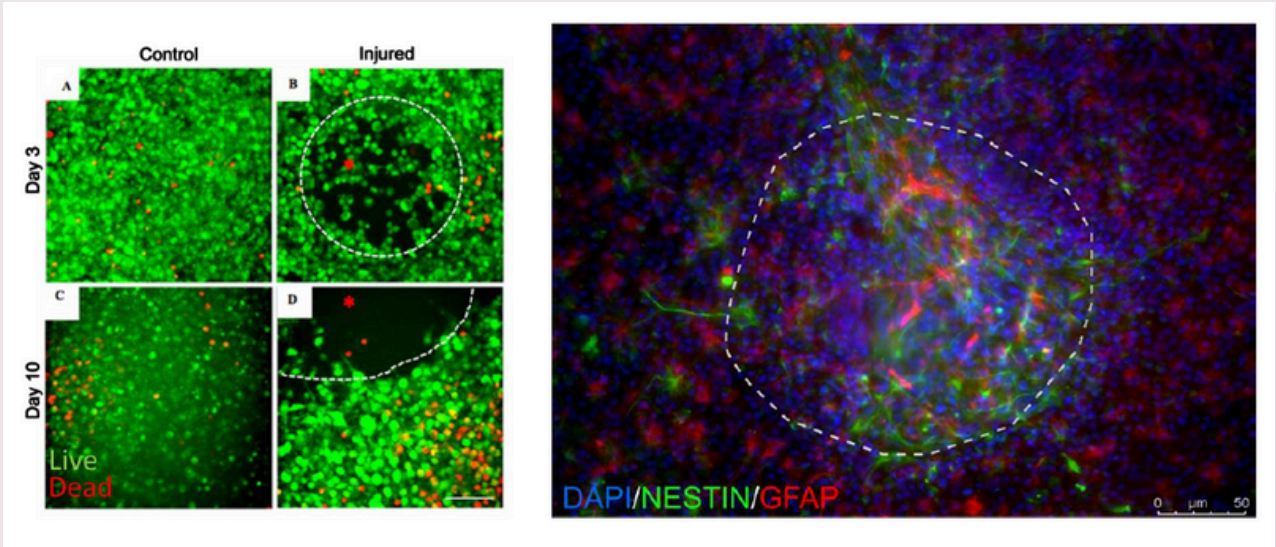
+60-3-9212-7625 Malaysia Toll
Access code: 2515 605 0063

All are invited
CPD Point (MMA & USM) is provided

Dr Mohd Nor Azim Ab Patar
azimpatar@usm.my

Ex Vivo Rat Model of Contusion Spinal Cord Injury

Spinal cord injury (SCI) is a debilitating condition that significantly impacts the lives of patients and their caregivers. Contusion SCI, a common form of this injury, is often studied using in vivo models. However, these models are costly, require extensive animal care, and involve lengthy experimental processes. In line with the 3R principle (Replacement, Reduction, and Refinement) in research, developing an ex vivo model presents a promising alternative. This study aimed to establish an ex vivo model that mimics contusion SCI in rats. The model's development involved determining the optimal height for the NYU impactor to create a consistent injury. A pilot study identified 12.5 mm as the most suitable height to produce reproducible injuries in ex vivo samples. Following this, immunofluorescence (IF) staining for glial fibrillary acidic protein (GFAP) was conducted to evaluate reactive astrocyte accumulation at the injury site. The results showed a decrease in reactive astrocyte accumulation at 10 days post-injury (dpi) in the injured samples. To explore the potential involvement of endogenous stem cells in this process, a quantitative PCR (qPCR) assay was performed to analyze the expression of the Cx3cr1 gene, which is associated with neurotrophic receptor activity. The qPCR results indicated no significant impact on astrocyte activity following the injury. Further assessments using βIII tubulin, Nissl, and Eriochrome cyanine staining demonstrated ongoing neuronal degeneration in the injured slices at 10 dpi. The study concludes that this ex vivo model is a reliable representation of the contusion events observed in SCI, particularly in relation to glial scar formation. However, further refinements are necessary to improve the robustness of the model for future SCI research.



Dr. Sharifah Zubaidiah Syed Jaapar
zubaidiah@usm.my

A Phenomenological Study of Sexual & Gender Minority Among Malay Women

The study investigates the identity construction, psychosocial spiritual distress, and help-seeking behavior of Sexual and Gender Minority (SGM) among Malay women in Malaysia. The research involved 30 SGM among Malay women and 20 service providers. Five themes emerged: identity construction, psychosocial spiritual distress and mental illness, self-reformation, and challenges in helping SGM. SGM are influenced by environmental, personal, and behavioral factors, including abuse, self-belief, religious beliefs, and past experiences of sexual assault and domestic violence. They face psychosocial spiritual distress and mental health issues, such as anxiety, depression, and suicidal thoughts. They seek help for mental health issues, often seeking meaning in practicing Islam and maintaining a social life. The study emphasizes the importance of religion and spirituality in improving mental health and finding meaning in life for SGM.

QR code for video recording

or click HERE

RESEARCH & INNOVATION DIVISION
School of Medical Sciences
Universiti Sains Malaysia
presents

MONTHLY RESEARCH PRESENTATION

via webex by CISCO

SCAN

Date Thursday, Oct. 24, 2024 **Time** 0810 - 0910

WEBINAR NUMBER **2514 029 4321** PASSWORD **mrpoct2024**

BRINGING GLOBAL EXPERIENCE TO LOCAL: INSIGHTS FROM CALOHEA ERASMUS CAPACITY BUILDING PROGRAM

Presenter 1

Overview of Measuring & Comparing Achievements of Learning Outcomes in Higher Education In Asean (CALOHEA)

ASSOC. PROF. DR. MUHAMAD SAIFUL BAHRI BIN YUSOFF
Director, Centre for Development of Academic Excellence (CDAE)

Presenter 2

Recognition Mechanism (RM) 1
- Building Competency Framework

PROFESSOR DR. KAMARUL ARYFFIN BIN BAHARUDDIN
Deputy Dean (Academic, International & Career)

Presenter 3

Recognition Mechanism (RM) 2
- Student Workload Measurement

ASSOC. PROF. DR. ZUL IZHAR BIN MOHD. ISMAIL
Department of Anatomy

Presenter 4

Recognition Mechanism (RM) 3
- Implementing Authentic Assessment

DR. NURHANIS SYAZNI ROSLAN
Department of Medical Education

JOIN BY VIDEO SYSTEM Dial 2514 029 4321@usm-cmr.webex.com
You can also dial 210.4.202.4 and enter your webinar number.

JOIN BY PHONE +60-3-9212-7625 Malaysia Toll
Access code: 2514 029 4321

All are invited
CPD Point (MMA & USM) is provided

Assoc. Prof Dr Muhamad Saiful Bahri Yusoff
msaiful_bahri@usm.my

Professor Dr Kamarul Aryffin Baharuddin
amararyff@usm.my

Assoc. Prof Zul Izhar Mohd Ismail
zulizhar@usm.my

Dr Nurhanis Syazni Roslan
nurhanis_syazni@usm.my

Bringing Global Experience to Local: Insights From CALOHEA ERASMUS Capacity Building Program

This monthly research presentation highlighted the School of Medical Sciences' participation in the Erasmus+ capacity-building initiative, the CALOHEA project. The CALOHEA project aims to enhance the quality and relevance of higher education in Southeast Asia by aligning learning outcomes with regional and global standards. Collaborating with 30 other institutions from ASEAN and 5 institutions from Europe, the project focuses on developing frameworks for competency-based education, student workload measurement, and authentic assessment to improve institutional accountability and graduate preparedness.

The CALOHEA project proposed that the recognition of qualifications, including medical training, should encompass four key principles: comparability, compatibility, transferability, and verifiability. To this end, a competency framework was developed under Recognition Mechanism 1 (Figure 1), which involved active engagement with faculty members from all participating institutions. This framework serves as a foundation for ensuring that higher education programs meet the diverse needs of both local and international stakeholders, providing a structured approach to evaluating and recognizing student capabilities.

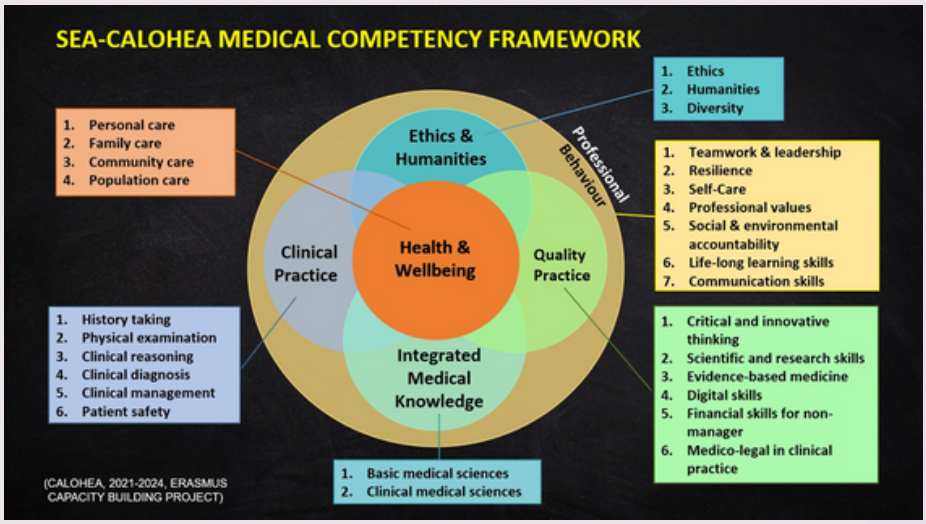


Figure 1: *South East Asia – CALOHEA Medical Competency Framework*

Through Recognition Mechanism 2, the CALOHEA project concentrated on assessing student workload. This initiative aimed to ensure an equitable distribution of student workload and align with the European Credit Transfer and Accumulation System. This allowed institutions to maintain academic rigor while promoting student well-being and preserving international compatibility. The researchers gathered data through desk-based estimation using logbooks and relevant documents, as well as engaging with stakeholders such as faculty members and learners via surveys and focus groups. The project findings were consistent with those of other institutions, which suggested that faculty members consistently underestimated student workload compared to the students' own assessments.

A key component of competency-based education is the use of authentic assessments that prepare learners for real-world scenarios through the meaningful application of knowledge, skills, and attitudes. Through Recognition Mechanism 3, the project evaluated the extent of authentic assessment implementation at the SMS. The findings indicated that SMS has incorporated several authentic assessment tools, such as the Community and Family Case Study (CFCS) and the Shadow House Officer Training Schedule (SHOTS), which were recognized as some of the exemplary practices within ASEAN medical schools. This was corroborated by graduate feedback, which highlighted the meaningful application of these assessments, particularly during the transition period as house officers. The project team actively engaged with clinical departments and course coordinators to evaluate and enhance the implementation of these authentic assessment practices.

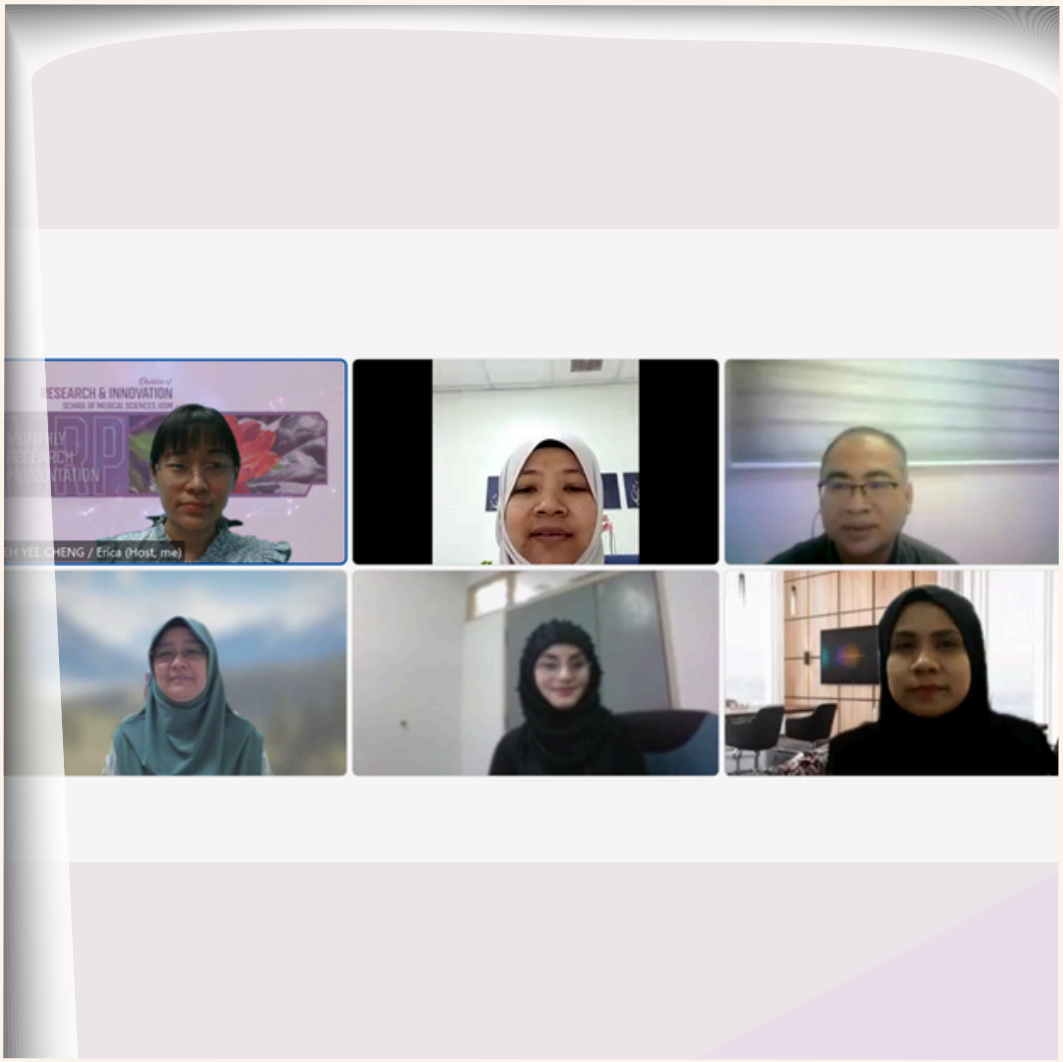
The project demonstrated how international frameworks like CALOHEA could be adapted to local contexts, driving innovation in educational assessment and quality assurance. The focus on evidence-based practices ensures that these advancements are grounded in measurable outcomes, paving the way for sustainable improvements in higher education.

Acknowledgement to all CALOHEA team: AP Dr Nor Azwany Yaacob, AP Dr Nik Ahmad Zuky Nik Lah, AP Dr Siti Nurma Hanim Hadie and Dr Jamilah Al-Muhammady Mohammad

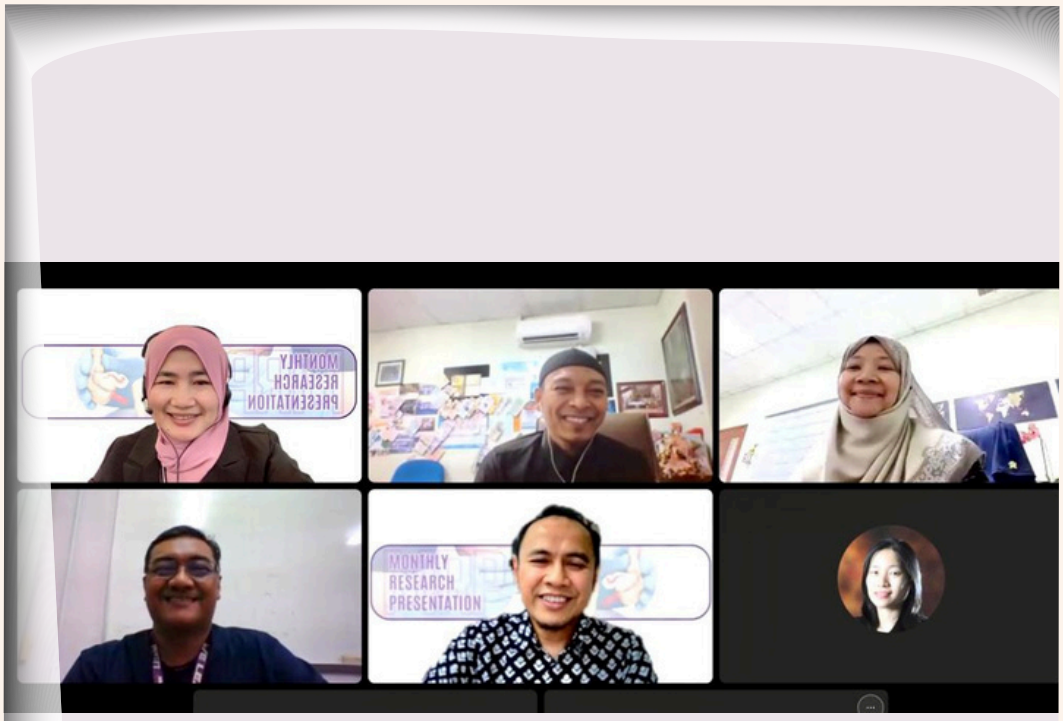
PHOTO GALLERY

JANUARY

FEBRUARY



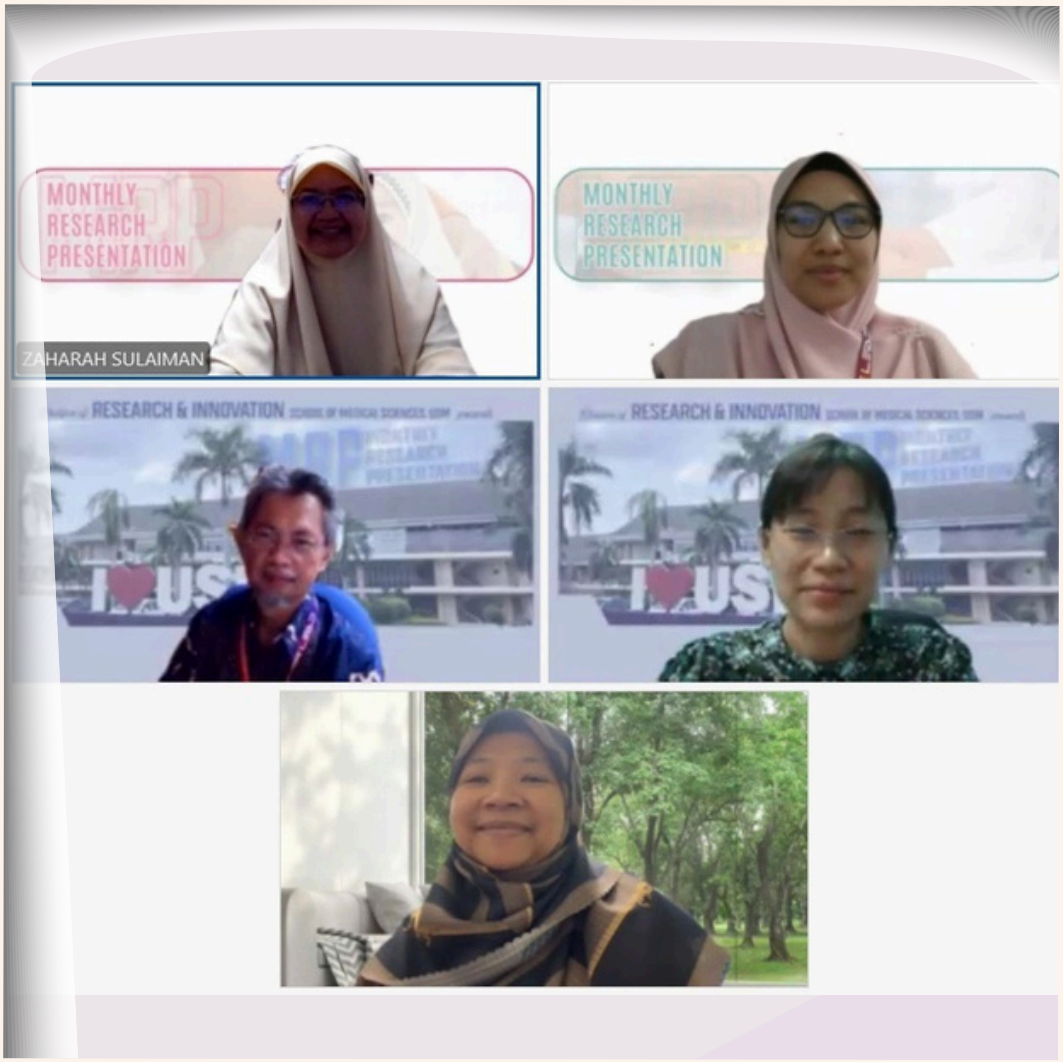
MARCH


MONTHLY
RESEARCH
PRESENTATION
MONTHLY
RESEARCH
PRESENTATION

APRIL


APPLICATION OF GEOGRAPHICAL
INFORMATION SYSTEM (GIS) TO IDENTIFY
SPATIAL PATTERNS FOR ROAD TRAFFIC INJURY
(RTI) WITHIN A DISTRICT IN NORTHEAST OF
PENINSULAR OF MALAYSIA

MAY


MONTHLY
RESEARCH
PRESENTATION
ZAHARAH SULAIMAN
MONTHLY
RESEARCH
PRESENTATION
RESEARCH & INNOVATION
RESEARCH & INNOVATION

JUNE


RESEARCH & INNOVATION
NAZIHAH BINTI MOHD YUNUS (Cohost)
AZIAN HARUN
RESEARCH & INNOVATION

JULY


Division of RESEARCH & INNOVATION SCHOOL OF MEDICAL SCIENCES, USM presents
MRP
MONTHLY
RESEARCH
PRESENTATION
I ♥ USM

AUGUST

SEPTEMBER

OCTOBER


BRINGING GLOBAL EXPERIENCE TO LOCAL:
INSIGHTS FROM CALOHEA ERASMUS CAPACITY BUILDING PROGRAM
MONTHLY
RESEARCH
PRESENTATION
CALOHEA: Measuring and
Comparing Achievements

THANK YOU!


PUSAT PENGAJIAN SAINS PERUBATAN
USM
UNIVERSITI SAINS MALAYSIA
APEX
I ♥ USM
School of
MEDICAL SCIENCES