2022

Monthly Research Presentation (MRP)

BULLETIN

SCHOOL OF MEDICAL SCIENCES

UNIVERSITI SAINS MALAYSIA

MEET OUR
TOP MANAGEMENT

TABLE OF CONTENTS

Prof Dr. Abdul Razak Sulaiman

Assalamualaikum & Salam Sejahtera

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

I want to take this opportunity to thank Assoc. Prof. Dr. Asrene Abdul Razak, a Deputy Dean (Research), and her team for organizing this MRP and publishing the e-bulletin for 2022.

I have personally observed some outstanding accomplishments by USM researchers during the last few years. Publications in high-impact journals and secured grants show an upward trend amongst our researchers. Despite their significance, such metrics are just some of the ones used to gauge research output. Alhamdulillah, I must mention that the research and presentation quality is at an excellent level. The team has selected various presentations ranging from fundamental research to clinical research. From the presentations I have attended at MRP, our academics are making significant contributions in areas like impactful fundamental and translational research, community engagement, and commercialization with industry players. The vision and goal of our university have always been the driving force behind our research. In this bulletin, we hope to shed more light on the accomplishments of our researchers to portray our research excellence better.

Once again, I'd like to offer my sincere congratulations to the organizing team and express my hope that PPSP continues to soar, resulting in even more groundbreaking research that can benefit society and our future generation.

Thank you.

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

Assoc. Prof. Dr. Asrenee Abdul Razak

Assalamualaikum & Salam Sejahtera

Congratulations to Dr. Rohimah Mohamud and Dr. Zefarina Zulkafli, as well as the other organizing committee members, on the successful Monthly Research Presentation (MRP) and strenuous effort to delivery and publish this 3rd MRP bulletin 2022.

As motivated academics, we hope to inspire and enlighten our readers with our findings. We are not giving our presentation at an academic conference to check a box for our professional growth reviews or promotion cases. We are doing this to share our discoveries with others. To further enrich this culture, with the approval from the top management of PPSP, MRP is organized to encourage and provide our academia with this platform to share their findings and new inventions. Moreover, this is the best method to promote research collaboration, introduce excellent researchers amongst PPSP, and highlight research through specific funding.

I want to express my deep gratitude to all the knowledgeable speakers who gave their time and contributed insightful information to this bulletin. MRP is an excellent opportunity to exchange ideas with other researchers in various areas and spark healthy discussion. Therefore, I hope everyone is encouraged and invited to use this platform in the future.

Finally, I wish all readers the happiness and knowledge that will fuel your will to contribute more fully to the scientific study community.

Thank you,

Assoc. Prof. Dr. Asrenee

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

FROM THE MRP CHAIRS

Dr Rohimah Mohamud
Department of Immunology

Dr Zefarina Zulkafli
Department of Haematology

Assalamualaikum & Salam Sejahtera

On behalf of the organizing committee, we would like to express our gratitude to the top management of PPSP for allowing us to chair the MRP 2022. In particular, we would like to thank all speakers and emcees who helped organize this research presentation. For the past months, we have had the privilege of serving as chairperson and co- of the committee. As you know, arrangements for a meeting of this sort seem simple, but it took a lot of effort and teamwork to make it possible. We are forever grateful for this opportunity and the connections we have made along the journey.

One of the most valuable takeaways from the talks is the opportunity to advocate our views in scientists community. Academics and researchers rely significantly on research meetings to present and discuss the relevance of their discoveries and make valuable academic and interpersonal connections that might lead to new opportunities and collaborations in the future. In addition, to assisting academicians to access the most recent scientific findings, MRP was established to provide a place for networking and raising visibility for potential collaborators.

The 3rd MRP bulletin is a compilation of presentations delivered by experienced speakers from various departments of PPSP. As these presentations primarily represent the cutting-edge research topic, this anthology provides valuable information far earlier than if you had waited for the publication. The views of our postdoctoral research fellows are also included here.

We hope this bulletin will benefit the readers in furthering the university's mission of transforming higher education for future sustainability. As such, we hope this MRP will be maintained for many years.

Thank you.

Dr. Rohimah

Dr. Rohimah Mohamud
Chairperson MRP 2022

Dr. Zefarina

Dr. Zefarina Zulkafli
Deputy Chairperson MRP 2022

OUR MRP TEAM
Session 2022–2024

MRP GOALS

1. To motivate researcher to publish their research in high impact journal
2. To give opportunity for researcher 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

MRP 2022

MRP EMCEES

Dr Rohimah Mohamud

Department of Immunology

Dr Kueh Yee Cheng

Department of Biostatistics and Research Methodology

Prof. Dr Chan Yean Yean

Department of Microbiology and Parasitology

Assoc. Prof. Dr Wan Mohd Zahiruddin Wan Mohammad

Department of Community Medicine

Assoc. Prof. Dr Mahaneem Mohamed

Department of Physiology

Assoc. Prof. Dr Kaur Banga Singh

Department of Microbiology and Parasitology

Dr Ramlah Kadir

Department of Immunology

Dr Nazihah Mohd Yunus

Human Genome Centre

Assoc. Prof. Dr Tuan Hairulnizam Tuan Kamauzaman

Department of Emergency Medicine

Assoc. Prof. Dr Wan Faiziah Wan Abdul Rahman

Department of Pathology

DETAILS of SPEAKERS

MRP 2022

MRP SPEAKERS

January 01

Associate Professor Dr. Ikhwan Sani Mohamad

Associate Professor Dr. Tuan Hairulnizam Tuan Kamauzaman

February 02

Dr. Maya Mazuwin Yahya

Dr. Wan Fadzlina Wan Muhd Shukeri

March 03

Dr. Wan Fatihah Wan Sohaimi

Professor Dr. Zamzuri Idris

April 04

Dr. Suhana Ahmad

Dr. Tengku Ahmad Damitri Al-Astani Tengku Din

May 05

Dr. Azizul Akram Bin Salim

Associate Professor Dr. Rahimah Zakaria

MRP SPEAKERS

June 06

Dr. Siti Safiah Binti Mokhtar

Associate Professor Dr. Muzaimi Mustapha

July 07

Associate Professor Dr. Sarina Sulong

Dr. Md Asiful Islam

August 08

Dr. Siti Norasikin Mohd Nafi

Professor Dr. Rosline Hassan

September 09

Associate Professor Dr. Rafidah Hanim Shueb

Dr. Mohd Zulkifli Mustafa

October 10

Associate Professor Dr. Wong Kah Keng

Dr. Fahisham Taib

DETAILS of PRESENTATION

Posters, abstracts and QR code for video recordings

MRP 2022

USM UNIVERSITI SAINS MALAYSIA

APEX™

CPD POINT (MMA & USM) IS PROVIDED

School of Medical Sciences presents

Monthly Research Presentation

Thursday, Jan. 27, 2022 | 0810-0910

EVENT NUMBER : 2511 265 5434

PASSWORD : mrpjan2022

via Cisco webex

PRESENTER 1

Assoc. Prof. Dr. Ikhwan Sani Bin Mohamad

(Department of Surgery)

Safe Cholecystectomy: Towards Zero Bile Duct Injury

PRESENTER 2

Assoc. Prof. Dr. Tuan Hairulnizam Bin Tuan Kamauzaman

(Department of Emergency Medicine)

Slowing Down Our Ambulances

CHAIRPERSON

Dr. Rohimah Mohamud

(Department of Immunology)

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Assoc. Prof. Dr. Ikhwan Sani Mohamad

Department of Surgery

SAFE CHOLECYSTECTOMY : TOWARDS ZERO BILE DUCT INJURY

PREDICTIVE RISK FACTOR FOR DIFFICULT ELECTIVE LAPAROSCOPIC CHOLECYSTECTOMY IN HUSM

Background : Laparoscopic Cholecystectomy (LC) is a gold standard management for symptomatic cholelithiasis. However, LC might be difficult due to the various risk factors. Preoperative risk factors are very important for the surgeon and patient in anticipating of difficulty during surgery.

Objective : This study to identify clinical, radiological, and perioperative risk factor with difficult elective laparoscopic cholecystectomy patient in HUSM.

Methods: This is a retrospective record review of patients who underwent elective laparoscopic cholecystectomy from 2013-2018 in Hospital Universiti Sains Malaysia. The patient's characteristics, clinical history, laboratory data, ultrasonography results and intraoperative details were retrospectively analyzed to evaluate predictors of difficult LC. LC.

Results: A total of 154 patients whom underwent elective laparoscopic cholecystectomy and fullfill the criteria were included in our study. The conversion to open surgey rate was 4.5%, the mean operative length was 91.71 minutes and the mean hospital stay post operative was one day. The prevalence of difficult elective laparoscopic cholecystectomy in HUSM was 55.2% (95% CI = 47.3, 63.0). The multivariate analysis showed the patient history of cholangitis , history of ERCP, thick gallbladder wall on ultrasound, dense adhesion and fibrosed Calot's triangle intraoperatively had significant association with difficult laparoscopic cholecystectomy.

Conclusion: From our study, we conclude that patient's history of cholangitis, history of ERCP, thick gallbladder wall on ultrasound, dense adhesion and fibrosed Calot's triangle intraoperatively were found to be the predictive factors of difficult LC in our study.

Assoc. Prof. Dr. Tuan Hairulnizam Tuan Kamauzaman
Department of Emergency Medicine

SLOWING OUR AMBULANCES DOWN

Ambulance service is important in transporting patients in a timely manner to the healthcare facilities while ensuring emergency treatment is administered and preventing worsening of diseases. However, ambulance workers are often exposed to accident hazards in transporting patients in high-speed ambulances. The estimated Emergency Medical Service (EMS) fatality rate is 12.7/100,000/year/EMS worker. The National Health Service (NHS) estimated that 70% of ambulance crashes involved in high-speed transportation and 84% of the paramedics were not restrained during the crash because they were involved in patient management in the ambulance. Malaysia recorded on average 129 ambulance crashes per year of which 2 incidents/year are considered fatal. We postulated that high-speed ambulance transport not only is detrimental to both paramedics and patients but also renders certain emergency procedure ineffective if performed in such situation. We conducted a simulation study on the effect of different ambulance speeds (0 km/h, 30 km/hr and 60km/hr) on the quality of cardiopulmonary resuscitation (CPR) by manual human compressor and mechanical compression device (AutoPulse and Lucas-2) (Tuan Hairulnizam et al, 2020). The outcomes of interest were average compression rate (compression/min), average compression depth (mm), fraction of normal hand positioning (%) and fraction of adequate/insufficient/excessive depth (%). In manual chest compression, significant variation were noted among different speeds in term of average compression rate ($p<0.001$), average compression depth ($p=0.007$), fraction of adequate/insufficient compression depth and fraction of normal hands positioning with $p=0.018$, 0.022 and 0.034 respectively. Overall, AutoPulse and Lucas-2 were not affected by ambulance speed. Lucas- 2 showed more consistent average compression rate, higher fraction of adequate compression depth and reduced fraction of insufficient compression depth as compared to manual compression with $p<0.001$, 0.001 and 0.043 respectively. We concluded that with higher ambulance speed, the compression rate is higher, compression depth is shallower and the fraction of adequate depth is less. Compression depth, rate, fraction hand positioning and fraction of adequate depth did not change when compression was performed with mechanical compression device. We discussed in great length that as far as CPR is concerned, slower ambulance transport will generate a more quality CPR as per the 2020 American Heart Association Resuscitation Guideline. I have also discussed briefly our findings on the association between ambulance response time (ART) and major adverse cardiac event (MACE) in non-cardiac arrest acute coronary syndrome (ACS) (Jeremiah et al, 2018). We found no significant association between ART and occurrence of MACE at 90 days post-ACS, the odds ratio was 0.98 (95% CI: 0.95, 1.02; $P=0.446$). In my conclusion, I have emphasized the need of all ambulance drivers to abide by the posted speed limit as per the Policy and Safety of Land Ambulance 2019 by the Ministry of Health, Malaysia.

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APEX

CPD POINT (MMA & USM) IS PROVIDED

School of Medical Sciences presents

Monthly Research Presentation

Thursday, Feb. 24, 2022 | 0810-0910

EVENT NUMBER : 2511 467 5755

PASSWORD : mrpfeb2022

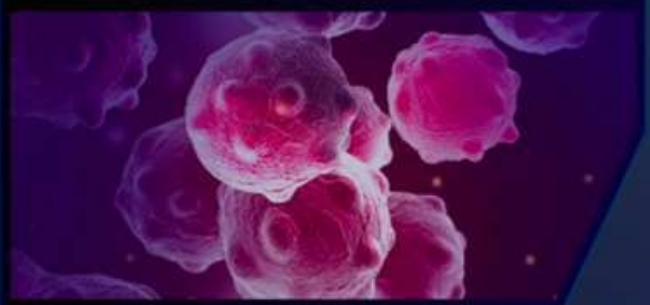
via Cisco webex

PRESENTER 1

Dr. Maya Mazuwin Binti Yahya

(Department of Surgery)

Plasma Circulating miRNAs Profiling for Identification of Potential Breast Cancer Early Detection Biomarkers



PRESENTER 2

Dr. Wan Fadzlina Binti Wan Muhd Shukeri

(Department of Anesthesiology)

Potential Diagnostic and Prognostic Roles of Procalcitonin in ICU

CHAIRPERSON

Prof. Dr. Chan Yean Yean

(Department of Microbiology & Parasitology)

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Dr. Maya Mazuwin Yahya

Department of Surgery

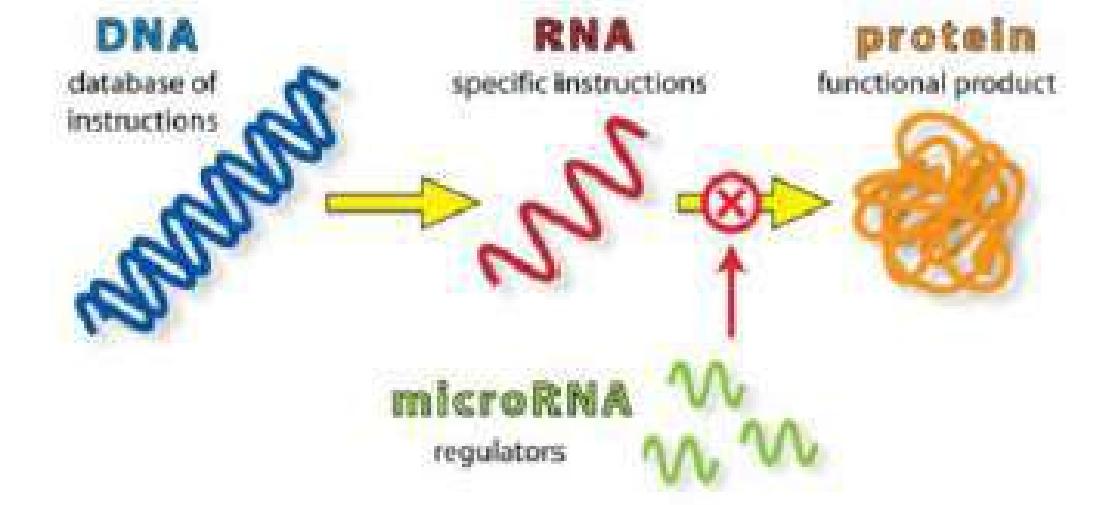
PLASMA CIRCULATING MIRNAS PROFILING FOR IDENTIFICATION OF POTENTIAL BREAST CANCER EARLY DETECTION BIOMARKERS

Introduction: Delay in seeking diagnosis among Malaysian women with breast cancer has been considered the major factor in the difficulty of providing best management to patients. This study was aim to To identify potential miRNAs as biomarkers for early detection of breast cancer based on tumour size.

Methods: A total of 9 patients and 9 healthy controls were recruited for history taking and collection of blood plasma for miRNA study.

Results: miR-27b-3p, miR-22-5p and mir-145-5p were significantly different in expression in plasma of breast cancer patients as compared to healthy controls.

Conclusion: We found that these 3 miRNAs (miR-27b-3p, miR-22-5p and miR-145-5p) can be considered as the most valuable biomarkers to undergo validation process. However, the potential of four other miRNAs (miR-125b-5p, miR-142-3p, miR-193a-5p and miR-423-5p) with AUC value > 0.7 should not be ignored thus, included in the validation process. Since this is a pilot study, we are in the process of validating the selected miRNAs in larger samples and comprising tumor sizes as early as T1 until T4.



Dr. Wan Fadzlina Wan Muhd Shukeri
Department of Anaesthesiology

NEW DIAGNOSTIC AND PROGNOSTIC ROLES OF PROCALCITONIN IN THE INTENSIVE CARE UNITS

Point-of-care (POC) procalcitonin (PCT) may have new diagnostic and prognostic roles in the intensive care units (ICU). The aim of this article is to present our findings in regard to two studies: 1) the diagnostic role of POC PCT for bacterial coinfection in patients with severe dengue and 2) the prognostic role of POC PCT combined with serum albumin for ICU-mortality in patients with sepsis admitted to the ICU. The first study was a cross-sectional study conducted in the ICU of Hospital Universiti Sains Malaysia and Sultan Ahmad Shah Medical Centre. Fifty patients with severe dengue were enrolled over a 1-year period. Fourteen (28.0%) of these patients had bacterial coinfection on ICU admission. PCT was significantly higher in patients with the coinfection than those without (36.2 ± 41.8 versus 3.6 ± 5.6 ng/mL, P = 0.012). The area under the curve (AUC) of 0.768, ideal cut-off of >4.6 ng/mL, sensitivity of 64.3% and specificity of 83.3% revealed that PCT was a good marker for diagnosing bacterial coinfection in our severe dengue cohort. The second study was a retrospective cohort study conducted in the ICU of Hospital Universiti Sains Malaysia. A total of 185 sepsis patients were recruited over a 3-year period. The primary outcome of all-cause ICU mortality was 35.1%. Baseline PCT was significantly higher while baseline albumin (ALB) was significantly lower in the non-survivors compared to the survivors [25.4 (SD = 31.2) vs 9.8 (SD = 20.0) ng/mL and 26.1 (SD = 5.4) vs 30.6 (SD = 6.5) g/dL, respectively, P <0.001]. The computed PCT-to-ALB ratio was significantly higher in the non-survivors compared to the survivors [1.04 (SD = 1.29) vs 0.36 (SD = 0.72), P <0.001]. The AUC of PCT-to-ALB ratio for discrimination of ICU-mortality was 0.731 (95% CI 0.658-0.804) which was higher than that of PCT alone (AUC 0.721, 95% CI 0.647-0.796). The ideal cut-off value for PCT-to-ALB ratio was 0.15 with sensitivity of 70.8% and specificity of 63.3%. In conclusion, POC PCT is a potentially reliable tool in the ICU to aid in the diagnosis of bacterial coinfection in severe dengue and prognosis of sepsis when used in combination with ALB as the PCT-to-ALB ratio. However, further larger studies are warranted to validate our current findings.

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Monthly Research Presentation

Thursday, March 31, 2022 | 0810-0910

EVENT NUMBER : 2529 570 3372

PASSWORD : mrpmac2022

via Cisco webex

PRESENTER 1

Dr. Wan Fatihah Binti Wan Sohaimi

(Department of Nuclear Medicine)

Randomised Controlled Trial of One Week Strict Low-iodine Diet Versus Two Weeks Non-Specified Low Iodine Diet In Differentiated Thyroid Carcinoma

PRESENTER 2

Prof. Dr. Zamzuri Bin Idris

(Department of Neurosciences)

Therapeutic Hypothermia and Quantum Thermodynamics in Severe Head Injury

CHAIRPERSON

Assoc. Prof. Dr. Mahaneem Mohamed

(Department of Physiology)

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Dr. Wan Fatihah Wan Sohaimi
Department of Nuclear Medicine

RANDOMISED CONTROLLED TRIAL OF ONE WEEK STRICT LOW-IODINE DIET VERSUS ONE WEEK NON-SPECIFIED LOW IODINE DIET IN DIFFERENTIATED THYROID CARCINOMA

Introduction: A low iodine diet (LID) is recommended prior to the Radioactive Iodine-131 (RAI) treatment or scanning in differentiated thyroid carcinoma (DTC) post total thyroidectomy. However, recommended strictness of LID is varying among major guidelines. This study was aim to investigate the patient's compliance to LID by measuring the urinary iodine level post LID.
Methods: A total of one hundred and four patients of DTC post total thyroidectomy patients that were planned for treatment or scanning were enrolled into the study. 55 patients are subjected to 1-week strict LID while the other 49 patients are subjected to 1-week non-specified LID before RAI administration. Baseline urinary iodine level were obtained prior to the LID and second urinary iodine level were measured at day-8 or prior to RAI administration.
Results: The compliance rate of patients that achieved urinary iodine level less than 100ug/L following 1-week strict LID was 89.1% as for the 1-weeks non-specified LID was 91.8% which did not show any significant difference between the two LID group (p=0.746). After 7 days institution of non-specified LID, the mean urinary iodine level was significantly reduced about 40.8% compared to strict LID (36.3%).
Conclusion: The 1 week of non-specified LID is effective enough to decrease the urinary iodine level in low iodine intake area and the longer duration of LID is more hindrance for the patient to comply.

Key words: Differentiated thyroid carcinoma; Low iodine diet; Urinary iodine level

Professor Dr. Zamzuri Idris

Department of Neurosciences

Therapeutic Hypothermia & Quantum Thermodynamics in Severe Head Injury

Traumatic severe head injury is commonly associated with undesirable outcomes. This is likely due to a complex pathophysiology underlying severely injured brain. Cooling the brain is one of the options that is currently under intense research and one of the subjects of interest. Currently, data on direct brain cooling is lacking. To specifically cool the injured brain, a direct brain cooling machine is needed. The direct brain cooling machine was thus newly innovated by our team which consists of engineers and neurosurgeons. The purpose of this innovation is to ensure therapeutic hypothermia was directly delivered at selected constant temperature (at 32 degree Celsius) to the injured brain. The practicality, effectiveness and safety of this machine was tested clinically in our initial series of fourteen severely head injured patients. The patients were randomized into two groups – direct brain cooling at 32°C and control group. All of them received intracranial pressure, focal brain oxygenation, brain temperature and direct cortical brainwave monitoring. The direct brain cooling group did fare better in Extended Glasgow Outcome Scale at time of discharge and at six months after the trauma. The basis for this could be due to a trend that noted in the monitored parameters: reduction in intracranial pressure, increment in cerebral perfusion pressure, optimal brain-redox regulation, near normal brain temperature and lessening of epileptic-like brainwave activities are likely reasons for better outcomes in the cooling group. Finally, this manuscript depicts an interesting cortical brainwaves during a transition time of being alive to dead. The demonstrated cortical brainwaves are thought as obeying the principles in quantum physics and thermodynamics.

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APEX

CPD POINT (MMA & USM) IS PROVIDED

School of Medical Sciences presents

Monthly Research Presentation

Thursday, April 28, 2022 | 0810-0910

EVENT NUMBER : xxxx xxx xxxx

PASSWORD : mrpapr2022

via Cisco webex

PRESENTER 1

Dr. Suhana Binti Ahmad

(Department of Immunology)

Novelty, Niche & Network (3N) for Successful Fundamental Research - A Postdoc Perspective

PRESENTER 2

Dr. Tengku Ahmad Damitri Al-Astani Bin Tengku Din

(Department of Chemical Pathology)

Identification of Potential Biomarkers & Metabolic Changes in the Serum of Breast Lump Patients in Hospital USM

CHAIRPERSON

Dr. Ramlah Binti Kadir

(Department of Immunology)

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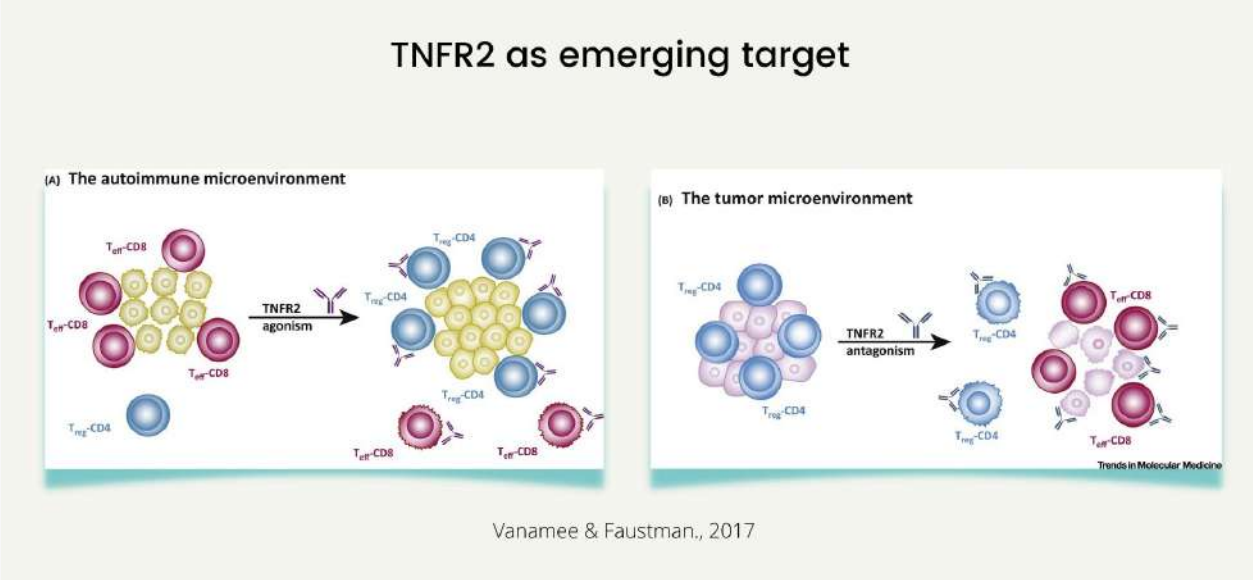
Dr. Suhana Ahmad

Department of Immunology

NOVELTY, NICHE AND NETWORK (3N) FOR SUCCESSFUL FUNDAMENTAL RESEARCH -A POSTDOC PERSPECTIVES

What makes successful fundamental research? From a postdoctoral fellow perspective, our research group applied the 3N; novelty, niche, and network to establish its fundamental research. Novelty is not just studying new thing but researching contradicting results may also lead to a novel research. Our group's novelty is TNFR2, one of the receptors of TNF that currently gaining interest as drug target. From this novel receptor, our group focuses into several niche of interest; inflammatory and infectious diseases as well as nanomaterial. These niches will help us to create new, important knowledge in a feasible period of time. To achieve and extend our scientific goals, our group build both local and international network that allow us to share, discover, verify, disseminate, and synergize between each other. Therefore, a researcher needs to be curious, creative, brave and works in team to be successful in fundamental research.



Vanamee & Faustman., 2017

Dr. Tengku Ahmad Damitri Al-Astani Tengku Din
Department of Chemical Pathology

IDENTIFICATION OF POTENTIAL BIOMARKERS AND METABOLIC CHANGES IN THE SERUM OF BREAST LUMP PATIENTS IN HOSPITAL USM BASED ON 1H NMR METABOLOMICS

Breast lump is a common symptom of breast pathology and it can be due to benign or malignant causes. The tumor markers used in breast cancer have limited capacity for early cancer detection. Metabolomics analysis has lots of potential to identify new blood biomarker and solving this issue. This study aims to determine the metabolite profile of breast lump patients using 1H NMR metabolomics approach. This was a case control study conducted at BestARi unit, Hospital USM. The serum for metabolic profiling f om breast lump (benign & malignant) patients were compared to a healthy group. Serums were analysed using proton nuclear magnetic resonance spectroscopy (1H NMR). Partial least squares discriminant analysis (PLS-DA) was conducted in order to discriminate between the 3 groups. Variable's importance (VIP) score was used to determine the variable with the most contribution towards group differentiation. PLS-DA score plot showed discrimination between the 3 groups while PLS-DA loading plot revealed most of the metabolites were higher in malignant group. Myoinositol contributed with the highest VIP score. There were different metabolites identified between benign and malignant breast lumps. Myoinositol could be the marker to differentiate between normal and pathological breast lumps. The potential usage of metabolomics in managing breast cancer and the results of this work may enhance towards the further understanding of the underlying molecular mechanism and the quest for suitable biomarker.

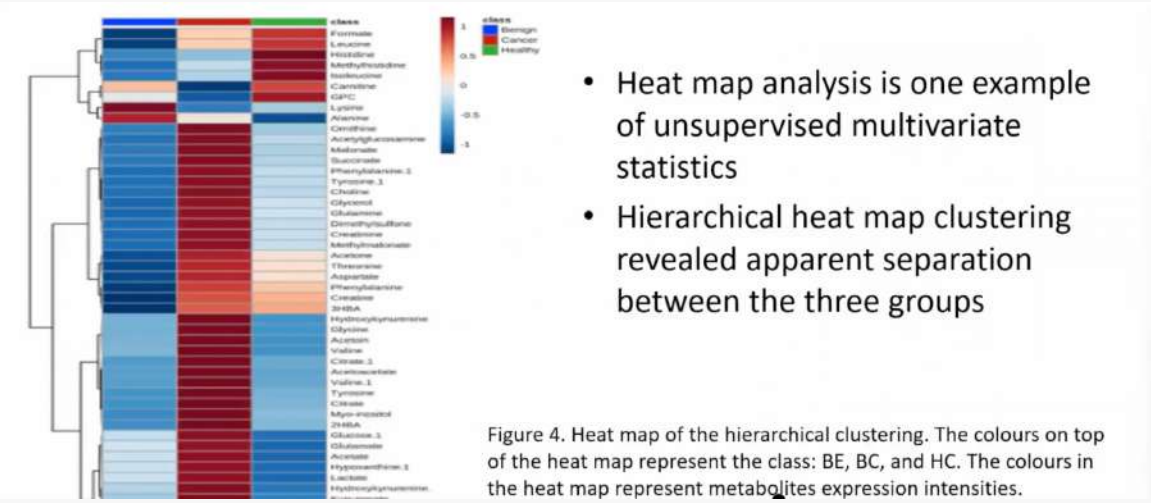


Figure 4. Heat map of the hierarchical clustering. The colours on top of the heat map represent the class: BE, BC, and HC. The colours in the heat map represent metabolites expression intensities.

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APEX

CPD POINT (MMA & USM) IS PROVIDED

Division of Research & Innovation
School of Medical Sciences presents

MONTHLY RESEARCH PRESENTATION

Thursday
May 26, 2022
0810-0910

via Cisco webex

EVENT NUMBER: 2510 728 8769 PASSWORD: mrpMay2022

PRESENTER 1

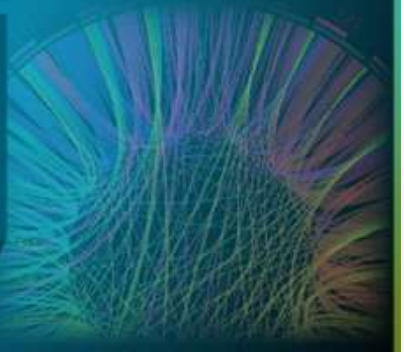
Cast Versus Wire Fixation in Displaced Distal Radius Fractures in Children: Outcomes Study at Skeletal Maturity

Dr. Azizul Akram Bin Salim
(Department of Orthopaedic)

PRESENTER 2

Introduction to Bibliometric Analysis

Prof. Madya Dr. Rahimah Binti Zakaria
(Department of Physiology)



CHAIRPERSON

Prof. Madya Dr.
Tuan Hairulnizam Bin
Tuan Kamauzaman
(Department of Emergency Medicine)

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Dr. Azizul Akram Bin Salim

Department of Orthopaedic

DISPLACED PHYSEAL AND METAPHYSEAL FRACTURES OF DISTAL RADIUS IN CHILDREN. CAN WIRE FIXATION ACHIEVE BETTER OUTCOME AT SKELETAL MATURITY THAN CAST ALONE?

Redisplacement following fracture reduction is a known sequela during the casting period in children treated for distal radius fracture. Kirschner wire pinning can be alternatively used to maintain the reduction during fracture healing. This study was conducted to compare the outcomes at skeletal maturity of distal radius fractures in children treated with a cast alone or together with a Kirschner wire transfixation.

This was a retrospective study involving 57 children with metaphyseal and physeal fractures of the distal radius. There were 30 patients with metaphyseal fractures, 19 were casted, and 11 were wire transfixed. There were 27 patients with physeal fractures, 19 were treated with a cast alone, and the remaining eight underwent pinning with Kirschner wires. All were evaluated clinically, and radiologically, and their overall outcome assessed according to the scoring system, at or after skeletal maturity, at the mean follow-up of 6.5 years (3.0 to 9.0 years).

In the metaphysis group, patients treated with wire fixation had a restriction in wrist palmar flexion ($p=0.04$) compared with patients treated with a cast. There was no radiological difference between cast and wire fixation in the metaphysis group. In the physis group, restriction of motion was found in both dorsiflexion ($p=0.04$) and palmar flexion ($p=0.01$) in patients treated with wire fixation. There was a statistically significant difference in radial inclination ($p=0.01$) and dorsal tilt ($p=0.03$) between cast and wire fixation in physis group with a more increased radial inclination in wire fixation and a more dorsal tilt in patients treated with a cast. All patients were pain-free except one (5.3%) in the physis group who had only mild pain.

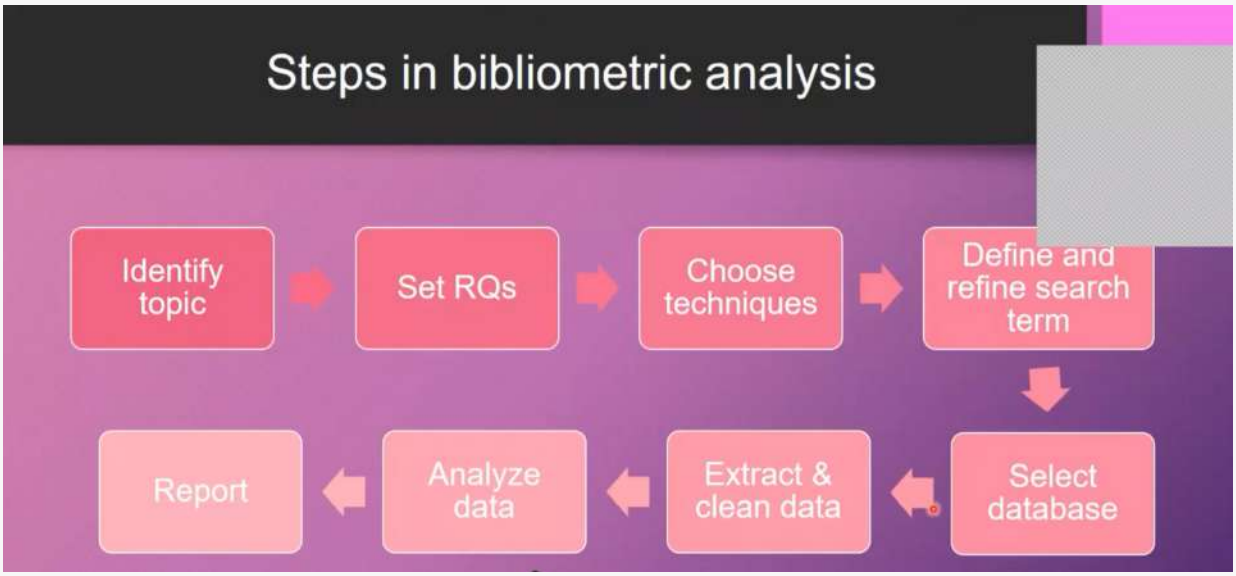
Overall outcomes at skeletal maturity were excellent and good in all patients. Grip strength showed no statistical difference in all groups. Complications of wire fixation included radial physeal arrests, pin site infection and numbness. Cast and wire fixation showed excellent and good outcomes at skeletal maturity in children with previous distal radius fracture involving both metaphysis and physis.

In conclusion, We would recommend that children who are still having at least two years of growth remaining be treated with a cast alone following a reduction unless there is a persistent unacceptable reduction warranting a wire fixation. The site of the fracture and the type of treatment have no influence on the grip strength at skeletal maturity.

Associate Professor Dr.
Rahimah Zakaria
Department of Physiology

INTRODUCTION TO BIBLIOMETRIC ANALYSIS

Bibliometric analysis is a method for exploring and analyzing large volumes of scientific data. It allows researchers to dissect evolutionary details while also shedding light on the emerging areas in a specific field. However, its application in the medical field is still relatively new. This presentation aims to give an overview of bibliometric analysis, the steps involved, and the benefits and drawbacks of bibliometric analysis. The steps in the bibliometric analysis include identifying a topic, establishing a research question(s), selecting bibliometric techniques based on the research question(s), defining and refining search term(s), selecting a database, extracting and cleaning data, analyzing bibliographical data, and reporting findings. This presentation hopes to create interest among researchers to use bibliometric analysis for writing a research paper.



USM UNIVERSITI SAINS MALAYSIA APEX

Division of Research & Innovation, School of Medical Sciences presents

MONTHLY RESEARCH PRESENTATION

Thursday
June 30, 2022
0810-0910

via Cisco webex

EVENT NUMBER: 2516 308 2141 PASSWORD: mrpjune2022

ALL ARE INVITED | CPD POINT [MMA & USM] IS PROVIDED

PRESENTER 1

Vasculoprotective Effects of Clinacanthus Nutans in High Fat Diet Fed and Streptozotocin-Induced Type 2 Diabetic Rats

Dr. Siti Safiah Mokhtar
(Department of Pharmacology)

PRESENTER 2

Research on 'Silent' Stroke in Kubang Kerian: Benign or Sinister?

Assoc. Prof. Dr. Muzaimi Mustapha
(Department of Neurosciences)

CHAIRPERSON

Dr. Kueh Yee Cheng
(Unit of Biostatistics and Research Methodology)

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Dr. Siti Safiah Binti Mokhtar

Department of Pharmacology

VASCULOPROTECTIVE EFFECT OF CLINACANTHUS NUTANS IN HIGH FAT DIET FED AND STREPTOZOTOCIN-INDUCED TYPE-2 DIABETIC RATS

Diabetes mellitus is associated with endothelial dysfunction, due to presence of hyperglycemia and insulin resistance. It causes progressive vascular damage resulting from an impaired endothelium-dependent vasorelaxation. Clinacanthus nutans was reported to have hypoglycemic, hypolipidemic, antioxidant, and anti-inflammatory properties. However, the possibility of C. nutans affecting the vascular endothelial function in diabetes remains unclear. This study was aimed to investigate the effects of C. nutans methanolic leaves extract (CNME) on atherogenic risk markers in a type 2 diabetes (T2DM) rat model. Sixty male Sprague-Dawley rats were divided into five groups (n=12 per group): nondiabetic control, nondiabetic treated with four weeks of CNME (500 mg/kg/daily), untreated diabetic rats, diabetic treated with metformin (300 mg/kg/daily), and diabetic treated with CNME (500 mg/kg/daily). T2DM was induced by a single intraperitoneal injection of low-dose streptozotocin (STZ) to rats fed with high-fat diet (HFD). Endothelial-dependent and endothelial-independent relaxations and contractions of the thoracic aorta were determined using the organ bath. Aortic endothelial nitric oxide synthase (eNOS) expression was determined using Western blotting. Aortic inflammation markers and oxidative stress markers were measured using ELISA technique. Endothelial-dependent relaxation was reduced in diabetic rats. Both diabetic groups treated with CNME or metformin significantly improved the impairment in endothelium-dependent vasorelaxation; this was associated with increased expression of aortic eNOS protein. CNME- and metformin-treated groups also reduced aortic endothelium-dependent and aortic endothelium-independent contractions in diabetics. The levels of MDA and TNF-a were significantly increased in diabetic group and reduced after treatment with metformin and CNME. SOD activity was reduced in diabetic group. Treatment with metformin and CNME significantly increased the SOD activity. In conclusion, C. nutans improves endothelial-dependent vasodilatation and reduces endothelial-dependent contraction, thus ameliorating endothelial dysfunction in diabetic rats. This may occur due to its effect on increasing eNOS protein expression and reducing oxidative stress and inflammation.

Associate Professor Dr. Muzaimi Mustapha
Department of Neurosciences

RESEARCH ON SILENT STROKE IN KUBANG KERIAN: BENIGN OR SINISTER?

On neuroimaging, ischaemic demyelination of the white matter is a part of cerebral small vessel disease (CSVD). It is known to progress either after lacunar stroke or in “silent or asymptomatic” lesions with ageing. On magnetic resonance imaging (MRI), these microchanges are seen as white matter hyperintensities (WMH) or leukoaraiosis that represent discrete lacunar infarcts and/or more diffuse areas of WMH. Currently, conventional MRI findings offer weak to moderate correlation to clinical parameters such cognitive impairment or large vessel stroke. Thus, more concise markers and reliable lesion surrogates are needed to improve the assessment of CSVD. Given the trend of ageing society worldwide including Malaysia, we used a population-based approach in Kubang Kerian, Kelantan to establish a clinically well-characterised at-risk (‘asymptomatic’) individuals in order to provide a practical assessment of white matter integrity in relation to CSVD using MR-diffusion tensor imaging (DTI) technology, cognitive function and haemostatic assay on novel thrombogenic marker, microparticles. We shared our published and on-going research in the area that employed clinical algorithm risk predictor (QRISK2) for cardiovascular disease (including cerebrovascular events) to establish a longitudinal data, the first study of its kind to our knowledge in Malaysia, to correlate MR-DTI findings of the white matter changes with serial performance on neurocognitive assessment, and that of the selected panel of microparticles. From the initial baseline datasets, we are now in further progress to understanding the natural history of this silent CSVD manifestation for future diagnostic and/or therapeutic trial for its potentially sinister sequalae. Keywords: cerebral small vessel disease; white matter hyperintensities; biomarkers; dementia

USM UNIVERSITI SAINS MALAYSIA

APEX

Division of Research & Innovation, School of Medical Sciences presents

MONTHLY RESEARCH PRESENTATION

Thursday
July 28, 2022
0810-0910

via Cisco webex

EVENT NUMBER: **2518 989 9937** PASSWORD: **mrpjuly2022**

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PRESENTER 1

Effects of Nicotinamide on telomerase activity & telomere length associated with poly (ADP-ribose) polymerase-1(PARP-1) regulation in a myeloid cell line

Assoc. Prof. Dr. Sarina Binti Sulong
(Human Genome Centre)

PRESENTER 2

Evidence Synthesis in Medical and Health Sciences

Dr. Md Asiful Islam
(Department of Haematology)

CHAIRPERSON

Assoc. Prof. Dr. Wan Mohd Zahiruddin Wan Mohammad
(Department of Community Medicine)

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Assoc. Prof. Dr. Sarina Sulong

Human Genome Centre

EFFECTS OF NICOTINAMIDE ON TELOMERASE ACTIVITY AND TELOMERE LENGTH ASSOCIATED WITH POLY (ADP-RIBOSE) POLYMERASE-1 (PARP-1) REGULATION IN A MYELOID CELL LINE

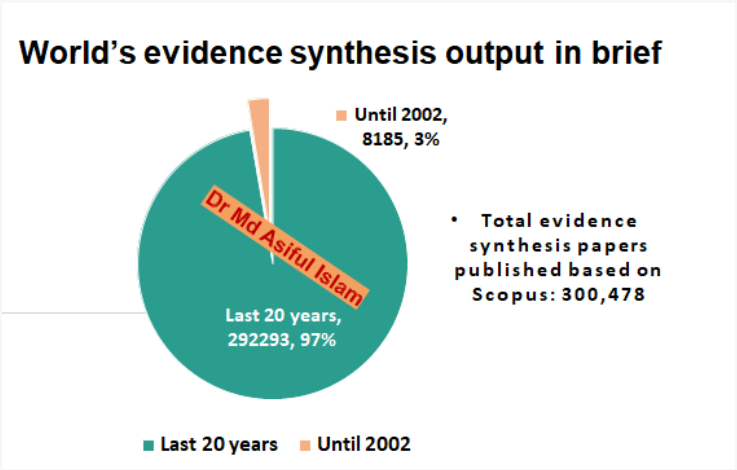
Chronic myelogenous leukaemia (CML) is one of the four major types of leukaemia disease that affecting myeloid cell. Blast phase of CML has continued to exist as a challenging disease even though the advance tyrosine kinase inhibitor (TKI) therapy has been introduced but with its own limitation and significantly less effective causing the patient to be less favourably to respond toward the therapy. By switching to the highly potent TKI such as nilotinib also could not be able to improve the overall health. Currently, there is no treatment options that are responding effectively in blast crisis phase of CML, and it is require an identification of new drug therapies to treat the CML patients in a blast crisis. In this study we investigate the effect of nicotinamide on telomerase activity and telomere length associated with poly (ADP-ribose) polymerase-1 (PARP-1) regulation in a myeloid cell line to enhance the current treatment of CML as part of supplementary agent. K562 cell line was used as the model representing CML in blast phase were treated with nicotinamide and nilotinib before combination of both substances been applied. This study has shown the effect of nicotinamide, nilotinib and combination of both substances in exhibit the anti-proliferation ability on K562 cell line after 48 hours. The implicated mechanism involved to induce such effect are not yet clear. In addition of nicotinamide, nilotinib and combination of both substances on K562 cell line have indicated as telomerase positive with significantly higher telomeres activity suggesting that inhibition effect of both substances is not in correlation with its effect in telomerase activity. Telomere length analysis was evaluated to determine the relation to function of telomerase enzyme to maintain the telomere cap of chromosome. Data results in longer telomere length in all group of treatment except for nicotinamide that have a slightly decrease of telomerase activity thus decrease in number of telomere length. Expression of TERT in this study suggest that the effect of these substances on telomerase activity and telomere length is necessarily dependent on their effect on TERT expression. Inhibition of the cell proliferation on K562 cell line may associated with the upregulation of PARP-1 related marker (BAX, RIPK1 and TRAF2) and elevated effect in apoptosis assay. The effect of nicotinamide and nilotinib on PARP-1 regulation including mechanism related to apoptosis provide evidence for future and wider research.

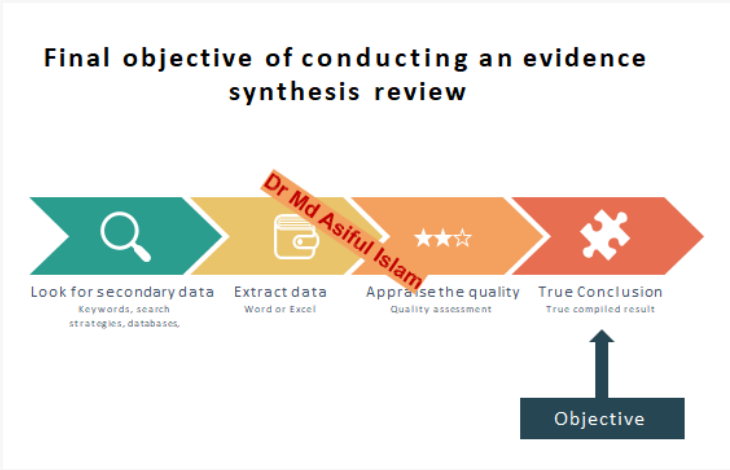
Dr. Md Asiful Islam

Department of Haematology

EVIDENCE SYNTHESIS IN MEDICAL AND HEALTH SCIENCES

Until 2002, there were only 8185 evidence synthesis papers worldwide, which is only 3% of the total evidence synthesis papers until 2022. In the last 20 years, approximately 300K evidence synthesis papers have been published, where Medicine is the dominating research category (more than 200K papers) and most of the papers were targeted to publish in PLoS ONE. Universities of Canada, China, USA, Australia and UK are within the top 10 mostly published evidence synthesis institutions. In Malaysia, so far just over 2600 evidence synthesis papers have been published, where, UM is leading followed by UKM, UPM, Monash University and USM. For the future evidence synthesis researchers from USM, it could be suggested to maintain their data quality, transparency and trustworthiness to ensure a sound evidence synthesis.






USM UNIVERSITI SAINS MALAYSIA
APEX
Division of Research & Innovation, School of Medical Sciences presents
MONTHLY RESEARCH PRESENTATION
Thursday
August 25, 2022
0810-0910
via
Cisco webex
EVENT NUMBER: 2514 120 5351
PASSWORD: mrpaug2022
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PRESENTER 1
Technical Perspectives for the Development of Human Breast Organoids
Dr. Siti Norasikin Mohd Nafi
(Department of Pathology)
PRESENTER 2
Cancer Research in School of Medical Sciences: Where Are We Since the Last Decade?
Prof. Dr. Rosline Hassan
(Department of Haematology)
CHAIRPERSON
Assoc. Prof. Dr. Kirnpal Kaur Banga Singh
(Department of Microbiology & Parasitology)
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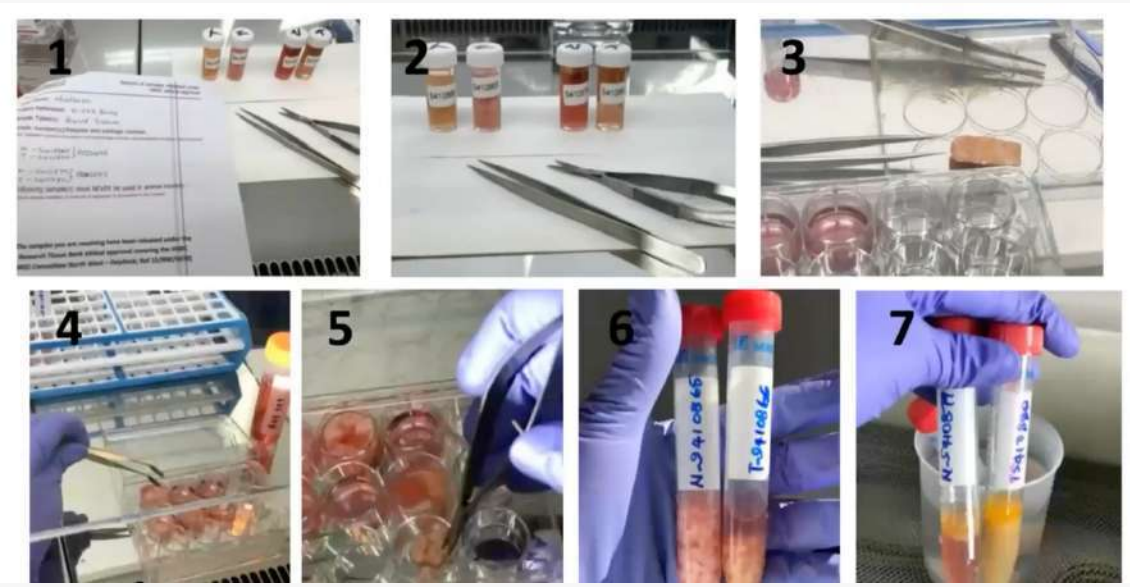
Dr. Siti Norasikin Mohd Nafi

Department of Pathology

TECHNICAL PERSPECTIVES FOR THE DEVELOPMENT OF HUMAN BREAST ORGANOIDS

In vitro studies have notably used 2D cell culture, also known as monolayer-grown cells. However, the model can only simulate in vivo conditions. As a result, an animal model will be used to verify the outcomes of 2D cell culture. Another problem with the species' relationship between humans and animals comes when the animal model is applied. 3D cell culture experiments would be the best system to mimic in vivo extracellular environment in order to bridge the gap between 2D and animal experiment models. As a result, more information on cell-cell interaction, tumour characteristics, biochemical profiling, and disease mechanisms can be obtained. This presentation offers the experimental experience I acquired during my postdoctoral attachment on developing human breast organoids. The significance of the approach in modern medical research is emphasised. Furthermore, several technical aspects of establishing and maintaining the organoid culture are discussed further. In conclusion, human breast organoids are used to model human breast cancers experimentally in order to design personalised treatment and predict drug responses.



Professor Dr. Rosline Hassan

Department of Hematology

CANCER RESEARCH IN SCHOOL OF MEDICAL SCIENCES: WHERE ARE WE SINCE THE LAST DECADE

The aim of cancer research is to conduct research in cancers that are of locally importance, improve patients' survival and quality of life by reducing all factors that contribute to cancer development and initiate effective treatment strategies. Cancer Research can be divided into Basic Research, Clinical Research, Population-Based Research, and Translational Research, all of which lead to produce output that can significantly fight for cancer. The component of cancer research can be on the molecular mechanism, pre-, clinical research, and epidemiology of cancer. In Malaysia, the most common cause of cancer for the past decades were breast cancer followed by colorectal, lung, lymphoma, nasopharynx, leukemia, liver, uterus, prostate. Malaysia government has strategized priorities on cancer research in 12th Malaysian Plan [12MP-HRR]-2021-2025). The top few focused on epidemiology studies which includes preventive strategy, early diagnosis, patient centered outcome, supportive care and technology advancement.

Cancer Research is one of the focus area of research in School of Medical Sciences. Hospital USM has the privileged of being a tertiary and referral hospital for Malaysia and East Coast of Malaysia, specifically. There were 828 new cancer cases and 4,000 recurrence cases in the year 2020. The high number of cancer cases, unique social-background with majority rural life-style would contribute to the golden-mine for cancer research. School of Medical Sciences have secured various related grants, supported by active and experience researchers in the area of clinical and fundamental research since 2017 to 2021 (Figure 1).

The out-put of these researches resulted in four-fold increase in the number of publications in many impactful journals from 2012 to 2021. Since the last decade the school has developed a series of strategies for cancer research such as nurture a culture that promotes talent and collaboration between schools in USM, forge close partnerships with other organisations at national, international level and industries. These efforts have led to a significant collaboration between deferent PPSP researcher on cancer topic to produce highly cited publications (Table 1) that eventually may be reflected on the health status of local patients and Malaysia as general.Together School of Medical Sciences and HUSM have also improved digital infrastructure, laboratory and research facilities such as cell culture and genetic laboratories. Health Campus is also geared forward by having Animal Research Center assisting pre-clinical research. The formation of an inter-department team of researchers, Breast Cancer Awareness and the Research Unit (BestARi) has promoted more research in Breast Cancer which is the way forward. In the recent years, the committee of School Research organization has actively set up cancer Biobank in Central Research Laboratory to preserve samples and data of cancer patients for the benefit of future research.

Division of Research & Innovation, School of Medical Sciences presents

MONTHLY RESEARCH PRESENTATION

Thursday
Sept 29, 2022
0810-0910

via Cisco webex

EVENT NUMBER: 2511 252 6051 PASSWORD: mrpsept2022

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PRESENTER 1

Anti-Chikungunya Activities of Tualang Honey

Assoc. Prof. Dr. Rafidah Hanim Shomiad @ Shueb
(Department of Medical Microbiology & Parasitology)

PRESENTER 2

Stingless Bee Honey: The Future of Honey Research in Malaysia

Dr. Mohd. Zulkifli Mustafa
(Department of Neurosciences)

CHAIRPERSON

Dr. Nazihah Binti Mohd Yunus
(Human Genome Centre)

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Associate Professor Dr. Rafidah Hanim Shueb

Department of Microbiology and Parasitology

IN VITRO ANTI-CHIKUNGUNYA VIRUS ACTIVITIES OF TUALANG HONEY

Chikungunya is a re-emerging mosquito-borne infection that is transmitted primarily by Aedes Aegypti and Aedes Albopictus. The infection is caused by chikungunya virus which belongs to the Togaviridae family. Currently, there is no approved vaccine or specific anti-viral available to prevent or treat chikungunya. The objective of this study was to evaluate the antiviral activities of Tualang honey on in vitro chikungunya infection in Vero cells and subsequently to investigate the mechanisms of action. Tualang honey was used in this study because although its anti-bacterial and anti-fungal activities have been studied, its anti-viral activities are not known. In this study, Vero cells were exposed to Tualang honey either before or after chikungunya virus infection. Viral titres were monitored 48 hours after infection. From the results, it was demonstrated that Tualang honey exhibited anti-chikungunya virus activities in Vero cells, evidenced by the reduced viral chikungunya virus titres. The most significant anti-chikungunya activities were when Tualang honey was added 24 hours before virus infection and eight hours after infection. Further to this, it was shown that Tualang honey might exert its anti-chikungunya activities by directly killing the virus and preventing viral entry. It remains to be investigated what other mechanisms of actions conferred by Tualang honey that resulted in the inhibition of chikungunya virus replication.

TUALANG HONEY

- Tualang honey
  - local Malaysian honey
  - collected from the honeycomb of Asian rock bees (*Apis dorsata*) found on Tualang tree.

- Has antimicrobial properties
  - phenolic acids
  - flavonoids
- Has antimicrobial effects against many pathogens including *Escherichia coli, Shigella sonnie and Salmonella typhi*

Dr. Mohd Zulkifli Mustafa

Department of Neurosciences

STINGLESS BEE HONEY: THE FUTURE OF HONEY RESEARCH IN MALAYSIA

Honey is uniquely produced by honeybees (Apis sp.) and stingless bees (Meliponini sp.). Both honey exhibits tremendous medicinal properties such as antimicrobial, anticarcinogen and antioxidant. Despite the medicinal properties, honey has never been included within the mainstream of disease management due to the unstandardized pre- and post-harvesting techniques. The harvested products are far below the standard for further application in hospital and pharmacy. Further, production of honey by honeybees in Malaysia has not been profoundly successful. Thus, availability of local honey is completely dependent on honey hunters who obtain feral bee such as Tualang bees (Apis dorsata). The Tualang bees, which mainly nest in the jungle and far off the ground, limit the implementation of standard production procedures. Meanwhile, stingless bee do not have stinger and possesses unique nesting behaviour. It provides the opportunity for the bee to be cultivated in intensive farms with controlled environmental that implement standard operating procedures. Composition of stingless bee honey includes sugars (fructose and glucose) with nearly zero hydroxymethylfurfural (HMF). It also contains organic acids, phenolic compounds (eg., phenolic acids and flavonoids), proteins, amino acids (eg., phenylalanine, alanine, tyrosine, valine, acetate and trigonelline), enzymes, vitamins and minerals. The polyphenolic content is nearly tenfold higher compared to other types of honey and owns unique trehalulose sugar. Stingless bee products have been reported to have potent pharmaceutical properties for prevention of chronic diseases, such as cancer, stroke, depression, hypertension and diabetes, as measured by its ability to manipulate signalling pathway of disease development. The facts that the stingless bee honey is produce by tropical country and Malaysia is leading with the first stingless bee honey standard in the world as well as the supply chain is equipped with GMP and HACCP certifications factory, the stingless bee honey is an excellence natural product to replace the honeybee in research. Along with bee bread (fermented pollen) and propolis product produce by the stingless bee, the future of honey research could be revitalizing. Overall, the stingless bee industry has catalyses the spill-over impacts within the community in relation to the new products, social innovations, entrepreneurship and agricultural interest as well as general well-being as a whole.

Division of Research & Innovation, School of Medical Sciences presents

MONTHLY RESEARCH PRESENTATION

Thursday
Oct. 27, 2022
0810-0910

via webex by cisco

EVENT NUMBER **2511 618 3091** PASSWORD **mrpoct2022**

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PRESENTER 1

Immunotherapy Against Metastatic and Advanced Cancers

Assoc. Prof. Dr. Wong Kah Keng
(Department of Immunology)

PRESENTER 2

Adverse Childhood Experiences & Health Risk Behaviours Among the Undergraduate Health Campus Student

Dr. Fahisham Taib
(Department of Paediatrics)

CHAIRPERSON

Assoc. Prof. Dr.
Wan Faiziah Wan Abdul Rahman
(Department of Pathology)

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Assoc. Prof. Dr. Wong Kah Keng

Department of Immunology

IMMUNOTHERAPY AGAINST METASTATIC AND ADVANCED CANCERS

Immunotherapy development, particularly chimeric antigen receptor (CAR) T cell therapy, against metastatic and advanced solid tumours is hindered by the lack of cell surface target highly expressed in cancer cells but with restricted presence in normal tissues to minimise off-tumour toxicities. In this presentation, a novel framework was presented to identify key cell surface targets for therapeutic development against colorectal cancer (CRC) and hepatocellular carcinoma (HCC). A longlist of genes detected in CRC or HCC cases according to the Human Protein Atlas (HPA) database were examined to shortlist for potential surface targets based on the following prerequisites: (i) Not expressed in the brain and lung tissues to reduce the likelihood of neurologic and pulmonary toxicities; (ii) Expressed in limited number of other normal tissues; (iii) Encode cell surface proteins and; (iv) Highly expressed in CRC or HCC cases. These resulted in a shortlist of genes for each cancer type. Subsequently, each set of the shortlisted genes were ranked according to the combination of their mRNA and protein expression levels in CRC or HCC cases derived from multiple transcriptomics and proteomics datasets. The top-ranked target for each cancer type was then compared with other common therapeutic targets in terms of their expression levels in normal tissues and cancers. These comparisons served as independent validation procedures, and the final shortlisted surface target in CRC or HCC demonstrated more favourable parameters (e.g. significantly lower and higher expression in cancers and normal tissues, respectively, than their therapeutic competitors). In conclusion, this study provides a novel framework to identify promising cell surface targets for CAR T cell development against solid tumours.

Dr. Fahisham Taib

Department of Paediatric

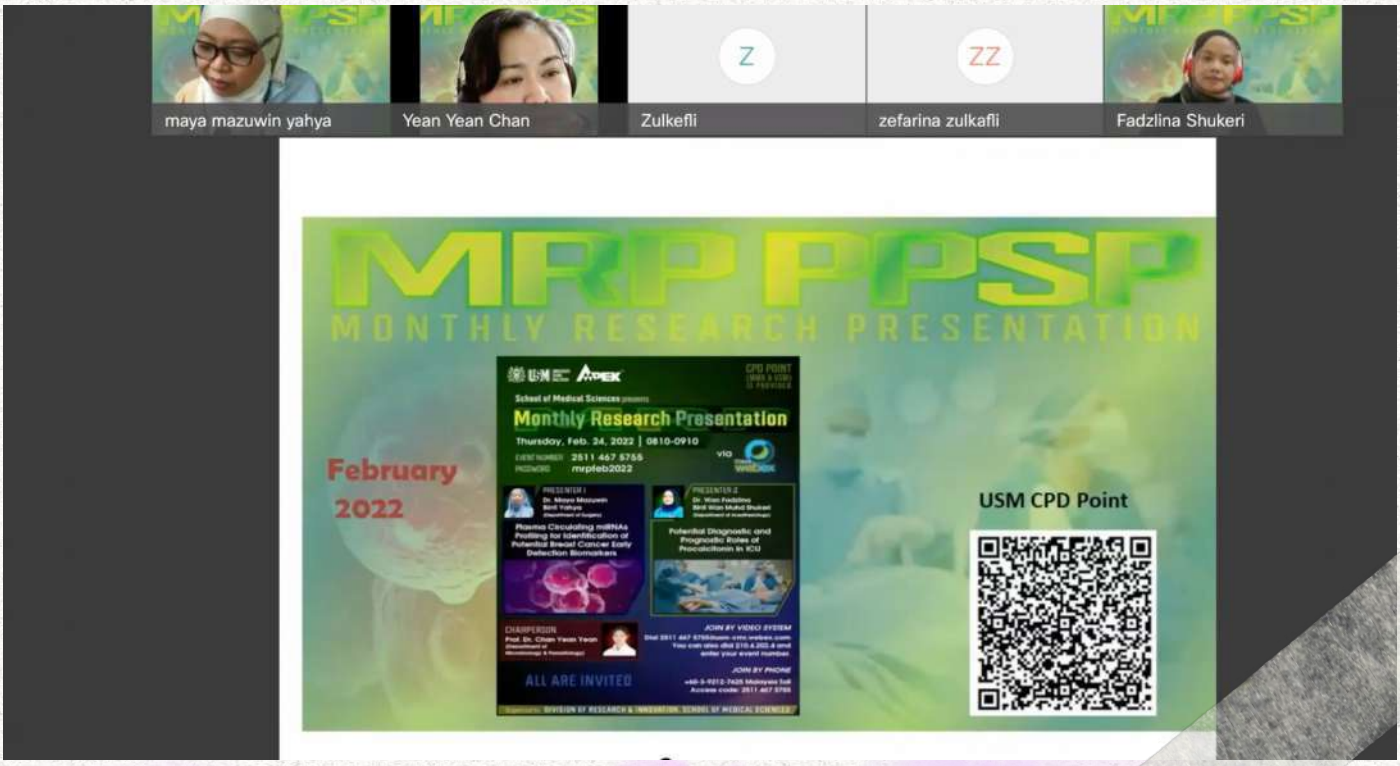
ADVERSE CHILDHOOD EXPERIENCES AND HEALTH RISK BEHAVIOURS AMONG THE UNDERGRADUATE HEALTH CAMPUS STUDENTS

Adverse childhood experiences (ACEs) have been shown to be linked with health risk behaviors (HRBs). The aim of this study is to evaluate ACEs among the undergraduate Health Campus of a university in the northeast of Malaysia, and the associated health risk behaviors. This cross-sectional study performed by recruiting 973 undergraduate students at the Health Campus of a public university from December 2019 to June 2021. An anonymous, self-reported questionnaire which consisted of the World Health Organization ACE-International Questionnaire and The Youth Risk Behavior Surveillance System (YRBSS) were distributed randomly to students according to the course and year of study by hard copies or via online questionnaires. This study found that ACEs were highly reported among participating university students ranging from 2.6 to 39.3%. The most commonly reported adversities were: emotional abuse (30.2%), emotional neglect (29.2%) and physical abuse (28.7%). The incidence of community violence was high, with about 39.3% of survey participants reporting the experience. The highest incidence of HRBs among respondents was 54.5% from physical inactivity, followed by overweight/obesity (28.8%) and safety negligence included text/email during driving (20.6%). The findings of this study showed that those who were exposed to ACEs were at risk of HRBs, for example participants with history of emotional neglect were more likely to have sexual risk behavior (AOR = 2.26, 95% CI 1.040 – 4.911). This study also supported that higher number of ACEs were associated with higher number of HRBs. Thus, the study has provided evidence on child maltreatment as one of the important public health problems in Malaysia.

PHOTO GALLERY

MRP 2022

JANUARY 2022



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AUGUST 2022

SEPTEMBER 2022

OCTOBER 2022

THANK YOU

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