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INTERNATIONAL CONFERENCE ON POST-COVID HEALTHCARE, MEDICAL RESEARCH AND EDUCATION
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PLENARY SESSION 1

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THE IMPACT OF COVID-19 PANDEMIC ON HEALTHCARE FACILITIES & SYSTEM: NATIONAL PERSPECTIVES

COVID-19 has illustrated the global chaos that can be unleashed by newly emerging infectious diseases. Malaysia's past experiences in facing infectious disease outbreaks have strengthened our emergency response system in health. Malaysia has taken unhesitating and revolutionary health emergency initiatives, across multiple sectors. The country's preparedness for the COVID-19 pandemic was powered by early planning and preparation of healthcare facilities and services. COVID-19 remains equally unparalleled in its sequelae, impacting numerous sectors, posing major challenges, and inflicting a diverse paradigm shift.

Through active detection, more and more cases were being detected. Larger number of patients were admitted to government health facilities. From the first wave, second wave (27.2.2020), third wave (20.9.2020) and the emergence of VOC particularly the Delta variant in 2021 had resulted with daily new cases increasing till its highest of 24,599 cases in August 2021. This situation has put stress on the Malaysian healthcare system. With the emergence of Omicron, new daily cases recorded in 2022, have reached more than 30,000.

This pandemic has strained the healthcare system, but yet frontliners continue to tirelessly put their lives on the line, sheltering millions. Hospitals are provoked to refresh and recreate themselves in light of the escalating demands, in the backdrop of chronic resource limitations and constraints. The contributions and help of organizations, the community and numerous agencies are immeasurable, and are invaluable in ramping up our efforts to save lives. A myriad of activities was in motion at the government health clinics. There was a huge surge of PPE utilization both in clinics and hospitals. Multiple activities occurring simultaneously, conducted by health clinics, District Health Offices, Hospitals, State Health Departments, all Programmes at Ministry of Health headquarters.

Nearly 500 clusters exploded all over the country in 2021 and manpower and equipment were still being mobilized to areas where they are most needed, in efforts to relieve the tension on the healthcare system. Workloads at hospitals and clinics are increasing tremendously. Congestion at health clinics and hospitals was unavoidable. Treatment for non-COVID-19 cases have been affected. Several non-COVID-19 public health activities at District Health Offices, such as Dengue and TB Control Programme, School Health Programme were also affected. The number of COVID-19 deaths and "Brought in Dead" were also increasing, requiring not only trained human resources,

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PPE, equipment, consumable but also involvement of NGOs and all related Malaysian Religious Authorities in this multi-ethnic society.

Malaysia stepped up efforts to strengthen both the hospital and public health capacity. Existing MOH hospitals were categorized to three types namely Full COVID-19, Hybrid COVID-19 and non-COVID-19 hospitals. As more beds were required for COVID-19 cases, numerous Low Risk COVID-19 Treatment and Quarantine Centres were established nationwide by the Government. Subsequently the private sector also participated in establishing Low Risk COVID-19 Treatment and Quarantine Centres. Private GPs also participated not only in performing swabs, but also doing RTK testing, managing Category 1 and 2 cases. As new cases went up, Covid Assessment Centres (CAC) were established by the Government, which was subsequently followed by establishment of private CAC by the private sector, The potential of digital technology was capitalized by establishing Virtual CAC and parallel to that the capacity of MySejahtera was also upgraded, which enabled it to register vaccination, change address, issuing digital Home Surveillance Order (HSO), digital Release Order (RO), Home Assessment Tool (HAT).

As COVID-19 cases increased, laboratory services in MOH facilities were also affected, hence outsourcing of COVID-19 tests to private laboratories and universities was implemented. As treatment for non-COVID-19 cases have been affected, the Government has outsourced treatment of non-COVID-19 cases to private hospitals nationwide. Several private hospitals and university hospitals also help manage COVID cases.

The National Immunization Program was introduced in 2021, and was implemented in phases, initially with low coverage but later was intensified. Numerous Vaccination Centres were established, and the private sector took a major part in this vaccination program. With the introduction and good uptake of booster dose, the children & youth immunization program has successfully protected the Malaysian health system. This is evidenced with the emergence of Omicron, although new daily cases in 2022 have reached more than 30,000, majority of these cases are within categories 1 and 2, and very few are in categories in 3, 4, and 5 and needing hospitalization. Patients who need ventilator support and ICU care have also reduced tremendously and the death has also shown a reducing trend.

A multi-sectoral and collaborative approach, in line with whole-of-government and whole-of-society approaches have shown that we are stronger when we work together towards a common purpose. Everyone worked hand-in-hand, helped to coordinate, make efforts more cogent and rely on each other to achieve a collective goal, to rid the country of the COVID-19 crisis. The unfolding crisis offers many opportunities to identify gaps, prioritize needs and enhance capacity development to strengthen the national health security further. There are numerous impacts and implications of COVID-19 to Malaysian healthcare facilities and systems. Currently COVID-19 is a battle that persists. Malaysia had and continues to face various issues and challenges ahead. The fight continues with a common goal of overcoming those issues and challenges together.

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PLENARY SESSION 2

Dr Benedict Sim Lim Heng

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CYTOKINE STORM IN COVID-19 – COMPLICATIONS AND MANAGEMENT: ROLE OF ANTI-INFLAMMATORY IN COVID-19 MANAGEMENT

One of the dreaded complications of COVID-19 infection, and indeed the major cause of death in its most severe form, is the development of hyperinflammation, also known as a cytokine storm. This typically occurs as a second phase of illness in the second week of infection after the start of symptoms, following the first phase of the disease, which is the viral proliferation phase. Patients at risk of this cytokine storm phenomena include those who are elderly, the male gender, the unvaccinated and those with chronic medical illnesses like chronic kidney disease, chronic heart failure, chronic respiratory disease, obesity, diabetes, and others.

As this pandemic evolved, the development of this complication has also changed, peaking with the Delta variant wave, and currently less prominently seen in the current Omicron variant wave. Partly, this is also due to an increasing proportion of people who have developed some immunity whether through vaccination or through previous infection. Recognizing the onset of the second phase of the illness is also critical as only a minority endure this second phase of illness. In addition, agents that work in the first phase of illness might be superfluous in the second phase of illness while if the agents used in the second phase of illness are used in the first phase, it can prolong illness and worsen the complications.

The pathogenesis of a cytokine storm is still uncertain and being researched. Two developing hypotheses are an inability to mount a timely antiviral response and an inability to control SARS-CoV-2–driven inflammatory responses. The first hypothesis is thought to be due to 3 factors – the viral load of the infection, defects in the type 1 interferon response and an imbalance in the adaptive immunity of the host. This leads to a failure of timely type 1 interferon response and a delay in clearance of virus. The second hypothesis includes altered myeloid response, pathogenic antibody production and increase in vascular permeability. These hyperinflammatory responses lead to significant tissue damage and impaired tissue repair. Based on these hypotheses, two major targets of treatment in COVID-19 emerge and are understood. The first is to interfere with the virus life cycle and thus prevent delayed viral clearance. This can be done with the use of antiviral agents or monoclonal antibodies that quickly limit viral spread and prolongation in the body. The second target is to regulate or modulate the immune system. This is shown clearly with the partial success of using steroids in patients with this complication. Other successful and more targeted ways of modulating

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the immune system have been found with the usage of interleukin-6 inhibitors like tocilizumab and sarilumab and Janus kinase inhibitors like baricitinib and tofacitinib.

Clinical trials using these agents have been found to reduce mortality, reduce the need for mechanical ventilation and to shorten the period of hospitalization. The usage of these agents has to be carefully balanced with the timing and recognition of the onset of cytokine storm and the possible side effects and complications of these agents which include concomitant bacterial infections and thrombosis.

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PLENARY SESSION 3

Professor Dr Gagandeep Kang

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SAFETY OF COVID-19 VACCINES: WHAT WE KNOW AND WHAT WE CAN DO

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PLENARY SESSION 4

Professor Dr Stephen Trumble

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DELIVERING MEDICAL CURRICULUM IN THE COVID-19 ERA: LESSONS LEARNT

The onset of the COVID-19 pandemic in early 2020 was the beginning of an unprecedented, existential crisis for the whole planet. Epidemiologists and public health physicians were thrust into the spotlight, and the need to continue or even accelerate the training of health professionals came into sharp focus.

As we emerge into the next phase of the pandemic, with vaccination having replaced isolation as the main containment strategy, we have learned a lot about many things to do with the business of educating new doctors. This presentation will describe some lessons learned in Australia about each of:

i. medical curriculum design and delivery when face-to-face teaching is not possible,
ii. the maintenance of clinical placements during periods of extreme workforce pressure,
iii. the resilience of students and staff in the face of multiple challenges,
iv. and maintaining our own levels of performance when priorities are conflicting.

The Melbourne medical course had just embarked on a major redesign and reaccreditation cycle when the pandemic hit, meaning that our carefully-planned change management process was swept away by the need to find immediate solutions for unanticipated problems. Rather than hindering the improvement of our curriculum and the way we were delivering it, however, the disruption caused by the pandemic allowed us to introduce much-needed changes faster and with greater acceptance from stakeholders. Many of the barriers to curriculum reform were swept away, and medical schools around Australia and New Zealand collaborated as never before.

In 2022, with our redesigned medical curriculum rolling out from the end of January, it is clear that many of the changes that were implemented to accommodate the pandemic need to be maintained into the future. Amongst these are a new recognition that content delivered within the core of the course has to be closely aligned with what students need for competence, that consistency of delivery at multiple sites is important for equity, and that our students have valid roles to play within the healthcare team even before graduation. Participants are encouraged to think about the changes they have observed within their own context that should be maintained, and what needs to go back to “the way it was” as quickly as possible.

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SYMPOSIUM SESSION DAY 1
SPEAKER 1

Dato' Dr Zainal Ariffin Omar

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Consultant Public Health Medicine Specialist

POSITIONING MALAYSIA'S PUBLIC HEALTH SYSTEM FOR THE NEXT PANDEMIC

In late December 2019, Chinese authorities reported several cases of "viral pneumonia" in the city of Wuhan. Later, on 11 March, the World Health Organization (WHO), formally declared the coronavirus outbreak a global pandemic. Since then, many routines in every aspect of our life changed to new-normal.

In the past 20 years, Malaysia has responded to every public health crisis with excellent experiences and outcomes. We are very fortunate because our health system has been built on the solid background for the current and immediate future, including a commendable Crisis and Epidemics Crisis Preparedness Plan. The COVID-19 pandemic has made clear that the nation's safety, health, and economic prosperity are dependent on a robust public health system. COVID-19 pandemic indicates that Malaysia should have a robust and resilient health system. Both for crisis and pandemic as well as to take care of our sick people and to maintain wellness and well-being of the general population.

Even as the pandemic is easing, Malaysia must prepare for possible other pandemics from dangerous infectious disease or a widespread natural or man-made disaster. We must transform our health system to strengthen especially in basic elements of prevention, preparedness, universal Healthcare, public health, political leadership and people. Our health system should give more emphasis on the lack of workforce and modern data systems to support surveillance, contact tracing, testing, guidance on mitigation measures, administration of intervention, and clear communication that is needed to manage health crises.

Community-based health care is an essential part of primary care at all times; in the context of the COVID-19 pandemic. In addition, many Malaysians have chronic underlying health conditions such as obesity, smoking, chronic diseases and heart disease, leaving them more likely to develop severe illness from many infections and stressful situations. We should have more advanced primary care facilities in the periphery, marginalized and urban areas. We should give more emphasis on the use of current ICT and digital technology in our healthcare delivery system. In addition, the whole-government approach should also involve greater community participation through community engagement and empowerment.

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SYMPOSIUM SESSION DAY 1
SPEAKER 2

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Head of Service for Family Medicine Specialty, Ministry of Health Malaysia

PRIMARY CARE ON THE FRONTLINE OF COVID-19 PANDEMIC: *WHEN THE GOING GETS TOUGH, THE TOUGH GET GOING*

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SYMPOSIUM SESSION DAY 1
SPEAKER 3

Dr Jeyanthi Suppiah

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LABORATORY DIAGNOSIS OF COVID-19: INTERPRETATION AND PITFALLS

Diagnostic testing for COVID-19 is a critical component to the overall prevention and control strategy. Implemented tests algorithm should be affordable and accessible to all and able to generate rapid and reliable results. This is to ensure appropriate clinical care for patients and inform actions to prevent onward spread of SARS-CoV-2. The World Health Organization (WHO) recommended nucleic acid amplification tests (NAAT) such as Real-Time RT-PCR (rRT-PCR) that targets the SARS-CoV-2 genome to be used as the main diagnostic tool in laboratory testing. Other lab tests such as virus isolation and genomic sequencing were suggested if deemed needed or for surveillance purpose. The presentation highlights the interpretation of laboratory test particularly PCR in diagnosing COVID-19, pitfalls of the test and possible solutions for improvement. Additionally, the presenter intends to share the experience of the Institute for Medical Research (IMR) in managing COVID-19 in view of early preparedness and implementation of laboratory testing.

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SYMPOSIUM SESSION DAY 2
SPEAKER 1

Dr Masita Arip

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THE IMPORTANCE OF RNA RESEARCH IN COVID-19 VACCINE DEVELOPMENT: LESSON LEARNT

The coronavirus (CoV) now named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is responsible for the disease coronavirus disease 2019 (COVID-19), and was first detected in early December 2019, in Wuhan City, Hubei Province, China. The disease was initially described as a “pneumonia of unknown etiology” with high fever that was not responding to drug treatment. SARS-CoV-2 is a zoonotic virus related to the severe acute respiratory syndrome coronavirus (SARS-CoV) that was responsible for a 2002 outbreak and is also related to Middle East respiratory syndrome coronavirus (MERS-CoV), responsible for Middle East respiratory syndrome. On Jan. 11, 2020, the genetic sequence of the new coronavirus, later named SARS-CoV-2, was published in Genbank, an international repository available to scientists around the world. On 16 March 2020, the mRNA COVID-19 vaccine (mRNA-1273) from Moderna entered phase I clinical trials.

An ideal antigen should be selected for the development of a safe and effective COVID-19 vaccine. The S protein is the major antigen in most COVID-19 vaccine candidates under development as it contains the major neutralizing epitopes and is located on the surface of the viral particle. Instead of delivering a virus or a viral protein, RNA vaccines deliver genetic information that allows the body’s own cells to produce the viral protein. Synthetic mRNA that encodes a viral protein then borrows this machinery to produce many copies of the protein. These proteins stimulate the immune system to mount a response, without posing any risk of infection. A key advantage of mRNA is that it is very easy to synthesize once researchers know the sequence of the viral protein they want to target. Most vaccines for SARS-CoV-2 provoke an immune response that targets the coronavirus spike protein, which is found on the surface of the virus and gives the virus its characteristic spiky shape.

Messenger RNA vaccines encode segments of the spike protein, and those mRNA sequences are much easier to generate in the lab than the spike protein itself. Messenger RNA is a large hydrophilic molecule. It doesn’t naturally enter cells by itself, and so these vaccines are wrapped up in nanoparticles that facilitate their delivery into the cells. This allows the RNA to be delivered inside of cells, and then translated into proteins. One drawback to mRNA vaccines is that they can break down at high temperatures, which is why the current vaccines are stored at such cold temperatures. Pfizer’s SARS-CoV-2 vaccine has to be stored at -70 degrees Celsius (-94 degrees Fahrenheit), and the Moderna vaccine at -20 C (-4 F). One way to make RNA vaccines more stable, is to add stabilizers and remove water from the vaccine through a process called lyophilization, which has been shown to allow some mRNA vaccines to be stored in a refrigerator instead of a freezer.

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SYMPOSIUM SESSION DAY 2
SPEAKER 2

Professor Dr Ammu K. Radhakrishnan

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MIX AND MATCH COVID VACCINES: IS MIXING COVID VACCINES A GOOD IDEA?

Ammu K. Radhakrishnan*, Samantha Khoo Si Mei, Ashwini Mahendran Saatheeyavaane B. Pillai

Background: It has been more than two-years since the emergence of the severe acute respiratory syndrome coronavirus-2 (SARS-COV-2), which caused the Coronavirus disease-2019 (COVID-19) pandemic in March 2020. There is no doubt that COVID-19 is a highly contagious respiratory infection that endangered the health and claimed the life of millions, which subsequently impacted the healthcare systems and economies worldwide. As the SARS-CoV-2 is a novel coronavirus, there is insufficient information on its short- and long-term effects. Vaccines have been used since the time of Edward Jenner and Louis Pasteur to help us develop immunity against a variety of pathogens. So, it is not surprising that within a short period of time, various types of COVID-19 vaccines such as mRNA vaccines, viral vector vaccines, and inactivated vaccines were rapidly developed and deployed worldwide. Despite limited testing and research, the newly minted COVID-19 vaccines were given the Emergency Use-Licence (EUL) by the World Health Organization (WHO) due to the gravity of this pandemic. The efficacy of these COVID-19 vaccines are being debated as more vaccines are being developed. Now with concerns of emerging new strains of the virus and limited vaccine availability, heterologous vaccine schedules are being considered. This paper aims to present the results of a scoping review of the available evidence to compare the immunogenicity of heterologous and homologous vaccines to determine which regime confers a better immunity against COVID-19. **Method:** Literature search was conducted on three electronic databases (Ovid MEDLINE, PubMed and Scopus). Studies obtained from the databases were screened for relevance and eligibility using an online platform (Covidence). **Results and Discussion:** A total of 27 articles were shortlisted for data extraction and analysis. In terms of study methodology, 17 were observational studies, seven were randomized controlled trials (RCT) and three were clinical trials. The analysis demonstrated that participants receiving the heterologous vaccination regimens generated higher levels of IgG antibodies to the spike protein of the SARS-COV-2 virus, antibodies to the receptor binding domain (RBD) and T-cell response to the spike protein compared to those who received the homologous vaccination regimens. Furthermore, the heterologous vaccination produced a higher titre of neutralising antibodies against several variants of concerns (VOC) of the COVID-19 virus including alpha, beta, gamma, delta and omicron. There were no severe vaccine related adverse events reported in these studies and some of the common local and systemic side-effects were manageable. **Conclusion:** Heterologous vaccination regimes were able to induce strong humoral and cellular immunity, which were comparable to the homologous vaccination regime. In addition, the heterologous regimes produced stronger neutralizing antibody activity against VOC.

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SYMPOSIUM SESSION DAY 2
SPEAKER 3

Dato' Dr Amar-Singh HSS

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COVID-19 CHALLENGES AND THE FUTURE

After more than two years of a COVID-19 pandemic the world and Malaysians are fatigued. They want the pandemic to end and for all of us to 'get on with our lives'. But is the end in sight? The reality about COVID-19 is that it is here to stay for a long, long time and that most, if not all, of us will get infected at some time with one variant or a future one; some may get infected a number of times. Fortunately, vaccines have significantly improved outcomes but this only applies to our current variants.

As Dr Maria Van Kerkhove, an infectious disease epidemiologist and technical lead for the World Health Organisation said in February 2022: "*The next variant of concern will most likely be more transmissible as compared to Omicron because it will have to overtake the strains that are currently circulating. Future variants may also have a greater ability for immune escape (vaccines will not be as effective against them).*"

Hence, we must continue to have vigilance and work to protect our most vulnerable members of society. Children under 5 years have no vaccination as yet. We need to advocate for full vaccination of children aged 5-11 years and boosters for adults, especially adults with disabilities, those immunocompromised, those with chronic illness and the elderly. These vulnerable individuals are at higher risk even if vaccinated but vaccination makes a major impact on reducing mortality.

We must remember that there are three effects of a COVID-19 infection. Firstly, the immediate hospital admission, organ damage and death risk. Secondly, the intermediate risk of Long Covid that may affect even those who have a mild infection. Note that data from the UK Office for National Statistics on Long Covid in children showed that 1.0% of all primary school and 2.7% of secondary school students in the UK have experienced Long Covid. Adult Long Covid rates are in the region of 20-30%. And thirdly, the still poorly understood Long Term effects of COVID-19 on the brain and other organs which may lead to disability 10-30 years from now (e.g. early onset dementia). This appears to have happened with other pandemics, like the Spanish Flu, and may result in a higher long-term burden to society than the current pandemic. We must also address the mental health pandemic that has risen in tandem with the COVID-19 pandemic.

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Currently, measures to fight COVID-19 are hampered by a fake news pandemic and what I term 'Covid Wars', even among medical personnel. We need to work to minimise this as it causes confusion among the public and leads to misleading outlooks and behaviour that may be less than safe.

It is extremely difficult to predict what will happen in the next 1-2 years as it is dependent on many factors which include:

i. What burden of disease and death from new variants is acceptable?
ii. What level of disruption to our healthcare capacity are we willing to accept?
iii. Will new vaccine resistant variants of concern emerge?
iv. Will we need yearly vaccine boosters or can we develop a pan-coronavirus vaccine?
v. What kind of meaningful social behaviour and change will the public make?

Hence, we as a society need to make significant long-term changes - a new way of life now and 'post' Covid that will enable us to live better now as well as face the next pandemic that will come. One key is to invest in our public health care system that has been neglected for many years. Important changes include making improvements to indoor ventilation in all buildings mandatory and a culture of using masks (reliable FFP2/KF94 masks) more often indoors or if unwell. We need to change our work ethic/behaviour to allow routine work from home, offer routine paid leave for unwell staff, move more meetings and conferences to online platforms. It is our collective societal behaviour that will determine our future.

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SYMPOSIUM SESSION DAY 2
SPEAKER 4

Dato' Professor Dr Andrew Mohanraj

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Adjunct Professor of Psychiatry, School of Medicine,
Taylor's University

CLINICAL RESEARCH IN STRESS-RELATED AND PSYCHOLOGICAL IMPACTS OF COVID-19 LOCKDOWN

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SYMPOSIUM SESSION DAY 2
SPEAKER 5

Professor Dr Raman Sharma

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CLINICAL RESEARCH ON THE OUTCOMES AND MANAGEMENT STRATEGIES IN SERIOUSLY ILL COVID-19 PATIENTS

The COVID-19 pandemic ramified negative repercussions globally, thereby igniting large scale medical research worldwide in a short span of time. The management of COVID-19 since its first wave has evolved drastically with emerging new data from innumerable clinical trials. There has been rejigging and repurposing of therapeutic drugs to refine the armamentarium in management of severely ill COVID-19 patients in order to improve outcomes.

Severely ill COVID-19 cases are defined as those with acute hypoxemic respiratory failure requiring mechanical ventilation with oxygen saturation <90% at room air, respiratory rate >30 breaths/min and a CT severity score >15/25. Management of these cases includes a two-pronged approach: one being general supportive care and the other being specific therapeutic management. General supportive care includes oxygenation, ventilation, maintaining hemodynamics, and maintaining other vital organ functions. Oxygenation is achieved through face masks, high-flow nasal oxygen, non-invasive (CPAP) or invasive mechanical ventilation to target saturation >90% and >92-96% (pregnant) in adults. The RECOVERY-RS trial demonstrated significantly reduced risk of intubation and mortality with initial early use of CPAP (36.3%) versus conventional oxygen therapy (44.4%) in acute hypoxemic respiratory failure. The significance of prolonged awake prone positioning sessions (16 hours/day) in severe ARDS (defined as PaO2/FiO2 <150 mmHg) has been proven in the PROSEVA trial, where in both 28-day (16% versus 32.8%) and 90-day (23.6% versus 41.0%) mortality was significantly reduced in the prone positioning group versus supine positioning.

NIH guidelines recommend using crystalloids for maintaining euvolemia, and norepinephrine as the first choice of vasopressor followed by vasopressin for septic shock to target a mean arterial pressure between 60-65 mmHg. Monitoring of dynamic parameters such as skin temperature, capillary refilling time, and/or lactate levels to assess hemodynamic status is recommended. There is insufficient evidence for empirical antibiotic usage in severe COVID, in absence of other indications and if initiated needs stringent antimicrobial stewardship.

A meta-analysis of studies of hospitalized COVID-19 patients treated with VTE prophylaxis found an overall VTE prevalence of 14.1%. Based on results of three major (ATTACC/ACTIV-4a/REMAP-CAP) and two smaller trials (RAPID, and HEP-COVID); the NIH guidelines recommend

using prophylactic dose anticoagulation with low molecular weight heparin (LMWH) for all hospitalized individuals including pregnant adults without any contraindication or bleeding risk, but recommend using therapeutic dose anticoagulation for those on low flow oxygen, not requiring ICU care with D-dimer levels above twice the upper limit of normal, for 14 days or until discharge, whichever is earlier. The INSPIRATION trial found no difference for the composite end point of venous and arterial thrombosis, ECMO, or all-cause mortality at day 30 in ICU patients treated with intermediate (enoxaparin 1mg/kg daily) versus prophylactic dose (45.7% versus 44.1%) of anticoagulation; it rather had increased risk of major bleeding (2.5% versus 1.4%). Hence, NIH panel recommends use of prophylactic dose LMWH for ICU COVID-19 patients. The use of Aspirin except for specific indications like ischemic stroke or coronary artery disease, is not recommended in COVID-19 based on the lack of mortality (17%) benefit at day 28 and increased risk of major bleeding (1.6%), based on results of the RECOVERY trial both during and post discharge.

The pathogenesis of COVID-19 involves an initial viraemic phase followed by a dysregulated immune response and hyperinflammatory phase. Based on data from several major trials like the RECOVERY, ACTT-1, PINETREE, Solidarity, DisCoVeRy, COVID-STEROID-2, COV-BARRIER, ACTT-2, STOP-COVID, EMPACTA and REMAP-CAP the following recommendations have been made by NIH regarding management of seriously ill COVID-19 patients:

Hospitalized but not requiring Oxygen	• Recommends AGAINST the use of Dexamethasone. • Early Remdesivir (PINETREE trial) may be considered in those at high risk of progression
Hospitalized and requiring low flow oxygen	Recommends using either one of the options: • Remdesivir • Dexamethasone* plus Remdesivir • Dexamethasone* alone
Hospitalized and requiring oxygen by either high- flow nasal oxygen or Non-invasive ventilation	Recommends using either one of the options: • Dexamethasone* • Dexamethasone* plus Remdesivir
Hospitalized and requiring either mechanical ventilation or ECMO	• Dexamethasone For those within 24 hours of admission to ICU: • Dexamethasone plus IV Tocilizumab

*For those on dexamethasone with increasing need for oxygen support or clinical and laboratory evidence of systemic inflammation, further addition of either oral Baricitinib (4mg per day for 14 days) or IV Tocilizumab (8mg/kg IV single dose) may be beneficial. If Baricitinib is not feasible, Tofacitinib may be used; and if Tocilizumab is not feasible, then use of Sarilumab may be considered.

Use of high-titre convalescent plasma is not recommended in hospitalized adults without impaired humoral immunity as it was associated with more adverse events and no difference in, in-hospital mortality or organ free support days as compared to standard care, evidenced from results of RECOVERY, CONCOR-1, REMAP-CAP and PlasmAr trials. The outcome of seriously ill COVID-19 patients is determined by underlying risk factors and laboratory markers of disease severity and progression. The consistent major risk factors are age ≥65 years, male sex, co-morbidities like obesity, chronic cardiac and pulmonary conditions, hypertension, diabetes, cerebrovascular accidents, chronic kidney disease, renal replacement therapy, cancer; laboratory parameters such

as D-dimer (> 1000ng/mL), CRP(>100mg/L), LDH(>245U/L), Troponin(>2xULN), lymphopenia, neutrophilia), severity of ARDS and organ dysfunction at time of admission.

The mortality associated with COVID-19 varies across the globe. The mortality is less than that associated with SARS-CoV-1 and MERS. Mortality is primarily driven by presence of ARDS (ranges between 12-78%). Length of ICU stay and days of mechanical ventilation also depend on presence and severity of COVID-19 associated ARDS, and with effective therapeutics the duration of both stay and intubation have declined. COVID-19 also has long-term sequel in the form of post-acute COVID syndrome (PACS) due to prolonged intubation and ICU stay.

The gamut of clinical research has highlighted the significance of global health, the challenges in the global response to initiate and coordinate trials in times of tremendous uncertainty and the need for high quality clinical trial research to provide more conclusive results.

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SYMPOSIUM SESSION DAY 2
SPEAKER 6

Dr Amnah Azahar

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ETHICAL CONSIDERATIONS AND CHALLENGES IN MEDICAL RESEARCH DURING THE COVID-19 PANDEMIC

The COVID-19 pandemic has had a tremendous impact on medical research. The focus on developing a vaccine and treatment for COVID-19 is, in fact, affecting many ongoing and upcoming medical research on other diseases. In addition, implementation of public health measures such as movement control order, physical distancing, restrictions on mass gathering and quarantine had also influenced the conduct of research during the pandemic. Although these preventive strategies helped in controlling the spread of COVID-19, they have led to several challenges within the field of research ethics that can affect: 1) the researchers, 2) the research participants, and 3) the quality of research outputs. These challenges may also lead to difficulties in fulfilling the seven requirements to make clinical research ethical.

Nonetheless, it is an ethical imperative to conduct research during the pandemic as some research might introduce novelties that could enhance public knowledge. However, the necessity to rapidly produce new evidence must be balanced with the realities of the situation. Therefore, to support the development of medical research during COVID-19, the World Health Organization (WHO) has outlined nine recommendations of ethical standards that should be adhered to by the researchers, review bodies, funders, publishers, and manufacturers to ensure ethical research conduct during COVID-19.

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SYMPOSIUM SESSION DAY 3
SPEAKER 1

Associate Professor Dr Anis Siham Zainal Abidin

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ALTERNATIVE ASSESSMENT TO ENSURE CLINICAL SKILL COMPETENCY IN REMOTE SETTING: SHARING THE EXPERIENCE

COVID-19 pandemic has undoubtedly disrupted the long-established traditional structure of medical education. The new limitations of face-to-face encounter have accelerated the development of an online learning environment, comprising both of asynchronous and synchronous distance education, and the introduction of novel ways of student assessment. In Faculty of Medicine UiTM, we were handling this crisis as early as March 2020 aiming to minimise serious implications to medical students and the impact to their academic trajectories. All things considered, the urgency for rapid and novel adaptations to the new circumstances has functioned as a springboard for remarkable innovations in medical education, including the promotion of work-place based assessments, online proctored theory and clinical examinations, and the use of clinical simulation centre.

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SYMPOSIUM SESSION DAY 3
SPEAKER 2

Professor Dr Shahid Hassan

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CLINICAL EDUCATION AND STUDENTS ENGAGEMENT: SHARING THE EXPERIENCE OF EMERGENCY REMOTE TEACHING DURING COVID-19 PANDEMIC

Background: Practice to explore factors influencing the students' engagement in the delivery of online clinical teaching during the COVID-19 pandemic was a new experience for many. Students' engagement technique has been studied in clinical training but factors influencing engagement under pandemic conditions have not yet fully explored. It was an added responsibility on the teaching faculty to research and publish, and direct the students' research topics to investigate clinical teaching faced with unprecedented challenges of Covid-19 crisis. A demands-resources-theory has helped the author to hypothesize that pandemic-related difficulties in clinical training and eLearning resources for online clinical teaching with desired students' engagement during the pandemic. Pandemic-related factors influencing the student's engagement will be shared. **Experience:** Priorities set for research and publishing the innovated concepts of clinical teaching and modifying the curriculum delivery influenced by the restrictions imposed on F2F was a major decision. Workplace-based clinical teaching, students' removal from their clinical placement and motivating them for stoutens' engagement in clinical training as emergency remote teaching were the influencing factors. Online clinical teaching based on educational concepts of flipped classroom model, Kolb's experiential learning cycle, hypothetico-deductive and think a loud approach, Gibb's reflective cycle, metacognitive skills, Gagne's instructional model, microlearning and digitisation of content were explored. All these methods were made student centric and focus being the students' wellbeing and online engagement. **Results:** The most important factor that has its impact on individual institutions, was decision to adopt changes based on educational principles and pedagogy combined with technology. However, emergency remote teaching using technology was not merely due to necessity rather than a need. Suitable digitisation of learning supports and developing faculty and students' competencies with eLearning were identified as important study resources for study engagement. However, improving emotional resilience, reliance on directed-self learning, creating microlearning content, digitalisation of lesson plane for asynchronous learning and developing and designing of online bedside teaching, task based learning, clinical skills learning were the game changer in students' engagement **Conclusions:** In any emerging crisis like Covid pandemic, medical institutions should focus on providing clinical teaching online with innovative ideas and ways to support students lacking in eLearning and pedagogy. Besides, students should be developed to adopt to new norms in clinical training to continuing clinical learning even if it has some compromises from, "show how" to "know how" level. Reflective practice, virtual medical clinic and digital scratch card for partial credit technique with formative assessment were the other practices the author experienced to monitor students' self-evaluation in a formative assessment environment.

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SYMPOSIUM SESSION DAY 3
SPEAKER 3

Professor Dr Olle ten Cate

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THE FUTURE OF MEDICAL EDUCATION: HOW STRONGLY WILL IT BE AFFECTED BY THE PANDEMIC EXPERIENCES?

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ORAL PRESENTATIONS

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GAUGING PRIVATE SECTORS CONTRIBUTION IN COMPETITIVE HEALTH-CARE STRUCTURE: A COMPARATIVE APPROACH OF MALAYSIA AND SCOTLAND

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Introduction: This article reflects on an investigation of the private health care market players' participation in Malaysia's Health care structure. The possibilities of how a competitive structure healthcare framework could enhance efficiency of accessibility and affordability within a consumer–market player's benefits framework was examined. A deregulated competitive market structure employs general practitioners (GP) as independent contractors and pharmacies as part of the national healthcare system. **Methods:** This study employed comparative documentary/doctrinal examination and qualitative analysis of Malaysia healthcare system and the Scottish NHS framework. This study, however, did not aim to review a privatization regime in the system but offer wider options to healthcare to maximize consumer welfare. Decentralization through deregulation would address health care delegation and budgetary constraints. The competitive market structure does not facilitate a shift of the responsibilities but rather it would establish a competitive market structure that facilitates the private sector to be part of the existing Malaysia healthcare system similar to the NHS system in Scotland whereby GP would be available to provide medical services and prescribed medications could be obtained from pharmacies. **Results**: The findings present structural suggestions and materials to facilitate a new direction to a competitive healthcare market structure in Malaysia. Part 1 documents a thematic analysis of the present national healthcare framework in Malaysia and Scotland. Part 2 documents the competitive structure justifications and challenges in both health systems. **Conclusion**: The conceptual recommendations for workable national healthcare sustainability goals.

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HYGIENE AS OBLIGATORY DUTY OF ISLAM TO MEET THE RISING NEEDS FROM THE PANDEMIC COVID-19 ACCORDING TO THE NEW NORM

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Introduction: Attention to cleanliness is an essential foundation of faith. Every Muslim must maintain the cleanliness of the human body and requires a mandatory mode of hygiene. The Covid-19 pandemic will bring uncertainties that affect hygiene and the necessities of healthy living. Thus, the article on hygiene and beneficial living aims to assess the level of hygiene practices among the Muslim community to protect themselves from COVID-19 infection. This article aims to find out the organization of personal hygiene and healthy living that will help maintain interest in performing duties while maintaining cleanliness in daily routines, especially during the COVID pandemic among the Muslim community. **Methods:** This study used a qualitative descriptive research approach. Library research is done through books, magazines, journals, the internet and so on. In addition, by conducting observational studies from previous research studies as well as the views of eminent scholars. **Results:** The results of empirical tests will provide a basis for managing mandatory tasks in moderate or adverse conditions. The findings show that a) significant demands of personal hygiene practices according to Islamic Fiqh and its comparison according to modern medicine relate to health to protect themselves from COVID-19 infection and b) there is a positive influence on inconsistent hygiene practices. **Conclusion:** Appropriate measures can be taken to initiate the development of compulsory duty activities according to the requirements of the new norm, especially to prevent infection of any disease, including COVID-19 epidemic.

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BARICITINIB, A JANUS KINASE INHIBITOR/BLOCKER REDUCED MORTALITY/DEATH AND DISEASE PROGRESSION IN SARS-COV-2 VIRUS INFECTED PATIENTS: A META ANALYSIS OF CLINICAL STUDIES

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Introduction: Addition of recent clinical trials' results related to baricitinib in the management of SARS-CoV-2 virus infected patients are conflicting. The aim of this systematic review and meta-analysis was to evaluate the efficacy of baricitinib in Covid-19 patients. **Methods:** Search engines such as ScienceDirect, PubMed and Google Scholar were searched thoroughly. Thirteen articles which met the inclusion criteria were analyzed. **Results:** The pooled data of RCTs and non-RCTs revealed baricitinib treatment significantly reduced the mortality rate in Covid-19 patients with risk ratio (RR) in fixed-effect model= 0.59 [95% CI=0.49, 0.70; p<0.00001]. Subgroup meta-analysis of RCTs was conducted. Baricitinib significantly reduced the mortality rate in RCTs with RR in fixed-effect model= 0.63 [95% CI=0.48,0.81; p=0.0004]. No heterogeneity was found in any analysis related to mortality. On the other hand, to address high heterogeneity related to block/reduce disease progression (BDP) research question, the authors pooled RCTs and nRCTs for BDP and removed 2 publication bias (PB) articles which were identified through funnel plots and found out very low heterogeneity with p=0.74 and I^2 was 0%. The RR in the fixed-effect model= 0.57 [95% CI=0.44,0.74; p<0.0001]. When only nRCTs related articles to BDP were analyzed with removal of 2 PB articles, the heterogeneity was very low with p=0.74 and I^2 was 0% with RR in fixed-effect model= 0.49 [95% CI=0.33,0.72; p=0.0002]. **Conclusion:** With inclusion of mostly low risk of bias (RoB) articles and 1 moderate RoB article which were assessed through Cochrane risk assessment and Newcastle-Ottawa scale (NOS), the meta-analyses revealed that baricitinib significantly reduced mortality rate and disease progression in SARS-CoV-2 virus infected patients. [PROSPERO protocol registration number: CRD42021281556].

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WHY INNOVATIONS ARE DRIVEN BY DISRUPTION – A PERSONAL NARRATIVE IN MEDICAL EDUCATION

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Introduction: In March 2020 the onset of the COVID-19 pandemic disrupted the conduct of all spheres of activity. Delivery of medical education was not spared. **Methods**: The pandemic required us to convert rapidly from a traditional face to face delivery to online delivery almost overnight. Closures of hospitals required conversion of clinical bedside teaching to case-based teaching using mannequins and simulated patients delivered online. **Results:** The training of doctors has always been based on face-to-face encounters, be it in lecture theatres, laboratories, or hospitals. The gap in IT skills among academics and students together with gaps in equipment and a reliable internet connection were problems that needed to be addressed. Solutions were to use what was available to rapidly convert teaching and learning delivery while building capacity and developing faculty. Communication, reassurance, and feedback to reassure both staff and students was important to develop confidence in the system and drive it forward. **Conclusion**: Disruption drives innovation. Innovations need to be appropriately cost effective and add value to curriculum delivery, while taking into consideration faculty development and student readiness. Innovations are most effective when there is a human interphase.

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CHALLENGES IN ROUTINE DIABETES MEDICATION THERAPY ADHERENCE CLINIC (DMTAC) SERVICES AT PRIMARY HEALTH CLINICS DURING COVID-19 PANDEMIC: ADDRESSING CONCERNS AND MAINTAINING SERVICES

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Introduction: Diabetes is a chronic disease that requires continuous close monitoring from the primary care team. In Malaysia, diabetes medication therapy adherence clinic (DMTAC) is an ambulatory care service provided by trained DMTAC pharmacists to patients with type 2 diabetes mellitus (T2DM) that has proven to have positive impacts on glycaemic control. However, with physical distancing being of utmost importance during the pandemic, it has imposed significant challenges in providing effective and sustained DMTAC service. **Aim:** To evaluate the impact of the DMTAC services in improving patients' glycosylated haemoglobin A1c (HbA1c, %), lipid profiles, medication compliance (MyMAAT score) and patients' understanding on their medications (DFIT score) during COVID-19 pandemic, and to discuss the challenges faced by the pharmacists during the DMTAC services. **Methods:** This is a cross-sectional retrospective, multi-centre study of the impact of the DMTAC services at 14 governmental health clinics in Johor Bahru District during the COVID -19 pandemic. Patients enrolled in the DMTAC program from January to December 2020 were included. Baseline values of HbA1c, lipid profiles, MyMAAT and DFIT score were taken from patients' medical records for the first visit while the post-intervention values were the last records before December 2021. **Results:** A total of 331 patients were included in this study. Significant reduction of mean HbA1c (1.01 ± 2.23%) and low-density lipoprotein (LDL) level (-0.35mmol/L) were detected. The level of high-density lipoprotein (HDL) was found to decrease a little (-0.04mmol/L) yet significantly. Both medication compliance and patients' understanding of their medications were found to have improved significantly. Challenges such as impact of social distancing on the self-management of T2DM and shortage of staff were highlighted. **Conclusion:** DMTAC is still able to produce significant improvement in patients' HbA1c, LDL level, medication compliance and understanding of medications, despite the challenges encountered during the COVID-19 pandemic.

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THE EFFECT OF DEPRESSION, ANXIETY AND STRESS ON MENTAL WELL-BEING AMONG YOUNG ADULTS DURING THE COVID-19 PANDEMIC IN MALAYSIA

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Introduction: The emergence of Coronavirus Disease 2019 (COVID-19) has been declared as an international health crisis and movement control disorder in most of the countries, including Malaysia. This has contributed to psychological distress among young adults. Psychological distress is quite common, during a pandemic but the demographic factors are unclear. **Aims**: The researcher analyzed whether depression, anxiety, and stress have significant relationships with mental well-being. Also, the researcher analyzed whether there is a significant difference in mental well-being based on gender. **Methods:** A sample population of 270 respondents who are from various states all over Malaysia, between ages 18 to 29 years, took part in the research. A set of questionnaires was created to collect the Depression Anxiety Stress Scale (DASS-21) and demographic backgrounds from the respondents. The mode of the research was an online questionnaire based on self-assessment via Google form. **Results**: The results indicated that there were significant relationships between depression, anxiety, and stress with mental well-being. However, there was no significant difference in mental well-being based on gender. **Conclusion:** Based on the results shown in the research, depression, anxiety and stress is common among young adults, and it affects their daily livelihood in many ways. With the pandemic gradually reaching its end point, proper mental well-being could be maintained by taking necessary measurements such as consulting a mental-health professional.

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OBSERVATIONAL CROSS-SECTIONAL STUDY ON REPORTS OF COVID-19 VACCINE SIDE EFFECTS VIA AN NGO ONLINE SURVEY IN MALAYSIA

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Introduction: The objective of this study is to describe the occurrence of Adverse Events Following COVID-19 Immunization (AEFCI) among the Malaysian population who made reports via the online data collection portal and to identify the relationship to sociodemographic data as well as vaccine brands. **Methods**: This cross-sectional study used responses (convenience sampling method) to the online Zoho Form platform for the period from July to December 2021. The questionnaire was in Malay and the link 'bit.ly/Laporankesansampingan' was distributed using social media platforms like Facebook, WhatsApp, and Telegram. The questionnaire design was partly based on the Vaccine Adverse Event Reporting System (VAERS) with modifications tailored to local acceptance. **Results**: A total of 2295 respondents reported adverse events. Only 31% had reported the AEFCI via MySejahtera and 6% to NPRA. AEFCI appeared after the first dose for 58.8%, 40.9% after the second dose and 0.17% after the booster dose. 78% were between 19 to 48 years of age. 91% of AEFCI occurred less than 2 weeks after vaccination administration with 45% within 24 hours, 22% within 2-3 days,14% less than one week and 8% less than 2 weeks. 43% were severe events, 45% moderate and 13% mild. As for continuity of suffering, 91, 90, and 85% of the respondents who had received Pfizer, Sinovac and AstraZeneca respectively were still continuously affected after the emergence of COVID-19 AEFCI. Respondents who sought medical treatment for the AEFCI reported that only 24% of medical doctors acknowledged the possibility of AEFCI, whereas 30% disagreed and 46% remained silent. **Conclusion**: This study found that many adverse events following vaccination are not reported to the government channels and that doctors seemed reluctant to diagnose the condition as an adverse event following vaccination. More research needs to be conducted within communities to assist in giving clarity to AEFCI and find solutions to reduce the sufferings of people who suffer from AEFCI.

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RADIOGRAPHIC ASSESSMENTS OF ENDODONTIC DISEASE PROGRESSION- A RETROSPECTIVE STUDY DURING COVID-19 PANDEMIC

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Introduction: Endodontic disease especially in asymptomatic apical periodontitis often develops without subjective symptoms and is detected mostly through radiographic changes. **Aims:** Progression of endodontic disease in adults with or without initial endodontic treatment was evaluated through intraoral periapical radiographic changes between twelve to fifteen months in patients attending UiTM Dental Centre during the movement control order (MCO). **Methods:** This retrospective study utilized radiographic images of thirty single rooted teeth in patients diagnosed with apical periodontitis treated by final year undergraduate students at the Faculty of Dentistry UiTM during the MCO 1.0 phase. Patients were divided into two groups according to the status of initial endodontic treatment. Group A consisted of patients who received no initial treatment while Group B consisted of patients who received pulp extirpation as the initial therapy. Post-MCO periapical lesion progression was compared with pre-MCO periapical lesion using the existing radiographic images between the two groups. The corono-apico and mesiodistal diameter of the periapical lesion were measured and categorized using the Periapical Index (PAI) by two calibrated examiners. **Results**: Paired t-test revealed a significant difference in corono-apico diameter ($p < 0.05$) and mesiodistal diameter ($p < 0.05$) between pulp extirpated and non-pulp extirpated group. Both groups had no significant difference in Periapical Index (PAI) score ($p > 0.05$). **Conclusion**: This study showed that the radiographic sign of endodontic lesion/disease progression were seen more in patients who did not undergo initial endodontic treatment as compared to and patients who started the initial endodontic treatment.

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PRELIMINARY REPORT ON MUSCULOSKELETAL CORTICOSTEROID INJECTION DURING COVID-19 PANDEMIC: EVIDENCE FROM UNIVERSITY MALAYA MEDICAL CENTRE

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Introduction: Robust international musculoskeletal bodies recommended against musculoskeletal steroid injection during COVID-19 pandemic, fearing the immunosuppressive effects of the steroid could worsen COVID-19 infection. **Methods**: This is a retrospective study from the 1st of January 2020 until the 28th of February 2021, on those who visited the sports medicine clinic in University Malaya Medical Centre and received musculoskeletal steroid injections. The list of patient's names with identification numbers were then sent to the national Crisis Preparedness and Response Center (CPRC) and positive cases of COVID-19 from the list including date of positive test were returned by the national CPRC team. Only patients who were positive for COVID-19 within 3 months after the corticosteroid injection were considered. **Results:** Of the 502 steroid injections, 89% (n= 443) received a single injection in one day, 10% (n=54) received 2 sites of steroid injections in one day and 1% (n=2) received 3 sites of steroid injections in one day. Out of 502 injections, 18% (n=97) received just steroid, 80.5% (n=396) received steroid mixed with local anaesthetic (lignocaine or bupivacaine), 1% (n=6) received steroid mixed with hyaluronic acid, 0.5% (n=3) received steroid mixed with prolotherapy. Triamcinolone was used in all procedures (100%), ranging from a total of 10 mg – 120 mg per patient per day. Using Fisher's exact test, there was no statistically significant difference between the steroid study and control group. **Conclusion**: We recommend careful risk-benefit analysis and shared decision making with patients prior to the procedure, hoping to improve management of musculoskeletal pain during COVID-19 pandemic.

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BOOSTING COVID-19 IMMUNISATION THROUGH MOBILE VACCINATION: COMPARISON OF EXPERIENCES AT PARIT SULONG AND PUNCAK ALAM

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Introduction: Malaysia is a multiethnic country with diverse geographical distribution, ranging from urban, suburban, and rural areas. The COVID-19 national immunization program in Malaysia calls for a specific strategy to enhance vaccine roll-out. The objective is to compare vaccination setup and demographic characteristics in Parit Sulong, Johor and Puncak Alam, Selangor and suggest strategies to improve vaccination rates in rural areas. **Methods:** A retrospective study was conducted at two vaccination centres in Parit Sulong and Puncak Alam. Vaccination setup was observed and documented. Registration data from 150 and 1420 consenting adults receiving their first dose of COVID-19 vaccination on the 25th and 26th June 2021 from Parit Sulong and Puncak Alam, respectively, were included. **Results:** The vaccination centre at Parit Sulong utilized three methods: 1) satellite vaccination camp; 2) mobile outreach camp; and 3) home-to-home visit to improve vaccine reach in a rural district. The vaccination centre at Puncak Alam utilized two methods: 1) vaccination in a large hall; and 2) drive-through vaccination to enhance daily vaccine administration in an urban district. The vaccine recipients at Parit Sulong were significantly older compared to Puncak Alam (70.39 SD 11.39 vs 51.52 SD 11.02 years respectively; $p<0.0001$). A significantly higher proportion of vaccine recipients at Parit Sulong were unable to read or write in their mother tongue (41.33%; $p<0.0001$), did not own a mobile phone (53.33%; $p<0.0001$) and did not have access to MySejahtera mobile application (84.57%; $p<0.0001$). **Conclusion:** The socio-demographic differences between the urban and rural districts in Malaysia calls for a different methodological approach for vaccine roll-out. The mobile vaccination model allows for greater vaccination reach and administration, targeting rural residents with transportation and technology restrictions. The drive-through vaccination model improved the vaccine uptake among young families with children, heavily pregnant ladies and elderly with physical limitations living in urban areas.

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"HIT BY THE STORM, BUT ARE WE IN THE DIFFERENT BOAT? BEYOND PSYCHOLOGICAL FIRST AID (PFA): THE EXPERIENCES AND PERSPECTIVES OF THE MALAYSIA PSYCHIATRY SERVICE"

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Introduction: When Malaysia had its first lockdown on the 18th of March 2020, healthcare professionals (HCPs) at all levels were on guard preparing for what could be coming. This unprecedented event has changed some of the daily clinical practices including mobilisation of thousands of healthcare workers to various COVID-19 fields. Studies have shown that during a pandemic there would be an increased rate in psychological distress among HCPs, including heightened stress, depression, anxiety and post-traumatic stress symptoms or disorders. Intervention such psychological first aid (PFA) has proven to be an effective mediator for psychological distress. **Methods**: With great leadership in the psychiatry services, a coordinator from each of 63 psychiatry departments was selected to coordinate the PFA activities under the mental health and psychosocial support groups (MHPSS). Meetings were held to share experiences and challenges between the coordinators with the aim to ensure an efficient delivery of PFA. **Results**: A few resolutions were identified, such as collaboration between NGOs, private companies, and other government agencies, to act as the connecting bridge between staff and the administration level, to be proactive by conducting regular PFA sessions, to further intensify the on-going mental health promotion and screening, including fighting the stigma among HCPs. Furthermore, some of the PFA teams have become more creative by creating YouTube videos on relaxation techniques, to suit our local population, producing posters and infographics to be widely distributed, and creating social media groups to ensure regular communications with the clients including talks on stress management. Data on the PFA sessions were also collected and reported for each month to ensure continuous improvement for future usage. **Conclusion**: The most important lesson we have discovered is that our HCPs are always ready to contribute, to sacrifice and to give their best within their capacity, which helps them to become resilient.

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CRISPR AS A NOVEL TECHNIQUE FOR COVID-19 DIAGNOSIS: A REVIEW

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Introduction: COVID-19 is a human coronavirus disease that was first detected in December 2019. COVID-19 occurs as a result of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) infection. SARS-CoV-2 is considered the seventh strain of Coronaviruses that targets the human respiratory system. To this moment, COVID-19 as a pandemic is still a critical case that provokes concern around the world. In January 2022, there were over 300 million infections and over 5 million fatalities from COVID-19. Thus, as a countermeasure against this rapid spread, there is a vital need for effective and low-cost diagnosis methods in order to control the danger of this pandemic. **Aims:** This paper reviews the state-of-the-art of developing the CRISPR platforms for the purpose of COVID-19 diagnosis and treatment. **Method:** CRISPR technology has proved its efficiency in detecting COVID-19 quickly and accurately. Therefore, many researchers and developers have paid attention to this technology regarding its simplicity, specificity, and high-sensitivity in terms of nucleic analysis of viruses. **Conclusion:** This paper discusses the limitations and challenges of CRISPR in terms of molecular detection applications.

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EVALUATING ONLINE PROBLEM-BASED LEARNING AS A WAY FORWARD POST COVID-19 PANDEMIC

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Introduction: The outbreak of the COVID-19 pandemic left medical schools with no choice but to move physical teaching and learning to online platforms. Following the changes, problem-based learning (PBL) sessions were conducted online to facilitate students' learning. Although online PBL seemed to be an appropriate solution during the pandemic, it remains unknown whether this teaching and learning mode shall be continued after the pandemic. **Aims**: To investigate the acceptance of online PBL among medical students by comparing their PBL learning experiences at the commencement of online PBL and after one year of the implementation. The findings provided some evidence for medical schools before making the next decision. **Methods:** This study was carried out at the Faculty of Medicine, Universiti Malaya. A 12-item questionnaire with a 5-point Likert scale was developed and validated among pre-clinical medical students. Based on the principal component analysis and internal consistency test, the questionnaire was valid and reliable. The self-administered questionnaire was distributed with students using Google Form twice (1st time = the commencement of online PBL; 2nd time = after a year of the implementation of online PBL). Students were given two weeks to complete and submit their responses. Data were analysed by using the Mann-Whitney U test to compare the online PBL learning experiences of medical students at two different points in time. **Results:** A total of 270 students (response rate = 80%) completed the questionnaire. Based on the findings, online PBL was perceived to be effective. Students' online PBL experiences improved after a year of participating in online PBL sessions. They were able to receive and understand the information from online PBL sessions. Despite the favourable responses, students also expressed their concerns on passing clinical examinations and the mastery of content. **Conclusion:** Online PBL is an acceptable solution during the pandemic, medical schools might consider continuing its implementation post-pandemic, subject to further research.

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THE IMPLEMENTATION OF PROBLEM-BASED LEARNING (PBL) GROUP PEER ASSESSMENT DURING THE COVID-19 PANDEMIC

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Introduction: Medical education was tremendously affected following the outbreak of the COVID-19 pandemic. As a result of the lockdown restriction, the Problem-Based Learning (PBL) sessions were migrated to the online platform. However, it is difficult to monitor the participation of medical students in online PBL as compared to physical PBL sessions. An example of the uncertainties was students did not turn on the camera and they were being silent. Therefore, the Group Peer Assessment was implemented to monitor the participation of medical students in online PBL as we believed students can give better feedback to their peers when they work together in groups. **Methods**: This study was conducted at the Universiti Malaya, a public-funded university in Malaysia. Year 1 medical students participated in the PBL Group Peer Assessment. The assessment was carried out on an anonymous feedback basis. Data were analysed to identify the best and poorly rated PBL group peers. The best PBL group peers received positive reinforcements (e.g., customized bookmarks) whereas PBL group peers who were poorly rated joined remediation. In the remediation students reflected and identified their weaknesses to improve in the future PBL session. **Results:** In the first assessment, sixteen students were identified as best PBL group peers and eleven students were rated below the expectations. They were rated poorly in terms of participation and preparation. In the second assessment, the number of best PBL group peers was increased to twenty-two students and the number of under-expectations peers was decreased to four students. The comparison results showed an improvement after the remediation. **Conclusion**: Overall, the PBL Group Peer Assessment was an effective approach to monitor students during the online learning process.

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NORMALIZING NEW NORM OF TEACHING AND LEARNING IN UNIVERSITY OF MALAYA MEDICAL PROGRAMME (UMMP)

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Introduction: The Covid-19 outbreak has changed our education as University Malaya (UM) has instructed and prepared new alternatives and policies in online teaching and learning (T&L) for students. The main purpose of introducing this alternative is to ensure the safety of all stakeholders. The alternatives of online learning used in UM included Microsoft Team (MST) and Spectrum. **Methods:** Synchronous and Asynchronous methods have been implemented to ensure the continuity in teaching and learning for the students. Asynchronous T&L occurred when the academic staff prepared a voiced-over PPT slides prior to the lecture session. Students then would listen to the presentation before coming to the live lecture session. Meanwhile, synchronous T&L happens when both academic staff and students are present online to discuss on important points of the lesson and question and answer session. All sessions were recorded for students' learning. **Results:** Among the challenges faced during the implementation process were adaptation and readiness of students, academic staff and administrators to the system, internet connectivity being an inevitable issue, infrastructure limitation, technological use and well-being of students, academic staff and administrators. We believe that the integration of information technology in medical programmes will be further accelerated by the university and that online learning will eventually become a successful transition by time. Online learning platforms now seem convenient for both academic staff and students as it can be done remotely. **Conclusion:** Covid-19 pandemic has left massive impacts on many educational institutions in restructuring their T&L system for continuous learning. This is even more so for medical programmes and other programmes which require face-to-face teachings for practical skills. Our institution has invested in a technological platform which we believe has aided us in implementing an effective way of T&L. This is imperative in order to produce competent medical graduates.

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AM I IN A VIRTUAL MEDICAL SCHOOL? - FIRST YEAR UNDERGRADUATE MEDICAL STUDENTS REFLECTING ON ONLINE EDUCATION DURING THE COVID-19 PANDEMIC

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Introduction: Universiti Malaya implemented full virtual teaching and learning activities for Year 1 students to avoid deferment in their studies. Subsequently, Year 1 students had no physical orientation week and did not have the opportunity to experience study life on campus. Students only met their classmates online and were unable to create physical bonding among themselves. **Methods:** At the end of Year 1, students performed a written reflection on their learning experience, guided by Kolb's reflective cycle (i.e., experience, reflect, conceptualize, apply). They described either a good or bad experience, expressed feelings, indicated lessons learnt, and suggested implications to begin Year 2 with. **Results:** The analysis showed that students were juggling to balance their studies and life at the same time. Whereas some of them were grateful for the opportunity to enjoy solitudes in the comfort of being at their own home. The most common feedback was they felt unmotivated and lost focus as a possible result of being away from campus. As online teaching and learning continued, some of them drifted in anxiety and FOMO (Fear of missing out). Hence, these students were adapting a complete virtual campus as Year 1 medical students. Meanwhile, students were not exposed to hands-on physical examination, and hence they might have low confidence level. On the other hand, these students had more screen time as they needed to revise all the teaching materials using their electronic devices. Over-screen time might adversely affect the students' behaviours and their academic understanding, and it could result in poor academic performance. Students might also experience negative psychological outcomes (e.g., lack of motivation, anxiety, stress, depressive symptoms). **Conclusion:** The plan is for Year 1 students to obtain an online COVID Preparedness Certificate (CPC) before they are allowed to come back to the physical campus in continuing their medical studies.

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MULTISYSTEM INFLAMMATORY SYNDROME (MIS-C) IN AN ADOLESCENT MALAYSIAN: RECOVERY OR START OF THE BATTLE OF COVID-19?

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Introduction: Multisystem Inflammatory Syndrome in children (MIS-C) is an uncommon complication of SARS-CoV-2 infection in paediatric populations that presents with a wide spectrum of illness. It can present up to 4 weeks after onset of acute COVID-19 with extrapulmonary multiorgan dysfunction because of immune dysregulation, hyperinflammation and endothelial injury. **Case Presentation:** An 18-year-old man with asymptomatic COVID-19 infection presented with high grade fever, profuse diarrhoea, abdominal pain, hallucination, peeling of skin on the pulp of fingers, myocarditis, circulatory shock, pericardial effusion, and acute kidney injury at second week following diagnosis of COVID-19. At presentation his white cell counts was 23.7x10^^{9}/L. Inflammatory markers including C-reactive protein (303 mg/L), serum ferritin (2077 ug/L), procalcitonin (4.69 ng/ml) were significantly raised. Interleukin (IL-6) (16pg/ml), tumour necrosis factor (TNF-α) (21.3pg/ml) showed a discordance with IL-1 level (0.19pg/ml). The cellular marker for CD4 T-cell activation and CD8 T-cell activation were 7.6pg/ml and 8.2 pg/ml respectively. The naso-oro-pharyngeal swab was negative for SARS-COV-2 virus but positive for COVID serology (IgM and IgG) on this admission. All cultures were sterile and negative for bacterial and viral serology tests. He was treated with methylprednisolone on day six of admission and responded well. **Discussion:** MIS-C is associated with a hyper-inflammatory state resulting in myocarditis and circulatory shock, probable COVID-19 related vasculitic process or diffuse microthrombi to the brain that explained his hallucination, or inflammation triggering T cells to breach the blood-brain barrier causing intramyelinic oedema. Of note, there is a discordance between IL-6 and IL-1 Beta levels which differentiate from other inflammatory conditions. Nevertheless, our patient responded with glucocorticoid with a good outcome and resolution of symptoms. **Conclusion:** This case illustrates the life-threatening nature of MIS-C with rapid progression to multisystem organ failure which needs early recognition and institution of treatment. This disease entity can be altered by encouraging vaccination in the paediatric population.

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OUTCOME ORIENTED E-LEARNING ENHANCEMENT BASED ON STUDENT FEEDBACK AND ITS EFFECT ON STUDENT EXPERIENCE IN ONLINE LEARNING

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Introduction: Experience during pandemic has indicated that student feedback has an important role in the decision-making process in improving the online administration of teaching and learning. **Aims**: The objective of the study was to evaluate the effect of outcome-oriented e-Learning enhancement based on the student feedback and observe its effect on student experience in online learning. **Methods**: A 25-item questionnaire was constructed based on a pilot survey done in the beginning of 2020. 55% of total students participated in online survey done in April 2020. Based on survey result, e-learning and IT teams increased capacity of simultaneous access to online portal, organized multiple online workshops on use of Microsoft Teams and Zoom, chunking of online lectures and use of online portal for online assessment. Another set of surveys was done in October-November 2020 to analyze students' feedback on online learning. **Results**: About 18% of students reported weak Wi-Fi connection at home. 92% of students accessed the portal every week. Challenges in accessing online study materials were difficulty in finding the links (38%), difficulty in finding relevant material (24%) and unstable internet connection (57%). 65% of students agreed to continue with online learning once the MCO was lifted. Second survey conducted during the later part of 2020 showed that 80% of students agreed that online portal has been improved and useful for study. A similar percentage of students agreed that improvement done by the e-Learning department was able to improve the online portal experience. Navigating for the study material and downloading it have become easy (68%) and voice-over lectures, lab-videos and skills-videos are easy to navigate (72%). **Conclusion**: The faculty, e-Learning and library team should work together, analyze students' feedback on online learning and expedite corrective measures. Faculty development is the key process to improve student experience in online learning.

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CoSMoS, A COVID-19 HOME MONITORING SYSTEM BASED IN A TERTIARY CARE HOSPITAL IN MALAYSIA

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Introduction: The third COVID-19 pandemic wave in Malaysia began in September 2020 and peaked in January 2021, reaching up to 4,000 cases per day. Epidemiological reports and studies showed that most COVID-19 patients in this wave develop mild symptoms and do not require inpatient admission. This led to the establishment of the COVID Assessment Centers (CACs) by the Ministry of Health. at University Malaya Medical Center (UMMC), the COVID-19 Task Force decided to use the COVID-19 Symptom Monitoring System (CoSMoS) to monitor University Malaya staff and staff dependents at home. **Aims**: To evaluate effectiveness of CoSMoS for COVID-19 home monitoring and its impact on inpatient admissions. **Methods**: This is a retrospective cohort analysis of data obtained during home monitoring of UMMC staffs and staff dependents from January to August 2021. **Results**: The CoSMoS clinical team triaged 1208 staff and staff dependents who tested positive for COVID-19 using the RT-PcR or RTK-Antigen tests. 63.9% (n=773) patients fulfilled the criteria for home monitoring. While patients were being monitored at home, 12.2% (n=94) patients were escalated to inpatient care, 13.1% (n=11/84) patients requiring oxygen supplementation upon arrival to UMMC. There was no mortality recorded amongst patients monitored by CoSMoS. **Conclusion**: Home monitoring of COVID-19 patients using the CoSMoS system was safe, efficient, and led to a low rate of hospital admission. By having a dedicated clinical team which included the Infectious Disease team at the hospital, rapid escalation of care for home monitored patients who deteriorated was performed in a timely manner. In the future, home monitoring should be applied to more medical conditions to reduce inpatient care.

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STUDENT EVALUATIONS IN THE ONGOING DEVELOPMENT OF A COVID-SOP COMPLIANT VIRTUAL WRITTEN SKILLS PROGRAMME.

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Introduction: Written skill acquisition is a fundamental outcome of undergraduate medical studies. Due to Covid related restrictions imposed upon educational institutions, written skills teaching became reliant on virtual sessions. Current literature comments on variable success of virtual programmes substituting face-to-face skills teaching. In response to this, we aim to develop a high quality (as per the Learning Object Review Instrument, LORI), virtual written skills teaching programme (including prescribing, requesting investigations, interpretation of investigation results, and documentation) with potential for transnational, cross-campus utility. This Microsoft 365 based programme features a platform to submit responses to practise cases, review of responses which inform a virtual lecture, and an interactive Q&A. **Aims**: To evaluate a virtual written skills programme for medical students, via a series of student surveys, to inform further development of the programme. **Methods**: The programme was introduced to a cohort of medical students undertaking an established module at a Malaysian medical school (Cycle 1). Evaluation data was collected via a mixed method of data collection, where quantitative Likert scales were embedded within a free text answer survey. Results and themes informed further development of the programme, which was then introduced to a wider cohort of clinical medical students (Cycle 2). Evaluation data of the same method was then collected and analysed. **Results**: Cycle 1 evaluations revealed all students felt more confident about their exam, all students enjoyed the session, and most students (90%) felt that this format addressed their needs. All students wanted more sessions in this format. At Cycle 2, themes identified included satisfaction regarding usability of the programme, and appreciation of feedback informing learning. **Conclusion**: This is a programme which supports development of written skills in a virtual environment, worthy of further development and implementation.

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PREVALENCE AND FACTORS ASSOCIATED WITH PHYSICAL VIOLENCE AMONG HEALTHCARE WORKERS IN MINISTRY OF HEALTH HOSPITALS AND MEDICAL INSTITUTIONS

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Introduction: Workplace violence, especially in health sectors, is a safety and health hazard that affects workers, organizations, and patient management. Among workplace violences, physical violence is the most severe form, causing injury, property damage and even health consequences. Hence, this study aims to determine the prevalence of physical workplace violence and its associated factors among healthcare workers in hospitals and medical institutions of MOH. **Methodology:** This study is a cross-sectional study, analyzing secondary data from a database established via notification of workplace violence from hospitals and medical institutions from 2018 to 2020. **Results:** From 1257 cases notified, the prevalence of physical violence is 31%, accounting for 390 cases. Multiple logistic regression models were constructed to discover the determinants of physical workplace violence, which showed males had an odds of 2.190 (95%CI: 1.620-2.961) compared to females, paramedics, dan security guards having odds of 2.243 (95%SK: 1.633-3.082) and 6.519 (95%CI: 2.988-14.225) respectively compared to doctors for physical workplace violence. Patient as an aggressor having odds of 2.154 (95%CI: 1.035-4.483) compared to a colleague in physical workplace violence. As for incidents of violence, ward, inside and outside the buildings having odds of 2.075 (95%CI; 1.380-3.119), 3.106 (95%CI: 1.552-6.216) and 3.405 (95%CI: 1.600-2.244) respectively for physical workplace violence compared to counter violence. Working in the evening shift revealed an odds of 1.419 (95%CI: 1.029-1.958) compared to morning shift and aggressor-related cause resulted in odds of 2.886 (95%CI: 1.975-4.218) compared to environmental factors are among the significant predictors for physical workplace violence in hospitals and medical institutions. **Conclusion:** The findings of this study allow prevention strategies to be focused on these factors and applied to manage physical violence in hospitals and medical institutions.

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CLINICAL CHARACTERISTICS OF COVID-19 BETWEEN ICU AND NON-ICU PATIENTS

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Introduction: During the peak of the greater Klang Valley COVID-19 crisis between May and September 2021, Hospital UiTM Sg. Buloh (HUiTMSB) was converted to a full COVID-19 hospital. We described our experience in managing active COVID-19 patients and subsequent follow-ups. **Aim:** To compare clinical characteristics of COVID-19 patients between ICU and non-ICU. **Methodology:** Patient medical clinical notes and investigations were reviewed during the hospital admission and subsequent follow-up. **Results**: A total of 215 COVID-19 patients were admitted to HUiTMSB between May and September 2021; 81 patients (38%) required ICU admission, and 134 patients (62%) required only ward admission. Mean age was 53 years old, male 61%, mean day of illness at presentation was 9 days, and mean duration of hospital admission was 10 days. Fully and partially vaccinated patients were less likely to be admitted to ICU, OR 0.59 (0.29-1.19). ICU patients were more likely to be female Adj OR 1.99 (1.11-3.56), diabetic Adj OR 1.96 (1.04-3.68), have more extended hospital stay (17 vs. 6 days), and higher mortality OR 5.50 (2.64-11.34). In terms of laboratory investigations 24 hours prior to oxygen requirement, those requiring ICU admissions had higher creatinine (167 vs. 107 mmol/L), CRP (115 vs. 69 ug/L), and ALT (80 vs. 53 mmol/L), as well as lower PF ratio (148 vs. 210). Cardiac arrhythmias and secondary infection were more likely in ICU patients, Adj OR 16.44 (1.56-172.81) and 12.05 (5.44-26.69), respectively. Pneumothorax, pneumomediastinum, subcutaneous emphysema, and acute cor-pulmonale were observed only in ICU patients. Mortality was recorded in 43 cases (20%). Out of 172 COVID-19 survivors, 83 patients (48%) who attended the 3-month follow-up revealed no difference in symptoms, 6-minute-walk-tests, and spirometry between ICU and non-ICU patients. **Conclusion:** ICU COVID-19 patients have poorer outcomes during hospital admission but similar recovery with non-ICU patients at 3-month follow-up.

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TRANS-RESVERATROL ATTENUATES COLLAGEN DEPOSITION IN DEXAMETHASONE-TREATED HUMAN TRABECULAR MESHWORK CELLS

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Introduction: Trabecular meshwork (TM) plays an important role in maintaining intraocular pressure (IOP) homeostasis by regulating aqueous humour drainage. In primary open angle glaucoma, ocular hypertension (elevated IOP) primarily occurs due to increase in outflow resistance resulting from TM tissue remodelling which involves increased deposition of extracellular matrix (ECM) within the TM pathway that blocks the outflow. *Trans*-resveratrol (TR), a polyphenolic compound has been shown to counteract steroid-induced increase in IOP and decrease in the ECM proteolytic enzyme, the matrix metalloproteinases. The effects of TR on the deposition of ECM components by TM however, remain unclear. Therefore, this study investigated whether TR is able to attenuate collagen expression, one of the main components of ECM in the TM induced by dexamethasone on primary human trabecular meshwork cells (HTMCs). **Methods**: Primary HTMCs were treated with 100 nM dexamethasone (Dexa) with or without 12.5 μM TR. The culture media were collected after 3 and 7 days of incubation for gene and protein analysis using real-time polymerase chain reaction (RT-qPCR) and ELISA respectively. **Results:** The gene and protein expressions for collagen type I (COLI), collagen type III (COLIII) and collagen type IV (COLIV) in Dexa only group were significantly upregulated compared to the other groups. Cells co-treated with Dexa and TR showed significant reduction of collagen type I α1 chain (COLI1A1) and collagen type IV α2 chain (COLIV1A2) genes, and significant reduction in the COLI, COLIII and COLIV proteins. **Conclusion:** Treatment with 12.5 μM TR reduced dexamethasone-induced gene and protein expression of collagens induced by HTMC. The mechanisms leading to reduction in these expressions by TR are yet to be investigated.
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TRENDS IN ANTIBODY RESPONSE AFTER VACCINATION IN RECIPIENTS WITH PRIOR MODERATE OR SEVERE COVID-19 INFECTION

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Introduction: The SARS-CoV-2 infection ranges from asymptomatic phase to severe respiratory illness leading to death and has been shown to affect the level of antibody response. The magnitude of antibody response in SARS-CoV-2 infection is higher in severe disease and those who received 2 doses of SARS-CoV-2 vaccines but waned significantly after its peak. This study aims to assess the level of antibody response among fully vaccinated recipients with prior moderate (category 3) or severe Covid-19 infections (categories 4 or 5). **Methods:** The serological sample from the recipients was subjected to quantitative immunoglobulin level measurement to the receptor-binding domain (RBD) of SARS CoV-2 spike (S) protein using ELISA method. A total of 43 vaccine recipients who were all COVID-19 survivors were followed up at a median of 97 [5] days after discharge. **Results:** The median age was 48 [19] years old, majority were male (26/47), COVID-19 category 4 (22/43) followed by category 5 (20/43) and category 3 (1/43). Most subjects received BNT162b2 vaccine (24/43) followed by CoronaVac (16/43) and ChAdOx1 (3/43). Antibodies were present in all recipients with median level of 172.881 [11.593] BAU/mL and significant differences in antibodies were observed between BNT162b2 and CoronaVac, 174.901 [7.358] vs 165.1735 [16.096] ($p<0.001$), respectively. No differences were observed between genders; male 171.812 [10.232] vs female 173.340 [28.493] ($p=0.258$), and COVID-19 severities; category 4 - 173.111 [11.429] vs 5 - 172.652 [12.734] ($p=0.870$). There were trends of declining antibody levels overtime after the first and second dose of vaccine, $r= -0.082$ ($p=0.6$) and $r= -0.145$ ($p=0.373$), respectively. **Conclusion:** These data showed a trend of declining antibody levels measured at an average of 3 months among the three types of COVID-19 vaccine. Further studies are necessary in understanding the long-term antibody response following vaccination and the risks of re-infection.

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PATTERNS AND OUTCOMES OF REFERRALS TO HOSPITAL UITM PALLIATIVE AND SUPPORTIVE CARE UNIT DURING THE COVID-19 PANDEMIC: A RETROSPECTIVE STUDY

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Introduction: Hospital Universiti Teknologi MARA (HUiTM) is an expanding network of medical facilities with the UiTM Palliative and Supportive Care Unit (PCU) developing into a dynamic and active establishment, providing inpatient services and outpatient clinics. **Aims:** This study evaluates the patterns and outcomes of referrals to the UiTM PCU from January 2020 to December 2021. **Methods**: This is a retrospective cross-sectional study, reviewing records of all patients referred to UiTM PCU from 1st January 2020 to 31st December 2021. Descriptive statistics were analyzed using SPSS version 28 and the domains include demographic data, referral team and location, disease classification, reason for referral and patient's outcome. **Results:** A total of 186 new referrals of which 84 were received in 2020 and 102 in 2021. There were 87 (46.8%) male and 99 (53.2%) female patients with mean age of 67.2 years old. Of these, 84.9% of patients were Malay, followed by Chinese (10.2%), Indian (4.2%) and one Caucasian (0.5%) . A total of 102 (54.8%) patients had non-cancer diagnosis, while the remaining 84 (45.2%) patients were cancer related. In 2021, 21.3% of the referrals of non-cancer patients were related to COVID-19. Majority (84.4%) of the referrals were for symptomatic control. The medical team contributed to most of the inpatient referrals (87.5%) while 39.7% of the outpatient referrals were from external facilities. From the referrals, 54.7% were discharged home, 23.4% died and 21.9% were for terminal discharge. However, of those discharged, 83 (44.6%) did not manage to come for outpatient visits. **Conclusion**: UiTM PCU had an increasing number of referrals within and outside HUiTM throughout the pandemic. Majority were discharged home, although most did not survive even for the first follow-up appointment. This trend is likely to continue and UiTM PCU must further expand its services to cater for the increasing needs.

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FURLING THE SAIL: COVID-19 OUTBREAK ONBOARD A CRANE VESSEL IN JOHOR BAHRU WATERS

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Introduction: There were 21 COVID-19 clusters which were ships-related in Malaysia since the pandemic started up until January 24, 2022, of which 8 clusters were located in the district of Johor Bahru. Johor Bahru District Health Office implemented quarantine on a pipelay crane vessel in a seaport in Pasir Gudang between May and June 2021 in an attempt to control the outbreak of COVID-19 onboard. **Aims**: We described the containment measures that were taken and the challenges that we faced in handling this cluster. **Methods**: A total of 206 crew members and visitors of the vessel were tested for presence of Severe Acute Respiratory Syndrome Novel Coronavirus 2 (SARS-CoV-2) using Reverse-Transcription Polymerase Chain Reaction (RT-PCR). **Results:** Of those tested, 74 (35.9%) tested positive for COVID-19, of which 64 (86.5%) were asymptomatic. As of July 10, 2021, 1 crew member was hospitalized, and none required ventilator support. There were zero deaths in this cluster. The challenges in implementing quarantine were in aspects of accessibility of the vessel, logistics, bureaucratic red tapes, dynamicity of travel-related control measures, maintaining safe daily operations and different health literacy background. **Conclusion**: Although there were many hurdles in implementing quarantine on the vessel, it was a necessary measure in order to control the outbreak. We recommend organizational planning in implementing quarantine on a vessel as it requires abundance of support and resources. Shipping industry is essential in maintaining the global supply chain, thus there is a compelling need to discuss a global framework to protect seafarers from emerging infectious diseases on vessels that could potentially spill over into local communities.

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PSYCHOSOCIAL LIVE EXPERIENCES OF NURSES CARING FOR COVID-19 PATIENTS: A SYSTEMATIC REVIEW

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Introduction: As the "gatekeepers" of the health care system, nurses at the forefront of the COVID-19 pandemic played important roles in caring for all types of patients and had the most contact with COVID-19 infected patients. This systematic review aimed to evaluate the psychosocial experiences of the nurses providing care for COVID-19 patients. **Methods:** Numerous databases were used in the article search using relevant keywords. The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) flow diagram was used in selecting a total of 1489 articles. The studies were screened and selected based on the inclusion and exclusion criteria. Quality appraisal was conducted using the Joanna Briggs Institute (JBI) Critical Appraisal guidelines. **Results:** A total of 26 studies were included in the review. The experience of 497 nurses from 16 countries were synthesized. Results revealed nurses dealing with COVID-19 patients in the form of psychological experiences, social experiences, and coping strategies of various challenges and obstacles throughout their journey of the pandemic. Nurses working frontline during the COVID-19 pandemic have experienced psychological distress and social stigma in coping with work demands, social relationships and their personal life. **Conclusions:** There is evidence to highlight that nurses do experience some distress during the COVID-19 pandemic. However, there are inadequate studies looking at psychosocial experiences in Malaysia. Protecting the nurses' psychosocial wellbeing by providing adequate psychosocial support is essential to ensure long-term capacity of the health workforce.

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POST COVID-19 CONDITION CHARACTERIZATION: ANALYSES OF THE COVID-19 REHABILITATION OUTPATIENT SPECIALISED SERVICES (CROSS) DATABASE IN THE PRIMARY DESIGNATED HOSPITALS IN MALAYSIA

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Introduction: While most COVID-19 survivors completely recover, a proportion of them experience a constellation of persistent symptoms such as fatigue, breathlessness, cognitive dysfunction and psychological effects. These multi-system sequelae are collectively known as post COVID-19 condition (PCC). Systematic research to further understand PCC is required to develop an evidence-based multidisciplinary approach for management of these patients especially within the healthcare facilities in Malaysia. **Methods**: A descriptive analysis of the prospective database series of referrals for COVID-19 Rehabilitation Outpatient Specialised Services (CROSS), Hospital Sungai Buloh from November 2020 – December 2021 were included. **Results:** Out of total 2,894 COVID-19 survivors (mean age 52.4 ± 13.23 years); 1,885 (65.1%) reported persistent symptoms of ≥ 3 months. PCC was characterized by a wide variety of symptoms including fatigue, exertional dyspnea, cough, pain, insomnia, myopathy, neurological dysfunction (numbness, giddiness, headaches), psychological dysfunction (anxiety, stress, depression), hair loss, cognitive dysfunction (brain fog), skin lesions, ageusia, anosmia, sexual dysfunction, cardiovascular symptoms (palpitation, chest tightness and pain) and others. Moderately severe functional limitations using the Post COVID-19 Functional Scale (PCFS) were observed in 178 (6.15%) survivors. Gender, race, comorbidities, pulmonary embolism and organising pneumonia were found to be significantly associated with PCC ($p<0.001$). Multiple logistic regression analyses showed female, Indian race, ≥ 3 co-morbidities and organising pneumonia were predictors of PCC. **Conclusion**: A proportion of COVID-19 survivors continue to experience long term multi-system sequelae ≥ 3 months; while some have significant functional limitations that hinder their full reintegration into society. This study provided an initial insight for the required provision of a comprehensive, patient centered and multidisciplinary care in the management of the affected individuals with PCC.

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HEAD AND NECK CANCER DETECTION IN HOSPITAL SUNGAI BULOH DURING COVID-19 PANDEMIC

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Introduction and aims: This study was conducted to compare the pick-up rates of head and neck malignancies, duration of symptoms prior to first presentation to hospital and duration to commence treatment among newly diagnosed patients with head and neck malignancies during the COVID-19 pandemic. **Methods:** This retrospective cohort study included newly diagnosed patients aged 18 years and above with head and neck malignancies based on histopathological diagnosis from January 2019 till December 2020 at Hospital Sungai Buloh. Data was analysed using descriptive statistics and Chi-square test. A *p*-value of less than .05 was considered statistically significant. **Results:** There was a significant drop of 56.1% in the total number of new referrals from 12,371 in 2019 to 5,425 in 2020 (p= .00001). The pick-up rate for the number of cancer cases based on the overall new referrals increased from 0.27% to 0.39%. The duration to seek the first consultation from the time of symptom appearance had shortened with 23.8% of the patients coming within 1 month of symptoms in 2020, compared to 12.1% in 2019. More patients (66.7%) began definitive treatment within a month in 2020 compared to 51.5% in 2019. **Conclusion:** The increased pick-up rate of head and neck malignancies during the COVID-19 pandemic in 2020 may have resulted in the reduced number of referrals. More patients were seen earlier and received treatment earlier during the pandemic due to the strategic measures (isolated scope room & scoping patients at predetermined time) to improve cancer pick-up rates.

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CircSCAND2P AS A POTENTIAL BIOTARGET FOR CHEMORESISTANT COLORECTAL CANCER

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Introduction: Colorectal cancer (CRC) is one of the most widely diagnosed cancers worldwide, and locally in Malaysia. CRC is conventionally treated with surgery and adjuvant chemotherapy. Nevertheless, chemoresistance in CRC has become a major hurdle for effective disease management. Currently, there is a limited number of feasible biotargets that can be used to desensitize or predict chemoresistance. With the advent of new biomedical technologies, circular RNAs (circRNAs) have been shown to be promising biotargets for cancer. CircRNAs are a recently rediscovered class of covalently closed non-coding RNAs that have been shown to be dysregulated in CRC. Therefore, we aim to study the profile of circRNAs in relation to chemoresistant CRC. **Methods**: We performed high throughput profiling of circRNAs to compare between 5 responders and 5 non-responder CRC samples. Subsequently, a bioinformatics analysis to determine the miRNA binding sites and gene network was conducted. The expression of selected circRNAs was validated via qPCR. **Results:** A total of 131 circRNAs were differentially upregulated and 144 circRNAs were downregulated between the responder and non-responder patients. Most of the dysregulated circRNAs were located on Chromosome 1 and 17. The most downregulated circRNA was circSCAND2P, which was further selected for downstream analysis. Our validation results showed that the expression of circSCAND2P was indeed downregulated in additional clinical samples. Furthermore, our in-silico analysis revealed that circSCAND2P may become a sponge for miR-22-5p. **Conclusion**: Our findings have produced specific circRNA profiles in chemoresistant CRC patients. CircSCAND2P may be a promising biotarget to be further evaluated in order to understand the mechanism of chemoresistance in CRC.

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ASSOCIATED FACTORS FOR SEVERE CASES OF COVID-19 INFECTION IN SABAH, MALAYSIA

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Introduction: COVID-19 was first confirmed in Sabah on 11 March 2020 in Tawau District. Determining factors for severe COVID-19 infection is crucial as it would enable healthcare providers to identify patients who need special attention and appropriate intervention to prevent unfavourable outcomes. The objective of this study was to determine the factors associated with severe cases of COVID-19 infection in Sabah. **Methods:** All confirmed cases of COVID-19 reported to the Surveillance Unit, Sabah State Health Department, Ministry of Health Malaysia from March 2020 to October 2021 were identified. Information on sociodemographic, clinical characteristics and vaccination status were extracted from the record. COVID-19 cases were grouped into mild and severe cases as per definition by the Ministry of Health Malaysia. Univariable and multivariable logistic regression analysis was conducted to identify the factors associated with severe cases. Statistical significance was set at a p-value of less than 0.05. **Results**: A total of 164,088 COVID-19 cases were included in the study. Individuals aged ≤5 years old and ≥ 65 years old [adjusted odds ratio (AOR) =1.87, 95% Confidence Interval (CI): 1.77–1.99)], non-citizens of Malaysia (AOR=1.46, 95% CI: 1.30–1.64), male gender (AOR=1.06, 95% CI: 1.01–1.12), native Sabahan (AOR=1.30, 95% CI: 1.19–1.42), presence of symptoms of COVID-19 infection (AOR=23.33, 95% CI: 20.75-26.23), presence of comorbidity (AOR=1.80, 95% CI:1.67-1.94), high exposure risk of COVID-19 infection (AOR=0.44, 95% CI: 0.28-0.71), and incomplete COVID-19 vaccination (AOR=8.53, 95% CI: 7.35-9.89) were significantly associated with developing severe COVID-19 infection. **Conclusion:** Evidence from this study emphasized the importance of access towards quality healthcare for stateless and legally marginalized groups as well as indigenous communities. There is also a dire need to strengthen COVID-19 vaccination program together with administration of COVID-19 vaccine booster dose at appropriate intervals.

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BLOCKCHAIN TECHNOLOGY INNOVATION TO STRENGTHEN MEDICAL TOURISM SECTOR DURING COVID-19 PANDEMIC PHASE IN MALAYSIA

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Introduction: Over the last decade Malaysia has grown as one of the top destinations for medical tourism in the world. However, the outbreak of Covid-19 in March 2020 has brought down the medical tourism sector in Malaysia. Hence, Malaysia is now developing measures to build a more resilient medical tourism industry post-Covid-19. Medical tourism sector needs to establish a digital infrastructure that can build trust in medical tourists and exemplifies safety. Employing blockchain technology would be an ideal solution to this matter, since blockchain technology is highly dependent on trust, transparency, affordability, and security. The critical issue then is, would the implementation of blockchain technology in medical tourism significantly cause an accelerated growth in this industry? The main purpose of the present study is to investigate the presence as well as direction of causality between blockchain technology and medical tourism growth in Malaysia. **Methods:** Based on the sample period of 2000 through 2021, the data were examined from the perspective of multivariate causality technique. **Results:** Finding of the study revealed a long run relationship between blockchain technology and medical tourism growth in Malaysia. Besides, results from the multivariate causality test indicate that there is one-way causality running from medical tourism to blockchain technology. **Conclusion:** In accelerating medical tourism growth during Covid-19 endemic phase, the utilization of blockchain technology is significant and it is in line with the Malaysia Digital Economy Blueprint.

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e-POSTER PRESENTATIONS

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IMPACT OF GENDER ON SELF-DIRECTED LEARNING AMONG E-LEARNING NURSING UNDERGRADUATE IN MALAYSIA

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Introduction: The demand for online education is on the rise in working nurses for its flexibility and accessibility to further their studies and to enhance their professional development, particularly during the COVID-19 pandemic. The ability to be self-directed in learning is imperative for nurses to continue their education using an e-learning approach. **Aims**: This study aims to investigate gender differences in overall self-directed learning among working nurses in e-learning nursing programmes. **Methods**: The conceptual framework of the study is based on the concept of a self-directed learning model. This is a cross-sectional quantitative correlational study using a multivariate analysis method to test the hypotheses. Stratified random sampling technique was employed to recruit 241 nursing students through an online survey. The Self-directed Learning Instrument (SDLI) was adopted to measure the dependent variables of the study. **Results**: The findings of the study revealed statistically significant differences between gender and dependent variables ($p<0.05$) of learning motivation, planning and implementation, interpersonal communication, and self-monitoring. Male nurses reported higher levels of self-directed learning than female nurses. **Conclusion**: This study highlights the important concepts of self-directed learning among online learners. The role of educators is essential to support students for self-direction in e-learning. Future studies to explore other possible determinants in e-learning context are recommended.

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CHILDHOOD VACCINE HESITANCY AND ITS ASSOCIATED FACTORS

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Introduction: COVID-19 era has led to a surge in vaccine hesitancy. It is predicted that this would negatively impact the more established childhood vaccination program. We aim to summarize the prevalence of childhood vaccine hesitancy and its associated factors. This review was conducted and reported in accordance with the PRISMA-ScR checklist. **Methods:** A scoping review was conducted through Scopus®, PubMed®, and Cochrane Library databases published from January 2016 to November 2021. The results were filtered to include articles that were full-text, available in English and focused on hesitancy for childhood vaccination. The factors were then grouped into four themes (caregivers, health providers, vaccine specific, and contextual factors). **Results:** A total of 576 articles were retrieved, from which 83 articles were included in this review. 52% articles were published within the last 2 years with 49% were cross-sectional studies and 39% came from the United States, Canada and Italy. The prevalence of vaccine hesitancy ranged from 3 to 50.6% with a mean of 25.8%. Factors related to caregiver's theme were the major contributor to vaccine hesitancy: caregivers' belief, attitude and knowledge about health (78%), trust to health system (33.7%) and socio-demographic (32.5%) while the other 3 themes are less notable (3-18%). **Conclusion:** Childhood vaccine hesitancy is on the rise and is a significant issue in developed countries especially during COVID-19 pandemic. Issues among caregivers are prominent compared to other factors. A proactive and multi-interventional approach by stakeholders is critical to increase caregivers' confidence, competence, and convenience of vaccination uptake. This would ensure the sustainability of existing vaccination programmes for children.

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IMPACT OF PHYSICAL ACTIVITY ON QUALITY OF LIFE'S COLORECTAL CANCER SURVIVORS: A SYSTEMATIC LITERATURE REVIEW

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Introduction: Early diagnostic and treatment advances have resulted in prolonged cancer survivorship. Therefore, good post-treatment management is critical for enhancing the cancer survivors' health and quality of life. Physical activity may significantly reduce the consequences of cancer therapies such as fatigue, loss of physical fitness, and psychological issues, which subsequently improve the quality of life among colorectal cancer survivors. Hence, this review aims to identify the impact of physical activity on colorectal cancer survivors' quality of life. **Methods**: EBSCOhost, Web of Science (WOS), Scopus, ScienceDirect and PubMed were searched from 2010 through 2020, specifically studies in English language. Studies included adults above 18 years old diagnosed with colorectal cancer and determining the effects of physical activity on quality of life outcomes among colorectal cancer survivors. **Results:** A total of 1,961 articles were identified, of which 16 fulfilled the eligibility criteria for the review. This review shows a significant effect of physical activity on improving the quality of life among colorectal cancer survivors. A higher level of moderate-vigorous physical activity (MVPA) was associated with an increase in physical functioning, feeling less fatigue, distress and pain, however the same was not observed with mental functioning among the colorectal cancer survivors. **Conclusion**: Physical activity intervention is recommended to be implemented among colorectal cancer survivors to improve their quality of life in the long run to prolong their cancer survivability.

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THE MURTAGH'S PRIMARY MASQUERADE IN SYMPTOMATIC PATIENTS WITH HEART FAILURE – TWO CASES OF HYPOTHYROIDISM

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Introduction: Patients are often referred to primary care for continuation of care after being discharged from tertiary centres. However, many of these patients may still have ongoing and ambiguous symptoms which are often a clinical conundrum. We report two cases of patients with heart failure with ongoing reduced effort tolerance and lethargy who were diagnosed with one of Murtagh's primary masquerades. **Case Presentation**: **Case 1**: A 74-year-old lady came to the primary care clinic for review after recurrent admissions for acute heart failure within six months. She presented with reduced effort tolerance and fatigue. She had not received medical care for 20 years prior to the first admission. Her movement and speech were slow. She was also bradycardic. Further examination showed a necklace scar mimicking neck lines which was inconspicuous previously. Her fasting lipid profile one month ago was markedly deranged. Thyroid function test (TFT) showed TSH of 28.5mIU/L and free T4 of 2.5pmol/L. Upon further history, she had thyroidectomy done almost 40 years ago for possible Graves' disease. She was started on levothyroxine for post thyroidectomy hypothyroidism. **Case 2**: A 83-year-old lady with ischemic heart failure with preserved ejection fraction for five years, hypertension and dyslipidaemia presented with worsening reduced effort tolerance and lethargy. She has no other symptoms. Her hair was thin with generalised dry and coarse skin. Her pulse rate was normal. There was no neck swelling. TFT showed TSH of 93.2mIU/L and free T4 of 6.2pmol/L. Anti-thyroid peroxidase was positive. She was diagnosed with Hashimoto's thyroiditis and started on levothyroxine. Both patients' symptoms have significantly improved with normalisation of thyroid function at six months follow up. **Conclusion**: Patients with heart failure may present with symptoms of hypothyroidism masquerading as heart failure. A high index of suspicion with proper assessment is warranted to comprehensively manage these patients.

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AN ADULT WITH FINGER MASS – A COMMON YET COMMONLY OVERLOOKED CASE OF GIANT CELL TUMOUR

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Introduction: Hand mass in adults is encountered regularly in daily general practice and can often be perplexing as many differential diagnoses need to be considered. We report a case of an adult presented with a finger mass. Further investigations confirmed a common, benign and yet aggressive tumour diagnosis. **Case Presentation**: A 42-year-old man with hypertension presented with persistent left index finger mass for 6 months. The mass was small and had gradually increased in size with limited finger flexion. No skin changes or neurological symptoms were noted. The mass was not preceded by trauma or fever. There was no other joint swelling, lymph nodes enlargement, cough, dysphagia or neck swelling. Physical examination showed a firm mass over the volar surface of the left index finger. There was no tenderness or redness. The range of movement especially upon flexion was limited due to the mass. The rest of the head and neck, chest, upper limbs and neurovascular examination were unremarkable. Blood investigations, including a full blood count, renal profile, liver function test, serum uric acid, fasting sugar and lipid were within the normal ranges. A plain hand radiograph showed soft tissue shadow with no bony involvement. MRI of the left hand showed a solid soft tissue lesion measuring approximately 0.6cm x 1.2cm x 2.6cm. The diagnosis of giant cell tumour (GCT) of the flexor tendon sheath was highly suspected. Excision of the mass was done under local anaesthesia. The histopathology report confirmed the diagnosis of GCT. **Conclusion**: This case highlights the importance of considering GCT as a differential diagnosis for adults with a firm finger mass that are otherwise asymptomatic. A prompt diagnosis and early intervention of GCT is important to reduce the risks of complications.

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AN UNUSUAL CAUSE OF IRRITANT CONTACT DERMATITIS: THE UNEXPECTED EFFECT OF GARLIC MEDICAMENT

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Introduction: Irritant contact dermatitis (ICD) is a frequently seen skin condition in primary care. The most common causes of ICD include hair dye, nail polish, paints, cleaners, soap and detergent. We present an unusual case of ICD, the cause of which was successfully identified and managed in primary care. **Case Presentation**: A 20-year-old woman presented with sudden onset of multiple painful localised blisters with redness on the right antecubital fossa. She neither had rashes elsewhere, nor any oral or genital ulcer. She was not on any regular medication and was not on any traditional medication. One day before the presentation, she reported applying raw garlic paste to the area to treat mild itchiness. She has no known allergies or medical illness. Examination revealed multiple bullae on the antecubital fossa with perilesional erythema. The clinical history of immediate bullae formation after direct contact with garlic was consistent with ICD due to garlic medicament. The lesions were managed with regular dressings. At one week follow-up, the lesions had healed well. She was advised to avoid further application of garlic topical medicines. **Conclusion**: Although *Allium sativum* (garlic) has been used either by topical use or orally as a medicinal treatment worldwide for thousands of years to treat various conditions, it has the potential to cause irritant dermatitis when applied to skin and mucosa. Patients and healthcare providers should be cautious on the potential adverse effects of using garlic for medicinal purposes.

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PREVALENCE OF MENTAL HEALTH AND THEIR RELATION WITH PARENTAL FACTORS AMONG ADOLESCENTS DURING COVID PANDEMIC IN EAST COAST OF PENINSULAR MALAYSIA

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Introduction: The COVID-19 pandemic has made an impact on various aspects of life, including social life and education. Adolescents are known to be vulnerable to develop mental health problems. The study aimed to determine the prevalence of mental health problems among early adolescents and their associations with parental relationships during the COVID-19 pandemic. **Methods**: A cross-sectional that included 535 adolescents aged 13 to 14 years, was conducted using online surveys from February 2021 to April 202. The participants were from the East coast of Peninsular Malaysia. Mental health status was assessed using Depression, Anxiety and Stress Scale- 21 (DASS-21), and parental or guardian supervision, connectedness, bonding, respect for privacy, physical activity, and risk behaviours were evaluated using the Malaysian Global School-based Student's Health Survey. Multiple logistic regression analysis was done to examine the associations of the variables. **Results:** The prevalence of depression, anxiety and stress was 28.2%, 38.1% and 18.5%, respectively. Adolescent with low parental/guardian connectedness and bonding were associated with depression (AOR = 3.82, 95% CI =1.80 – 8.08), anxiety (AOR 2.17,95% CI = 1.34 – 3.50) and stress (AOR 2.29, 95% CI = 1.13 – 4.65). Low parental supervision (AOR = 2.37, 95% CI = 1.19 – 4.54), low academic performance (AOR = 3.57, 95% CI = 1.10 – 11.62), stress (AOR = 8.56, 95% CI = 4.38 – 16.70) and anxiety AOR = 7.83, 95% CI = 4.48 – 13.70) were predictors for depression. Adolescent who was divorced or separated from parents/guardians (AOR = 3.57, 95%CI = 1.10 – 11.62) and married parents/guardian but living apart due to working requirements (AOR = 3.57, 95% CI = 1.10 – 11.62) were at higher risk of stress. **Conclusion**: Depression and anxiety were prevalent among adolescents from the East coast of Peninsular Malaysia. Poor relationship with parents or guardians was a significant factor for mental health problems among these adolescents during the COVID pandemic.

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VIRTUAL REHABILITATION USING BAL EX VIRTUAL VERTIGO, STROKE ASSESSMENT AND REHABILITATION DIGITAL HUB AS AN ALTERNATIVE FOR CARE IN THE COVID-19 PANDEMIC

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Introduction: During pandemic COVID-19, most patients found it difficult to come to healthcare facilities or hospitals for their regular follow up treatment. The frequency with which patients attended hospital, physically, declined due to worries of getting infection. They preferred virtual consultations to monitor the progress of their treatment or recovery. Virtual reality (VR) technology is rapidly becoming a popular application for physical rehabilitation and motor control research in developed countries. VR gives us the opportunity to bring the complexity of the physical world into the controlled environment of rehab tools on virtual platforms. In diseases such as stroke or vertigo, patients may have similar outcomes as in physical rehabilitation. Hence, use of virtual rehabilitation may keep patients safe from getting COVID-19 infection. **Methods**: Current study involved patients with Parkinson disease. The participants were randomized into two groups; that received either virtual or physical rehabilitation. **Results**: Both study groups showed improvement in balance and gait, and the virtual rehab group exhibited significantly greater improvements, especially on the Unified Parkinson's Disease Rating Scale. No subject suffered any injury during virtual rehab sessions. **Conclusions**: Use of virtual platforms is expected to increase patient's cooperation and compliance for attending rehabilitation sessions. This approach may benefit certain groups of patients such as those with physical disability, logistic issues and transportation problems.

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CASE STUDY: NEGATIVE RT-PCR AND POSITIVE IgG IN TRAVELLERS BOUND TO CHINA

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Introduction: The presence of IgG and IgM during N protein antibodies test after completion of two doses of vaccination has caused misinterpretation about SARS-CoV-2-infections. Although the U.S. Food and Drug Administration (FDA) has stated that SARS-CoV-2 antibody tests should not be used to evaluate a person's level of immunity or protection from COVID-19, all travelers bound to China are required to present negative results for both RT-PCR and N protein antibodies test. Therefore, this study aims to report the possible conditions for travelers to comply with the regulations to enter China. **Methods**: A total of 200 travelers who did not contract COVID-19 infection at the time of screening from 13/8/2021 to 16/10/2021 were chosen to participate in this study and were divided into two groups; group A (aged 18-35) and group B (aged >35). Nasopharyngeal and oropharyngeal swab samples were collected for detection of ORF1ab gene, N gene and E gene. Meanwhile, blood samples were collected into an EDTA tube and tested for N protein antibodies. The data was analyzed statistically using the student t-test. **Results**: Results showed that all 200 travellers had negative PCR tests and IgM antibodies. However, all travellers in both groups showed positive IgG. In further study, all travellers in both groups received two doses of Sinovac vaccine. Relationships between the timeline of full vaccination to the date of testing showed no significant differences between both groups with 51.82 ± 2.80 and 51.05 ± 2.74 days, respectively. **Conclusion**: In conclusion, all travellers presented with both negative PCR and IgM but positive IgG antibody which was due to vaccination. Therefore, the embassy should take note of this situation and may revise the suitable requirements.

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DISEASE PROGRESSION AMONG PERIODONTITIS PATIENTS WITHOUT TREATMENT DUE TO THE COVID 19 PANDEMIC VERSUS PATIENT UNDER SUPPORTIVE PERIODONTAL THERAPY: ONE-YEAR OBSERVATIONAL STUDY

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Introduction: Periodontitis is an inflammatory disease of the periodontal tissues, which is characterized by loss of support of the affected teeth, specifically periodontal ligament fibres and the bone into which they are inserted. Periodontal disease is assessed and its progression is determined via observations on a site-by-site basis of the tooth Probing Pocket Depth (PPD) and Clinical Attachment Loss (CAL). **Methods**: It was a single centre retrospective cohort study to compare periodontal disease progression between patients with Periodontitis devoid of treatment due to the pandemic (NoTX) versus patients with stable periodontal condition under Supportive Periodontal Therapy (SPT). Using mixed effects modelling, we analyzed 130 sites distributed on 392 teeth in 14 patients, and data were collected post 12-month follow-up among patients that did not receive any periodontal management and treatment due to COVID 19 pandemic. The change in the CAL, PPD and tooth loss was used as the outcome variable. **Results**: Statistical analysis showed that there is a significant difference in mean PPD when compared between the NoTX and SPT group ($p < 0.05$). Similar results were also noted for site specific assessment where PPD 3MM showed significant difference between 2 groups ($p < 0.05$). **Conclusion**: The PPD at baseline were an important determinant of the PPD changes, which varied widely according to the site severity. The parameters identified in this study may guide practitioners in determining the type and extent of treatment needed at the site and patient levels.

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DEPRESSION AND PSYCHOLOGICAL APPROACH TO EXERCISE – A REVIEW

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Introduction: Depression is a major global problem and it is estimated to be the leading cause of disability worldwide and is also a significant contributor to the overall global burden of disease. Statistics from the Global Burden of Disease, Injuries and Risk Factors Study (GBD) stated that 264 million people and more are affected by depression. During covid-19 pandemic, the prevalence of depressive symptoms was three-fold higher compared to before the pandemic. Most of the reviews done recently proved that exercise is an important management and is also a preventive measure for depression. Meta-analysis from Wegner et al. (2020) shows a significant and consistent positive effect of exercise on depressive symptoms without any adverse effects on both children and adolescents. **Methods**: In this review, the psychological approach to exercise among depressive patients are explained and discussed. **Results:** Self-determination theory (SDT), also called theory of motivation, can be introduced to enhance the commitment of people with depression to exercise. SDT interconnects three aspects which are personality, optimal or best functionality and human motivation. Next, affective-reflective theory (ART) is recommended because it is a default-interventionist dual-process theory that highlights the main positive and negative alliance for succeeding physical inactivity or exercise and stresses on the role of thinking rationally about all behavioural options. Social cognitive theory (SCT) that emphasizes self-efficacy and the outcome of the behaviour is also one of the psychological approaches to commit to exercise. **Conclusion**: Exercise for patients or individuals with depressive symptoms should be prioritized and relevant psychological approaches may help to promote engagement to exercise.

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ASSESSING THE SPATIOTEMPORAL SPREAD PATTERNS OF THE COVID-19 PANDEMIC IN MALAYSIA

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Introduction: COVID-19 pandemic has greatly affected humans in many aspects. In Malaysia, studies have described the characteristics and trend of the epidemic, evaluated the effectiveness of the policies, and other countermeasures. The spatiotemporal studies on the disease dispersal were limited to monthly and bi-weekly analysis and association with environmental factors. We investigated the daily spatial autocorrelation of COVID-19 cases and identified spatiotemporal clusters of COVID-19 in Malaysia from 25 January, 2020 to 24 February, 2021, before the national vaccination program was initiated. **Methods:** We obtained confirmed cases and deaths from the official GitHub repository. All analyses were based on daily cumulative cases, derived from the sum of retrospective 7-day and the current day for smoothing purposes. Daily global, local spatial autocorrelation, scan statistics of COVID-19 cases were examined at district level using Moran's I and SaTScan™. **Results:** At the initial stage of the outbreak, Moran's I index > 0.5 ($p<0.05$) was observed. Local Moran's I analysis delineated the high-high cluster risk expanding from west to east of Malaysia. The cases surged exponentially after September 2020, with the high-high cluster in Sabah, from Kinabatangan on 1 September (Cumulative cases=9,354; Moran's I=0.34; $p<0.05$), to 11 districts on 19 October (21,363; Moran's I=0.52, $p<0.05$). The most likely cluster identified from space-time scanning was centered in Melaka (RR=11.93; $p<0.001$) which encompassed 36 districts with a radius of 178.8km, from November 24, 2020 to February 24, 2021, followed by the Sabah cluster. **Conclusion:** Both analyses complemented each other in depicting underlying spatiotemporal clustering risk, giving detailed space-time spread information at district level. This daily analysis could be valuable insight in real-time reporting of transmission intensity, and alert the public to avoid visiting high-risk areas.

Keywords: COVID-19; LISA; Moran's I; spatial autocorrelation; SaTScan

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EFFECTS OF COVID-19 AMONG HEALTHCARE PROVIDERS IN A TEACHING HOSPITAL

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Introduction: Patient safety has been recognized as a global issue leading to potentially avoidable morbidity and mortality during Covid-19 pandemic. **Aim:** This study describes predictors of safety attitude among health care professionals (HCPs) during the COVID-19 pandemic. **Methods:** This was a cross sectional study that used Safety Attitudes Questionnaire (SAQ) administered electronically in English and Malay languages to evaluate safety culture domains among HCPs in a teaching hospital. A positive percentage agreement scores of 60% was considered as satisfactory. Comparisons were made among all Healthcare Providers during the pandemic. **Results:** Among 6562 respondents, 3175 (48.4%) completed the questionnaire; 2320 (73%) were female, 1223 (38.5%) were nurses, and 1131 (35.6%) had 5-10 years of working experience. A total of 1000 (31.5%) respondents were redeployed either to a covid ward or non-covid ward within the hospital to assist in clinical care. In terms of exposure to COVID-19, a large majority of allied health professionals (68.4%) were exposed, followed by doctors (53.9%) and nurses (53.1%), in comparison to attendants and support staff. 533 (43.8%) nurses were deployed to another unit/ward during the pandemic. Safety domains showed highest for job satisfaction (71.3%), followed by teamwork (66.5%), however; stress recognition received the lowest percentage (57.9%) scores during the pandemic. Linear regression showed significant improvement in all domains except stress recognition for those HCPs who were exposed to Covid-19. Reduction in teamwork opportunities, Safety climate, Job Satisfaction, Unit Management Perception, Hospital Management perception were found among respondents who were redeployed. Findings revealed safety culture among HCPs to be above satisfactory level, with lower percentages in the stress recognition domain from baseline. **Conclusions:** The overall mean SAQ score was above the satisfactory level, except for stress recognition domain. Interventions to improve patient safety culture should be developed, focusing on stress management.

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CHATBOT FOR SELF-REPORT INJURY DURING PANDEMIC USING FLUTTER FRAMEWORK

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Introduction: Athletes usually suffer from Musculoskeletal Disorder (MSD). MSD are often degenerative diseases and inflammatory conditions that affect different parts of the body including resulting in Upper Limb Disorders (ULD), Lower Limb Disorders (LLD), and the diseases affecting back (upper and lower). To monitor the athletes' injury, athlete trainers use Subjective, Objective, Assessment, and Plan notes (SOAP) to collect information and evaluate the information. However, during the pandemic, the athlete trainers had difficulty in supporting injured athletes. **Aims**: Therefore, this project aims to design and develop a chatbot application for athletes to do self-reporting of injury. **Methods**: The chatbot application was created in order to collect and assess athletes' injury related information quickly during pandemic. The chatbot interacts with the athlete and collects all the information needed by the athlete trainer to perform the assessment and provide feedback to the athlete. The application uses the Flutter framework using Dart language with Dialogflow Application Programming Interface (API). The questions asked by the chatbot are ruled out using *kommunicate_flutter* packages. **Results**: The application was tested with athlete trainers from the Faculty of Sport Science and Recreation. The results showed that the chatbot can be effectively used during pandemic. **Conclusion**: Chatbots using artificial intelligence can significantly improve and change the process in collecting data especially during pandemic.

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BURNOUT AMONG HEALTHCARE WORKERS IN THE COVID-19 PANDEMIC: A CROSS-SECTIONAL STUDY

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Introduction: Burnout is a condition due to prolonged exposure to work-related stress and presented in the forms of emotional exhaustion, dislike of the current job, and lack of professional competencies. In the COVID-19 pandemic, health care workers experience increasing work tension, consequently leading to a higher level of burnout among the population. Therefore, the purpose of this concept paper is to review the literature that relates to the contributing factors and impact of burnout among healthcare workers, in the context of pandemic COVID-19. **Methods:** This review paper is based on several online databases which focus on relevant keywords related to healthcare workers, COVID-19, and burnout. **Results:** As a result of the thoroughly reviewed literature, this concept paper proposed sociodemographic, personality traits, and coping styles as the three main factors of burnout among healthcare workers in the COVID-19 pandemic. Meanwhile, lower quality of patient care, higher staff turnover rates, and reduced productivity are the impacts of burnout among healthcare workers in the context of the COVID-19 pandemic. **Conclusion:** In conclusion, this review paper provides information on the factors and impact of burnout among healthcare workers in the COVID-19 pandemic. This information will guide future researchers, healthcare providers, and policymakers in navigating and providing more targeted efforts to prevent and intervene burnout among healthcare workers in the context of the COVID-19 pandemic.

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DISTRIBUTION OF FRONTAL SINUS PATTERNS AMONGST MALAYSIAN POPULATION: A SKULL RADIOGRAPH STUDY

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Background: Radiographs have been widely used for forensic identification purposes. The frontal sinus (FS) is resilient to damage, suggesting its potential use for biological profiling. However, the distribution of FS patterns has yet to be explored in the Malaysian population. **Aim:** This study aimed to describe the distribution of FS patterns in relation to sex among adult Malaysians. **Methods:** 409 adults Malaysian posteroanterior (PA) skull radiographs, consisting of 200 males (49%) and 209 females (51%), were included in the study. The FS patterns were classified according to total and percentage of presence or absence of FS, symmetry or asymmetrical (right or left dominant), unilateral absence (right or left), bilateral absence and lobulations. **Results:** The findings showed that bilateral presence FS is common in 95.3% of individuals (195 males and 195 females). Bilateral absence was noted in a small population of 2.7% individuals (2 males and 9 females). Unilateral absence of left and right FS was found in 0.5% (2 males and 0 females) and 1.5% (1 male and 5 females) individuals, respectively. FS symmetry was noticed in 40.8% of individuals (73 males and 94 females). Left dominant asymmetry was seen in 36.0% of individuals (76 males and 71 females), while right dominant asymmetry was observed in 18.5% of individuals (46 males and 30 females). The lobulations were seen more in males than females, with the majority of FS possessing 1 to 3 lobes. **Conclusion:** The findings suggest that the absence of FS is rare, FS symmetry is dominated by the females, and asymmetry and lobulations are more in the male population. This provides an insight of the landmarking placement for measurement during forensic application and the potential use of FS for sex identification among Malaysians.

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APPLICATION OF MOBILE APP IN TEACHING MAGNETIC RESONANCE IMAGING (MRI) SAFETY

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Introduction: The COVID-19 pandemic has shifted the radiology education from face-to-face to online teaching. We developed one mobile application as a high-tech approach to aid students in their learning of Magnetic Resonance Imaging (MRI) safety. This app has incorporated all the MRI contraindications and students need to input the data as if they are taking consent in a real situation. Subsequently, after students input the patient's particulars, the app will give a decision whether the patient is allowed to go for an MRI or not. Repetitively using this app and the interactive platform will help students to remember the MRI contraindications more easily. **Aim**: The aim of this study is to develop the mobile application and investigate the effectiveness of the mobile-based teaching method. **Methods**: A cross-sectional study was conducted among 55 final year medical students. A short introduction highlighting the learning objective was given. Pre-test assessment using One Best Answer (OBA) format was conducted. All the students were taught on how to install and operate the mobile application. 10 simulated scenarios were practiced. Students were given 3 days duration to make use of the app by input their imagined scenarios. Subsequently, a post-test assessment was conducted. **Results**: Fifty-five Year 5 medical students participated (29 % female; 71% male). Score improvement was achieved in 43 students (78%). Pair t-test shows statistically significant improvement in post-test assessment with the mean increase of score of 10.4% [95% CI (-13.4, -7.3) ; t_{54} = -6.803, $p<0.001$ from 62.9% (pre-test) to 73.3% (post-test)]. Majority of the student's feedback on this mobile application was good. **Conclusion**: Our study showed this mobile application has the potential to assist students in learning MRI safety topics. The concept of clinical simulation is achieved when students key in various clinical scenarios and get the answer.

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MEDICAL STUDENTS' PERCEPTIONS ON THEIR LEARNING ENVIRONMENT DURING PRIMARY CARE POSTING AMID COVID-19 PANDEMIC: A CROSS-SECTIONAL STUDY IN A MALAYSIAN PUBLIC UNIVERSITY

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Introduction: The learning environment has been shown to profoundly impact on the students' satisfaction, academic achievement, and learning effectiveness. The COVID-19 pandemic has significantly changed the medical students' learning environment from face to face to online or hybrid methods. Currently, data on students' perception of their learning environment in primary care medicine attachment during the pandemic is scarce. **Aims**: This study aims to determine students' perception of their learning environment during primary care medicine attachment during the COVID-19 pandemic using the Dundee Ready Education Environment Measure (DREEM) questionnaire. **Methods**: This is a cross-sectional study using a self-administered DREEM questionnaire, accessed via Google form involving undergraduate medical students from a Malaysian public university. Participants were year 4 students who had completed primary care medicine posting during the peak of COVID-19 pandemic from 2020 to 2021. The sociodemographic factors and total DREEM mean score, including its domains, were analyzed using SPSS version 27. The questionnaires assessed 5 domains; students' perceptions of learning, teaching, atmosphere, self-perceptions, and social perceptions. Higher scores translate into more positive perceptions. **Results**: The majority of the respondents were female (72.2%) and Malay (98.5%). Regarding device usage and internet connectivity, 51.2% of the students used multiple devices, including laptops, tablets and mobile phones for online teaching sessions, with 46.3% of them using campus's Wi-Fi. Many were dissatisfied (51.2%) with the internet connection stability. The total DREEM mean score was 72.94 (SD 28.8) implying a more negative perception. The student's perceptions were viewed negatively across all 4 domains except for the 'perception of atmosphere' domain. **Conclusion**: The student's perceptions of the learning environment were negative. Further studies to assess the factors associated with negative perception will help rectify the affected domains to help students achieve their learning outcomes.

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CONDUCTING OBJECTIVE STRUCTURED CLINICAL EXAMINATION (OSCE) FOR PRE-CLINICAL YEARS STUDENTS DURING THE PANDEMIC IN UNIVERSITI MALAYA MEDICAL PROGRAMME (UMMP)

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Introduction: Due to the current Covid-19 pandemic and the need for remote learning, Universiti Malaya Medical Programme (UMMP) have shifted from conducting normal face-to-face Objective Structured Clinical Examinations (OSCE) to virtual ones. Alternatively, OSCE is conducted virtually via Microsoft Teams (MST) platform. **Methods:** There are two types of question employed in the virtual OSCE: a) Video submission of clinical examination prior to the exam. Students are required to record and submit a video of their clinical examination based on the scenarios given. b) Live interactive history taking sessions conducted with students and examiners. Several channels are created by administrative staff for each examiner tasked in assessing students during the assessment day. Students are divided into several groups. The examiners will then admit the students one by one into their respective channel and the same process is repeated for the next group session. In addition, students are instructed to register early via MST to ensure that their connections are secure and stable 30 minutes prior to the assessment start time. All instructions and information for the students are posted via Bulletin Board which is an official platform of communication with the students. It is important for all students to be aware of this information prior to the assessments. **Results:** As we never experienced a virtual examination before, a proper planning between the medical education team, the OSCE coordinators, and the IT support system team was conducted. However, the involvement of standardized patients (SPs) is not allowed during the assessments to minimize the risk of Covid-19 infections. **Conclusion:** Standard operating procedure and guideline are rigorously developed with the team to ensure that students could proceed with the assessment and academic year without delaying their graduation.

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THE INFLUENCE OF PATERNAL AGE ON SEMEN PARAMETERS AND PREGNANCY OUTCOME FOLLOWING INTRAUTERINE INSEMINATION.

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Introduction: Up to date, the male factors contributing to subfertility had account for 25 to 40% of subfertility cases, and there was a significant negative association of semen parameters with advanced male partner's age. Combination of the sperm preparation method and assisted reproductive treatment were used for a better chance of pregnancy. **Aims**: This study was to analyzed the influence of age on the sperm quality and the effect of density gradient centrifugation on sperm parameters and pregnancy outcome in infertile couple following intrauterine insemination (IUI). **Methods:** This retrospective cross-sectional study investigating 181 cases of IUI cycles from reproductive clinic of two public universities from January 2019 to December 2020. They were categorized into study group (male partner's age 40 years and above) and control group (male partner's age less than 40 years old). Sperm concentration and sperm motility pre and post density gradient centrifugation (DGC) reports were extracted from the patients' records. Serum beta human chorionic gonadotropin (HCG) more than 25 mIU/L 14 days after IUI was the criteria for the IUI success. **Results**: The mean age of male and female partners were similar in both groups. Sperm parameters showed an improvement after density gradient centrifugation sperm preparation with significant results in grade 1 and grade 3 sperm motility. There was no significant different in the reproductive outcome among the groups. **Conclusion**: Our findings project an improvement in sperm parameters after density gradient centrifugation and the male age is not significantly affect the pregnancy outcome following IUI.

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COMPARING STRESSFUL FACTORS AMONG DENTAL STUDENTS PRE AND DURING COVID-19 PANDEMIC

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Introduction: COVID-19 pandemic has negatively affected higher education due to the sudden need to shift to an online mode of teaching and learning which is new to the students and lecturers. Dental students are impacted by this type of teaching and learning as a considerable portion of their curriculum requires clinical training on real patients. This study aimed to compare the stressful factor among dental students during COVID-19 pandemic with stressors assessed before the pandemic. **Methods**: This study was conducted among dental students during COVID-19 Movement control order where online teaching and learning were implemented. Dental students at Kulliyyah of Dentistry, International Islamic University Malaysia were given a list of possible stressful factors and were asked to rate these stressors on a scale from 0 (I don't consider it a stressful factor/Does not apply to me) to 4 (I consider it an extreme stressor). The results were compared to the source of stressors among dental students before COVID-19 pandemic. **Results**: There are consistent stressors before and during COVID-19 pandemic such as 'lack of motivation to learn', 'Fear of failing or unable to catch up', 'feeling incompetent', 'Fear of unemployment after graduation' however the ranking and mean score of these stressors increased during COVID-19 pandemic. New stressors emerged during the pandemic which were 'Understanding lecturers during online classes', 'Cannot catch up with online learning', 'Fear of not completing clinical requirements/logbook'. **Conclusion**: Academic related stressors consistently exist among dental students however their severity increased during COVID-19 pandemic. Academic institutions need to adopt strategies to alleviate the newly emerging stressors related to the effect of pandemic on teaching and learning.

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TOCILIZUMAB AS A TREATMENT FOR CYTOKINE STORM IN COVID-19 PATIENTS: A SYSTEMATIC REVIEW

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Background: Tocilizumab is a competitive interleukin-6 inhibitor agent that has been proposed to combat the COVID-19-related hyperinflammatory state, known as a cytokine storm. This systematic review is conducted to study the treatment of cytokine storm by Tocilizumab in COVID-19. **Methods:** The search strategy ("COVID-19" OR "COVID19" OR SARS-CoV-2") AND "tocilizumab" AND "cytokine storm" AND "inflammatory markers" AND ("ICU stay duration" OR "intensive care unit stay duration") AND "mechanical ventilation requirement" AND (mortality OR death) were manually searched through Web of Science, Scopus, and PubMed databases spanned from March 2020 to November 2021. The inclusion criteria were: research articles, human study, clinical trial, and articles in English. The exclusion criteria were: review articles, case reports, early access, editorial materials, letters, short survey, in vivo or in vitro studies. **Results:** Five articles were included in the analysis. There were four countries had conducted the studies (Italy, China, USA and Netherland) with different study designs (observational (80%) and randomized controlled trials (20%)) involving 649 patients (48% received TCZ) among moderate to severe COVID-19 patients. There were variabilities in the TCZ dosage given with some combination with other medication (methylprednisolone, azithromycin, hydroxychloroquine, lopinavir and ritonavir). TCZ reduce death cases significantly. It improves respiratory function, reduces the incidence of respiratory syndrome and less-invasive mechanical ventilation usage. The level of inflammatory markers such as C-reactive protein, ferritin and lactate dehydrogenase were significantly higher in the TCZ group. **Conclusion:** Tocilizumab may increase survival and favourable clinical course, improved hypoxia, accelerate respiratory recovery, lower hospital mortality, reduce the likelihood of invasive mechanical ventilation, improve clinical symptoms, represses the deterioration of patients (prolonging survival) and improve inflammation and immune cell function.

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OTORHINOLARYNGOLOGY SERVICE WITH ONGOING COVID-19 PANDEMIC IN HOSPITAL MELAKA: A SINGLE CENTRE, RETROSPECTIVE, DESCRIPTIVE STUDY.

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Introduction: First case of COVID-19 in Malaysia was reported on 25th January 2020. In less than three months, Malaysia implemented a nationwide Movement Control Order (MCO) to cut down the exponential increase of COVID-19 cases. Hospital Melaka is a state hospital which caters for 930,000 population and was selected to handle COVID-19 cases. Department of Otorhinolaryngology-Head & Neck Surgery (ORL-HNS) heavily involved in managing upper aerodigestive tract conditions. These are potential sites with high COVID-19 viral load. **Aims:** To describe activities of the Department of ORL-HNS Melaka and strategies implemented to decrease cross-infection of COVID-19. **Methods**: Retrospective description of data obtained from Clinic, Operation theatre and Ward registry. We also describe health care policies contributing to very low COVID-19 cross-infection between patients and ORL-HNS healthcare workers (HCW). **Results:** In the year 2020, a total number of 18,317 outpatient visits were made, 10,107 clinic procedures were done. Total number of 366 elective surgeries, 192 emergency surgeries, and 34-day care surgeries were conducted. There were 942 inpatient admissions. There was no COVID-19 cross-infection between patients and ORL-HNS HCW in 2020. **Conclusion**: Despite working in a high-risk environment and performing aerosol generating procedures, ORL-HNS HCW were able to reduce the risk of cross-infection of COVID-19 by adhering to the strict policies laid down by the Ministry of Health of Malaysia and Hospital Melaka.

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NON-TYPHOID SALMONELLA (NTS) MYCOTIC ANEURYSM PRESENTS WITH OBSTRUCTIVE UROPATHY

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Introduction: Mycotic aneurysm (MA) is a serious clinical condition in which without prompt diagnosis and management leads to severe complications. The signs and symptoms however, are nonspecific, which pose a challenge in diagnosing the condition. **Case Presentation:** A 76-year-old lady with hypertension and diabetes mellitus presented with malaise and pain over the left lumbar region for 2 weeks. On admission she was hemodynamically stable, non-febrile, there was tenderness at the right hypochondrium, epigastric and positive renal punch. Blood tests showed increased white cell count (20 x 10^9/l) and CRP (172 mg/L). Blood culture on the second day of admission revealed Salmonella spp. Ultrasound kidney showed left hydronephrosis due to proximal hydroureter and ultrasound abdomen showed focal soft tissue density around the left common iliac artery (CIA), internal iliac artery (IIA) and external iliac artery (EIA). CT abdomen revealed severe atherosclerosis of the abdominal aorta and small saccular aneurysm at the proximal left CIA with surrounding soft tissue mass. The appearance and raised infective marker is suggestive of MA. She was treated with intravenous ceftriaxone and responded well. She was then referred to the vascular team for left IIA coiling and CIA stenting. **Discussion:** In this case, the obstructive effects of the MA leading to the patient atypical signs and symptoms. NTS MA, is prevalent in Asian population and is associated with older age and atherosclerosis commonly present with unremitting fever, however was absent in this case, probably indicating that the patient was in a bacteraemia stage leading to metastatic infection. Although she presented with atypical symptoms, with the aid of radiological imaging the diagnosis was confirmed in the early phase. **Conclusion:** Investigation on the underlying cause of obstructive uropathy in patients with positive blood culture of NTS is important to exclude the diagnosis of MA.

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PUBLIC STIGMATISATION TOWARDS COVID-19 PATIENTS IN MALAYSIA

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Introduction: Public stigma can be defined as the ways in which the general public stigmatize people. People are being discriminated against or treated separately and in some situations experience loss of status because of a perceived link with a disease. Some specific populations had become a victim of public stigmatization and being stereotyped due to their condition which related to COVID-19 either as patient or close contact of the patient. Due to this stigmatization and stereotyping situation, some people choose to hinder for specific treatment although they had symptoms or being in close contact with the positive COVID-19 patient. **Aims:** In relation to the current situation of COVID-19, this situation will lead to ongoing transmission and the action to control the infection become more vulnerable. This study evaluated the factors that influence stigmatization towards the patient of COVID-19 in Malaysia. **Method:** In this cross-sectional study involving 215 respondents, the association between level of stigma with controllability, responsibility and blame were examined using Pearson correlations. The analysis was carried out by using Statistical Package for the Social Sciences (SPSS) software. **Results:** Controllability, responsibility and blame are the three attributions used to determine stigmatization. Only responsibility and blame indicated a positive relationship with stigmatization. **Conclusion:** According to the result, there is still lack of awareness on this particular disease thus resulting in stigmatization. Majority of the respondents will still keep their distance with the patient of COVID-19 although they are fully recovered. However, they are not considered the patient as a burden to them. Therefore, it is necessary to create awareness about stigmatization and its' implications towards the patients infected with COVID-19 and the citizens itself.

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THE PREDISPOSING FACTORS FOR SEVERE COVID-19 INFECTION AMONG PREGNANT WOMEN IN SELANGOR, MALAYSIA: A RETROSPECTIVE COHORT STUDY

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Introduction: The physical and physiological changes in pregnant women predispose them to have more severe COVID-19 infection. **Aim:** To investigate the demographic and the contributing factors leading to severe COVID-19 infection during pregnancy. **Methods:** A retrospective cohort study was carried out from 1st January to 31st December 2021 in a tertiary hospital designated solely for treating COVID-19 infections. All patients admitted with COVID-19 infection that are pregnant or within puerperium period were included. The clinical information was obtained from admission until discharge. Descriptive analysis, Relative Risk, Chi-Square and Fisher Exact Tests were used to analyse the data. **Results:** A total of 3428 patients with mean age of 30.250 (SD 5.1579) years, with the majority in their second and third trimesters (26.6% and 54.3% respectively), were studied. 8.7% (n=297) had severe COVID-19 infection (Category 4 and 5). Severe infection was more marked in pregnant women with BMI >30kg/m2 with Relative risk (Rr) 1.458 (95%CI 1.095-1.941) and pre-existing comorbidities such as diabetes mellitus Rr 2.080(CI 1.230-3.518), hypertension Rr 1.416(CI 0.760-2.639), asthma Rr 1.593(CI 1.033-2.457), chronic kidney disease Rr 1.781(CI 0.495-6.402) and pregnancy induced hypertension or pre-eclampsia Rr 1.118(CI 0.379-3.296). Conversely, gestational diabetes mellitus on treatment Rr 0.671 (CI 0.432-1.041) was not shown to increase the risk of developing severe COVID-19. 88.2% of severe COVID-19 infections occurred in unvaccinated or incompletely vaccinated women ($p<0.05$). 13% of the patients delivered during active COVID-19 infection. 35.7% of deliveries were iatrogenic and preterm. Only two neonates tested positive for SARS-CoV-2 following delivery. **Conclusion:** Incomplete vaccination with underlying comorbidities increases the risk of severe COVID-19 infection in pregnant women. The rate of vertical transmission to neonates is low (3%).

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IMPROVEMENT OF CONFIDENCE LEVEL FOLLOWING AN INTERACTIVE REAL-TIME ONLINE NASOPHARYNGEAL SWABBING TRAINING SESSION.

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Introduction: Nasopharyngeal swab (NPS) performers need adequate training to confidently conduct effective and safe NPS procedures. The COVID-19 pandemic, however, had made the traditional face-to-face training undesirable due to its risk of spreading infections. The strategy to use readily available NPS demonstration via YouTube videos is of concern since some of the videos show improper techniques. **Aims:** This survey aims to assess the confidence level of participants who attended a real-time online training session for nasopharyngeal swab (NPS) sampling and handling. **Methods:** We developed an interactive, real-time online training session to train the primary care medicine providers on NPS swabbing and handling. The content was crafted and delivered by experts in their respective fields to include certified NPS trainers, otorhinolaryngologists, and a medical laboratory technologist. The training consists of; 1) Sequence of donning and doffing of personal protective equipment; 2) Tutorial session outlining the anatomy of the nasal cavity; 3) A live endoscopic demonstration of the nasal passage anatomy and nasal swabbing procedure, and 4) Interactive discussion on handling the samples. A pre and post-training survey on participants' confidence level on performing and handling the nasopharyngeal swab was collected via the Slido® platform. **Results:** A total of 50 participants attended the training. The results showed that compared to pre-training levels, the percentage of participants 'being very confident' had increased from 3% to 36%, while the percentage of 'rather confident' had increased from 37% to 64%. Meanwhile, the percentage of 'not confident', 'less confident' and 'not sure of confidence level' had all decreased to 0% from 14%, 11%, and 37% respectively after the online training. **Conclusion:** Online NPS training which incorporates a real-time nasal endoscopy video can be a valuable strategy to train nasopharyngeal swab performers.

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ASSESSMENT OF ASTHMA AND COPD CARE PRACTICES IN A UNIVERSITY PRIMARY CARE CLINIC

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Introduction: Asthma and COPD (chronic obstructive pulmonary disease) are common obstructive pulmonary diseases encountered in primary care. Evidence based practices according to the current guidelines ensures delivery of high-quality care which would lead to better disease outcomes. Thus, there is a need to assess what is currently practiced to identify gaps in the quality of care. **Aim:** The aim of this study is to assess the practices in asthma and COPD management in a university primary care clinic and compare it with the current recommendations based on the latest clinical practice guidelines. **Methods:** This is a mixed cross-sectional study looking at current clinic service structure, followed by a retrospective study of the process and outcome measures for asthma and COPD management. The patient's medical records were obtained via the electronic database (UNIMEDS). The data collected include sociodemographic, clinical characteristic, clinic structure, management process and outcome. The results were then analyzed and compared to the practice standards. **Result:** Majority of the asthma patients were female while male dominated the COPD group with the age group 60 and above predominating both obstructive diseases. In terms of the structure there is self-management support for asthma patients however the same is not available for COPD patients. 4 out of 6 process of care standards were not met for asthma while all 8 were not met for COPD. In terms of outcome of care, 78.8% patients achieved ACT (Asthma control test) score of more than 20. However, the percentage for pneumococcal immunizations were not achieved. **Conclusion:** There is urgency to rectify gaps in the quality of obstructive pulmonary diseases management in this clinic setting. The multidisciplinary team plays a big role to spearhead these changes at each stage in the delivery of care.

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COVID-19 DETECTION USING MACHINE LEARNING IN CHEST XRAY

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Introduction: From December 2019, the first case of Covid 19 patient was detected in Wuhan, China. Covid -19 has become a pandemic nowadays. Chest X-ray has played a significant role to help the doctor to make the diagnosis of covid-19 infection. It also helps doctors to see the severity of the disease based on lung involvement. Chest x-ray has been used as a screening tool for detecting Covid-19 infection. High number of Covid-19 infection cases in hospital, causing significant burden to doctor to interpret all the chest x ray in short period of time. This problem could be solved with the help of artificial intelligence. **Methods:** This is a retrospective study using public dataset which allowed by the owner to use for machine learning research. About 12000 images of chest x-rays within the dataset. From 12000 images, 6000 of the images are chest x-ray with covid 19 positive patient and 6000 of the images are images for negative of Covid-19. **Results**: The result shows with an increased number of samples, the “Performance Per Tag” is improved as. Training using 12000 samples of Chest x-ray has shown the best performance with the precision of 99.3%, recall of 99.3%, and M.A.P of 99.7 %. However, other iteration using a smaller amount of sample shows good performance with precision, recall, and M.A.P more than 90%. **Conclusion:** Artificial intelligence helps doctors to make the diagnosis in fast and efficient ways. This is really helpful in the situation with the high number of patients especially in Covid-19 infection.

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CHARACTERISTICS OF COVID-19 PATIENTS REFERRED TO THE HUITM PALLIATIVE AND SUPPORTIVE CARE UNIT (PCU) SERVICE

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Introduction: During the pandemic, Hospital UiTM received COVID-19 positive patients, some of which were referred to the PCU. **Aims:** To determine the characteristics of COVID-19 patients referred to the PCU between May to September 2021. **Methods:** This is a retrospective cross-sectional study, reviewing records of all COVID-19 patients referred to the PCU. Descriptive statistics were used to analyze demographic and clinical data, indications for referral and patients' outcomes. **Results:** Of the 215 COVID-19 admissions, 12 (5.6%) were referred to the PCU. All were off-tagged COVID-19 patients. 4 (33.3%) were male. The mean age was 58 years. 10 (83.3%) had been a Category 5 patient, while 2 (16.7%) were Category 4b patients. Only 1 patient had no background medical illness, with the others having non-cancer-related chronic diseases. 3 (25.0%) had moderate organising pneumonia (OP), while the rest had moderate-severe or severe OP. 6 (50.0%) had CT Pulmonary Angiography-confirmed pulmonary embolism (PE). The mean Day-of-Illness upon referral to the PCU was 48 days. 11 (91.7%) were referred for symptoms control with 5 of them (45.5%) also referred for end-of-life care. All were started on strong opioids. 3 (25.0%) patients passed away in the ward, 2 (16.7%) were terminally discharged, and 7 (58.3%) were discharged as per medical plans. Of these 7, 1 passed away after 2 months of discharge, while the others were still alive after 5 months and discharged from the palliative care service. **Conclusion:** Half of the COVID-19 patients referred to the PCU team are still alive after at least 5 months of discharge. The palliative care approach to caring for COVID-19 patients is individualized and referral does not necessarily mean imminent death.

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THE STUDY EFFECT OF DISINFECTANT SOLUTION ON FACE SHIELD'S DURABILITY

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Introduction: The outbreak of Covid-19 around the world makes the demand for face shields increase rapidly. There are various types and shapes of face shield designed with a clear plastic face cover. The purpose of this research is to study the effect of disinfectant solution on 3D printer face shield's process. This process is important in protecting the face shield from any droplets-spread virus. This study evaluated the disinfectant solution for ABS materials applied to different designs of face shield pattern. **Methods**: There are two types of disinfectant solution; Dettol Antiseptic Liquid, (DA) and Sodium hypochlorite, (SH) (10%~ 12%). Both solutions were tested and observed to see the effect of the structure and durability. Initially, the structure of ABS dog bones were soaked for 15 minutes and 30 minutes. Subsequently, each specimen will be tested using a tensile test to determine the durability of ABS. **Results:** The changes of the strength of the specimen at the different times were taken. The difference between the strengths of SH15 and SH30 is 2.172MPa, equivalent to 8.931%, while for DA15 and DA30 is 2.129MPa which is equivalent to 8.965%. The lowest ultimate tensile strength is specimen DA30 with the value of 10.809 MPa, while the highest ultimate tensile strength is specimen SH15 with the value of 13.246 MPa. **Conclusion**: From the tensile test study, the longer the specimen immersed in the disinfectant solution, the lower the maximum force produced. The tensile force of specimens soaked with Dettol Antiseptic Liquid was slightly lower than the specimen that was soaked in Sodium hypochlorite. This indicates that Sodium hypochlorite is more suitable for use as a disinfectant solution ABS material. The findings also found that both disinfectant solutions can affect the ABS material's durability, but the changes are not too significant in time.

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INTERACTIVE ROLE PLAY IN ASSISTING STUDENTS TO STAY FOCUSED ON ONLINE CLASSES

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Introduction: The COVID-19 pandemic has elicited swinging changes in education due to the hurried move to online learning. Prior to the pandemic, education primarily embraced traditional means of physical teaching and learning. The COVID-19 pandemic has indisputably pushed education towards virtual platforms. It is very challenging to adjust the pace of teaching accordingly without body language cues in a wide range of learner types and levels. This article describes the usage of role play in online teaching. **Methods**: The role plays include the role as presenter, questioner, challenger, supporter and judge. The learning scopes in presenter role cover the capability to highlight key messages of the clinical case, presentation style that grab audience attention, convincing deductive ability and flow of thoughts, organization skills, language proficiency, professionalism, competency to link the case to relational knowledge and basic concepts. The inquiry learning is the main focus of the questioner. Questioning is the ability to organize the thinking around what is unknown. It encompasses the understanding of philosophy behind six types of questions (clarification, challenging assumption, evidence & reasoning, alternative viewpoints, implication & consequences, and challenging the question itself) with nine types of questioning techniques. The challenger and supporter play contradictory roles to debate professionally to uphold evidence-based practices. The judge takes the role to compare and contrast the facts given to reach a good clinical conclusion. **Results:** A Likert scale of 5 was used to evaluate the satisfaction of learning experience through role play. Approximately 95% of the feedback on both delivery mode and student learning experience are rated as above average/satisfactory. **Conclusion**: Role play can turn online learning from passive and monotone to proactive and interactive. It can be an important component in collaborative learning. Role play has the potential to bridge the gaps between theoretical knowledge and practical competency.

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DEVELOPMENT OF A CHATBOT-BASED PROTOTYPE MODEL FOR RADIOTHERAPY COMMUNICATION SKILLS TRAINING (SCIMORT)

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Introduction: Effective communication skills are critical for radiotherapy students to acquire in order to provide exceptional patient care when interacting with patients. Students often feel demotivated to effectively communicate as a result of miscommunication. This study was conducted, with the goal of building a chatbot-based prototype model to support learners in strengthening their communication skills, confidence, knowledge, and critical thinking. **Methods:** The SCIMORT module was developed in this pilot and survey study to successfully promote pre-clinical training in communication skills. Two phases constitute the research project. The initial stage consists of developing the SCIMORT module, which involves creating a 3D realistic virtual patient using Blender and Bot Libre and exporting it via Unity 3D. SCIMORT was developed in accordance with the academic syllabus and learning outcomes of the Clinical Practice of Radiotherapy course, specifically in the simulation and treatment of breast cancer. The second phase entails an evaluation of the SCIMORT by a questionnaire survey. This pilot study has recruited 118 participants, including internal academics and students from Diagnostic Imaging and Radiotherapy (PDR), to assess their perceptions of the SCIMORT module in terms of user acceptance and engagement with the prototype. The data was evaluated using IBM SPSS with a 0.05 significance level. **Results:** All PDR undergraduates were expected to deliver a positive response to the SCIMORT module's user acceptance and engagement in terms of the prototype's adaptability, acceptability, and effectiveness in improving critical thinking and communication skills. **Conclusion:** The SCIMORT module is projected to significantly improve students' communication skills and performance in patient care. The feedback from users will act as a catalyst for updating the next phase prototype by incorporating new features to make it more dynamic and engaging to the learners' needs.

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STUDENTS' READINESS AND PERCEPTION ON ONLINE DISTANCE LEARNING (ODL) FOR OBSTETRICS & GYNAECOLOGY COURSE DURING COVID-19 PANDEMIC

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Introduction: COVID-19 pandemic has led to significant modification, yet necessary, in the delivery of the Obstetrics & Gynaecology course for medical students in UiTM. The traditional 8-week face-to-face course was transformed into a 3-week ODL theory block and 5-week hybrid clinical block. This survey aimed to determine students' readiness and perception on the ODL component of the course. **Methods:** A cross-sectional survey was conducted among 2020/2021 Year 3 medical students. The students were invited to complete the questionnaire at the end of each block. The survey included 'Online Learning Readiness Scale' (OLRS) questionnaire which composed of five dimensions (Computer/internet self-efficacy, self-directed learning, learner control, motivation for learning and online communication) using a 5-point Likert scale and a question on perception using a 10-point Likert scale. **Results:** A total of 193 (85.8%) and 200 (88.9%) students responded to the survey in theory and clinical block, respectively. The mean score for OLRS dimensions ranged from 3.22 to 3.96 (±0.71-0.75) during the theory block and varied between 3.37 and 3.99 (±0.59-0.65) during the clinical block. Computer/internet self-efficacy scored the highest (3.96±0.75 and 3.99±0.60) in both blocks, followed by motivation for learning (3.85±0.73 and 3.92±0.60). Learner control had the lowest score (3.22±0.71 and 3.37±0.65) with distraction from other online activities as the main barrier to ODL. There were no significant differences between mean scores of all ORLS dimensions by gender. The overall perception on ODL was good with a mean score of 7.51±1.4 and 7.59±1.6, respectively. **Conclusion:** Students demonstrated average level of readiness in all but one dimension and had a favourable perception towards ODL for this course. Distraction from other online activities during ODL was a major challenge and this must be addressed for future improvement.

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PUBLIC PERCEPTION AND CONFIDENCE LEVEL TOWARDS RULING GOVERNMENT DURING COVID-19 PANDEMIC

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Introduction: For the first time in Malaysia's political history, a change of government took place without a general election. The sudden turn of the political parties and some Ministers of the Parliament has enabled them to form a new government and become ruler. This unprecedented event has drawn mixed reactions from the people. Right after the Perikatan Nasional (PN) became the government, a total of 27 civil society civil associations condemned the move to form a backdoor government. What was even more surprising was that the current Prime Minister (PN) and his cabinet resigned only after 17 months in power. Therefore, this study aimed to investigate the perception of the public in Kuching, Sarawak towards the PN's governance during the pandemic COVID-19. **Methods**: A correlational study was undertaken to explore the dimension of public perception of trust, COVID-19 management, and leadership in influencing the confidence towards the current ruling government. A total of 190 respondents participated in a survey distributed using convenience sampling through Google Form. **Results:** The responses were gathered from 130 registered voters against 60 unregistered voters. All variables showed very good internal consistencies for the items in each variable. It was found that the confidence level of the residents was at the moderate level and trust, COVID-19 management and leadership were confirmed to be the factors for public perception towards the current ruling government. All variables were positively correlated with the confidence level and leadership having the strongest correlation, followed by trust and COVID-19 management. **Conclusion**: This study concluded that the majority of the Kuching residents agree that trust, COVID-19 management and leadership contribute to the confidence level towards the current ruling government.

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A COMPARATIVE LEGAL STUDY ON MANDATORY VACCINATION LAW FOR CHILDREN IN MALAYSIA AND THE SELECTED EUROPEAN COUNTRIES

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Introduction: In Malaysia, the outbreaks of infectious diseases affecting children are partially a reflection of declining vaccination uptake secondary to vaccine-hesitancy, anti-vaccination propaganda and more. Numerous countries have implemented mandatory vaccinations to protect their citizens when vaccination coverage is inadequate, yet Malaysia remains lacking of any such legislation. Besides, Malaysia is also legally unprepared from the legal standpoint to deal with childhood vaccination programs for curbing the existing and re-emerging infectious diseases affecting the children and protecting public health. In determining whether to mandate vaccination for children demands detailed information on the threats, including the severity of the disease, vaccine effectiveness and safety, a comparative review of the alternatives, and the degree of compulsion inherent with each. **Methods:** This study employs doctrinal legal analysis–comparative legal research- to review and examine laws and guidelines regulating vaccination for children in Malaysia and the selected European countries to develop a proposal and recommendations for the introduction of mandatory vaccination laws for children in Malaysia. **Results:** Numerous European countries have amended their vaccination policies, adopting or expanding mandatory vaccination requisites, where individuals or their children are obligated to be vaccinated. The scope of mandatory vaccination policies implemented in the countries is broad, varying from permissive to punitive. The comparative review provides better insight into how a mandatory vaccination law should be incorporated into existing Malaysian law to safeguard public health against infectious diseases. Comparatively, Malaysia lacks specific legislation relating to vaccines and vaccinations for children. Other pertinent existing laws and statutes are applicable and can be amended further to address existing legal gaps. **Conclusions:** If Malaysia is to develop a legal framework for mandatory vaccination for children, reference could be made to existing legislation in other nations. Some aspects could be amended to accommodate the Malaysian local context and residents with the caveat.

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THE IMPACT OF HEALTHCARE EXPENDITURE ON ECONOMIC GROWTH DURING COVID-19 OUTBREAK: EVIDENCE FROM MALAYSIA

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Introduction: Malaysia's healthcare expenditure has been steadily increasing from 4.2 per cent of Gross Domestic Product (GDP) in 2016 to 4.7 percent of GDP in 2020. This figure reaches approximately 5 percent of the GDP or RM72.7 billion in 2021. According to the 2022 budget, healthcare would receive RM32.4 billion. The Covid-19 pandemic has put a strain on healthcare worldwide, including in Malaysia. RM 4 billion allotted specially for the handling of Covid-19 and also be utilized to improve general public health. Does this mean Malaysia has been under investing in the healthcare sector over the last decade? In this regard, the main motivation of this paper is to investigate the impact of healthcare expenditure on economic growth to ensure that it can address future challenges to safeguard the wellbeing of the people. **Methods:** In examining the presence as well as direction of causality between healthcare expenditure and economic growth, cointegration tests based on Johansen and Juselius are utilized. **Results:** Findings of the study indicate that there is a significantly cointegrated relationship between healthcare expenditure and economic growth in Malaysia. In addition, Covid-19 Pandemic significantly give negative impact on economic growth in Malaysia. **Conclusion:** Findings of the study can provide relevant information to assist policy-makers in implementation of the healthcare reform programmes in Malaysia. The efforts to reform healthcare should focus on controlling costs and making it accessible to everyone.

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STIGMASTEROL ATTENUATES INFLAMMATORY HYPERALGESIA IN MICE

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Introduction: Stigmasterol is a plant sterol that can be found in various parts of plants. Based on previous studies, many plant extracts have anti-osteoarthritic, anti-hypercholesterolemic and anti-inflammatory activities, which may be due to the presence of stigmasterol. Stigmasterol has been shown to possess anti-inflammatory activity and one of the cardinal features of inflammation is that normally innocuous stimuli produce pain. **Aim**: This study was carried out to investigate the analgesic effect of stigmasterol by using various pain models. **Methods:** The pain models used in this study were tail immersion test, formalin-induced inflammation test and acetic acid-induced writhing test. Male ICR mice were treated with stigmasterol (10, 20 and 40 mg/kg; p.o.). Morphine (5 mg/kg; i.p.) was given as positive control for the tail immersion test and indomethacin (10 mg/kg; p.o.) were given for the other two tests. **Results:** For the tail immersion test, mice treated with stigmasterol (10, 20 and 40 mg/kg, p.o.) and morphine (5 mg/kg, i.p.) had a significant ($p<0.05$) pain inhibition, 60 minutes after treatment compared to control (10% Tween 80. As for the formalin-induced inflammation and acetic acid writhing tests, stigmasterol (40 mg/kg) and indomethacin (10 mg/kg) showed significant differences ($P<0.05$) compared to control mice. The findings from this study revealed that stigmasterol has an analgesic effect as potent as morphine and indomethacin. The ability of stigmasterol to alleviate pain may be due to its ability to bind to opioid receptors at the central nervous system and causes the inhibition of thermal pain transmission. Also, stigmasterol can inhibit the inflammatory mediators (histamine, serotonin, prostaglandin and bradykinin) that are present in the late phase of inflammation which stimulate the nociceptive endings. **Conclusion:** Stigmasterol has central- and peripheral-acting analgesic activities that have the potential to be further developed as an adjunct to relieve pain.

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A SINGLE-SUBJECT RESEARCH DESIGN INVESTIGATING THE IMPACT OF STRUCTURED FULL ONLINE LEARNING ON LEARNERS' SATISFACTION

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Introduction: COVID-19 pandemic drastically altered the health professions education. The learners and educators need to shift from conventional teaching and learning activities into full online learning. However, this transition happens without adequate preparation and creates dissatisfaction. This issue is shared internationally, especially among developing and less developed countries. However, this is also not investigated in nursing education. A contingency and remediation action is required to ensure a conducive learning experience can be provided during this emergency. **Methods:** A single-subject research design with alternate phases is conducted with a class of nursing students. Four weeks of teaching are selected by alternating the weeks with the control and experiment phase. The control phase consists of a didactic lecture with multimedia use, but class interaction is minimal. The experiment phase involved more active learning–including the use of multimedia didactic lecture, games, polling/quiz application, well-being education, student-centred learning (e.g., reflection sharing, discussion), and in-class prompt feedback. All the classes were conducted online via teleconference application while the students stayed at their homes. The Student Satisfaction with Online Learning questionnaire was administered to the students every week. **Results:** The whole class participated in the study. Visual analysis on the plot graph appeared the experiment phases had higher satisfaction levels than the control phases. **Conclusion:** Properly planned online learning with various learning activities contributes better satisfaction to learners. COVID-19 has accelerated the process for health professions education to embrace online learning as a mainstream practice. Online learning is gradually accepted; therefore, learners and educators need to prepare to embrace the Industrial Revolution 4.0 and Internet of Things and this study may become the catalyst for such effort.

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AN INNOVATION OF OCCUPATIONAL THERAPY CLINICAL PLACEMENT DURING THE COVID-19 PANDEMIC

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Introduction: The COVID-19 pandemic has drastically altered health professions education. This resulted in an in-home quarantine, and educational activities were shifted to online and compromising clinical placement. Professional bodies were called for health professions education to utilize e-learning. The World Federation of Occupational Therapists permitted relevant adjustments for clinical learning. **Methods:** Educationists at one public institution innovate clinical learning via online and remote learning for five weeks. A total of 17 undergraduates undergoing mental health clinical placement were divided into four groups. Week-1 and week-2 involve team-based learning conducted fully online using discussions on real case studies, role play on history taking, demonstrating assessments and presenting potential interventions. Week-3 implemented problem-based learning on the recorded clinical scenarios. Week-4 and week-5 involved collaborative learning; half attended onsite clinical placement with real clients at the institution's OT-Clinic, paired with off-site students via teleconference using the Microsoft Team application. A mixed-methods approach was used. Every week, the students provided group reflective writing and individual self-administer on System Usability Scale and e-learning preference level. The student's final mark is compared with the past cohort who attended conventional clinical placement. **Results:** Multi-factorial repeated-measures ANOVA indicates no significant difference between onsite and online clinical learning students, either on SUS or e-learning preference. Qualitative outcomes show positive towards this innovative approach where online activities have minimal restriction on the learning process. Other learning approaches were found beneficial in improving themselves better due to immediate feedback and guidance from the lecturer and clinicians. However, the majority of the students prefer hands-on clinical due to real experience in managing clients. Interestingly, the current cohort gained a better final mark than the previous cohort, which is statistically significant. **Conclusion:** This innovative approach is acceptable for substituting conventional clinical learning during this restricted situation.

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GSK3B INHIBITOR K-167 INHIBITS IL-6 SECRETION AND PLATELET AGGREGATION DURING INFLAMMATION

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Introduction: Immuno-coagulation is a phenomenon of increasing clinical importance, characterized by coagulopathies triggered by the activation of immune cells. GSK3B is involved in both inflammatory signaling and platelet activation. **Aims:** To evaluate GSK3B inhibitor K-167 as a therapeutic agent against excessive cytokine production and platelet aggregation during LPS challenge. **Methods:** Peritoneal macrophages were isolated from male mice. After stimulation with 100 ng/ml LPS for 24 hours NO in supernatants was determined using a standard Griess reagent. The concentration of IL-6 was determined with ELISA kit. Cell viability was monitored as LDH activity in a cell culture medium. Functional activity of platelets was determined on an analyzer of platelet aggregation BIOLA-220 LA. To prepare PRP venous blood was taken from the ear marginal vein of a rabbit, stabilized with a 3.8% sodium citrate solution. PRP and a solution of the test compound at a concentration of 100 μM were sequentially introduced into the cell of the aggregometer. To induce aggregation ADP and collagen at a concentration of 5 μM and 4 mcg/ml respectively, was added to the cuvette. ASA was used as a reference drug. Statistical analysis was performed using GraphPad Prism 8.0. **Results:** We found that K-167 inhibits LPS-induced NO synthesis and IL-6 secretion with IC_{50} of 13.9 μM and 22.4 μM, respectively, with no significant cytotoxicity. ASA blocked platelet aggregation and the IC_{50} value was 81 μM. Compound K-167 showed superior antiplatelet activity inhibiting platelet aggregation and had IC_{50} of 7.9 μM. **Conclusion:** The results showed that inhibition of GSK3B with compound K-167 is a viable approach to tackle proinflammatory cytokine overproduction in a cellular model. Antiplatelet activity of compound K-167 exceeded that of ASA by more than 10 times. These findings may guide further development of protective agents for complications of severe infections, including COVID-19

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NOVEL QUINAZOLINE NHE-1 INHIBITOR SUPPRESSES IL-6 SECRETION AND PROTECTS FROM LPS-INDUCED ACUTE LUNG INJURY

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Introduction: The Na^+/H^+ exchanger isoform 1 (NHE-1) inhibitors attract attention as agents with cytoprotective, anti-ischemic, and anti-inflammatory effects. In our previous studies, we identified a potent NHE-1 inhibitor compound VMA-21-10. **Aims:** To evaluate anti-inflammatory properties of small molecule NHE-1 inhibitor VMA-21-10 during LPS challenge *in vitro* and *in vivo*. **Methods:** Peritoneal macrophages were isolated from male C57bl/6j mice. Cells were cultured in DMEM (Gibco) supplemented with 2 mM L-glutamine (Gibco), 10% FBS (BioClot, Germany), 100 U/ml penicillin and 100 mg/ml streptomycin. After stimulation with 100 ng/ml *E. coli* O127:B8 LPS for 24 hours nitric oxide (NO) in supernatants was determined using a standard Griess reagent. The concentration of IL-6 was determined with the ELISA kit (Cloud-clone). Cell viability was monitored as lactate dehydrogenase (LDH) activity in a cell culture medium. In vivo studies were performed on C57bl/6j mice in the LPS-induced acute lung injury model (LPS-ALI). The concentration of IL-6 in blood and broncho-alveolar lavage samples was determined as described earlier. **Results:** We found that VMA-21-10 inhibits LPS-induced NO synthesis and IL-6 secretion with IC_{50} of 72.9 μM and 51.7 μM, respectively, with no significant cytotoxicity up to 100 μM. Administration of 50 mg/kg VMA-21-10 significantly ameliorated IL-6 levels, vascular integrity and tissue damage in the LPS-ALI model. **Conclusion:** We have shown that NHE-1 inhibitor VMA-21-10 prevents proinflammatory cytokine overproduction in cellular and animal models. These findings may guide further development of protective agents for severe infections, including COVID-19.

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SPONTANEOUS RETROPERITONEAL HAEMORRHAGE SECONDARY TO ANTICOAGULANT THERAPY IN COVID PATIENT WITH PULMONARY EMBOLISM: CASE REPORT

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Introduction: Spontaneous retroperitoneal haemorrhage (SRH), also known as the Wunderlich syndrome is a rare life-threatening event characterized by sudden onset bleeding into the retroperitoneal space without associated trauma or iatrogenic manipulation. The exact etiology for SRH remains unclear but documented cases include patients with underlying bleeding disorder, malignancy and patients on anticoagulant therapy. Anticoagulant therapy is considered lifesaving in patients with thrombo-embolic phenomenon. Its application in clinical practice must always be weighed against possible life-threatening complications such as spontaneous bleeding tendencies. **Case Presentation:** A 69-year-old lady with underlying hypertension and diabetes diagnosed with category 5 COVID infection complicated with acute pulmonary embolism (PE). Anticoagulant therapy was initiated for the PE. She developed SRH after 3 days of the anticoagulant therapy. **Conclusion:** SRH is a rare life-threatening condition which requires immediate diagnosis and management. Most cases can be managed conservatively. In certain situations, image-guided drainage may be indicated. Rarely does it require surgery to achieve hemostasis. Therefore, in patients with unexplained drop in hemoglobin, SRH should be taken into consideration after ruling out other common causes of blood loss.

Keywords: Spontaneous Retroperitoneal Haemorrhage, COVID-19, anti-coagulant

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UNMASKING THE COVID-19 PANDEMIC'S IMPACT ON FACEMASKS WASTE DISPOSAL IN MALAYSIA

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Introduction: Globally, the ongoing COVID-19 pandemic has resulted in a massive increase in the consumption of single-use face masks used for personal protective equipment (PPE) to prevent virus transmission. However, improper management of such materials poses a new form of plastic pollution to the sustainability of the environment. Furthermore, standardization, procedures, guidelines, and strict implementation of facemasks management concerning COVID-19, community habitats, and public areas should be carefully considered to mitigate pandemic risks in transmitting the virus. **Aims**: This study investigates the public's awareness, particularly amongst the immigrant workers, on the methods of facemasks disposal during the pandemic to educate foreigners or immigrants in addressing the negative environmental impact of waste disposal. **Methods**: Structured interviews were conducted with 6 participants, and structured literature reviews. **Results**: Our analysis showed that users' behaviour concerning the use and management of facemasks has a significant impact on environmental impacts. The improper disposal of face masks is due to a lack of knowledge and awareness. Thus, changing public attitudes toward using and disposing of plastic waste, such as facemasks and installing efficient and functional waste management facilities in urban areas, will help reduce plastic waste during the pandemic and afterwards. **Conclusion**: We conclude that proper facemasks disposal effectively controls infection sources as well as ensure environmental sustainability

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7.3 MB *DE NOVO* TERMINAL MICRODELETION OF CHROMOSOME 18 IN A BOY WITH FEW FEATURES OF TYPICAL 18Q- DELETION SYNDROME

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Introduction: The phenotype of patients with 18q- syndrome can be highly variable ranging from almost normal to severe malformations and intellectual disability. Here we report a 16-year-old boy, a product of a non-consanguineous marriage, who presented with intellectual disability, facial dysmorphism, high arched palate, congenital talipes equinovarus (clubfoot), congenital scoliosis, congenital heart defect and behavioural problems. **Methods**: Array-based comparative genomic hybridization (array-CGH) was performed using commercially available high resolution 244K 60-mer oligonucleotide microarray slide according to the manufacturer's protocol. This platform allows genome-wide survey and molecular profiling of genomic aberrations with an average resolution of about 10 kb. In addition, multiplex ligation-dependent probe amplification (MLPA) analysis was carried out using SALSA MLPA kit P320 Telomere-13 to confirm the array-CGH finding. **Results:** Array-CGH analysis revealed a 7.3 Mb terminal deletion involving chromosome band 18q22.3-qter. This finding was confirmed by MLPA where a deletion of 10 probes mapping to the 18q22.3-q23 region was detected, and further MLPA analysis on his parents showed the deletion to be *de novo*. **Conclusion**: To the best of our knowledge, this is the first report of a Malaysian individual with 18q- terminal microdeletion diagnosed with microarray technology, and this report expands the phenotypic spectrum of the 18q- deletion syndrome by adding malformations to the literature.

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PERCEPTION OF ACADEMIC STRESS DUE TO ONLINE LEARNING AND THE COPING STRATEGIES AMONG UNIVERSITY STUDENTS DURING THE COVID-19 PANDEMIC

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Introduction: Academic stress has long been recognised as a critical issue in educational settings. Unfortunately, COVID-19's current predicament is causing students to become more stressed due to the abrupt transition from a physical classroom to a virtual environment. The aim of this study was to assess the perception of academic stress due to online learning and the coping strategies among university students during the COVID-19 pandemic. Moreover, the relationship between academic stress, emotional intelligence, and selected demographic characteristics were also explored. **Methods**: A quantitative, cross-sectional study was conducted using the convenience sampling method. An anonymous self-administered questionnaire was conducted online to assess Socio-demographic characteristics, Perceptions of Academic Stress Scale (PAS), and Emotional Intelligence Scale (EIS). Data were analyzed using descriptive and inferential statistics. **Results:** Overall, students had a moderate level of academic stress and a high level of emotional intelligence. Academic stress experienced by students was significantly due to the academic workload and course assessments. Further, self-motivation and empathy were the coping strategies most often used by students to overcome academic stress. Academic stress was moderately associated with emotional intelligence. Academic stress and emotional intelligence significantly showed a strong to moderate relationship with both online learning and college learning environments satisfaction. Additionally, both gender and pre-existing psychological disorders showed no relationship with neither academic stress nor emotional intelligence. **Conclusion**: This study indicated that the COVID-19 pandemic has a significant impact on students' academic stress. Further, the findings showed that most students have the ability to overcome the challenges in online learning by developing their own stress management strategies to cope with the consequences caused by the pandemic. This study may benefit the educational institution by providing some insight into how to tackle the main obstacles of online learning that currently is the only option during the COVID-19 pandemic.

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COVID-19 INFECTION PRESENTING AS INTUSSUSCEPTION IN INFANTS: A CASE REPORT

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Introduction: Intussusception as the presenting symptom for Covid-19 paediatric is very rare. There was only a total of 5 cases of intussusception reported as a presentation of Covid-19 for paediatric patients worldwide from January till July 2020. We present a case of intussusception in a 7 months old boy with Covid-19 infection. **Case Presentation:** A 7 months old boy, born at term with uneventful postnatal history, presented with fever for 2 days, associated with abdominal distension and multiple episodes of vomiting for 2 days. He also had no bowel output for the past 2 days and did not pass flatus for the past 1 day. Otherwise, he did not have any upper respiratory tract infection symptoms and there was no history of close contact to Covid-19 patients. The abdomen was distended with fullness and tenderness over the right iliac fossa on examination. Bowel sound was sluggish. On the digital rectal examination (DRE), there was red currant jelly stool. In view of fever, covid PCR test was performed and it is positive. Abdomen x ray revealed a dilated small bowel. Ultrasound abdomen was inconclusive. Contrast-enhanced CT(CECT) scan of the abdomen was performed, and it showed long segment ileocolic intussusception. Hydrostatic reduction under ultrasound guidance was attempted but failed. Thus, the child underwent exploratory laparotomy, distal ileum resection and primary end to end anastomosis and appendicectomy. Intra-operatively, there was long segment ileocolic intussusception and 4 sessile polyps over distal ileum with multiple mesenteric lymph nodes. Histopathological report revealed lymphoid hyperplasia with no true polyp structure seen. Post operatively, the patient recovered well and discharged home uneventfully. **Conclusion:** Children with Covid-19 infection can be presented with intussusception, but it is not common. Thus, intussusception should be one of the alarming differential diagnoses for paediatric patients with Covid-19 infection that presented with gastrointestinal symptoms.

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POST COVID-19 ORGANIZING PNEUMONIA WITH ACUTE PULMONARY EMBOLISM AND POSSIBLE PULMONARY ASPERGILLOSIS: A CASE REPORT

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Introduction: Pulmonary thromboembolism and fungal superinfection following COVID-19 infection are conditions that can lead to an increase in morbidity and mortality. **Case Presentation:** A 41-year-old male, with underlying insulin-dependent type 2 diabetes mellitus was admitted in June 2021 with cough, fever, and anosmia for more than one week. He was admitted to the intensive care unit (ICU) and treated as COVID-19 category 4. He was discharged well on day- 22 of COVID-19 infection. The patient was readmitted 2-weeks after that due to worsening clinical condition and hypoxemia. Respiratory examination revealed bilateral lung crepitations up to the mid-zone. Laboratory tests showed an elevated white blood cell count (WBC) of 8.68 $x10^9$ g/L with 57.5% neutrophils. C-reactive protein (CRP) was elevated at 66.6 mg/L. Chest radiograph revealed ground-glass opacities and blunted costophrenic angle in the lower zones bilaterally (Figure 1). He was diagnosed with hospital-acquired pneumonia. His condition deteriorated on day 4 of ICU admission, requiring mechanical ventilation. Antibiotic therapy was escalated from piperacillin-tazobactam to meropenem. He was empirically treated as COVID-19 associated pulmonary aspergillosis (CAPA) and was started on anidulafungin. Urgent CT pulmonary angiography and high-resolution computed tomography revealed evidence of pulmonary artery thrombus and organizing pneumonia. He was given intravenous heparin infusion for pulmonary embolism. The patient responded well and was extubated. The patient was discharged well after 21 days of hospitalization, with oral prednisolone and warfarin. **Conclusion**: It is important to follow-up COVID-19 patients after discharge as some of the complications of COVID-19 appear later.

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FABRICATION OF HYDROXYCHLOROQUINE THROUGH INHALATION FOR SEVERE ACUTE RESPIRATORY SYNDROME CORONAVIRUS 2 (SARS-COV-2): A SYSTEMATIC REVIEW

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Introduction: Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) caught the global attention, where it leads to the coronavirus disease 2019 (COVID-19) pandemic. Hydroxychloroquine (HCQ) is an antimalarial drug and considered as a potential medicament for treating SARS-CoV-2 infection. HCQ especially as an aerosol application will prevent or at least markedly reduce the replication rate of the SARS-CoV-2 virus in the early phase of the infection. However, the method of fabrications for the delivery of HCQ via inhalation could also impacted the encapsulation efficiency of HCQ. This systematic review aimed to rule out the fabrication method of HCQ through inhalation. **Methods**: The manuscript selection was based on the inclusion criteria and only articles published in English and containing keywords in the title or in the abstract were selected. The data were gathered by searching in Scopus, Web of Science, and EBSCO from 2018 until recently. Three investigators assessed the quality of the studies. **Results**: Data from all three search engines were obtained with 36 from Scopus, 45 from Web of Science and 63 from EBSCO. Fabrication of HCQ via inhalation was compared with the standard usage of HCQ through oral administration, method of fabrications of the HCQ inhalation were further identified, safety of HCQ in the treatment of COVID 19 and the adverse effects. The study found HCQ are mostly given through oral administration however did not impact disease progression but resulted in a higher risk of adverse effects Fabrication for inhalation delivery include the nanocellulose, nanoparticles via spray drying technique and microparticles through the solvent evaporation technique. **Conclusion**: This study revealed that HCQ through oral administration might possibly lead to intolerable, unsafe, and not efficacious in the management of COVID-19. HCQ via inhalation route might be delivered through liposomes, jet milled and nebulized solution.

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PLENARY LECTURE

PL-1

Recognizing the Role of Leptin in Disease

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Research in leptin has grown exponentially following its discovery in 1994. Although initially perceived to mainly regulate appetite and body weight, it is now known to contribute to the homeostasis of numerous other physiological functions in the body. Leptin deficiency results in hyperphagia and severe obesity, hypothalamic hypothyroidism, hypogonadotropic hypogonadism, impaired respiratory function, increased susceptibility to opportunistic infections, and impaired T cell number and function. However, leptin deficiency or leptin receptor mutations are rare in humans, and of more concern is the consequence of increased leptin levels. Research in recent years has demonstrated mechanistic links between leptin and some pathologies. For example, hypertension, particularly in the obese, has been linked to leptin's proinflammatory endothelial activation activities, increased ET-1 release, decreased nitric oxide synthesis and ACE2 expression in endothelial cells, increased oxidative stress, and altered renal salt handling. In addition, leptin also increases sympathetic tone in blood vessels. Although the kidney is the major site for leptin metabolism, there is evidence linking elevated leptin levels to chronic kidney disease. There is a strong link between hyperleptinemia and steatosis, fibrinogenesis, and liver carcinogenesis. A significant association between high plasma leptin levels and the risk of severe respiratory infections has also been reported. The link between leptin in sperm abnormalities and reproductive dysfunction is repeatedly reported. Both clinical and experimental data indicate the involvement of leptin/leptin receptors in tumour development and its progression, as well as a reduction in the efficacy of cancer treatments. In addition, evidence also suggests that leptin increases the carcinogenicity of carcinogens. Given the existing evidence, the role of leptin in disease has to be taken seriously. Clear criteria for the diagnosis of hyperleptinaemia have to be established, and methods for assessing leptin sensitivity or resistance in a clinical setting have to be developed. Measures are required to reduce the impact of raised leptin levels on the pathogenesis and pathophysiology of disease. Currently available pharmacological agents to block the actions of leptin are not appropriate and more organ-specific leptin antagonists are therefore required. In addition, other means have to be sought to reduce the level and impact of hyperleptinaemia. In this regard, adequate weight bearing or resistance exercises with reduction in body weight could help blunt some of the adverse effects of raised leptin levels on the body. Physical exercise on its own has been shown to prevent leptin-induced increase in blood pressure in rats. Use of more potent antioxidants could also help reduce the oxidative stress associated with raised leptin levels.

Keywords: Leptin, hyperleptinaemia, cardiovascular diseases, reproductive disfunctions, cancercinogenicity.

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PL-2

Current State of Omics in Gastrointestinal Disorders

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Current approach in understanding the diseases has revolutionized not limited to a single omics but more on the meaningful linkages between two or more omics. Complex interaction between genetic predisposition, exposome, and gut microbiota may explain the aetio-pathogenesis of gastrointestinal (GI) disorders. Since the establishment of our GUT research group in 2017, we focused on the association between multi-omics data with clinical outcomes with the intention to unravel the complexity and heterogeneity of the various GI disorders. Our recent study has shown that duration, age of onset and severity of diseases were associated with changes at the genes and microbial population. Altered gut-liver in non-alcoholic fatty liver disease (NAFLD) and gut-brain axes in irritable bowel syndrome with depression was explored in association with gut microbiota composition and intestinal barrier function. Potential roles of modulating gut microbiota using probiotics (single or multi-strain) as an adjuvant therapy in various GI diseases with the final output to improve quality of life, reducing potential risks of developing complications following treatment, and stabilize the intestinal microenvironment was evidenced in several of our clinical trial studies. Integrative data generated from a single disease will potentially fill the gap of various aspects, leading to the application of precision medicine in various GI disorders.

Keywords: Gastrointestinal disorders, omics, gut microbiota, probiotics

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PL-3

Safety and Efficacy of Very Low Carbohydrate Diet in Patients with Diabetic Kidney Disease - A Randomized Controlled Trial

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The low-carbohydrate diet is a hotly disputed management technique for people with type 2 diabetes mellitus (T2DM), even more so in patients T2DM with impaired renal function. The dispute happens despite scientific evidence. Recent dietary trends for those with T2 Diabetes (T2D) include 'keto' and low carbohydrate diets (LCD) which may lead to a potentially increased protein intake. As a result, the safety and efficacy of habitually consuming dietary protein in excess of recommended intakes has been questioned. In particular, there is concern that high protein intake may promote renal damage by chronically increasing glomerular pressure and hyperfiltration· resulting in worsening of diabetic kidney disease (DKD). Given the central role of hyperglycaemia in the pathogenesis of DKD it seems logical to suggest a LCD approach, which by its very nature reduces blood glucose, may be beneficial in the management of risk factors impacting on DKD. There is limited data on the effects of LCD on renal outcomes particularly in patients with DKD. However more recent studies have shed some light and have shown that a LCD can be an effective option in the management of many metabolic conditions including T2D and has been recently endorsed by the American Diabetes Association. Recent studies have shown this may well be the case as there have been improvements in in serum creatinine, eGFR, urine ACR. This contradicts the notion that LCDs may be harmful to renal health, despite being likely to include higher dietary protein and fat. An earlier study found that dietary interventions to reduce weight cause progressive improvement in eGFR and marked regression of microalbuminuria regardless of the dietary approach. In patients with a pre-existing renal dysfunction and microalbuminuria, or in patients with type 2 diabetes, a low carbohydrate high-protein diet is not inferior to other dietary approaches in improving renal function. Our own study has shown that dietary intervention of very low carbohydrate diet in patients with underlying diabetic kidney disease was safe and associated with significant improvements in glycaemic control, anthropometric measurements including weight, abdominal adiposity and IL-6. Most of the markers for renal outcomes remained unchanged. These findings would strengthen the importance of this dietary intervention as part of the management of patients with diabetic kidney disease.

Keywords: Low-carbohydrate diet, type 2 diabetes mellitus, impaired renal function, glycaemic control, safety

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PL-4

Pharmacology of the Endothelium: Linking Laboratory to Clinical Practice

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The endothelium is a monolayer of cells lining the inner blood vessel; it separates the circulating blood from the vascular wall and tissues. These cells play crucial roles in vascular homeostasis which includes regulation of vascular tone, permeability, thrombosis and angiogenesis. These are performed by releasing substances and regulating expression of receptors on the endothelium. Dysfunction of the endothelial is seen with common chronic medical conditions such as obesity & diabetes, and certainly has significant clinical implications. In this presentation, findings from some of our clinical and experimental work on the involvement of the endothelium in common medical conditions, and their interventions will be discussed. These may include medical conditions such as non-obstructive coronary artery disease, obesity, diabetes, vitamin D deficiency and glaucoma. Most of the work to be presented here, will be on the microvasculature.

Keywords: Endothelium, endothelial dysfunction, obesity, diabetes, non-obstructive coronary artery disease, vitamin D deficiency

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SYMPOSIUM

SS-1.1

Product Development of Natural Products: Facing-up to the Challenges

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There have been many research conducted in local institutions on natural products, either sourced from plants or marine organisms found in Malaysia. The rich biodiversity of the local flora and fauna, and the national research policies with the attendant funding, have propelled many laboratories to undertake projects related to phytochemistry and pharmacology of the bioactives harnessed from these sources. However, the translation of research outputs from bench to market has been poor. Reasons behind the low uptake include misalignment of research focus with industry needs, unfavourable perception of the market towards locally researched and produced goods, lack of expertise in transforming bioactives into market-acceptable final products, upscaling difficulties and the high cost of various tests to meet regulatory requirements. In this presentation, several formulation strategies are presented for bioactives in the form of aqueous extract, ethanol extract, supercritical fluid extract and oil. Formulation is a critical yet an often overlooked step towards obtaining a final product which is stable throughout its shelf-life and able to deliver the bioactives to the target organ at the required concentration, whilst maintaining acceptable organoleptic properties which are crucial for consumer acceptance. Challenges faced during the process and some proposed solutions will be discussed.

Keywords: Bioactives, formulation, product development

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SS-1.2

Parkia speciosa Hassk.: A Potential Phytomedicine for Cardiovascular Disease

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Parkia speciosa Hassk. (bitter bean) from family Fabaceae, is a flowering plant that grows endogenously in Southeast Asia. It is locally known as *petai* or *peté* in Malaysia, Indonesia and Singapore, *sator* in Thailand or *u'pang* in Philippines. It bears long and flat fruits (pods) which contain seeds. The pods and seeds have a high content of antioxidants like phenolic acids and terpenoids. The plant seeds, leaves and roots are used traditionally to treat hypertension, diabetes and heart problem. In laboratory rats, the empty pod extract was able to prevent the development of hypertension which was induced by a nitric oxide synthase inhibitor, possibly by preventing the loss of plasma nitric oxide, as well as cardioprotective effects by reducing myocardial angiotensin-converting enzyme activity and oxidative stress level. The protective effect of the extract was further evaluated in hypertrophied cardiomyocytes. It was noted that the extract prevented the cardiomyocyte hypertrophy, possibly by regulating mitogen-activated protein kinase signalling pathway and reducing oxidative stress as well as inflammatory reactions. In conclusion, *Parkia speciosa* empty pods have a potential to be developed as a supplement to reduce the risk of cardiovascular-related problems. Further studies should be conducted to identify the phytochemicals in the plant that are responsible for the therapeutic effects.

Keywords: *Parkia speciosa* Hassk., extract, cardiovascular disorders, oxidative stress, inflammation

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SS-1.3

Characterization of Asian Honey and its Potential Medicinal Benefits: A Sustainable Research

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Although honey is extensively used in food and food products, little is known on its purity and medicinal properties. In this study, the physicochemical and antioxidant properties of eight Malaysian honey samples were compared to that for Manuka honey, followed by investigation on their medicinal values. The mean 5-hydroxymethylfufural (HMF) content (a carcinogen) in the samples (35.98 mg/kg) is within the International Honey Commission guideline for tropical honey. However, honey kept for more than one year has high HMF levels and honey should therefore be consumed within one year of its processing. Tualang honey had the highest concentration of phenolic compounds (352.73 ± 0.81 mg galic acid/kg), flavonoids (65.65 ± 0.74 mg catechin/kg), indicating its strong antioxidant properties. Six phenolic acids (benzoic, gallic, syringic, trans-cinnamic, p-coumaric and caffeic acids) and five flavonoids (catechin, kaempferol, naringenin, luteolin and apigenin) were identified for the first time. Manuka and gelam honeys are rich in calcium and may be useful for osteoporosis. Rubber tree honey is rich in iron and may be suitable for anaemics. Honey is best stored in glass bottles since honey stored in plastic containers contained some plasticisers transferred from the bottles. Tualang Honey has similar antibacterial properties with manuka honey but is more active against *Stenotrophomonas maltophilia* and *Acinetobacter baumannii*. Besides having good antimicrobial properties, other honey products can improve memory deficits, is useful in diabetic wounds, ameliorate hepato-nephrotoxocities, is cardioprotective and is useful in immunosuppressed individuals.

Keywords: Honey, phenolic acids, flavonoids, storage, antimicrobial properties

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SS-1.4

Carbonic Anhydrases Inhibitors: Theragnostic Agents for Hypoxic Tumor

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Carbonic anhydrase (CA, EC 4.2.1.1) isoforms IX and XII are overexpressed in many hypoxic tumors as a consequence of the hypoxia inducible factor (HIF) activation cascade, being present in limited amounts in normal tissues. These enzymes together with many others are involved in the pH regulation and metabolism of hypoxic cancer cells, and were validated as antitumor targets recently, both for treatment and imaging. A multitude of targeting strategies against these enzymes have been proposed. The small molecule inhibitors, small molecule drug conjugates (SMDCs), antibody-drug conjugates (ADCs) or cytokine-drug conjugates and several monoclonal antibodies against CA IX/XII will be discussed. Relevant synthetic chemistry efforts, coupled with a multitude of preclinical studies, demonstrated that CA IX/XII inhibition leads to the inhibition of growth of primary tumors and metastases and depletes cancer stem cell populations, all factors highly relevant in clinical settings. One small molecule inhibitor, sulfonamide SLC-0111 discovered in the author's laboratory, is the most advanced candidate, having completed Phase I and being now in Phase Ib/II clinical trials for the treatment of advanced hypoxic, metastatic solid tumors.

Keywords: Carbonic anhydrases inhibitors, sulfonamide SLC-0111, tumor, clinical trials

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SS-2.1

Bisphenol A and Memory Function: Is BPA Predominantly Related to Behavior?

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The frequency of human exposure to Bisphenol A (BPA) has steadily increased because of the increased use of polycarbonate plastics and epoxy resins in the coatings of beverage cans and bottles. During pregnancy, maternal BPA is transferred to the fetus and conjugated to an active form. Retrospective studies indicated that children with learning disabilities were exposed to high levels of maternal BPA during fetal life. In Malaysia, the enrolment of children with learning disabilities in primary special inclusive programs has shown a steady increment. This talk is to discuss the most relevant human and animal studies, mechanisms, and highlight the importance of epigenetic findings for adequate interpretation of the mechanism to support decision-making.

Keywords: Bisphenol A, pregnancy, children**,** behavior**,** epigenetics

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SS-2.2

Interaction of mTORC2 and PKC Epsilon in Alcohol Addiction

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Protein Kinase C epsilon (PKCε) regulates various alcohol-related behavioural changes, especially in the amygdala. Mammalian target of rapamycin complex 2 (mTORC2) facilitates the phosphorylation of PKCε at S729 prior to activation. In line with this, the present study was undertaken to evaluate the interaction between mTORC2 and PKCε during various stages of ethanol exposure. Rats were allocated into control, acute, chronic ethanol, ethanol withdrawal (EW), and EW+EtOH groups. A modified liquid diet with or without ethanol was given for 27 days and followed by intraperitoneal administration of ethanol (2.5 g/kg, 20% v/v) or saline on day 28, and followed by bilateral extraction of the amygdala. The mRNAs of PKCε were significantly upregulated in the amygdala of EW and EW+EtOH rats. The gene expression of Sin1 was profoundly reduced following chronic ethanol intake. The protein expression of mTOR, Sin1, PKCε, and phosphorylated PKCε (Ser729) was significantly elevated in the chronic ethanol, EW, and EW+EtOH groups. The interactions between mTOR/PKCε and mTOR/phosphorylated PKCε (S729) were increased following acute ethanol intake, whereas mTOR/Sin1, mTOR/PKCε, and mTOR/phosphorylated PKCε were reduced in chronic ethanol, EW, and EW+EtOH groups. Our results indicate that increase in expression of phospho-PKCε (Ser729) during the late stages of AUD is not directly mediated by mTORC2, but most likely due to an increased reserve pool of PKCε.

Keywords: PKC epsilon; mTOR; alcohol; mTORC2; amygdala

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SS-2.3

Disease-Modifying Drugs in Alzheimer Disease: What Is on the Horizon?

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Alzheimer disease (AD) is a progressive neurodegenerative disease affecting older people and characterised by memory impairment and cognitive decline. Currently, no proven effective drugs or vaccines are available for to either delay or reverse the progression of AD due to polygenic nature of pathological condition. The detailed pathogenesis of AD remains elusive. Although it has been widely accepted that amyloid cascade hypothesis along with the tau hyperphosphorylation are primarily involved, other mechanisms, such as oxidative stress and neuroinflammation, deficiency of cholinergic neurotransmission, mitochondrial stress and unfolded protein response have also been documented. The largest number of drugs in the AD pipeline are drugs that will delay or slow progression of AD in the early stage of disease progression. Approximately two-thirds of the current AD drug development pipeline involves disease-modifying drugs – either immunotherapies or small molecule agents administered orally. The focus of this presentation is to overview current disease-modifying drugs in Phase III clinical trials and candidate compounds based on their mechanisms of action.

Keywords: Alzheimer disease, disease-modifying drugs

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SS-2.4

The Role of Dopamine in Therapeutic Effects of Deep Brain Stimulation

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Deep brain stimulation (DBS) is a potential therapeutic manner in some brain disorders including epilepsy and Alzheimer's disease. The precise mechanisms involved in DBS action are not completely determined. Changes in the activity of neuromodulators, including dopamine, is considered as a probable mechanism of DBS action. The activity of D1-like and D2-like dopaminergic receptors depend on the dopamine concentration. On the other hand, dopamine concentration depends on the neural firing rate of brain dopaminergic nuclei such as ventral tegmental area (VTA). Therefore, the activity of VTA dopaminergic neurons may be managed through applying DBS at different frequencies. Here, I will try to show that low-frequency DBS in VTA has therapeutic effect in brain disorders that accompany with hyper-excitably (such as seizure) and high-frequency DBS is effective in treatment of brain disorders that are accompany with a decrease in neural activity, such as Alzheimer's disease.

Keyword: Deep brain stimulation, dopamine, ventral tegmental area, Alzheimer's disease

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SS-3.1

Male Reproductive Abnormalities Associated with Diabetes Mellitus: Role of Propolis in Animal Study

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Diabetes mellitus is reported to be associated with male reproductive abnormalities such as steroidogenesis and spermatogenesis impairments, erectile dysfunction and poor fertility outcome. These abnormalities have been reported to be associated with the increases in oxidative stress, inflammation and apoptosis in the male reproductive organ which are linked with diabetes mellitus. This talk summarises the potential beneficial role of propolis which has antioxidant property in mitigating diabetes mellitus-induced male reproductive abnormalities at the pre-testicular, testicular and post-testicular levels in male diabetic animal model.

Keywords: Diabetes mellitus, reproduction, propolis, oxidative stress

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SS-3.2

Antioxidant Potential of Tocotrienol-Rich Fraction in Female Reproductive Health

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Tocotrienol-rich fraction (TRF) has potent antioxidant properties that can counteract oxidative stress (OS) induced by an imbalance of free radicals and endogenous antioxidant levels, and hence it may play a role in maintaining the normal function of the female reproductive system. This talk summarizes the antioxidant potential of TRF in preventing the detrimental effects of OS on female reproductive health based on our previous and ongoing studies. We have previously demonstrated that TRF supplementation in corticosteroid-induced stress and aging mice is able to overcome the deleterious effects of OS on the quality of oocytes and embryos, improve the development of preimplantation embryos, reduce DNA damage in oocytes and embryos, normalize the expression of DNA damage detection genes in the ovary and suppress the expression of pro-apoptotic factors in oocytes. Currently, we are investigating the potential of TRF in overcoming the adverse effects of maternal diabetes mellitus and obesity-associated OS on reproductive outcomes. The findings of our studies may elicit new insights into prevention strategies and strengthen the evidence supporting the antioxidant potential of TRF in female reproduction health.

Keywords: Tocotrienol-rich fraction, maternal diabetes mellitus, oxidative stress, reproduction

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SS-3.3

Understanding Paternal Factors in Recurrent Pregnancy Loss through the Proteome Profile of Seminal Extracellular Vesicles

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There is uneven contribution of women and men to reproduction, where both partners are responsible for sharing equal genetic complement by gamete fusion; women take the strain of gestation and delivery. This makes it biologically inevitable to physical burden on women during infertility treatment and more so in case of recurrent pregnancy loss (RPL). RPL is defined as two or more successive and spontaneous pregnancy losses before 20 weeks of gestation. Approximately 1–2% of couples are affected by RPL and in a considerable number of cases; the causes of RPL remain unknown resulting in complications in treatment and high levels of stress in couples. RPL is usually evaluated from a women's perspective, nevertheless, current literature entails that paternal factors play an important role in embryo development and pregnancy continuation as paternally expressed genes predominate placenta. Seminal extracellular vesicles (SEVs)secreted from cells of male reproductive tract carry regulatory proteins and RNAs and are suggested as regulator of sperm maturation and function while their fusion to endometrial stromal cells helps in decidualization. During fertilization, prior to implantation the immune system purposefully produces early pregnancy factors with potent immunomodulatory properties for adaptation to antigenically dissimilar embryo. Therefore, we hypothesize that analysis of the cargo of the SEVs in semen of fertile men and partners of RPL patients may reveal cues to understand paternal contributions in RPL. A comparative proteomics (label-free LC-MS/MS) of isolated seminal extracellular vesicles from fertile men and partners of patients with RPL (n = 21 per group) was carried out to prove the objectives. Bioinformatics analysis revealed the identified differentially expressed proteins to be involved in DNA replication, recombination and repair, gene expression, cellular assembly and organization, cell death, and survival. Major disease pathways affected were identified as developmental, hereditary, and immunological disorders. Of the three identified hub genes regulating the above disease pathways, two (HNRNPC and HNRNPU) are overexpressed while RUVBL1 is under expressed along with over expression of HIST1H1C, DDX1, surmising defective chromatin packaging, and histone removal in spermatozoa resulting in improper expression in paternal genes thereby leading to abnormal embryo development. Besides, alteration in GSTP1 expression points oxidative predominance in RPL group. Differential expression of C3, C4a/C4b, CFB, and GDF 15 may be involved in altered maternal immune response to paternal antigens. In SEVs, under expressed GDF15 and overexpressed C3 imply distorted maternal immune response to paternal antigens leading to impaired decidualization. Dysregulated TGFβ signalling in extracellular vesicle free seminal plasma surmises defective modulation of inflammatory response

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and induction of immune tolerance to seminal antigens in the female reproductive tract through generation of regulatory T cells. Retained histone variants in spermatozoa construe defective expression of early paternal genes while under expressed PTN may inflict defective angiogenesis resulting in expulsion of decidua. Impaired modulation of immune response and improper placental development due to altered cytokine levels in seminal components may be the contributing paternal factors in RPL along with the DNA damage.

Keywords: Recurrent pregnancy loss, immune response, gene expression

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SS-4.1

Teaching Physiology Online - A Sharing Experience

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This talk will discuss on the current status of ODL in general as well as in physiology. Other aspects such as advantages, challenges and effectiveness of ODL faced by students and educators will also be presented. A brief outlook on popular online tools as well as personal experience in online teaching will also be shared during the talk. Finally, some suggestions to overcome issues faced – from the literature, as well as from students.

Keywords: Physiology, medical education, online distance learning

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SS-4.2

Flexibility in Online Team-based Learning: A Sharing Experience

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Team-based Learning (TBL) is a global education strategy designed to inculcate self-directed and active learning. Millennial students are exposed to restricted and compromised teaching and learning methods via online platforms amidst this COVID -19 pandemic. Therefore, this session aims to share experiences from the field, the do's and don'ts in applying online active learning among undergraduate medical students. Several online platforms will be shared to replace a face-to-face session, yet still can promote active learning while maintaining the principles of TBL. Emphasis is placed on applied learning of the fundamental knowledge learnt during the preparation phase through team discussions and subsequent pitching presentations. Active and self-directed learning can be integrated through virtual means with reproducible excellent results as with conventional face-to-face TBL.

Keywords: Team-based learning, COVID -19 pandemic, undergraduate teaching, online teaching

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SS-4.3

Taking Case Based Integrated Physiology and Pharmacology Teaching Online: Experiences and Outcomes

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Both physiology and pharmacology are disciplines key to the practice of medicine; however, teaching them to junior medical students can be challenging as the content is frequently perceived as abstract, dry and complex. This is true even in a face-to-face class room, and even more so in a virtual classroom. During the COVID-19 pandemic, the need to take all teaching online posed significant challenges to create classes that could genuinely engage students and enable effective learning and teaching. We describe our experience in developing and running case-based teaching integrating physiology and pharmacology using active learning principles delivered online using a mix of synchronous and asynchronous modalities. Student feedback indicated that the experience was positive, and in fact in some ways better than previous face to face sessions. Assessment scores in summative exams showed no deterioration in performance with online teaching, further supporting that the methods used were effective.

Keywords: Physiology, Pharmacology, COVID-19 pandemic, online teaching, case-based teaching

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SS-4.4

Online Physiology Laboratories Support Students Conceptual Learning and Research Skills Development

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Laboratories are core for physiology education, enabling students to reinforce physiology knowledge and to develop research, technical and employability skills. In 2020, the COVID-19 pandemic forced a rapid transition from interactive, in-person laboratories to online laboratories. Given the critical role of laboratories, this transition was expected to induce educational impacts on students, especially for the development of research and laboratory specific technical skills. Together with colleagues, I completed three studies to examine the impacts of online laboratory experiences on undergraduate student learning and research and technical skills development: (1) A 2020 systematic review found that online physiology laboratories are effective for students conceptual learning.;[1] (2) For a virtual experiment examining the neuronal control of gut motility,[2] student survey data showed that the virtual experiment supported students' understanding of physiological concepts and experimental design, with self-reported time spent on the virtual experiment (and not on lectures or the laboratory notes) a significant predictor of their understanding; (3) For a laboratory examining factors that modulate force of ventricular contraction, students completed an in-person or virtual version of this laboratory. The in-person laboratory provided students with hands-on experience in data collection and analysis, while the virtual laboratory was a synchronous 'Zoom', guiding students through the same series of experiments using pre-recorded data. Pre- and post-laboratory surveys assessed students' conceptual understanding, and self-reported ratings of confidence in research and technical skills. After the laboratory, both in-person and virtual groups significantly improved performance on conceptual multiple-choice questions. 'In-person' students performed significantly better on application-based short-answer research questions, and had greater confidence in their technical skills, compared to the 'virtual' students. Interestingly, no differences were observed between either group on self-reported ratings of confidence in their research skills of graphing and writing figure legends. The result of these three studies indicate that online laboratories are effective for supporting student understanding of physiological concepts and some research skills, but it is important to identifying pedagogical approaches that focus on developing students' technical and research skills within virtual settings.

Keywords: Online Physiology laboratories, physiology education, virtual experiment

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SS-5.1

Multifunctional-Natural Biomaterials for Cutaneous Tissue Engineering: Conventional vs Additive Manufacturing Technology

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Tissue engineering and regenerative medicine technologies are currently tremendously explored to achieve future personalized/precision medicine. Current standard gold treatment for full thickness skin wound using split skin graft (SSG) may lead to severe infection and limited source of autologous skin even though it helps in healing process. A major drawback for deep and large open wounds, especially in chronic wounds, is slow healing, severe infection and scar formation lead to treatment failure and mortality. Thus, rapid skin wound management is a feasible approach to expedite the healing rate and reduce the risk of complications via multifunctional smart biomaterials. Therefore, our Functional Biomaterials Technology research group focuses on developing ready-to-use products from green resources and fulfil the requirements for local medical device authority. It includes collagen, gelatine or cellulose etc., incorporating various forms of formulation, including natural products, growth factors, and secretome, which have been explored widely to accelerate cutaneous regeneration. Additionally, various fabrication technologies from conventional until advanced technology have been used for the abovementioned applications.

Keywords: Skin wound, biomaterials, regeneration

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SS-5.2

Immune Modulation as a Therapeutic Strategy in Bone Regeneration

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The regeneration of bone fractures, resulting from trauma, osteoporosis or tumours, is a major problem globally. Bone regeneration is one of the key areas in regenerative medicine. Nowadays, stem cells have been used in regenerative medicine with promising results due to their self-renewal and differentiation capacity. Furthermore, stem cells have the ability to release bioactive molecules and regulate the behaviour of other cells in various host tissues. Bone regeneration process may improve significantly when stem cells are employed. In addition, to enhance the osteogenic potential, an effective bone substitute made of synthetics or biological factors is necessary. It has been discovered that the immune system and the bone regeneration mechanism work in concert. Crosstalk between immune components and mesenchymal stem cells (MSCs) has also been shown to modulate the bone regeneration mechanism. Recent studies reported the potential role of pro-inflammatory cytokines in promoting osteogenic potential. Interleukin-17A (IL-17A) is a T-cell derived, proinflammatory cytokine which is an important mediator of the inflammatory responses. IL-17A, on the other hand, may have pro-osteogenic effects, albeit the mechanisms behind these effects are remain unclear. In this study, we investigated the potential role of IL-17A in promoting bone regeneration. Our studies showed that treatment with IL-17A increased proliferative activity of stem cells from human exfoliated deciduous teeth (SHED) in a dose-dependent manner, but decreased the expression of stem cell markers as the days progressed. IL-17A induced osteogenic differentiation in SHED as evidenced by high alkaline phosphatase (ALP) activity, increased matrix mineralization, and upregulation of the osteogenic marker expressions and altered the OPG/RANKL ratio. Our findings also showed that IL-17A activated the MAPK signalling pathway in SHED by upregulating both upstream activators and downstream targets of the ERK, P38 and JNK pathways. The activation of MAPK signalling was confirmed by ERK/MAPK, which was activated in a time dependent manner during osteogenic differentiation of SHED. We also demonstrated that combination treatment of IL-17A and IL-6 synergistically increased adhesion, proliferation and differentiation of cells on hydroxyapatite. Together, these findings imply that inducing IL-17 signalling to promote bone regeneration is a feasible strategy.

Keywords: Bone regeneration, cytokine, immunomodulation, stem cells

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SS-5.3

Precision Biomaterial Design for Sustainable TERM

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As precision medicine moves forward, new biological and drug products will necessitate new material-based devices to deliver them, and these devices will require precision biomaterials capable of interacting with the biology of the patient to elicit desired and predictable outcomes.
In this context, biomaterials have been largely developed to mimic the native structure and composition of ECM and provide structural and functional support to the cells especially for re-growing or regenerating damaged tissues in clinical settings. Scaffold materials play a fundamental role in driving functional tissue outcomes, particularly in the cell-free strategies. Natural polymers, for instance proteins and polysaccharides, are intrinsically multifunctional, dynamic and environment responsive. These materials offer several advantages such as excellent biodegradable and biocompatible, and high flexibility, which possess the capability of changing shape and size to promote the growth of engineered tissue within the surrounding tissues. Among them, fibrous proteins are finding broad impact in biomaterial systems for a range of cell and tissue studies. In these fibers, constituents' properties are arranged in hierarchical assemblies, their supramolecular structure imparting them biological performances, resistance to solvents and ageing. The final scaffold properties can be tuned through processing, i.e., dissolution and fabrication methods, so producing materials with specific physic-chemical cues, which have been demonstrated ability to activate specific pathways inducing tissue regeneration. In addition, adding or conjugating selected biological moieties can specifically improve bioactivity so obtain materials for precision medicine. Additionally, three-dimensional (3D) additive manufacturing, microfabrication, and nanoscale lithography have begun to address the complexities required for manufacturing precision biomaterial-based devices across many length scales. This concept has been extensively studied and applied in the last years to the design scaffolds for innovative therapeutics strategies, considering patient diversity, clinical needs, and future products commercialization. During the seminar it will be used the silk-platform design as an example.

Keywords: Biomaterials, scaffold materials, fibrous proteins, tissue regeneration

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SS-6.1

Development of Novel Uracil Derivatives as Potential Antiviral Agents

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Heterocyclic bases in the composition of nucleosides and nucleotides are important components of DNA and RNA, also participating in a number of key intracellular metabolic processes. Heterocyclic base derivatives are commonly used as anticancer, antibacterial, antifungal, and antiviral agents. Currently, more than 100 of N1 and N3 substituted uracil derivatives with potential antiviral activity have been synthesised by our research team. Most newly synthesised compounds are lipophilic, stable, and showed activity against different RNA including hepatitis C virus (HCV), chikungunya virus (CHIKV), SARS-CoV-2, as well as human immunodeficiency viruses (HIV). Thus, several compounds were found to inhibit HIV-1 reverse transcriptase at nanomolar concentrations. A number of compounds have shown activity against HCV. The most promising Z390 inhibited HCV at EC_{50} of 4.8 μM. Compounds Z214 and Z364 revealed activity against CHIKV in Vero 76 cells at EC_{50} of 7.92 μM and 14.41 μM respectively. Newly synthesised Z876 recently has shown inhibitory activity against SARS-CoV-2 at EC_{50} of 1.012 μM in Vero cells. Uracil derivatives are also promising to show activity against respiratory syncytial virus, human adenovirus, and human cytomegalovirus, however, these studies have not been conducted yet. The mechanism of antiviral action of novel uracil derivatives also needs to be investigated. The study on HCV revealed that Z390 did not inhibit HCV replication, assembly, or release of infectious virions, but inhibited the spread of HCV to non-infected cells, most likely by inhibiting vesicular transport. A study on CHIKV showed that both Z214 and Z364 were associated with inhibition of the late stage of CHIKV life cycle. In conclusion, novel uracil derivatives exhibited antiviral activity against RNA viruses and might be considered specific treatments for main viral infections in the future.

Keywords: Uracil derivatives, antiviral agents, Chikungunya virus, SARS-CoV-2б, Hepatitis C virus.

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SS-6.2

Collaborative Discovery of the Magic Bullet Targeting Pancreatic Cancer

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Pancreatic cancer is one of the most lethal type of cancers, with an overall five-year survival rate of less than 5%. It is usually diagnosed at an advanced stage with limited therapeutic options. To date, no effective treatment options have demonstrated long-term benefits in advanced pancreatic cancer patients. We aim to lower the barriers between investigators working inside and outside an organization. We establish network with academic and biotechnology industries to provide access to disease-relevant phenotypic and target specific assays. Investigators are taking advantage of this resource which will open new venues to test novel therapeutic hypotheses and deepen our understanding of complex biological systems. Through this initiative, our steadfast goal remains focused on the discovery of novel therapeutics approaches to improve patient's lives. Dr Mai will be sharing his research team's discovery of several potential anti-pancreatic cancer agents. Our team is the first of its kind in the Asian region and the aim of the programme is to contribute to the advancement of medical sciences and for the betterment of the human health. At present, the programme has attracted many national and international collaborators. The programme is open to all collaborators from academicians to the industry partners.

Keywords: Pancreatic cancer, therapeutic target

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SS-6.3

Safety and Efficacy of an rAd26 and rAd5 Vector-based Heterologous Prime-boost COVID-19 Vaccine (Gam-COVID-Vac, Sputnik V)

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The report highlights the spectrum of available in Russia vaccines against COVID-19 and targets the results of randomised, double-blind, placebo-controlled, phase 3 trial of Gam-COVID-Vac (Sputnik V) vaccine hold at 25 hospitals and polyclinics in Moscow, Russia (vaccine group (n=16 501), placebo group (n=5476)). The details of study design are given according to phase 3 clinical trial. Among the main results vaccine efficacy is described together with safety parameters (adverse events structure).

Keywords: Covid-19 vaccine, Sputnik V, phase 3 clinical trial, vaccine efficacy

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ORAL PRESENTATION

OR-1

Lactobacillus Plantarum LAB12-Induced Hepatoprotection In Vivo is Associated with Gut-Liver Axis

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Dysbiosis is the driving factor of non-alcoholic fatty liver disease (NAFLD) and is associated with leaky gut and raised lipopolysaccharide level, which could induce inflammation. It was found that supplementation with *Lactobacillus plantarum* LAB12 (LAB12) in high-fat diet (HFD)-induced NAFLD mouse model not only reduced the severity of liver injury, but also improved gut barrier function and caecocolonic bacterial richness. This study went on to investigate the beneficial effects of LAB12 on the biochemical parameters (i.e., short-chain fatty acids (SCFA), lipid profile and inflammatory markers) in HFD-induced NAFLD mice. Seven-week-old, male C57BL/6J mice were divided into five groups (n=11/group), with each group being fed with normal chow, normal chow supplemented with LAB12, HFD, HFD supplemented with LAB12 or vitamin E for 20 weeks. The animals were anaesthetised, and terminal blood sampling was performed. The blood was processed for determination of serum SCFA, lipid profiles and inflammatory markers. Liver and colonic content were harvested and snap frozen. The former was used for determination of hepatic total cholesterol (TC) and triacylglycerol (TAG) while the latter was used for profiling of SCFA. The HFD-induced NAFLD mice were presented with significantly higher ($p<0.05$) serum TC, TAG, LDL/VLDL, TNF-α and hepatic TC, but significantly lower ($p<0.05$) colonic propionate when compared to their control counterparts. The supplementation of LAB12, however, significantly reduced ($p<0.05$) hepatic TC, TNF-α and IL-6 in HFD-induced NAFLD mice. Additionally, LAB12 also significantly increased ($p<0.05$) serum butyrate in HFD-induced NAFLD mice. The improved NAFLD pathology in HFD-fed mice by LAB12 could be mediated, in part, through reduced hepatic TC and systemic inflammation as well as improved serum SCFA, gut barrier function and gut microbiota composition. The present findings provide important insight into the understanding of LAB12-induced hepatoprotection through the gut-liver axis.

Keywords: Probiotics, non-alcoholic fatty liver disease, gut-derived butyrate, inflammation, cholesterol

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OR-2

Effects of Profortil® on Leptin-induced Effects on Sperm DNA Fragmentation and Junctional Proteins in Rats

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Exogenous leptin administration increases oxidative stress, increases sperm DNA fragmentation, and disrupts junctional proteins of the blood-testis barrier in the rat. This study, therefore, examined the effects of Profortil®, an antioxidant micronutrient supplement, on leptin-induced adverse effects on sperm DNA fragmentation and gene expressions of occludin and connexin-43 in the testis. Sprague-Dawley rats, aged 12-14 weeks, were divided into a Control group (0.1 ml of normal saline); a LEP group (60µg/kg/day of leptin); a PRF group (50mg/kg/day of Profortil®), and a LEP+PRF group (leptin and Profortil®). Treatment was given once daily via the intraperitoneal route. Leptin was given for two weeks and Profortil® for three weeks. PCR for gene expressions of catalase (an antioxidant enzyme), occludin (a tight junction protein), and connexin-43 (a gap junction protein) in the testicular tissue was performed. Sperm DNA fragmentation was assessed using Comet assay. Data were analyzed using ANOVA. The gene expression of catalase was significantly lower in all three groups compared to Control ($p<0.05$). Occludin and connexin-43 gene expressions were significantly lower in the LEP and LEP+PRF groups compared to that in the Control group. Comet assay revealed significantly higher DNA fragmentation in the LEP group compared to that in the Control. Profortil® administration in the leptin-treated rats did not significantly decrease the level of DNA fragmentation, although it was slightly lower than that in the LEP group. Profortil® supplementation at a dose of 50 mg/kg/day for three weeks did not prevent the leptin-induced adverse effects on sperm DNA fragmentation and junctional proteins.

Keywords: Leptin; Profortil®, sperm DNA fragmentation, oxidative stress, testicular junctional proteins

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OR-3

The Antianxiety Effect of Vinpocetine in Caffeine-Induced Anxiety in Rats

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Vinpocetine (VP) is a semi-synthetic derivative of the vinca minor plant, commonly used as a neuroprotective agent. The current study evaluated the capacity of VP to alleviate anxiety symptoms and compared its efficacy to that of lorazepam. Intraperitoneal injection of 100mg of caffeine (CAF) was done to induce anxiety in all rat groups except the saline-treated control (CONT) group. Elevated plus maze (EPM) test was used to evaluate the anxiety level in animal groups after one month of treatment with oral lorazepam (LZP) and VP. Using ultra-performance liquid chromatography, quantification of rats' brain neurotransmitters in response to treatments was done. The anxiogenic action of caffeine in rats was evident by significantly more entries and longer time staying in the closed arms of the EPM, longer time mobile, higher number of line crossings ($p<0.001$), and a longer distance travelled in the close arm zone ($p<0.01$) compared to the CONT group. A significant anxiolytic activity of VP was observed in all parameters assessed by the EPM; compared to the CAF group ($p<0.05$). Compared to the CONT group, the serotonin concentration in the cingulate gyrus was significantly higher in the CAF-treated group and significantly lower ($p<0.01$) in VP and LZP-treated group. Compared to CONT and CAF-treated groups, there was a considerably higher concentration of GABA in the cingulate gyrus, hippocampus, and frontal cortex of the (VP and LZP)-treated groups ($p<0.01$). A significantly lower level of epinephrine was found in the cingulate gyrus and the frontal cortex ($p<0.001$) of the (VP and LZP)-treated groups compared to CONT and CAF-treated groups. Therefore, it can be concluded that long-term administration of VP at moderate to high doses can offer anxiolytic activity, as evidenced by the EPM test. The underlying mechanism may at least involve VP modulation of serotonin, GABA, and EPI neurotransmitters.

Keywords: Vinpocetine, anxiolytic, elevated plus maze, caffeine, neurotransmitter

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OR-4

Trans-Resveratrol Retinal Antiapoptotic Effects Mediated by Adenosine A1 Receptors in NMDA- Induced Retinal Injury in Rats

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Glaucoma, the leading cause of global irreversible blindness is a neurodegenerative disease involving the retina. NMDA-mediated excitotoxicity seems to play a critical role in glaucomatous retinal degeneration leading to optic atrophy. Modulation of adenosine A1 receptor (AA1R) is known to counteract NMDA-mediated excitotoxicity and a polyphenol, trans-Resveratrol (TR) has a potential role in preventing retinal excitotoxicity due to its ability to modulate AA1R. This study investigates the effects of TR on N-methyl-D-aspartate (NMDA)-induced retinal apoptosis in Sprague Dawley rats. Sprague Dawley rats (200-250g) were divided into 4 groups; Group 1 received intravitreal injection (IV) of phosphate buffer saline (PBS); Group 2 received IV NMDA (160 nmol) only; Group 3 received IV TR (4 nmol) 24 hours prior to IV NMDA (160nmol), and Group 4 received IV TR (4 nmol) and DPCPX (8 nmol) (AA1R antagonist) 24 hours prior to IV NMDA. Rats were euthanized after 7 days, and the retinae were collected to assess the apoptotic markers. Group 2 demonstrated elevated levels of BAX and caspase-3 by 97.31 folds and 2.62 folds, respectively and decreased BCL-2 level by 3.19 folds compared to Group 1 ($p<0.001$). In contrast, pretreatment with TR lowered the levels of retinal BAX by 68.3 folds ($p<0.001$), and caspase-3 by 2.87 folds ($p<0.01$), with higher level of BCL-2 by 2.63 folds ($p<0.001$) in comparison to Group 2. The addition of DPCPX in Group 4 partially abolished the antiapoptotic effects of TR. TR protects against NMDA-induced retinal damage by reducing the apoptotic markers and this effect is partially modulated by AA1R.

Keywords: Trans-resveratrol, adenosine A1 receptor (AA1R), glaucoma, N-methyl-D-aspartate receptors, apoptosis

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OR-5

The Effect of Bisphenol A Exposure Below No-Observed-Adverse-Effect-Level (NOAEL) on The Female BALB/c Reproductive Systems

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The use of everyday items such as food containers, plastic bottles, and thermal receipts increases the likelihood of being exposed to Bisphenol A (BPA). It is commonly employed in the processing industry because of its capacity to give items a good structure and mobility. However, BPA is one of the most studied Endocrine Disrupting Chemicals (EDC) as it is known to cause disruption in the homeostasis of endocrine systems, which can cause abnormalities in the normal function of the reproductive system. This study aimed to investigate the effects of BPA exposure below its No-Observed-Adverse-Effect-Level (NOAEL) on adult female BALB/c mice. The mice were randomly allocated to either Control Sham (Group 1), Control Tween 80 + distilled water (Group 2), 20 mg/kg bw/day BPA (Group 3), 3 mg/kg bw/day BPA (Group 4) or 1 mg/kg bw/day BPA (Group 5) group. Administration of treatments were carried out via oral gavage for 7 days. Mice were superovulated by intraperitoneal injection of Pregnant Mare Serum Gonadotrophin (PMSG) on Day-4 of treatment, followed by Human Chorionic Gonadotrophin (HCG) 48 h later. After treatment, the ovaries were retrieved from the mice and subjected for BPA concentration analysis using ELISA. The number of abnormal embryos retrieved from the oviduct produced 48 h post HCG were also analysed. Bisphenol A levels were found to be significantly higher in the ovaries of 20 and 1 mg/kg bw/day BPA treated groups, compared to control. The number of abnormal embryos produced were significantly higher in the 1 mg/kg bw/day BPA treated group, compared to control. In conclusion, BPA exposure below the NOAEL caused adverse effects on the quality of preimplantation embryos. This finding suggests that low doses of BPA exposures (below NOAEL) is detrimental to preimplantation embryo viability, and therefore may cause future health problems.

Keywords: BPA, NOAEL, preimplantation embryo, reproduction

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OR-6

Regulation of HOXA10 by miR-27a-3p, miR-27b-3p, miR-15a- 5p and miR-195-5p in Endometriotic Tissue

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Endometriosis is a gynaecological disorder condition marked by the presence of endometrial tissues outside the uterine cavity, which affects 5 to 10% of reproductive-aged women. Numerous studies have found that microRNAs and their target mRNAs are expressed differently in endometriosis, implying a role in the development and persistence of endometriotic lesions. Homeobox A10 (HOXA10) gene expression was generally elevated during the window of implantation, indicating that it modulates endometrial receptivity however, in endometriosis, the expression of this gene was decreased. The goal of this study was to investigate how microRNAs regulate the HOXA10 gene in endometriosis. We used databases to find microRNAs that targeted the HOXA10 gene and compared the expression of microRNAs and HOXA10 in patients with and without endometriosis. The patients are split into control groups (n=20) and endometriosis group (n=20). Endometrial tissue biopsies were taken using pipelle. Surgery was used to retrieve ectopic tissues from the endometriosis group. Bioinformatics analysis was used to determine microRNA target binding to HOXA10. Three databases (TargetScan 7.2, DIANA- microT-CDS and miRDB) revealed miR-27a-3p, mir-27b-3p, miR-15a-5p and miR-195-5p target HOXA10. All studied miRNAs and HOXA10 gene expressions were determined through quantitative polymerase chain reaction (qPCR) normalised to endogenous controls. Endometriosis patients showed significantly higher expression of miR-27a-3p, miR-27b-3p, miR-15a-5p and miR-195-5p than controls ($P<0.05$). When compared to controls, HOXA10 expression was significantly downregulated in endometriotic women by 0.81-fold in eutopic endometrium and 0.42-fold in ectopic endometrium ($P<0.05$) compared to controls. The miR-27a-3p, miR-27b-3p, miR-15a-5p, and miR-195-5p genes were shown to play a function in regulating the expression of the HOXA10 gene in endometriotic tissue, which could lead to the discovery of non-invasive diagnostic tools in the future.

Keywords: Endometriosis, miR-27a-3p, miR-27b-3p, miR-15a-5p, miR- 195-5p, HOXA10

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OR-7

Investigating Size-Dependent Inhibition of Cytochrome P450 Isozymes by Zinc Oxide Bulk and Nanoparticles

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Zinc oxide is a multifunctional material used in several industries. The potential of inhibition of drug metabolising cytochrome p450 (CYP) isozymes by zinc oxide bulk (ZnOBPs) and nanoparticles (ZnONPs) is not well understood. Inhibition of CYP isozymes may lead to adverse drug reactions due to delayed clearance of co-administered drugs. This study was designed to investigate the in-vitro inhibitory effect of ZnO BPs and ZnO NPs on CYP1A2, CYP2A6, CYP2B6, CYP2C8, CYP2E1, CYP2J2 and CYP3A5. Additionally, the study focused on potential size-dependent inhibitory effects. Inhibitory potential of ZnOBPs and ZnONPs (<50nm and <100nm) on CYP isozymes were investigated using in-vitro fluorescence enzymatic assays in the presence and absence of various ZnO compound concentrations. IC50 and IC50-shift values were determined. ZnOBPs did not demonstrate significant reversible inhibition on any CYP isozyme, except for CYP2E1 with IC50-value 16.32µg/ml. ZnONPs with size <100nm demonstrated significant reversible inhibition of CYP2B6, CYP2E1, CYP2J2, and CYP3A5 with IC50-values of 8.43, 36.10, 23.25, and 7.93µg/ml. Irreversible inhibition of CYP isozymes by <100nm ZnO NPs was not discovered. ZnONPs with size <50nm demonstrated significant reversible inhibition on CYP2B6, CYP2C8, CYP2E1, CYP2J2, and CYP3A5 with IC50-values of 13.22, 10.15, 4.85, and 10.15µg/ml. Irreversible inhibition of CYP isozymes by 50nm ZnONPs was evident for CYP2B6, CYP2C8 and CYP2J2. CYP metabolism mediated ZnO-drug interactions are possible post co-bioavailability of zinc oxide bulk particles and zinc oxide nanoparticles with drugs metabolized by CYP2B6, CYP2C8, CYP2E1, CYP2J2 and CYP3A5. Smaller-sized ZnONPs were able to elicit stronger inhibition in all inhibited isozymes, except for CYP2J2, indicating size-dependent inhibitory effects. Future in-vitro studies will allow confirmation modes of inhibition. Further in-vivo and in-silico are required to confirm the potential for adverse drug reactions and to understand the molecular interaction between these compounds and CYP isozymes.

Keywords: Zinc oxide, bulk particles, nanoparticles, cytochrome P450, nanoparticle-drug interaction

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OR-8

Lipidomic Analysis Between Preterm and Term Infants in The First 10 Weeks of Life

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Prematurity is considered as an insult to fetal growth and is linked to later ill health development, like cardiovascular and diabetes mellitus. The causal pathways and pathophysiology mechanisms, either pre or postnatal driving, are poorly understood and warrant further investigation. When preterm babies are born before reaching or in the early third trimester, they miss out on in-utero accretion and have interrupted lipid transfer from maternal. In the postnatal period, they were introduced with parenteral feeding before being established orally. As lipid homeostasis involves a complex interaction of numerous lipid species responsible for each degradation or synthesis pathway, a lipidomic study in the preterm population compared to the term population can demonstrate further understanding of the lipid-related disease or act as a lipid biomarker for diagnostic and intervention purposes. This study aimed to determine the lipidomic profile in preterm infants and compare them to term infants. Lipidomic analyses were conducted by mass spectrometry using blood samples from two established UK-based cohorts involving preterm (n=78) and term infants (n=119). Preterm infants were recruited after establishing full feed (PEF) and after reaching term corrected age (PAT). The results were compared to term infants at 2- and 6-weeks of life. Nutritional intervention applied for preterm infants followed the local hospital clinical guidelines. There were 44 similar lipid species identified in both cohorts. Statistical differences with $p<0.001$ was observed mainly in sphingomyelins (SM 34:1, 32:1, 34:2), phosphatidylcholines (PC 30:0, 34:1, 38:4, 38:5), triglycerides (TG 54:3, 52:3, 48:4, 50:2), lysophosphatidylcholines (LPC 16:1), and hydroxycholesterol. Relative lipid abundances (RLA) in preterm infants were not identical to healthy term infants in the first ten weeks of life. The distinct features between preterm and term infants might be driven by incomplete metabolic development and the necessary adaptation to the extrauterine environment.

Keywords: Lipidomic, preterm, birth, metabolism, mechanism

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OR-9

Correlations Between Different Kind of Diets and Changes in Ultrastructures of Corticotrophs

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The adenohypophysis is home to five type of cells which secrete distinct hormones related to the physiology of homeostasis. Somatotroph, lactotroph, thyrotroph, gonadotroph and corticotroph produces growth hormone, prolactin hormone, thyroid-stimulating hormone, follicle-stimulating hormone and adrenocorticotropic hormone (ACTH) respectively. Corticotrophs in the adenohypophysis produce ACTH in response to hypothalamus-pituitary-adrenal (HPA) axis stimulation when the body responds to stress. Unhealthy dietary habits were suggested to have led to metabolic and physiological stress. This study aims to discover whether different kind of diets will introduce changes into the ultra-morphology structures of corticotrophs. Thirty-five male, 8 weeks old, Sprague-Dawley rats were acclimatized for 2 weeks. They were then divided into five groups. Each group received different diets. Control (normal rat chow), high-fat diet, high-protein diet, high-sugar diet, and high-starch diet. Eight weeks was the treatment duration (ad libitum) with tap water as drinking water. After eight weeks, the rats' skull was dissected, the pituitary gland was harvested, fixed and processed according to electron microscope preparation protocol. Ultrastructure analysis revealed a high-fat diet, and a high-sugar diet affected the corticotrophs the most. The ultrastructures seen most affected was the nucleus, nuclear membrane, mitochondria and the endoplasmic reticulum. Nuclear degeneration, impairment of the nuclear membrane, swollen mitochondria and swollen endoplasmic reticulum were clearly observed. Studies suggested that metabolic and oxidative stress leads to significant changes in the morphology of various subcellular structures along with alterations in their activity and metabolic function. There is a strong correlation between certain diets and the ultrastructures of corticotrophs which is most probably due to metabolic and oxidative stress. This study was funded by Malaysian Fundamental Research Grant Scheme FRGS/1/2018/SKK08/UNIKL/03/1.

Keywords: Ultrastucture, corticotrophs, diets, oxidative stress

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OR-10

Bioactive Compounds Isolated from *Enicosanthellum Pulchrum* Exhibit Promising Anticancer Properties Towards Ovarian Cancer Treatment: An In Vitro Study

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Enicosanthellum pulchrum belongs to an Annonaceae family, which can be found in the middle of the highlands in Malaysia. Previously, four bioactive compounds have been isolated from this plant, namely cleistopholine, liriodenine, plagioneurin B and pulchrin A with promising anticancer effects on ovarian cancer cells. Interestingly, these compounds possess different classes of chemical structures yet exhibit the same feature of cell death through apoptosis induction on ovarian cancer cells. Apoptosis becomes an important variable in cancer therapy, suggesting these bioactive compounds be further investigated for ovarian cancer treatment. Detailed in vitro findings on these bioactive compounds showed that plagioneurin B (20.57 µM) was the most active compound against ovarian cancer cells (CAOV-3) compared with the other compounds at 24h of treatment. It was then followed by pulchrin A (22.3 µM), liriodenine (37.3 µM) and cleistopholine (62.8 µM). All bioactive compounds were shown comparable and even better for the IC50 values as compared with carboplatin and cisplatin. Meanwhile, plagioneurin B induced apoptosis through two different signalling pathways, extrinsic and intrinsic, while other bioactive compounds only at the intrinsic pathway. All bioactive compounds also demonstrated cell cycle arrest on the CAOV-3 cell line at different phases, leading to inhibition of cells proliferation. Cleistopholine and pulchrin A inhibited the CAOV-3 cell cycle at G0/G1 phase, while liriodenine and plagioneurin B at S and G2/M phases, respectively. These findings indicated that plagioneurin B, pulchrin A, liriodenine and cleistopholine stimulated not only cell death but also inhibited ovarian cancer cell proliferation which is the hallmark of cancer therapeutics. Further investigations are needed to fill the gap in the drug discovery and development process before they can be introduced as a new pharmacotherapeutic for ovarian cancer.

Keywords: Plagioneurin B, pulchrin A, liriodenine, cleistopholine, ovarian cancer

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OR-11

Altered Placental Proteins are Indirect Measures of Altered Salivary Proteins in Children with Allergic Diseases

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Allergic disease has risen to epidemic proportions. Prenatal events determine disease susceptibility via environmental influences on placental function and fetal programming. We hypothesize that childhood susceptibility to allergy is increased through significant alterations in placental gene expression and the altered placental genes are indirect measures of altered protein concentrations in the allergic children's saliva. We aim to identify proteins associated with childhood allergy using placental tissue (n= 16) and child saliva (n= 18) from non-allergic children compared with allergic children using a proteomic approach of quantitative label-free comparative mass spectrometry with Mascot database and MaxLFQ software. Using the placenta, 1223 proteins were identified, nineteen proteins were significantly altered in allergic males and 21 proteins were altered in allergic females, relative to non-allergic children. Five candidate placental proteins associated with allergic diseases were validated with Western blot (n=68). 14-3-3 protein had very high expression in allergic children and very low expression in the non-allergic group. Using saliva, 177 proteins were identified and six candidate proteins with a significant ratio in specific allergic phenotypes were validated with Western blot (n=62). From Western blot validation, 14-3-3, cornulin and involucrin proteins were further validated with Blitz system (n=126). They were significantly altered in allergic children with asthmatic mothers, as compared to non-allergic children with asthmatic mothers. Only salivary cornulin was significantly altered in allergic children as compared to non-allergic children regardless of maternal asthma status. In both samples, 14-3-3 proteins were significantly altered in female allergic children as compared with female non-allergic children. Interestingly, altered expression of haptoglobin and involucrin varies in a sex-specific manner and is related to the presence or absence of maternal asthma. In conclusion, protein expression can be altered in-utero in children who subsequently develop an allergy and altered expression of these proteins is detectable in saliva in early life.

Keywords: Childhood allergy, fetal programming, proteomics, salivary proteins, placental proteins

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OR-12

The Relationship Between Bone Markers Secreted by Osteocyte with Bone Histomorphometry in Rats with Secondary Osteoporosis Induced by Metabolic Syndrome

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Bone is a dynamic organ constantly being resorbed and reconstructed in response to the products secreted by bone cells. Osteocytes are bone cells that occupies in lacunae and entombed in mineralised bone. The role of osteocyte in regulating bone remodelling has not been widely investigated. This study aimed to investigate the association between expression of osteocyte-secreted bone markers and bone histomorphometry in osteoporotic rats induced by metabolic syndrome. We quantified the osteocyte number, empty lacunae number, and expression of osteocyte-mediated bone markers (DMP1, Phex and FGF-23) from seven experimental groups: rats of baseline control, rats on standard diet (normal), high-carbohydrate high-fat (HCHF) diet treated with vehicle, HCHF diet treated with 60 mg/kg palm tocotrienol, HCHF diet treated with 100 mg/kg palm tocotrienol, HCHF diet treated with 60 mg/kg annatto tocotrienol, as well as HCHF diet treated with 100 mg/kg annatto tocotrienol. The association between measured parameters with structural, static, and dynamic bone histomorphometry was evaluated using Pearson's correlation for normally distributed data and Spearman's correlation for not normally distributed data. There were significant negative correlations between empty lacunae and FGF-23 level with bone structural parameters, but positive correlation between Phex level and bone structural parameters. For static bone histomorphometry, osteocyte number was negatively correlated but empty lacunae number and FGF-23 were positively correlated with eroded surface. The osteocyte number was positively associated with mineralising surface and bone formation rate whereas Phex level was negatively associated with single-labelled surface and mineralising surface for dynamic bone histomorphometry. Higher osteocyte number and Phex level but lower empty lacunae number and FGF-23 favour bone formation and suppress bone resorption. These findings suggest the role of osteocyte in bone remodelling and osteocyte-secreted bone markers as potential predictors of bone health, which awaits further validation from human trials.

Keywords: Bone loss, vitamin E, osteoblast, osteoclast

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OR-13

Evaluation of the Effect of Lutein-Rich Purple Sweet Potato Leaves (PSPL) Extract in Ameliorating Diabetic Retinopathy in Streptozotocin-Induced Diabetes Sprague Dawley Rats

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Sweet potatoes have been widely cultivated for their beneficial nutrients. However, the leaves of sweet potatoes are normally discarded as an agro-waste product after harvesting the tubers. The sweet potato leaves extract (SPL) has been reported to have a high content of carotenoids including lutein, which helps to prevent various chronic diseases as well as eye-related diseases such as retinopathy. Therefore, the present study aimed to evaluate the antiretinopathy effects of the sweet potato leaves since they can be developed as an alternative dietary supplement for diabetic retinopathy patients. After successful induction of diabetes using intraperitoneal injection (60mg/kg BW) of streptozotocin, 24 adult male Sprague Dawley rats were divided into 4 groups: diabetic rats (DM), diabetic rats treated with 200mg/kg BW SPL (DM-200SPL), diabetic rats treated with 400mg/kg SPL (DM-400SPL) and diabetic rats treated with gliclazide (DM-GLZ). Normal rats (n=6) were also included in this study as the control group. The experiment was conducted for 12 weeks. During the treatment period, weekly body weight, weekly calorie and fluid intake, fasting blood glucose level and oral glucose tolerance test (OGTT) were conducted. At the end of the experiment, the rats were sacrificed, and blood was collected for several relevant biochemistry parameters. Histological analysis was conducted on the pancreas and retinal tissues. In the present study, extracts were able to lower the blood glucose level as tested by OGTT and prevent the formation of cataracts in diabetic rats. Interestingly, the extract was able to significantly increase the number of β cells and increase the size of pancreatic islets in diabetic rats. Furthermore, the extract was able to ameliorate the retinopathy effect by improvement on retinal tissues. Treatment of SPL was able to ameliorate diabetic retinopathy in this animal model since it showed improvement in retinal tissues and pancreatic islets in diabetic rats.

Keywords: Sweet potato, diabetic retinopathy, pancreas, retina

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OR-14

The Effect of Ipamoea Batatas Leaves Extract on Diabetic Dyslipidemia Induced in Sprague-Dawley Rats

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Diabetes is one of the most common diseases which can occur due to either lack of insulin or insulin resistance. Dyslipidemia can arise from diabetes which manifests itself as having an abnormal level of lipids. This is due to problems with insulin which is supposed to act as a regulator for lipid production. Thus, the oxidative stress which stems from insulin resistance can cause oxidative stress which can cause further complications in a diabetic person. Sweet potato leaves (ipomoea batatas) have been found to be rich in antioxidant carotenoids such as lutein which can combat oxidative stress. This study was done to evaluate the effect of sweet potato leaves extract on diabetic dyslipidemia induced by streptozotocin in Sprague-Dawley rats. The rats were induced with diabetes using streptozotocin and treated with ethanol extract of sweet potato leaves. Various parameters were recorded such as calorie intake, water intake, body weight, blood glucose level, renal and liver function test as well as other biological and histological changes. Weekly body weight, water and calorie intake does not show any significant differences between control and treatment group. However, the total cholesterol and low-density lipoprotein of the treatment group has shown significant improvement as compared to the diabetic group. Besides that, HMG CoA reductase protein levels also showed improvement in the treatment group as compared to the control group. The thickness of tunica media of aorta in the treatment group is thinner as compared to the diabetic group. Furthermore, the area of adipocytes in the retroperitoneal white adipose tissue was reduced significantly in the treatment group. Sweet potato leaves extract shows promising ameliorating effect towards diabetic dyslipidemia in Sprague-Dawley rats.

Keywords: Diabetes, diabetic dyslipidemia, sweet potato

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OR-15

Neuroprotective Effects of Philanthotoxin-343 in Mitigating NMDA-induced Retinal Ganglion Cell Apoptosis Involves Calcium-Regulated Proteins

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Glaucoma is associated with retinal ganglion cell (RGC) apoptosis mediated by N-methyl-D-aspartate receptor (NMDAR) excitotoxicity. Excessive Ca^{2+} influx after NMDAR stimulation modulates several Ca^{2+}-regulated proteins such as Calpain-1, Cabin-1 and Calcineurin, leading to increased pro-apoptotic proteins BAX and Caspase-3, while reducing anti-apoptotic protein BCL. In the present study, we investigated the neuroprotective mechanism of Philanthotoxin (PhTX)–343 against NMDA-induced excitotoxicity involving Ca^{2+}-regulated proteins to mitigate the apoptotic effects in RGC. Sprague-Dawley rats were divided into three groups; Group I (negative control) intravitreally injected with phosphate buffer saline, Group II injected with NMDA to induce excitotoxicity, Group III injected with PhTX-343 24 h prior to NMDA exposure. After 7-days treatment, retinal tissues were harvested and subjected to H&E staining, ELISA protocol (Calpain-1, Cabin-1, Calcineurin, BAX, Caspase-3, BCL), and immunohistochemistry (Caspase-3, Brn3A). Our findings demonstrated that, in comparison with negative control, the NMDA-induced group displayed extensive loss of retinal cell nuclei and thinning of the ganglion cell layer (GCL), elevated Calpain-1 and Calcineurin, reduced Cabin-1, elevated pro-apoptotic proteins (BAX, Caspase-3), reduced anti-apoptotic protein (BCL), and marked reduction of Brn3A which is the RGC surface marker. Treatment with PhTX-343 resulted in a significantly higher number of retinal nuclei within the GCL compared to the NMDA group. A striking reduction of Calpain-1 and Calcineurin, and elevated Cabin-1 were seen in PhTX-343 group as opposed to the NMDA group. Expectedly, PhTX-343 reduced BAX and Caspase 3 markers, while increasing BCL-2 in contrast to the NMDA group. PhTX-343 treatment was also associated with greater RGC survival as the Brn3A marker was significantly elevated in comparison to the NMDA group. All results for PhTX-343 group were statistically comparable with the negative control. In conclusion, PhTX-343 protected against NMDA-induced RGC apoptosis by modulating the expression of Calpain-1, Cabin-1, and Calcineurin, thus mitigating the apoptotic effects.

Keywords: Glaucoma, philanthotoxin 343, N-methyl-D-Aspartate, apoptosis, retinal ganglion cells

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OR-16

Effect of Edible Bird Nest Supplementation on Reproductive Hormone in Adult Spermatogenesis Following Wi-Fi Exposure

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Wi-Fi radiofrequency electromagnetic fields (RF-EMF) cause testicular tissue degeneration, DNA damage, and cell apoptosis, affecting male reproductive hormone balance, spermatogenesis, and sperm quality, ultimately leading to male infertility. Thus, men need supplementation, and edible bird nest (EBN) is one example that has been shown to benefit men's fertility. EBN contains male reproductive hormones and has the ability to improve sperm quality in rats. It can also protect and improve spermatogonia proliferation, which is negatively impacted by Wi-Fi exposure. As a result, this research was conducted to determine the effect of edible bird nest (EBN) and its hormonal properties on male reproductive organs and sperm parameters after Wi-Fi exposure. Thirty-six eight-week-old Sprague Dawley rats were divided into six groups (n=6). The control group received a standard food diet, the second group (control EBN) received a 250mg/kg EBN enriched pellet daily for 8 weeks, and the third group (control estradiol (E2)) received a subcutaneous 12 µg/kg E2 daily for 10 days. The remaining three groups (Wi-Fi, Wi-Fi + EBN, and Wi-Fi + E2) were exposed to Wi-Fi for 8 weeks and were given standard food pellet, 250mg/kg EBN enriched pellet daily for 8 weeks, or subcutaneous 12 µg/kg E2 daily for 10 days. After eight weeks, rats were sacrificed, and the organs were weighed for organ coefficients. Sperm concentration, motility percentage, and viability were all measured. EBN supplementation results in a significant increase in sperm concentration, motility, and viability compared to the control group. Meanwhile, when exposed to Wi-Fi, EBN was found to cause a significant increase in sperm concentration when compared to the Wi-Fi and Wi-Fi+E2 groups. However, it has no effect on sperm motility or viability. According to these findings, EBN may have some protective effect on sperm quality, which is harmed by Wi-Fi.

Keywords: Wi-Fi, edible bird nest, sperm, male reproductive hormones

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OR-17

REM Sleep Deprivation Induces Vascular Hypercontractility and Damage in REM Sleep-Deprived Animal Model

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Sleep deprivation has been linked to endothelial dysfunction, an early sign of cardiovascular disease. This study aimed to investigate the effects of REM sleep deprivation on the endothelium using the inverted flowerpot technique. Twenty-eight male Sprague-Dawley (SD) rats were randomly divided into four groups (n=7): free-moving control rats (FMC), 72-h REM sleep-deprived rats (REMsd), tank control rats (TC) and 72-hour REM sleep-deprived rats pre-treated with 100 mg/kg vitamin C daily for four weeks (RVC). Rats were deprived of REM sleep using the inverted flowerpot technique. Food consumption (Fc), body weight gain (BWg) and systolic blood pressure (SBP) were monitored. The descending thoracic aorta was isolated for oxidative stress markers, in vitro functional vessel study, endothelial nitric oxide synthase (eNOS) protein expression and histology examination. REMsd showed a significant decrease in BWg despite a significant increase in Fc, and increase in SBP. Superoxide dismutase (SOD), total antioxidant capacity (TAC), catalase (CAT), and glutathione (GSH) were significantly decreased while malondialdehyde (MDA) levels were significantly increased in REMsd. An impairment of endothelium function, low levels of eNOS protein expression and endothelial damage were observed in REMsd. This study provides convincing evidence that REMsd leads to endothelial dysfunction and damage, which were reduced by Vitamin C supplementation.

Keywords: REM sleep deprivation, endothelial dysfunction, oxidative stress, endothelial damage

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OR-18

Trans-Resveratrol and RU-615 Attenuate Dexamethasone- Induced Fibronectin Expression in Human Trabecular Meshwork Cells

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Elevated intraocular pressure (IOP) is the main risk factor and remains the only proven treatment target for glaucomatous optic neuropathy. IOP elevation is due to reduced aqueous humour outflow caused by increased deposition of extracellular matrix (ECM) proteins, particularly fibronectin in trabecular meshwork region. Previous studies have demonstrated that trans-resveratrol (TR), a polyphenolic compound, and RU-615, a derivative of imidazo[1,2-a]benzimidazole, were able to reduce the IOP in rats with steroid-induced ocular hypertension. However, whether this effect is mediated by the reduction of ECM proteins deposition, especially fibronectin is yet to be elucidated. This study investigated the effects of TR and RU-615 on the gene and protein expressions of fibronectin induced by dexamethasone in human trabecular meshwork cells (HTMCs). Primary HTMCs in the fifth passage were incubated with 12.5 μM TR or 0.1 mM RU-615 with or without 100 nM dexamethasone. The cell lysate and culture media were collected after 3 and 7 days of incubation for gene and protein analysis using real-time polymerase chain reaction (RT-qPCR) and ELISA, respectively. Dexamethasone treatment of primary HTMCs significantly upregulated the fibronectin gene and protein expressions compared to control and vehicle-treated group ($p<0.05$). TR reduced the dexamethasone-induced increase in the gene and protein expression of fibronectin by 1.3- ($p<0.001$) and 76.72-fold ($p<0.05$), respectively. Similar effects were observed when RU-615 was added with dexamethasone. RU-615 downregulated the gene and protein expressions of fibronectin amounting to 1.46- ($p<0.01$) and 39.59-fold ($p<0.05$), respectively. Treatment with TR and RU-615 reduced the dexamethasone-induced increase in fibronectin expression by HTMC. The mechanisms leading to these effects of both agents are yet to be elucidated. This study is supported by grant 600-IRMI/FRGS 5/3 (413/2019).

Keywords: Dexamethasone, fibronectin; human trabecular meshwork cells, imidazo[1,2-a]benzimidazole, trans-resveratrol

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OR-19

Synergistic Potential of *Hibiscus Rosa Sinensis* and *Centella Asiatica* Leaves Extract Combination on Fibroblast and Keratinocyte Cells Proliferation

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Hibiscus rosa-sinensis and *Centella asiatica* are widely known for their potential in enhancing cellular proliferation. Cell proliferation is an essential process in general development and regeneration such as in the wound healing process. This study aims to investigate the synergistic potential of the leaves ethanolic extract of these plants on human dermal fibroblast and keratinocyte cells. Cell proliferation potential of each plant extract was determined via MTT assay. Synergistic potential of the HRSCA combination was also determined via MTT assay by adapting the fixed-ratio method based on the extracts' individual median effective concentration (EC50). Results showed that both plants extract significantly enhanced cell proliferation as compared to untreated cells. EC50 values were determined to be at 5.43 μg/ml and 10.47 μg/ml of HRS and CA extracts respectively on keratinocyte cells while 2.35 μg/ml and 2.78 μg/ml of HRS and CA extracts respectively on fibroblast cells. Combination of 3.50 μg/ml HRS with 2.50 μg/ml CA and 1.83 μg/ml HRS combined with 3.50 μg/ml CA exhibited the most effective combination in accelerating cell proliferation of keratinocyte and fibroblast cells respectively. In summary, the combination of *Hibiscus rosa-sinensis* and *Centella asiatica* is favourable in accelerating cell proliferation compared to individual extracts and might be beneficial for further wound healing treatment development.

Keywords: *Hibiscus rosa sinensis*, *Centella asiatica*, cell proliferation, synergy

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OR-20

MicroRNA Expression Profiling in Endometriosis

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Endometriosis is a benign gynaecological disease characterised by the presence and growth of endometrial glands and stroma outside the uterine cavity. The most common site of ectopic endometriosis tissue is in the ovaries. MicroRNAs (miRNAs) are negative regulators that could play an important role in disease development and patients' poor response to progesterone treatment. This study aimed to determine the differentially expressed miRNAs in eutopic and ectopic tissues of endometriosis patients compared to normal endometrium in patients without endometriosis. Three groups of samples were included in our study, namely ectopic and eutopic tissues from endometriosis patients and control endometrial samples from patients without endometriosis. Next-Generation Sequencing (NGS) was performed to profile miRNA expressions in six normal endometrial samples, seven eutopic and two ectopic tissues in endometriosis patients. The patterns of differentially expressed miRNAs were then established between control, eutopic and ectopic tissues. Comparing control endometrium with ectopic tissues, four miRNAs (miR-1247- 3p, miR-1973, miR-199a-3p and miR-181a-2-3p) were significantly differentially expressed. Of these, one miRNA (miR-1247-3p) was upregulated and three miRNAs (miR-1973, miR-199a-3p and miR-181a-2-3p) were downregulated. When comparing eutopic with ectopic tissues, three miRNAs (miR-243-5p, miR-1246 and miR-7-5p) were significantly differentially expressed. Two miRNAs (miR-243-5p and miR-1246) were upregulated, and one miRNA (miR-7-5p) was downregulated. MiR-243-5p is a novel miRNA that was upregulated in endometriosis. There were no significant differentially expressed miRNAs when comparing control endometrium with eutopic endometrium. These data suggested that miRNA patterns of ectopic endometriosis tissues are distinct, which could play a role in the development of endometriosis. These differentially expressed miRNAs need to be validated in an independent set of samples so that they could serve as minimally invasive biomarkers and potential therapeutic targets.

Keywords: Endometriosis, endometrium, microRNA, biomarker

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OR-21

Clinacanthus Nutans Enhances M1 Macrophage Polarization in THP-1 Co-Cultured with AnnexinA1 Knockdown MDA-MB 231

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Tumour associated macrophages (TAM) are key components of the tumour microenvironment and can be classified into two subtypes: antitumor M1 phenotype and pro-tumour M2-phenotype. Growing evidence indicates that reprogramming macrophages to M1 phenotype reduces tumour growth. *Clinacanthus nutans* (CN) has gained much attention because of its anti-cancer properties but the underlying mechanism remains unclear. Here, we investigated the effect of CN treatment in combination of Annexin A1 (AnxA1) knockdown (KD), a well-characterized immunomodulatory protein on macrophage polarization. A comparative transcriptomic analysis between MDA-MB 231 and MCF-7 was performed to identify the expression trend of various mediators related to classically (M1) or alternatively (M2) activation of macrophages. THP-1 cells induced macrophages (Mθ), M1 and M2 were treated with 100ug/ml CN, either alone or cocultured with AnxA1 KD MDA-MB 231 cells for 48 h. Flow cytometry analysis of treated macrophages was performed using HLA-DR and TLR-4 markers to identify M1 macrophages and CD206 marker to identify M2 macrophages. The transcriptomic profiling showed that AnxA1 gene signatures were highly expressed in MDA-MB 231, but not in MCF-7. Most of the M1 and M2 gene signatures were highly expressed in MDA-MB 231 cells (high AnxA1 expressor), suggesting a heightened macrophage activity compared to low AnxA1 expressor. As such, the results indicate that there is a possible relationship between tumour AnxA1 and macrophage activity. In line with transcriptomic result, the flow cytometry analysis revealed that CN treatment combined with AnxA1 KD re-educated the M2 macrophages to M1 phenotype and substantially increased the M1 macrophages. Taken together, the findings indicate that CN together with AnxA1 knockdown can enhance the macrophage polarization to an M1 phenotype which might inhibit the cancer cell growth, however, the anti-cancer mechanism induced by M1 phenotype warrants further investigation.

Keywords: Annexin A1, tumour microenvironment, TAM; macrophage polarization, M1 phenotype

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OR-22

Effects of Palm Carotene Mixture on Osteoblasts and Osteoclasts in A Two-Dimensional Co-Culture System

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Naturally derived carotene usually presents in a mixture of its α-, β-, and, γ-isomers. The skeletal effects of palm carotene mixture have not been studied. This study aimed to investigate the effects of palm carotene mixture on osteoblast proliferation and osteoclast maturation using a two-dimensional osteoblast-osteoclast co-culture system. Cell viability of human foetal osteoblast 1.19 cells and THP-1 monocytes were performed at day 1, 3, and 6 after treatment with different concentrations of palm carotene mixture (3.13-50 µg/ml). Both osteoblasts and monocytes were then co-cultured in a ratio of 2:1 for 21 days under standard culture conditions. The co-cultured cells were stained using alkaline phosphatase (ALP) to measure osteoblast proliferation and tartrate-resistant acid phosphatase to measure the number of multinucleated osteoclasts. Palm carotene mixture showed non-cytotoxic effects on osteoblasts and monocytes. The co-cultures treated with palm carotene mixture at a concentration of 12.5 µg/ml showed an earlier peak for the ALP-positive area on day 14 as compared to the co-cultures treated with vehicle ($p<0.05$). No significant change was observed in the number of multinucleated osteoclasts between co-cultured cells treated with 12.5 µg/ml of palm carotene mixture and without treatment on day 14 ($p>0.05$). Our results suggest that the palm carotene mixture hastens osteoblast proliferation without affecting osteoclast maturation. The findings of the current study await further validation using a comprehensive three-dimensional co-culture system mimicking the skeletal microenvironment.

Keywords: Bone cells, bone remodeling, alpha-carotene, beta-carotene, gamma-carotene

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OR-23

Protective Effects of Edible Bird Nest on p38 MAPK pathway in Busulfan-induced Sprague Dawley Rats

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Busulfan is a chemotherapy drug that could cause adverse effects on the sperm parameters and spermatogenesis leading to male infertility. Edible bird nest (EBN) was found to be beneficial in treating infertility in men. EBN contains antioxidants and possesses positive proliferative effects on spermatogonia resulting in improvement of sperm parameters and spermatogenesis. Thus, this study is aimed to evaluate the protective effects of EBN supplementation on p38 MAPK pathway in Busulfan-induced male Sprague Dawley rats. In this study, thirty-six adult male Sprague Dawley rats at the age of eight weeks were equally divided into six groups (n=6). The control group received a standard food diet, the sham group received DMSO, the Busulfan group received 10 m/kg Busulfan and the remaining groups received 10 mg/kg Busulfan and different doses of EBN (250 mg/kg, 500 mg/kg, and 1000 mg/kg) in each group. 10 mg/kg Busulfan was administered as a single intraperitoneal injection to induce oligospermic condition. EBN enriched pellets were administered daily for 28 days. After 28 days, rats were sacrificed, the organs were dissected, and organ coefficients were evaluated. Sperm parameters including sperm concentration, sperm motility, and sperm viability were measured. Findings showed 500 mg/kg and 1000 mg/kg EBN supplementation demonstrated a significant increase in sperm concentration when compared to the Control, Sham and Busulfan group. However, there are no effects on sperm motility or viability. In conclusion, EBN supplementation may possess protective effects on sperm parameters and may improve male fertility.

Keywords: Edible bird nest, oligospermic, sperm parameters, p38 MAPK, Busulfan

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OR-24

The Mechanisms Linking Vitamin D Deficiency and Diet-Induced Obesity in the Development of Insulin Resistance in Mice Skeletal Muscles

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Vitamin D deficiency and diet-induced obesity have been independently linked to the development of insulin resistance (IR). However, the exact mechanisms linking both conditions concomitantly to the development of IR are still a matter of debate, and it remains unclear, particularly in insulin-responsive tissues. The aim of this study is to evaluate the mechanisms linking vitamin D deficiency and diet-induced obesity to the development of IR, focusing on skeletal muscle (SM) tissue. 48 adult ICR strain mice were divided into 4 groups of different diet types for 12 consecutive weeks: G1: standard diet with 2000 IU/kg vitamin D (SD+VD), G2: standard diet without vitamin D (SD-VD), G3: high-fat diet with 2000 IU/kg vitamin D (HFD+VD), G4: high-fat diet without vitamin D (HFD-VD). Weekly fasting blood glucose (FBG) and body weight were measured. Oral glucose tolerance test (OGTT) and insulin tolerance test (ITT) were also performed. Gastrocnemius muscles were harvested for immunohistochemistry, immunofluorescence, and simple western analysis. There were significantly higher FBG levels and impaired OGTT and ITT results in the HFD-VD group. Molecular studies demonstrated significantly lower expression of insulin receptor subunit IR-α, key insulin-signalling molecule GLUT4, anti-inflammatory marker Adiponectin, and antioxidant enzyme Catalase in the HFD-VD group, indicating an ongoing development of IR together with ongoing inflammation and oxidative stress in the SM tissue. On the other hand, there were significantly high levels of pro-inflammatory marker TNF-α and oxidative stress marker malondialdehyde (MDA) in the HFD-VD group compared to the rest. This study suggests that vitamin D deficiency and diet-induced obesity are linked to the development of IR in mice SM by causing metabolic impairment, disrupting insulin signal transduction responsible for glucose uptake and subsequently metabolism, exerting inflammatory effects, as well as causing oxidative stress in the SM tissue.

Keywords: Vitamin D, insulin resistance, obesity, skeletal muscle, inflammation

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POSTER PRESENTATION

P-1

Low Dose of Endothelin-1 Activates Endogenous Protective Mechanisms via Suppression of the Classical and Activation of The Alternative RAAS Axis in Rat Retina

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Glaucoma is a group of optic neurodegenerative diseases that is hallmarked by the loss of retinal ganglion cells and their axons. There is evidence suggesting the important role of endothelin-1 (ET1) in glaucomatous neurodegeneration. ET1 is the most potent vasoactive peptide mediating vasoconstriction. Hence, ET1-induced models or retinal injury are often used for experimental purposes. Notably, components of the renin-angiotensin-aldosterone system (RAAS) are present locally in the retina and may play an important role in the fate of the injured retinal tissue; however, the effect of ET1 on RAAS expression remains unclear. The objective of this current study was to investigate the effect of ET1 at a dose of 200 pmol on the protein expression of retinal glutamate and RAAS components. *Sprague Dawley* rats of either sex weighing 150-300 g were randomly allocated into two groups of 54 animals each: the control group received PBS while the other group received ET1, intravitreally. Seven days after injections, the rats were sacrificed, and their retinas were harvested. The retinal samples were homogenised and underwent ELISA to estimate the concentration of angiotensinogen, renin, angiotensin I (Ang I), angiotensin-converting enzyme (ACE), angiotensin II (Ang II), angiotensin type 1 receptor (AT1R), angiotensin-converting enzyme 2 (ACE2), angiotensin 1-7 (Ang 1-7), aldosterone and glutamate. In our study, the expression of Ang I, Ang II, glutamate, and aldosterone were significantly decreased in ET1-exposed retinas compared to the control group, whereas the expression of ACE2, Ang 1-7, and AT1R were significantly upregulated. It is suggestive that at dose 200 pmol ET1, the classical ACE/Ang II/AT1R axis is counter-regulated by the ACE2/Ang 1-7/Mas receptor axis that opposes the actions of ET1. Experimental studies that aim to investigate therapeutic agents targeting RAAS in rats should use an ET1 dose higher than 200 pmol because pathological switch in the RAAS expression is unlikely at this intravitreal dose.

Keywords: Renin-angiotensin-aldosterone system (RAAS), glaucoma, ischemic retinal damage

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P-2

Minocycline Reduced Toll Like Receptor-4 (TLR-4) in the Lipopolysaccharide-Induced Neuroinflammation Rat Model

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Lipopolysaccharide (LPS) was used to induce neuroinflammation. However, the effects of minocycline on Toll-like receptor-4 (TLR-4) activation induced by LPS was not elucidated. The aim of this study is to elucidate the effects of LPS and minocycline on TLR-4 in comparison to a clinically approved drug, memantine. A total of twenty-five male SD rats were divided into: (i) control, (ii) LPS, (iii) LPS-treated with minocycline 25 mg/kg, (iv) LPS-treated with minocycline 50 mg/kg, and (v) LPS-treated with memantine 10 mg/kg. Minocycline and memantine treatments were administered intraperitoneally once daily for 2 weeks, and LPS was injected once on day 5. Immunohistochemistry and western blot for TLR-4 protein were performed to measure its expression and level in the hippocampus and cortex. This study showed that LPS significantly increased TLR-4 expression and level compared to other groups ($p<0.05$). Minocycline treatment, dependent on dose, reduced TLR-4 expression and level compared to the LPS group ($p<0.05$), comparable to the memantine effect. Dependent on the dose, minocycline reduced TLR-4 expression in the LPS rat model of neuroinflammation, similar to the effect of memantine. Thus, minocycline has potential preventive-therapeutic effects in neuroinflammatory diseases such as Alzheimer's.

Keywords: Toll-like receptor-4, lipopolysaccharide, minocycline, memantine

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P-3

Involvement of Descending Nociceptive Signalling in Antinociceptive Activity of DMPF-1 Compound in Mice Model

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Searching for an analgesic compound to replace poorly tolerated and various side effects of commonly used medications are still keeping pace. Chalcone and its derivatives are being extensively explored due to its pharmacological potential in treating various illnesses. Chalcone derivative, 3-(2,5-dimethoxy phenyl)-1-(5-methyl furan-2-yl) prop-2-en-1 (DMPF-1) has been shown to have analgesic properties; however, its underlying mechanism towards the specific nociceptive pathway is poorly investigated. Therefore, this study was designed to evaluate the antinociceptive mechanism evoked by this compound. Analysis of the response mechanism of DMPF-1 was evaluated to identify how this compound participates in central antinociception specifically. Several central modulatory activities involved in the pain pathway were studied, including GABAergic, dopaminergic, and cholinergic systems. At present, the possible involvement of various inhibitory neuroreceptors was performed using an acetic acid-induced abdominal writhing test. Pre-treatment with bicuculine appears to block its antinociceptive profile in which the event was not seen in pre-treatment with phaclofen, thus suggesting the involvement of the GABAA receptor. Meanwhile, pre-treatment of the subject with haloperidol and metoclopramide was carried out to investigate the involvement of dopaminergic receptors. Marked inhibition of DMFP-1 activity by only metoclopramide was observed, which indicated the contribution of the D2 dopaminergic receptor. Further investigation using atropine attenuated its antinociceptive action, thus suggesting those receptors' participation in pain modulation. In summary, the present study demonstrates that antinociceptive activity provided by chalcone derivative DMPF-1 was possibly through its interaction with various modulatory systems, namely, GABAA receptor system, D2 dopaminergic, and cholinergic system. Thus, the promising action of this compound could make it become a compound of interest in developing a new analgesic agent to counter pain.

Keywords: (3-(2,5-dimethoxyphenyl)-1-(5-methylfuran-2-yl prop-2-en-1- one, chalcone, analgesic, pain, GABAergic

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P-4

Skeletal Effects of E'Jiao in An Ovariectomised Rat Model of Bone Loss

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E'Jiao derived from donkey's skin is a traditional Chinese medicine used to nourish the blood and treat dry cough. E'Jiao could be a potential osteoporosis preventive agent due to its rich collagen content, but this speculation needs to be validated in a proper model of bone loss.
Objectives: This study aimed to determine the skeletal effects of E'Jiao in an ovariectomised rat model of bone loss. Forty-two three-month-old female Sprague Dawley rats were randomised into baseline, sham and ovariectomised groups. The ovariectomised groups were treated with either low- (0.26 g/kg), medium- (0.53 g/kg) and high-dose E'Jiao (1.06 g/kg), or calcium carbonate (1% w/v) for eight weeks. Bone mineral density and content were determined at baseline, 1 and 2 months after treatment. Blood was collected at baseline and at sacrifice to determine the level of bone remodelling markers. Femur and tibia were harvested at sacrifice for bone histomorphometry and biomechanical strength investigation. All doses of E'Jiao prevented high bone remodelling due to ovariectomy marked by the elevated bone formation and resorption markers, single-labelled surface and osteoclast surface. Both ovariectomy and treatment did not affect bone microstructure, bone mineral density and content, and biomechanical strength profile of the rats. E'Jiao could suppress the high bone remodelling phenotype in early menopause. A more comprehensive study with a longer treatment period will be required to establish the effects of E'Jiao in preventing bone loss.

Keywords: Bone, collagen, oestrogen deficiency, osteoclast, osteoporosis

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P-5

Effects of Isometric and Isotonic Circuit Exercises on QT Interval Among Young Adults in Malaysia

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Vigorous exercise can acutely increase the risk of Cardiovascular (CV) event during or immediately after exertion in young adults. The vagus nerve activity increases after the exercise cessation to return the heart to normal levels, thus resulting in lengthening of QT interval. An exercise Electrocardiogram (ECG) screening is suggested to observe if the circuit exercises can further trigger a more extensive CV event. The study aimed to investigate the immediate effects of isometric and isotonic circuit exercises on QT interval in young adults. 100 healthy subjects aged between 18 to 24 participated in this study. All subjects underwent four different circuit exercises: upper limb isometric circuit, upper limb isotonic circuit, lower limb isometric, and lower limb isotonic circuit exercises. A baseline ECG and post-exercise ECG after completion of each circuit exercises were recorded. Paired t-test was used to compare the pre- and post-circuit exercises. The study found a significant ($p<0.05$) decrease of QT interval duration which was observed after both isometric and isotonic circuit exercises of upper and lower limb when compared to pre-exercise values. QT interval duration reduced from 0.33 seconds to 0.31 seconds (post-isometric upper limb circuit), 0.30 seconds (post-isotonic upper limb circuit), 0.31 seconds (post-isometric lower limb circuit) and 0.29 seconds (post-isotonic lower limb circuit). There was no prolongation of QT interval duration observed after both isometric and isotonic circuit exercises training. In conclusion, a change in QT interval can be seen among healthy young adults, and if predisposed with other comorbidities, physical exertion may increase the risk of a CV event. It is unlikely that the isometric and isotonic circuit exercises exerted different effects on vagal activity as the duration of QT interval were decreased after each circuit exercises.

Keywords: Ventricular depolarization, repolarization, post-exercise effect, electrical changes

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P-6

Effect of Kelulut Honey Supplementation on Bone Biomechanical Strength in Male Rats on High-Carbohydrate-High-Fat Diet

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Metabolic syndrome has been implicated in the pathogenesis of osteoporosis. Kelulut honey (K) is shown to be beneficial to metabolic and skeletal health in separate studies. This study aimed to investigate the effects of K on the bone biomechanical strength of rats with metabolic syndrome (MetS) induced by high-carbohydrate high-fat (HCHF) diet. Male Wistar rats were randomly assigned to the normal control and MetS group fed with HCHF. The MetS group was further divided into negative control and honey group supplemented with K (1 g/kg/day) for eight weeks. High-resolution bone mineral content and density scans were performed on femur bone at the end of the study. Femoral biomechanical properties were analysed using a universal mechanical tester. Displacement and strain decreased significantly, while stiffness increased significantly in the negative control group compared to the normal control group ($p<0.05$). No significant difference was observed in bone area, bone mineral content and bone mineral density among the groups. MetS exerts harmful effects on bone biomechanical strength and kelulut honey reverses these effects.

Keywords: Metabolic syndrome, osteoporosis, bone strength

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P-7

The Effect of Vitamin E and Vitamin C Supplementation on DNA/ RNA Oxidative Damage in Down Syndrome Individuals

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The Cu-Zn superoxide dismutase (SOD) gene is present on chromosome 21, thus, individuals with Down syndrome (DS) are under oxidative stress. Antioxidant supplementation is thought to decrease the oxidative stress level. Vitamin E is one of the fat-soluble antioxidants present in cell membranes and plasma lipoprotein that forms an important line of defense against hydroxyl radicals while vitamin C is an essential cofactor for α-ketoglutarate-dependent dioxygenases. Human requires these two dietary antioxidants for hemostasis. Therefore, the objective of this study was to determine the effects of Tocotrienol Rich Fraction (TRF) and vitamin C supplementation on DNA/ RNA oxidative damage levels in DS individuals. In this randomised, double-blind, placebo-controlled study, 60 DS individuals (aged between 2 to 29 years old) were recruited. They were assigned to receive either supplementation (n=30) of TRF (150 mg) and vitamin C (250 mg) or placebo (n=30) for 6 months. Blood samples were obtained from each subject at 0, 3rd and 6th months for the measurement of DNA/RNA oxidative damage by quantifying 8-hydroxy-2'-deoxyguanosine (8-OHdG) using ELISA. Unfortunately, there was no significant difference in the treatment group from the controls ($p>0.05$). When comparing the 8-OHdG level at 3 and 6 months of intervention, no significant difference also was observed from baseline at 0 months ($p>0.05$). In summary, there was no significant difference in DNA/RNA oxidative damage with the supplementation of vitamin E and C compared to the placebo-control group. A more significant impact of the supplementation might be observed if the study was extended for another 6 months.

Keywords: Down syndrome, TRF, vitamin C, oxidative DNA damage, 8- OHdG

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P-8

In Vitro Functional Characterisation of Cytochrome P450 2C19 Allelic Variants CYP2C19*31, CYP2C19*32, and CYP2C19*33

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Cytochrome P450 (CYP) enzymes are among the most important drug-metabolising enzymes, responsible for metabolising 70% to 80% of clinically used drugs. CYP2C19 catalyses at least 10% of clinical medicines, such as (S)-mephenytoin as an anticonvulsant and omeprazole as an antiulcerative. Thirty-five variants have been reported. CYP2C19 alleles with decreased enzyme activity such as CYP2C19*2 and CYP2C19*3 are linked to poor drug metabolism status. CYP2C19*31, CYP2C19*32 and CYP2C19*33 were recently identified from the Chinese Han population. Their enzyme activities are yet well documented. This study aimed to compare the catalytic activities of CYP2C19*31, CYP2C19*32 and CYP2C19*33 with that of CYP2C19 wild type (CYP2C19*1) by employing as probe substrates in vitro. The plasmid of pACYC-ompA-OxR and pCW-CYP2C19 wild-type were extracted from E. coli. Then, the reactions of site-directed mutagenesis of CYP2C19*31 and CYP2C19*32 and CYP2C19*33 alleles were successful and verified by the sequencing analysis. After transformation, the proteins were expressed from E. coli. Fluorescence-based enzyme assays were used to evaluate the enzyme activities by quantifying metabolite formation. Enzyme kinetic parameters such as IC50, Km and Vmax were determined. Vivid® EOMCC (ethoxymethyloxy-3-cyanocoumarin) as a substrate was used in the current study. It showed no significant difference in enzyme kinetic parameters on CYP2C19*31, CYP2C19*32 and CYP2C19*33 compared with CYP2C19 wild type in vitro. Miconazole, a positive inhibitor of CYP2C19, was used in the experiment. The result showed that CYP2C19 wild type and CYP2C19*31 have a higher IC50 than CYP2C19*32 and CYP2C19*33 but have similar Ki. Other substrates such as (S)-mephenytoin and omeprazole will be tested in the near future.

Keywords: CYP2C19 allelic variants, *in vitro*

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P-9

Ethyl Acetate Fraction from *Parkia speciosa Hassk.* Empty Pod Extract Alleviates Angiotensin II-Induced Cardiomyocyte Hypertrophy

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Parkia speciosa Hassk. (bitter bean) is traditionally used for reducing hypertension and maintaining cardiovascular health. It was shown previously that empty pod crude extract of P. speciosa reduced cardiomyocyte hypertrophy in H9c2 cells. This study therefore was undertaken to investigate the effects of various fractions of the plant ethanol extract on angiotensin II (Ang II)-induced cardiomyocyte hypertrophy. Ethyl acetate (EA) fraction displayed the best antihypertrophic effect based on the release of brain natriuretic peptide (BNP) and was selected for further study. H9c2 cells were exposed to three concentrations of EA fraction (25, 12.5 and 6.25 µg/mL) and valsartan (20 µM, a positive control) simultaneously with Ang II (1 µM) for 24 h. The treatment with EA fraction at all concentrations and valsartan diminished the increases in cell surface area, hypertrophic factors which were atrial natriuretic peptide (ANP) and BNP, reactive oxygen species level and protein content in the cells induced by Ang II. The effects of EA fraction were comparable to that of valsartan. In conclusion, EA fraction from *Parkia speciosa* empty pods exhibited protective effects against Ang II-induced cardiomyocyte hypertrophy in H9c2 cells, possibly via its antioxidant property.

Keywords: *P. speciosa*, plant extract, cardiac hypertrophy, angiotensin II

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P-10

The Effect of Prenatal Bisphenol A Exposure on the Expression of MicroRNA in Hippocampus of Male Sprague Dawley Rat

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Interactions between epigenetics and environmental factors are believed to cause permanent disorders. The effect of environmental pollutants such as Bisphenol A (BPA) has been documented in pregnant women to cause neurodevelopmental disorders in their offspring. Early-life exposure to BPA is a potential concern as deregulation of miRNA expression may adversely affect brain development. Therefore, this study aims to investigate the effect of prenatal BPA exposure on the expression of miR-19a and miR-539 in the male rat hippocampus at different aging stages. For the treatment group, 5 mg/kg/day of BPA dosage with 0.5% Tween 80 in reverse osmosis water were orally exposed to the pregnant Sprague Dawley rats from gestation day 2 until 21. The control group was exposed to the same except without BPA. The male foetuses and litters were raised until gestation day 21 (GD21), postnatal day 7, 14, 21 (PD7, PD14, PD21), and adolescent day 35 (AD35). The expression of miR-19a and miR-539 in the male foetus and adolescent hippocampus was measured using RT-PCR. The findings showed that the expression miR-19a and miR-539 ($p<0.01$ and $p<0.001$) between all ages was disrupted and significantly decreased compared to control. In conclusion, the BPA-induced miRNA alterations in the hippocampus may interfere with the gene expression during neurodevelopment and increase the susceptibility of the offspring to have impairment in synaptic function during the learning and memory process in later life.

Keywords: Bisphenol A, miRNA, prenatal, hippocampus

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P-11

Asiatic Acid Inhibits Cells Proliferation and Induce Apoptosis in Acute Lymphoblastic Leukaemia Cells In Vitro

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Asiatic acid (AA) is a pentacyclic triterpene that is widely present in various natural products, such as *Centella asiatica* or also known as 'pegaga' in our local populations. It has been reported to possess anti-cancer properties in various types of cancer cells. The present study aims to investigate the anti-leukaemic activities of AA in CCRF-CEM acute lymphoblastic leukaemia (ALL) cells *in vitro*. The cells were treated with different concentrations of AA (from 0 to 40 µM) for 48 hours before being evaluated for cell viability by MTT assay. Cell apoptosis was determined by double staining with Annexin V- FITC/propidium iodide and detected by a flow cytometer. The production of reactive oxygen species (ROS) and mitochondrial membrane potential (MMP) was detected using a fluorescent reader. The protein expression levels of caspases (CASP3, CASP7 and CASP9) were observed by western blotting. Results show that AA possessed high cytotoxicity activity toward leukaemia cells with the IC50 value of 13.14 ± 1.13 µM. It induced almost 6% of early and late apoptosis compared to the control group (untreated). ROS level was gradually increased in the range of 10-30% at different incubation times (0, 1, 2, 3, and 4 h) and slightly increased the MMP level in the cells. Meanwhile, AA was found to induce the protein expression level of caspases in the cells and further activate intrinsic apoptosis leading to cell death. These findings suggested that AA is a potential chemotherapeutic candidate in the treatment of leukaemia.

Keywords: Asiatic acid, leukaemia, proliferation, apoptosis, reactive oxygen species, caspases

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P-12

The Phytochemicals Identification and Quantitative Determination of Aqueous Propolis Extracts Derived from *Geniotrigona Thoracica Sp.*

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Propolis is a resinous material or wax-cum-resin substance that comprised a combination of biologically active compounds produced by stingless bees. The major polyphenols (flavonoids, phenolics, and terpenes) which have results in recent surge of interest in the pharmacological evaluation of analgesic, anti-inflammatory and anticancer properties. Water solvent is frequently used due to its low toxicity since it economically and most favorable. Aqueous extraction of propolis sample was prepared from stingless bee species namely *Geniotrigona thoracica sp.* The phytochemical components were separated on a C-18 column, mixture of mobile phase (A)methanol: acetonitrile: deionized water (40:5:55, v/v) containing 0.1% formic acid (v/v) and (B)methanol: acetonitrile: deionized water (80:5:15, v/v) containing 0.1% formic acid (v/v) and flow rate at 0.4 ml/min. Chromatographic peaks were identified by comparison of their retention times with standard compounds. Propolis extract of *Geniotrigona thoracica sp.* revealed the presence of caffeic acid and p-coumaric acid via High Performance Liquid Chromatography (HPLC) analysis. This study finding suggested that Malaysian propolis contains chemical constituents that are similar with other geographical vouchered propolis. Only a few bioactive compounds can be identified via HPLC analysis due to the limited usage of certified standards that serve as reference for the presence of the compounds in propolis extracts. Further usage of a higher number of reference standard is needed to ascertain for the major constituents of propolis commonly seen in European country to act as markers in HPLC chromatograms.

Keywords: Phytochemical, propolis, *Geniotrigona thoracica*, phenolics

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P-13

The Effects of Long Term Pitavastatin Treatment in Hyperlipidemia Rat Model

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Statins are mostly prescribed drug to combat dyslipidemia as they are proven effective in lowering low-density lipoprotein cholesterol (LDL-C) levels and therefore, it may decrease the risk of cardiovascular disease. However, it has been shown that statin therapy may increases the risk of a patient to suffer from incident type 2 diabetes. Hence, the aim of this research study was to investigate the effects of hyperlipidemia and long term pitavastatin therapy on blood glucose, adiponectin, and histopathological analysis on pancreas of hyperlipidemia rat model. We used hyperlipidemia rat model which were divided into three groups namely; Hyperlipidemia CMC - treated with 0.5% Carboxymethylcellulose (CMC); Hyperlipidemia ATV - treated with 10 mg/kg Atorvastatin; and Hyperlipidemia PTV - treated with 3 mg/kg pitavastatin. Fasting blood glucose (FPG), oral glucose tolerance test (OGTT) and adiponectin level readings were collected and tested prior statin treatment and similar data were also taken at week 8 of treatment. The pancreases of the rats were collected for histological analysis at the end of experiment. It was observed that there were significant increases in FPG and glucose levels at minute 120 in OGTT in Hyperlipidemia ATV group compared to Hyperlipidemia CMC and Hyperlipidemia PTV groups at week 8. Both group of Hyperlipidemia ATV and Hyperlipidemia PTV groups showed significant increase in adiponectin level at week 8 of experiment. Histological analysis on pancreas for Hyperlipidemia CMC and Hyperlipidemia PTV groups showed normal morphology, while Hyperlipidemia ATV group showed abnormal morphology. Despite both pitavastatin and atorvastatin tests showed a greater increase in adiponectin level, long term treatment with pitavastatin has beneficial effects on glucose metabolism and showed normal morphology of pancreas, compared to atorvastatin.

Keywords: Hyperlipidemia, pitavastatin, atorvastatin, adiponectin, type 2 diabetes

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P-14

Reproductive Hormones and Organ Coefficient Following Edible Bird Nest Supplementation in Busulfan-treated Male Rats: A Preliminary Report

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Edible bird nest (EBN) is a well-known nutraceutical consumed for most body systems, including the male reproductive system. However, scientific evidence of its effectiveness in improving male factor infertility is sparse. This study aimed to evaluate the effect of EBN supplementation on Busulfan-induced male Sprague-Dawley rats. Thirty Sprague Dawley male rats (N=30) at eight weeks were randomly divided into five groups: Control, Sham, Busulfan, EBN 250 mg/kg/daily and EBN 1000 mg/kg/daily. A single dose of 10 mg/kg of Busulfan was injected intraperitoneally to induce the oligospermia condition in the rats. EBN supplementation was given daily for 28 consecutive days. The effects of EBN supplementation were studied on organ coefficients and male reproductive hormones. Busulfan has reduced the organ coefficient of the testes but increased in the seminal vesicle. EBN supplementation of 1000 mg/kg has increased the organ coefficient of the epididymis in oligospermia-induced animals. Estradiol and testosterone levels are reduced, but luteinising hormone is increased. In contrast, there is no change in follicle stimulating hormone levels after EBN supplementation. In the oligospermia-induced model, EBN influences male reproductive hormone levels and most likely plays an essential role in organ coefficient changes.

Keywords: Edible bird nest, male reproduction, rats

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P-15

The Biphasic Relaxation of AH-13205 (Selective EP2 Agonist)

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Prostaglandin has been shown to be beneficial in cardiovascular diseases. A study in EP2-KO (knock-out prostanoid E2 receptor/EP2) mice showed that intravenous infusion of prostaglandin E2 (PGE2) induces hypertension. When fed on a high-salt diet, the EP2-KO animals developed significant hypertension with a concomitant increase in urinary excretion of PGE2. These results indicate that PGE2 is produced in the body in response to a high-salt diet and works to negatively regulate blood pressure via the relaxant EP2 receptor. Thus, a selective EP2 agonist that produces significant relaxation in the smooth muscle is a promising therapeutic agent for hypertension. AH-13205, a synthetic selective EP2 agonist, has been shown to produce complete relaxation under 1 μM histamine tone (low tone) in the guinea-pig trachea (GPT) in a myograph study. However, the relaxation of AH-13205 under a high tone of histamine (100 μM) was atypical, as the data points did not fit the standard sigmoidal curve well. Two theoretical curves were fitted to the inhibition data using the two-site competition equation for AH-13205 under high tone histamine. Four parameters were fitted by the one-site equation fit using GraphPad Prism. The r2-value was 0.96 for the two-component fit and 0.91 for the one-component fit. Statistical analysis established that the two-curve fitting was significantly better than the single-curve fitting, indicating that AH-13025 has two components to its relaxation curve (bi-phasic relaxation). This suggest the dual-mechanism action of AH- 13025 or the presence of two isomers in AH-13205 may be responsible.

Keywords: AH-13205, EP2 agonist, biphasic, two-site competition, myograph

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P-16

Evaluation of Oral Toxicity Effect of Non-Polar Leaf *Baeckea Frutescens* Extract on Wistar Rats Model

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The purpose of this research is to determine the acute and subacute toxicity of hexane extract of *Baeckea Frutescens (Bf)* in Wistar rat model. The acute toxicity test was carried out with a limit dosage of 2000 mg/kg body weight. Data were collected and documented every 24 hours for the next 14 days. During the study, the rats were weighed, and other observations, such as mortality, behaviour, damage, or any indicators of disease, were made twice daily. For the subacute test, four groups of eight animals (n=8) were used (four female rats and 4 male rats) received corn oil (Vehicle), as well as low, intermediate, and high concentrations of non-polar *Bf* leaves extract were administered orally every 24 hours for 28 days. Haematological testing and biochemical parameters were examined at the completion of each research. For visible discoveries, histopathological analysis of important organs (kidneys and livers) was performed and compared to controls. When compared to the control, there was no significant difference ($p>0.05$) in the relative organs, body weights, haematological, biochemical parameters, or physical abnormalities. There was no death recorded. As a consequence of the data, it is possible to conclude that oral treatment ingestion of non-polar *Bf* leaves extract for 28 days does not promote toxicity.

Keywords: *Baeckea Frutescens*, non-polar extract, oral toxicity, Wistar rat model

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P-17

Bone Protective Effect of Fig on Bone Strength of Ovariectomized Rats

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Osteoporosis results in millions of fracture cases globally every year, with the vast majority involving postmenopausal women. Postmenopausal women are exposed to a 20% lifetime risk of hip fracture and 50% risk of any osteoporotic fracture. Hip fracture results in low quality of life and increased risk of deaths. The pharmacological agents for treatment of postmenopausal osteoporosis are classified into anti-resorptive such as estrogen replacement therapy (ERT), bisphosphonates, denosumab, and teriparatide. Although these agents are known to be effective, long-term use may result in many adverse effects. This study is mainly focusing to evaluate the bone protective effects of *Ficus carica* (FC) via the anti-inflammatory pathway on bone-related genes and bone strength of postmenopausal osteoporotic rat model. Forty Sprague Dawley female rats were divided into five groups. Group I comprised the sham-operated rats, while groups II-V included ovariectomised rats. After 10 weeks, the right and left tibia of all rats were harvested and stored at -80°C till used for analysis. Group I and II were given distilled water at 0.2 ml/100g daily via oral gavage. Group III was given an estrogen replacement therapy (ERT) at 64.5 µg/kg) daily via oral gavage. Group IV and V were orally given dried and raw figs respectively at 0.2 ml/100g. After ten weeks, the gene expressions were measured. Group IV showed significantly higher gene expressions of ALP compared to Group II. In conclusion, these findings suggested that raw and dried FC at the doses of 1000mg/kg have the potential to improve bone in treating postmenopausal osteoporosis. However, it needs to be confirmed with higher doses.

Keywords: Postmenopausal osteoporosis, *Ficus carica*, fig, bone marker, Sprague Dawley rats

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P-18

Bioactive Extract and Fraction from *Ardisia crispa* Root Exert Anticancer Effects on Colorectal Cancer by Impeding Angiogenesis and Metastasis, In Vitro

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Ardisia crispa is a local plant that has been traditionally used to treat various ailments. Previous studies on the hexane extract of the root, namely ACRH, and its benzoquinonoid rich fraction, BQ have been reported to exert promising anti-inflammatory and anti-angiogenic activities. Hence, this study aims to further investigate the potential of ACRH and BQ in impeding angiogenesis and metastasis in human colorectal cancer cell lines. Cell viability was evaluated using MTT assay which resulted in ACRH and BQ's IC50 at 1.9±0.3, 1.5±0.2 ug/mL and 2.1±0.2, 2.4±0.2 ug/mL towards HCT 116 and LoVo cells, respectively. Subsequent experiments were conducted with HCT 116 and LoVo cells treated with ACRH and BQ at concentrations of 2.0 ug/mL, 0.2 ug/mL, and 0.02 ug/mL. Apoptotic activity was measured using flow cytometry in which the results notably correlate with cell viability with increased apoptotic rate of both HCT 116 and LoVo cells in a dose-dependent manner. Scratch assay showed significant inhibitory effect on proliferative and migratory ability, particularly of LoVo cells treated with 2.0ug/mL BQ with only 36% ±0.5 cell migration. In addition, migration and invasion assays using Transwell Boyden chamber also indicated that 24-hour treatment with ACRH and BQ exert significant effects in inhibiting the mobility of both HCT 116 and LoVo cells. Although HCT 116 cells treated with ACRH at 2.0 ug/mL showed to have the least migrated (0.9 ± 0.1%) and invaded (1 ± 0.03%) cells, overall treatments of ACRH and BQ at all concentrations are observed to be more effective in inhibiting LoVo cells in comparison to HCT 116 cells. These current results suggest the promising potential of ACRH and BQ as a valuable candidate for the development of colorectal cancer therapy.

Keywords: *Ardisia crispa*, ACRH, BQ, colorectal cancer, metastasis, angiogenesis

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P-19

Correlation of Metabolic Syndrome with Clinicopathological Characteristics and Treatment Outcome in Bladder Cancer: A Retrospective Observational Study

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Metabolic syndrome (MetS) is a cluster of risk factors that include impaired glucose tolerance, abdominal obesity, hypertension, as well as dyslipidemia with low HDL cholesterol and high triglyceride levels. Several epidemiological studies have shown that MetS is linked to the occurrence and progression of several cancers, including colorectal, breast, and endometrial cancers. However, the relationship between MetS and bladder cancer is still under-investigated and often conflicting. Therefore, this study is aimed to investigate the correlation between MetS and its individual components with the clinicopathological characteristics, chemotherapy responsiveness and survival outcome among bladder cancer patients. We retrospectively analysed data of 45 patients who were diagnosed with non-muscle invasive bladder cancer (NMIBC) or muscle-invasive bladder cancer (MIBC) and received chemotherapy at the University of Malaya Medical Centre (UMMC) between 2010 and 2020. Overall, 24 patients (53.3%) were presented with MetS criteria at the time of diagnosis. Across MetS and its components, no significant association was found with pathological tumor stage, histological grade, and chemotherapy response in our patient population. Interestingly, there was a significant difference in overall survival between patients with and without diabetes (62.47 ± 8.32 months and 84.93 ± 3.96 months respectively, p=0.045). Although no significant association between MetS with bladder cancer clinicopathological characteristics and treatment outcome was found, intensive care and lifestyle modification should be considered for bladder cancer patients with metabolic disorders.

Keywords: Bladder cancer, chemotherapy, metabolic syndrome, survival

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P-20

Postnatal Trans Fat Diet Outweighs Prenatal BPA Exposure Effect on the Gut Microbiome, but Combined Treatments Possibly Lead to Weight Gain

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Bisphenol A(BPA) presence in the environment has been concerning since it negatively affects human health, especially during the developmental period. Furthermore, there is evidence that developmental BPA exposure and postnatal high fat diet could affect heart function. However, how these exposures affect the gut microbiome is still unknown. To determine how postnatal trans fat diet (TFD) influences the impact of prenatal BPA in offspring's gut microbiome, twelve pregnant rats were exposed to either BPA or control drinking water after positive mating was confirmed until the end of pregnancy. A total of 24 offspring were then divided into normal or TFD group (via feed) starting postnatal day (PND) 21 until PND100; forming CTLND, BPAND, CTLTFD, and BPATFD groups. Offspring's body weight measured on PND21 and PND100 revealed that BPATFD offspring were significantly heavier than CTLND offspring on PND100 (505.0±15.6 versus 434.2±13.7 g, $p=0.0435$). Gut microbiome analysis from stool samples collected on PND100 displayed lower bacterial diversity and richness in TFD offspring compared to normal diet offspring ($p<0.005–0.01$). Multivariate parametric analysis (Deseq) of the bacterial species revealed that there were seven significantly different species between BPAND versus BPATFD ($p<0.0001–0.05$), nine significantly different species between BPAND versus CTLTFD ($p<0.0001–0.05$), and only one significantly different species (*Ruminococcus bromii*) between BPAND versus CTLND ($p=0.0065904$). This result was consistent with the alpha diversity data (diversity and richness). Our findings suggested that postnatal TFD possibly outweighs prenatal BPA exposure effect on the gut microbiome. However, the combination of both factors (prenatal BPA and postnatal TFD) contributes to weight gain in adult offspring, perhaps leading to obesity later in life, which demands additional investigation.

Keywords: Bisphenol A, prenatal exposure, postnatal trans fat diet, obesity, gut microbiome

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P-21

Lupeol Prevents AGE Formation through ALR2 Suppression and GLO1 Activation in ARPE-19 Cell Line

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The prevalence of diabetes in Malaysia increased from 13.4% in 2015 to 18.3% in 2019 and approximately 40% to 70% of diabetic patients develop chronic complications such as retinopathy, nephropathy, neuropathy and cardiovascular complications. One major factor of the onset of diabetes is the formation of advanced glycation end products (AGEs) through the polyol pathway where an abnormal influx of aldose reductase (ALR2) activity, the rate-limiting enzyme, disrupts the natural order of the pathway. The deleterious effect of AGE also hampers the enzyme glyoxalase 1 (GLO1) of the glyoxalase cycle which prevents the formation of methylglyoxal (MGO), a major precursor of AGEs. Our previous studies showed that the crude extract of a novel polyherbal product ABPA exhibited strong antiglycation activity where lupeol was isolated as one of the major compounds in this product. Hence, the current study aims to investigate the antiglycation potential of lupeol, a pentacyclic triterpenoid isolated from ABPA, in suppressing the activity of ALR2 while activating GLO1. ARPE-19 cells were stimulated with high glucose to mimic diabetic conditions prior to treatment with controls and lupeol at concentrations of 50 µg/ml and 100 µg/ml. ALR2 and GLO1 activities was assayed spectrophotometrically at 340nm and 240 nm, respectively while the RNA and proteins were extracted from the cells to conduct qPCR, Western blot and ELISA analyses. Antiglycation properties were also studied through lysine-MGO and lysine-Glucose models. Based on the results obtained, lupeol showed excellent glycation effect in both antiglycation models and spectrophotometric assays in a concentration-dependent manner. These findings were supported with the qPCR, Western blot and ELISA analyses where lupeol showed significant decrease in ALR2 expression while increasing that of GLO1. Conclusively, lupeol shows strong therapeutic application as a potent glycation inhibitor.

Keywords: Lupeol, ALR2, GLO1, AGE formation, diabetes.

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P-22

Microlearning Packages as Self-Learning Tools for Pharmacology Teaching and Learning: Knowledge Gained and Student's Perception in a Malaysian Medical University

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The term "microlearning" refers to small, focused learning units that can be accessed on various devices, especially mobile devices. A learner-centred approach breaks down complex materials into small chunks of learning content that can be accessed anytime and anywhere. Microlearning approach enables learners to access the specific piece of information related to the specific learning outcome. This study aims to assess the knowledge and the perception of the students using microlearning for pharmacology teaching and learning. The Articulate Rise software was used to create two microlearning eLearning content packages for first-semester medical students that cover Autocoids and the principles of antimicrobial therapy topics. The subtopics were broken down into small learning chunks which were available as videos, PowerPoint, and interactive quizzes. Pre-test and post-test quizzes were added to evaluate the learning progress. The usage of the microlearning packages were tracked using SCORM format. Validated questionnaires were used to gather students' perceptions of the microlearning packages. The pre-test and post-test mean scores for the microlearning packages on autocoids were 2.9±1.9 and 3.8±1.4, respectively, with the maximum score being 5. The means scores for principles of antimicrobial therapy were 3.0±1.4 and 3.1±1.1, respectively, with the maximum score being 5. Most of the students felt that the objectives were clearly defined (51%). They agreed that these packages improved their knowledge of the topic (66%). Overall, 59% of the students felt the microlearning package was good, 24% thought it was very good, and 2% excellent. The microlearning packages were an effective tool for acquiring pharmacology knowledge. The students positively responded to microlearning packages for pharmacology teaching and learning. Microlearning packages can be a helpful learner-centric tool for pharmacology teaching and learning.

Keywords: Microlearning, Pharmacology, teaching and learning, Malaysia.

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P-23

Alginate Beads/Micro-Beads as a Drug Carriers System Prepared by Dripping/Electrospraying Method: A Comparative Study

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Hydrogelling ability of alginate has attracted high attention from pharmaceutical scientists due to their useful applications as hydrogel carriers for targeted drug delivery system. Understanding the physical properties of alginate hydrogel particles is critical to facilitate the manufacturing process and avoid limitations associated with the final product. Electrospraying is a novel technique that able to produce particles with a controlled size range. Its principle relies on generation of small droplets by applying a high voltage to polymeric solution that infused through a thin metal needle. Compared with the dripping method, electrospraying method formulates monodisperse droplets in the range of nano- to micrometer using low amount of solutions and high yield. In this regard, alginate micro-beads were produced through electrospraying and dripping methods. This work investigates the independent factors of dripping method parameters, namely: needle gauge, alginate concentration, CaCl2 concentration, on the size, sphericity, aspect ratio, water uptake, erosion and swelling of the alginate beads. Furthermore, in the case of electrospraying, the influence of applied voltage on the same factors was also examined in order to compare between both methods. The results indicated that needle gauge, alginate and CaCl2 concentration have a strong influence on the response variables. Spherical small beads with high percentage of erosion as well as low percentage of water uptake and swelling were obtained by reducing needle gauge, alginate concentration, and increasing CaCl2 concentration. While, applying high voltage led to a reduce in particles size and the degree of erosion as well as improved in particle's sphericity and increased the degree of swelling and water uptake of the particles. Electrospraying is a useful preparation method, offers a high ability to control the characteristics of prepared particles. Applying voltage added a new particle size range of the dripping method which will expand the its applications in manufacturing process.

Keywords: Alginate, electrospraying, ionic gelation, erosion, micro-beads

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P-24

Green Synthesis of Zinc Oxide Nanoparticles Using *Eurycoma longifolia* Root Extract: Characterisation and Anticancer Activity

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In the present study, zinc oxide nanoparticles (ZnOTA NPs) were synthesised by adding 7 mM Zinc acetate to solution of root extract of *Eurycoma longifolia,* which is known as tongkat ali (TA), with concentration (0.1%). Characterisation of ZnOTA NPs was carried out using techniques such as X-ray Diffractrometry (XRD), Fourier transform infrared–attenuated total reflection spectroscopy (FTIR–ATR), ultraviolet–visible spectrophotometry, scanning electron microscopy (SEM), and zetasizer. XRD analysis revealed structure of ZnOTA NPs and FTIR–ATR showed that primary and secondary amide groups in combination with the protein molecules present in the branch extract were responsible for the reduction and stabilisation of of ZnOTA NPs. TA and ZnOTA NPs were investigated for their anticancer activities. ZnOTA NPs exhibited significant anticancer activity against human breast cancer cells (MCF-7). This suggest that ZnOTA NPs synthesised from *Eurycoma longifolia* can be exploited as potential nanoformulation for anticancer therapy applications.

Keywords: Zinc oxide nanoparticles, green synthesis, anticancer

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P-25

Preliminary Screening, Determination of Phytochemicals and Its Antioxidant Capacities of *Abelmoschus esculentus* Extracts.

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Abelmoschus esculentus (L.) Moench (*A. esculentus*) commonly known as okra is a prominent vegetable crop with high nutritional and therapeutic values. It is made up of significant amount of phytochemical that exhibits its medicinal benefits. This study was performed to determine the phytochemical component and antioxidant activities of hexane extract (HE), chloroform extract (CE), methanol extract (ME), and aqueous extract (AE) of *A. esculentus* cultivated in Malaysia. The phytochemical constituents of *A. esculentus* extracts was determined by performing qualitative phytochemical screening, total phenolic content and total flavonoid content. Meanwhile, its antioxidant activities were evaluated by conducting the 1,1-diphenyl-2-picrylhidrazyl (DPPH) assay and reducing power assay. The qualitative phytochemical screening showed the presence of flavonoids, tannins, phenols, saponins, anthraquinones, alkaloids, and reducing sugars in *A. esculentus* extracts. Amongst the extracts, CE had the highest phenolic content whereas, the highest flavonoid content was depicted by HE. Besides, ME showed the highest free radical scavenging activity and reducing power. These findings indicated that extracts of *A. esculentus* are constituted with diverse range of phytochemicals and its antioxidant activities. Thus, *A. esculentus* extracts may be efficient in depleting the inflammation precursors that lead to chronic inflammatory diseases.

Keywords: *Abelmoschus esculentus*, antioxidant activities, phytochemical content.

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P-26

Bee Bread Improves Hepatic Lipid Metabolism and Inflammation in High-Fat Diet-Induced Obesity and Non-Alcoholic Fatty Liver Disease Rat Model

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Obesity is associated with non-alcoholic fatty liver disease (NAFLD). Bee bread (Bb) is a fermented mixture of pollen, honey, and bee saliva which has been reported to possess hepatoprotective and anti-obesity effects. This study aims to investigate the effects of BB on hepatic lipid metabolism and inflammation in obesity-induced NAFLD. Forty male Sprague Dawley rats were randomly divided into the following four groups (n = 10/group) i.e., Normal control (NC), high-fat diet (HFD), HFD+bee bread (HFD+Bb) (0.5 g/kg/day), and HFD+orlistat (HFD+Or) (10 mg/kg/day) groups. After 12 weeks of experimental period, the intake of HFD significantly increased Lee obesity index, calorie intake, fasting blood glucose and insulin levels, HOMA-IR index and hepatic lipids (triglyceride and total cholesterol) levels. HFD group also demonstrated increased levels of pro-inflammatory markers (nuclear factor-κβ and tumor necrosis factor-α), reduced level of anti-inflammatory marker (interleukin-10), upregulated lipid synthesis related genes (peroxisome proliferator-activated receptor gamma and fatty acid synthase), down-regulated the expression of fatty acid β-oxidation-related genes (peroxisome proliferator-activated receptor alpha and carnitine palmitoyltransferase-1α), as well as increased steatosis and fibrosis scores in the liver. Administration of Bb significantly improved all these alterations in HFD-fed rats. We demonstrated that Bb might have a promising role in regulating hepatic lipid metabolism and reducing inflammation in HFD-induced obesity and NAFLD.

Keywords: Bee bread, obesity, non-alcoholic fatty liver disease (NAFLD), hepatic lipid metabolism, inflammation

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Knowledge, Attitude and Practice Towards Voluntary Blood Donation among Students from Quest International University, Malaysia

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Adequate and safe blood supply has remained a challenge in the healthcare industry. Human blood donation is the primary source of blood and blood components required during surgery, blood loss due to accidents, obstetric and gynaecological haemorrhages, anaemic, and cancer patients. This study aimed to assess the knowledge, attitude, and practice of voluntary blood donation among university students. A total of 279 (21.29 ± 2.7 years) undergraduate students (male 111, female 168) participated in the study. A validated structured questionnaire was used for data collection, namely sociodemographic variables, knowledge, attitude, and practices pertaining to blood donation. Chi-square or Fisher's exact test was used for testing the significance between proportions (significance level, $p < 0.05$). We found a significant association ($p < 0.05$) of gender and general knowledge categories; age with the attitude towards blood donation and gender with practice. Most participants had good knowledge and positive statements towards blood donation, but the practice was relatively less. So, there is a need for an active education program to encourage all students to blood donation.

Keywords: Blood donation, gender, health, students, university.

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Effect of Sal-Drop on Systolic Blood Pressure in Spontaneously Hypertensive Rats (SHRs)

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Hypertension and its complications remain major health problems in older adults despite the availability of numerous antihypertensive drugs. The effect of Sal-drop, an electrolyte solution, on systolic blood pressure (SBP) has not been investigated before. Therefore, this study examined the effects of Sal-Drop on systolic blood pressure in spontaneously hypertensive rats. Twelve-week-old male spontaneously hypertensive rats were randomised into control, and Sal-Drop treated groups (n=6). Sal-drop was given orally, once daily for two weeks at a dose of 0.2 ml. Control group received 0.2 ml of water daily. Upon completion of the two-week treatment, the animals were allowed to recover for three weeks. Systolic blood pressure was monitored weekly throughout the study period using tail-cuff plethysmography (CODA System). Data were analysed using SPSS using ANOVA. SBP was significantly lower in Sal-Drops treated SHR than that in the control group after two weeks of treatment (150.67±6.57 and 180.50±5.34 mmHg respectively; $p<0.01$). Moreover, SBP was still significantly lower in Sal-Drops treated rats than that in controls at three weeks after the cessation of Sal-Drops supplementation (158.17±5.23 and 186.50±4.52 mmHg respectively; $p<0.01$). No significant differences were evident in body weight between the two groups. It appears that Sal-Drops decreases blood pressure in SHR and its antihypertensive effect seems to last for more than three weeks even after the cessation of treatment. This preliminary finding certainly necessitates further in-depth studies on the mechanism of the anti-hypertensive action of Sal-Drops.

Keywords: Sal-Drop, systolic blood pressure, spontaneously hypertensive rats

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P-29

The Antimicrobial Properties of *Mallotus mollissimus* and *Solanum erianthum* Extracts

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Mallotus mollissimus (M. mollissimus) and *Solanum erianthum (S.erianthum)* plants has been explored and used by indigenous communities because of their medicinal properties. Despite that, the antimicrobial activities and phytochemical constituents of these plants are under-studied. The present study investigated the antimicrobial activities and phytochemicals contents of *M. mollissimus* and *S. erianthum* plant extracts. Briefly, *M. mollissimus* and *S. erianthum* methanolic extracts was fractionated using column chromatography. Disk diffusion assays were used to determine the antimicrobial activity of the extracts and fractions against several Gram-positive and Gram-negative microorganisms. Phytochemicals (alkaloid, saponins, steroids and tannins, flavonoids, terpenoid and phlobatannins, anthraquinones and cardiac glycosides) were qualitatively determined. The results show that *M. mollissimus* and *S. erianthum* methanolic extracts exhibited a broad antimicrobial activity. Both, the plant extracts and fractions contain alkaloid, steroids and cardiac glycosides. Intriguingly, flavonoids, terpenoid, tannins were only found in *M. mollissimus* and exhibited antimicrobial activity against Streptococcus pneumoniae. The findings suggested that *M. mollissimus* have better antimicrobial activity when compared to *S. erianthum* due to additional phytochemical contents.

Keywords: *Mallotus mollissimus*, *Solanum erianthum*, antimicrobial, phytochemical

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P-30

Effect of *Bouea Macrophylla* Yoghurt on Aberrant Crypt Foci Formation of DMH-Induced Rat with High Fat Diet

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Colorectal cancer (CRC) is the third most prognoses cancer globally, with high mortality and morbidity rate. Although chemotherapy and radiotherapy have been applied as the treatments of CRC, this treatment present with various side effects. Nowadays, usage of plant and fruits as alternative supplement became prominent due to less toxic and with fewer side effects for instance, *B. macrophylla* is local fruit that has been claimed to protect against CRC. Besides that, gut microbiota also one of the factors that play a role in CRC development. Hence, this research aims to evaluate the beneficial effects of B. macrophylla yoghurt on DMH-induced rats fed with a high-fat diet. So in our study, we formulated yoghurt incorporated with *B.macrophylla* fruit. Then, this yoghurt formulation was given orally for 20 weeks toward colorectal cancer-induced rats. Our finding shows that, rats that ate our yoghurt had lesser numbers of aberrant crypt foci (ACF) in their colon, the earliest detectable neoplastic lesions in the CRC model. Inflammatory cytokines expression conducted on serum of rats that were orally treated with our formulated yogurt also shows low level compared to those without our formulated yogurt. These finding suggest that our new formulated *B. macrophylla* yogurt able to slow the progression and inflammation of CRC.

Keywords: *B. macrophylla*, colorectal cancer, high fat diet, gut microbiota, crypt foci

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P-31

The Effect of Ethanolic *E. Tapos* Yoghurt for Cognitive Function Restoration in Offspring of Obese Dams

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Maternal obesity resulted in wide range of complications particularly in neurodevelopmental in child such as intellectual delay, attention span, and memory deficit. Recent discovery shows that flavonoids able to reverse memory decline and improve learning ability. In regard to this claim, a natural tropical fruits, *E. Tapos* contains high level of flavonoid compound. As so, this research was designed to prevent neurodevelopmental delay in obese dam's offspring and to study the effect of yoghurt as a dietary supplement integrated with ethanol extracted *Elateriospermum tapos (E. tapos*) on cognitive performance on maternal programming and its offspring. In this, a total of 48 female Sprague Dawley (SD) rats were assigned to 6 groups, where the control group consisted of eight rats, and the remaining rats had obesity-induced over 17 weeks with a high-fat diet pellet. On the 18th week, the rats were allowed to mate, and pregnancy was confirmed through a vaginal smear. Upon confirmation of pregnancy, the obese induced group was further divided into five groups as follows; negative and positive controls, followed by 3 different concentrations (5, 50, and 500 mg/kg) of *E. Tapos* yoghurt. To access the cognitive performance, place and object recognition test was done on postnatal day 21 on both genders of offspring. Result indicates that significant increase ($P < 0.05$) in exploration rate in place and object test in both genders of offspring in treated groups compared to control groups. The obese rats proven to spend more time for self-grooming instead of novel place or recognition due to their emotionally stress state. However, prebiotic supplemented group enhances both hippocampal-dependent and independent memory abilities. In toto, *E. Tapos* yoghurt is a prebiotic supplement that ameliorates declarative memory, enhances learning abilities and transforms sensory information to facilitate efficient behaviour via the action of flavonoids in the offspring and obese dams.

Keywords: *E. Tapos*, yoghurt, cognitive performance, maternal programming, obesity

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Quadrupole-Time-of-Flight Mass Spectrometric Identification and Relative Proteome Quantification of Hemoglobin Subunits Alpha, Beta, Gamma and Delta in Unknown Peak of High Performance Liquid Chromatography of Haemoglobin in Beta-Thalassemia Subjects in Malaysia

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This is the first report of quadrupole time-of-flight (Q-TOF) and QQQ-mass spectrometric identification and quantification of the haemoglobin (Hb) subunits, alpha, beta, delta, and gamma-globin, derived from enzymatic digestion of proteins in the early unknown peaks of the cation exchange chromatography of Hb. The objectives were to identify the unknown HPLC peaks in healthy subjects and in patients with beta-thalassemia (β-thal). The results demonstrate the existence of pools of free globin chains in red blood cells (RBCs). These Hb peptides were identified in the unknown HPLC peaks. Identification of all types of Hb subunits in the retention time (RT) before 1 min suggests that altered Hbs is the nature of these fast-eluting peaks. The QQQ-mass spectrometric quantification of the Hb subunits, alpha, beta, delta and gamma globin peptides, aimed to assess the relationship of the quantity of these free globin chains with the phenotypic diversity of β-thal. The results demonstrated that the pools of free globin chains in red blood cells correlated with the severity of the disease in patients with different phenotypes of β-thal. The mechanism and the regulation of free globin chains pool synthesis in a normal individual and in patients with different β-thal phenotypes could arise from several pathways that will require further investigation. The relevance of β-thal to protein aggregation disorders will require a review of the role of free globin in the pathology of the disease. The role of the free globin pool in patients with β-thal for developing novel therapeutic approaches based on these potential targets requires further investigation. Pertinent biomarkers improve the diagnosis of the β-thal, especially in low-income countries where they are most common, and allows more effective therapeutic intervention leading to more successful therapeutic outcome.

Keywords: Anaemia, thalassemia, globin chain, quantification, HPLC

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PCNE-Methodology as a Clinical Pharmacologist's Tool for Working on Medication Errors in Antibiotic Use in Outpatient Practice: Implementation Mechanisms and Potential Results

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This study was aimed to investigate the prevalence and type of drug-therapy problems (DTPs) associated with antibiotics (AB) in ambulatory patients using PCNE (Pharmaceutical Care Network Europe) classification system, and to evaluate the applicability of this method in real clinical practice. Outpatients were enrolled in June 2021 (a primary study). Any detected AB-associated DTP was evaluated with PCNE Classification V 9.1. Second monitoring was performed after doctors' education in August 2021. In the first study, the population included patients with upper airways infections (UAIs): 38 pediatric (2 AB prescriptions – 5 DTPs, an average of 2.5 DTPs per patient used AB) and 101 adult patients (10 AB prescriptions – 22 DTPs, an average of 2.2 DTPs per patient used AB). In the second study population included 54 pediatric patients (3 AB prescriptions – 8 DTPs, an average of 2.66 DTPs per patient used AB) and 80 adults with UAIs (6 AB prescriptions – 13 DTPs, an average of 2.16 DTPs per patient used AB). In pediatric population drug selection (C1.1) (100%) was the most common DTP followed by under (C4.1) (50%) and over-treated (C4.2) (50%) in the first (for second study corresponding prevalence was 33%; 0%; 0% respectively). In adults, DTPs structure in the first study included C1.3 (no indication for drug, 70%), C1.1 (inappropriate drug according to guidelines/formulary, 40%), C3.2 (drug dose too high, 30%) and C3.4 (dosage regimen too frequent, 30%); in the second study prevalence for the same DTPs was 50%; 33%; 33%; and 17%, respectively. Compared with paediatricians, physicians demonstrated a higher adherence to clinical guidelines for antibiotic stewardship. Monitoring prescription lists with the PCNE classification system may be used to decrease AB prescribing errors in outpatients.

Key words: Outpatients, upper airways infections, antibiotics, PCNE classification, drug-therapy problems

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Comparison of Antiviral Activity of Novel Phenylaminouracil Derivatives with Ribavirin Against Chikungunya Virus at Different Multiplicities of Infection *In Vitro*

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Chikungunya virus (CHIKV) has caused large outbreaks of chikungunya viral fever (CHIKF) worldwide, and no specific antiviral treatment is currently available. Ribavirin and novel phenylaminouracil derivatives, Z214 and Z364, were previously shown to inhibit CHIKV *in vitro*. This study aimed to evaluate and compare the antiviral activity of Z214 and Z364 with ribavirin against CHIKV at different multiplicities of infection (MOI) in Vero cells. Vero 76 cells were infected with CHIKV at MOI of 0.5 or 1 and when treated with 50 µM Z214, 100 µM Z364, 500 µM ribavirin or 1% DMEM (virus control) at 2-hours post-infection. Non-infected cells incubated in DMEM were used as cell control. Cell viability were determined using MTS-based antiviral assay after 48 hours of incubation. This study revealed significantly higher cell viability in Z214 (114.9 ± 5.4%) and Z364 (114.2 ± 3.7%) treated groups compared to the ribavirin-treated group (83 ± 3%) ($p<0.01$). The antiviral study with CHIKV MOI of 0.5 showed a significant increase in the viability of CHIKV-infected cells with 27.8 ± 6.2% of cells viability in Z214-treated group, 24.2 ± 1.7% in Z364-treated group and 29.27 ± 3.6% in ribavirin-treated group compared with virus control ($p<0.01$). Similarly, at MOI of 1, all tested compounds significantly increased the viability of CHIKV-infected cells compared to that in virus control ($p<0.01$ for Z214 and ribavirin,–and $p<0.05$ for Z364). There was no significant difference between the antiviral activity of all test compounds against CHIKV. The study has demonstrated the potential antiviral activity of Z214 (50 µM) and Z364 (100 µM) against two different CHIKV MOI *in vitro,* that was comparable to RBV (500 µM). We acknowledge the financial support of the grants 600-UiTMSEL (PI. 5/4) (018/2020) and 600-UiTMSEL (PI 5/4)(GPK-K5TP)(006/2020).

Keywords: Phenylaminouracil derivative, CHIKV, Vero cells, cell viability, antiviral activity

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Etlingera Elatior Flower Aqueous Extract Protects Against Oxidative Stress-induced Dyslipidaemia and Hepatic Steatosis in a Rat Model of Type 2 Diabetes Mellitus

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Non-alcoholic fatty liver disease (NAFLD) is highly prevalent in type 2 diabetes mellitus (T2DM). Oxidative stress has been linked to the pathogenesis of NAFLD. *Etlingera elatior* is a medicinal plant that contains chemicals and antioxidants that can delay the oxidation process. This study aims to determine the anti-diabetic and hepatoprotective effects of *E. elatior* flower aqueous extract (EEAE) in a Type 2 DM rat (T2DR) model. The T2DR model was achieved by combining a high-fat diet (HFD) for six weeks with a low dose of streptozotocin at 35 mg/kg. Thirty-two Sprague Dawley male rats were randomly divided into four groups (n=8); Control (Normal rat), Untreated-T2DR, Met-T2DR (250 mg/kg metformin-treated T2DR), and EEAE-T2DR (1000 mg/kg EEAE-treated T2DR). All treatments were orally administered for six weeks. Fasting blood glucose, total cholesterol, triglycerides, low-density lipoprotein, and the atherogenic index were all significantly reduced by EEAE. In addition, EEAE preserved the functions and structures of the liver. Furthermore, EEAE significantly reduced malondialdehyde and increased antioxidant markers such as superoxide dismutase, catalase, glutathione, and total antioxidant capacity. The liver of untreated-T2DR rats showed steatosis histologically. However, the liver tissue in the EEAE group was preserved that comparable to the metformin-treated group. In conclusion, EEAE has anti-hyperglycemic, anti-hypercholesterolaemic, and hepatoprotective properties that may be due to its antioxidant properties. The effects of EEAE were comparable to those of the metformin-treated group. Therefore, *E. elatior* has the potential to be developed as a natural source of antioxidants for the prevention or treatment of diabetes. These findings could lead to future research into the therapeutic use of *E. elatior* in alleviating the progression of diabetes and preventing hepatic steatosis, which can lead to chronic liver disease.

Keywords: Diabetes mellitus; *Etlingera elatior*; animal model; hypercholesterolaemic; hepatoprotective

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RNA Sequencing Analysis of the Endothelial Cells Exposed to High Glucose Level Reveals Novel microRNAs

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Hyperglycemia is the hallmark of diabetes mellitus that results in oxidative stress, endothelial dysfunction and vascular complications of diabetes. MicroRNAs (miRNAs) play a role in the development of endothelial dysfunction in diabetes, with potential application for the future therapy of diabetic vascular complications. However, there is a limited number of studies that characterise the miRNA profile of endothelial cells exposed to hyperglycemic condition. This study aimed to identify the miRNA profile of human umbilical vein endothelial cells (HUVEC) exposed to a hyperglycemic state using RNA sequencing analysis. HUVEC were cultured and treated with high glucose concentration (33 mmol/L D-glucose) to induce *in vitro* hyperglycemic state. Following 24 h of treatment, total RNA was isolated, and RNA sequencing analysis was performed. HUVEC exposed to high glucose level expressed 811 known miRNAs and 1282 novel miRNAs. Based on the expression profile, five miRNAs were significantly upregulated in HUVEC treated high glucose. Among these, two novel miRNAs, novel miRNA-1133 and -90, were upregulated by 5.7-fold (P <0.05) and 4.9-fold (P <0.05), respectively. Interestingly, these novel miRNAs were associated with the phosphatidylinositol 3-kinase (PI3K) pathway, which is involved in regulating apoptosis and oxidative stress. Novel miRNA-1133 and -90 are upregulated in HUVEC exposed to high glucose levels. The findings suggest that these novel miRNAs may have a seminal role in inducing apoptosis and oxidative stress in endothelial cells exposed to hyperglycemia via the PI3K pathway. Thus, further functional study is required to validate the role of novel miRNA-1133 and -90 in HUVEC exposed to high glucose conditions.

Keywords: Diabetes, endothelial dysfunction, human umbilical vein endothelial cells, microRNA.

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Phytochemical Properties and Antioxidant Activities of *Baeckea Frutescens* Branches Ethanolic Extract on RAW 264.7.

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Baeckea frutescens L. of family Myrtaceae, locally referred to as *Cucur Atap,* is a small tree found in Peninsular Malaysia and Sumatra. It has been reported that this plant is one of the traditional remedies used to treat jaundice, measles, influenza, dysentery and dyspepsia, but scientific evidence is still lacking. This project aims to study the phytochemical contents and antioxidant activities of *Baeckea frutescens* branches ethanolic extract on RAW 264.7. The phytochemistry of the extract was evaluated by phytochemistry screening assay, whereas the antioxidant activities were determined through DPPH scavenging and ferric reducing antioxidant power (FRAP) assays. Macrophages RAW 264.7 cells were treated with non-toxic doses of the extract, challenged with LD50 of hydrogen peroxide (H_2O_2) and then cell viability of the cells was determined by using MTT assay. Phytochemical screening assay showed the presence of flavonoids, saponins, and tannins in the extract. Both DPPH and FRAP assays showed the extract exhibited good antioxidant activity in a dose-dependent manner. The MTT assay showed non-toxic doses of the extract (3.13 – 100 µg/mL) significantly reduced hydrogen peroxide-induced cytotoxicity in hydrogen peroxide-treated cells as compared to control. The results indicated that the extract has the potential to be developed as a natural antioxidant. However, further studies are required to clarify the underlying mechanism of the extract in protecting cells from oxidative stress-mediated cytotoxicity.

Keywords: *Baeckea frutescens* branches, RAW 264.7, antioxidant

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Screening of Novel Small Molecules for Parkinson's Disease-Associated Leucine-Rich Repeat Kinase 2 (LRRK2) Variant.

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Parkinson's disease (PD) is one of the fastest growing neurological disorders that affect the motor system. One of the genetic causes of PD is mutations in the leucine-rich repeat kinase 2 (*LRRK2*) gene. The G2019S mutation ($LRRK2_{G2019S}$) is commonly found among LRRK2 variants, which increases its kinase activity, perturbing neuronal survival. Hence, inhibiting the LRRK2 kinase has become a therapeutic strategy of high interest in PD treatment. However, current potent LRRK2 inhibitors such as MLi-2 did not pass clinical trials due to the side effects *in vivo*. In this study, computational experiments were conducted to screen novel small molecules for use as a LRRK2 kinase inhibitor based on their binding affinities and physicochemical properties. We show that most of the small molecules were predicted to have a better binding affinity to $LRRK2_{G2019S}$ kinase and are physicochemically effective for drug delivery than MLi-2. This suggests that they can potentially be better inhibitors than MLi-2. The computational predictions were then validated *in vitro* by inhibition of phosphorylated LRRK2 and its substrate Rab10 as biomarkers of LRRK2 kinase activity. Interestingly, the novel small molecules inhibit phosphorylated LRRK2 lesser than MLi-2. Our study can contribute towards improving strategies in developing LRRK2 kinase inhibitors targeting its mutant form without disturbing physiological LRRK2 functions to minimise side effects in PD treatment.

Keywords: Kinase inhibitors, leucine-rich repeat kinase, Parkinson's disease

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Effect of Oral Administration of Tocotrienol-Rich Fraction on Hypoxia-Induced Factor 1 Alpha (Hif-1α) in Diabetic Retinopathy Rat Model

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Diabetic retinopathy (DR) is the second commonest ocular manifestation of diabetes mellitus (DM). This complication is expected to be increased following the increased prevalence of DM every year. Abnormal growth of new blood vessels or angiogenesis plays a critical role in the DR onset and advancement. Hypoxia-induced factor 1 alpha (HIF-1α) is an important transcription factor for downstream signalling of biomarkers responsible for angiogenesis in DR. In this study, we investigated the effect of palm oil-derived tocotrienol-rich fraction (TRF), which has anti-angiogenic and antioxidant characteristics, towards the expression of HIF-1α in the retinas of diabetic rats. Male *Sprague-Dawley* rats (200 to 250g) were grouped into normal (N) and diabetic rats. N rats received intraperitoneal (IP) injection of citrate buffer, whereas diabetic rats were injected with streptozotocin (STZ) (IP, 55mg/kg body weight). Those with a blood glucose of more than 20mmol/L were considered diabetic and included in the study. Diabetic rats were further subdivided into DV and DT groups. DT group received 100 mg/kg body weight of TRF, whereas N and DV groups received vehicle. All treatment was given through oral gavage once daily for 12 weeks period, and after being euthanised, eyeballs were dissected out for measurement of HIF-1α expression using immunohistochemical staining. Greater HIF-1α immunostaining was detected in DV compared to N. Quantitatively, there was 1.58-fold higher number of HIF-1α positive nuclei in DV compared to N ($p < 0.001$). Unlike DV, less staining for HIF-1α was detected in DT with a 1.17-fold lower number of HIF-1α positive nuclei compared to DV ($p < 0.05$). The result in DT, however, was comparable to N. Oral administration of palm oil-derived TRF at 100 mg /kg body weight per day for 12 weeks lowers the retinal angiogenesis transcription factor HIF-1α expression in the STZ-induced DR rat model. We acknowledge the financial support of the grants 600-IRMI/FRGS 5/3 (101/2019) by the Ministry of Higher Education (MOHE).

Keywords: Tocotrienol-rich fraction, diabetic retinopathy, angiogenesis, transcription factor, hypoxia-induce factor 1 alpha

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P-40

Identification of Small Molecule Stabilisers of the IkBa NF-kB p50:p65/RelA Complex

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The inflammatory response coordinates various signalling pathways and is mediated by the transcription factor nuclear factor kappa-light-chain enhancer (NF-κB) of resident tissue cells and immune cells. Inflammatory responses play a crucial role in the immune system, autoimmune diseases, and cancer. NF-κB is directly regulated through protein−protein interactions, including those withp50:p65/RelA dimer and IκBa to form a trimeric complex in the cytoplasm. IkBa serves to sequesters the p50:p65/RelA dimer in an inactive state. IkBa becomes phosphorylated and subsequently degraded. This liberates the p50:p65/RelA dimer, which is its active form that moves to the nucleus to act as a transcription factor. These pathways are often deregulated in a number of cancers. In this study, we used artificial intelligence molecular screening to obtain a set of small molecule compounds predicted to target a binding site within the p50:p65/RelA: IκBa trimer complex. These compounds were screened on lung cancer cell lines using a luciferase assay, and the function of positive hits was further evaluated and validated using an assay to assess for small molecules acting as 'Molecular glues'. Our study identified a novel strategy to potentially stabilise the p50:p65/RelA: IκBa trimer complex with the potential to reduce the inflammatory pathway, which is deregulated in cancer.

Keywords: Inflammation, IkBa, p50:p65/RelA dimer

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Philanthotoxin-343 Protect Against NMDA-Induced Retinal Injury Through Modulation of Oxidative Stress, Transcription and Apoptotic Factors

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Excessive N-methyl-D-aspartate receptor (NMDAr) activation is associated with retinal ganglion cell apoptosis in glaucoma. NMDAr activation triggers Ca^{2+}-influx leading to excessive nitric oxide ($NO^{\cdot}$) production, perpetuating nitrosative and oxidative stress conditions. NMDAr excitotoxicity also upregulates transcription factors such as nuclear factor kappa B (NF-κB) and p53, thereby mediating apoptotic mechanisms resulting in RGC death. The present study examined the neuroprotective mechanism of PhTX-343 against NMDA-induced RGC loss involving suppression of nitrosative and oxidative stress as well as modulation of transcription factors and apoptotic protein. Rats were divided into three; Groups 1 and 2 were intravitreally injected with phosphate buffer saline (negative control) and NMDA, respectively. Group 3 was pre-treated with PhTX-343 24 hours prior to NMDA injection. Seven days post-treatments, rats were euthanised, and retinae were harvested. Oxidative stress levels were quantified with antioxidant biomarkers (GSH, SOD, CAT) using ELISA protocol, nitrosative stress biomarker iNOS was detected via ELISA and immunohistochemistry (IHC), transcription factor biomarkers (nFKB, p53) were determined via ELISA and IHC, while apoptotic protein Caspase-3 were quantified using ELISA and IHC. Our findings demonstrated that the NMDA-induced group were associated with significantly elevated levels of oxidative and nitrosative stress biomarkers, transcription factors, and apoptotic protein as compared to the negative control group. Pre-treatment with PhTX-343 strikingly reduced the levels of biomarkers for all parameters and were comparable with the negative control group. Our results suggested that PhTX-343 protects against NMDA-induced retinal injury by suppressing oxidative and nitrosative stress conditions and inhibiting transcription factors and pro-apoptotic protein in the rat retina.

Keywords: Philanthotoxin-343, glaucoma, N-methyl-D-aspartate receptor

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