The 2ⁿᵈ Biennial Medical & Health Sciences Conference 2019, Faculty of Medicine & Health Sciences, Universiti Tunku Abdul Rahman, was held at the UTAR Sungai Long Campus, Kuala Lumpur South, Malaysia from 4-6 July, 2019. Abstracts of the scientific presentations are as follows:

Keynote address

Challenges in the 4th Industrial Revolution

Ir Professor Academician Dato' Dr Chuah Hean Teik
President/CEO, Universiti Tunku Abdul Rahman, Bandar Sungai Long, Kajang, Selangor

In this conference, various trends and challenges facing the world with the arrival of the new Digital Revolution, commonly known as the 4th Industrial Revolution, will be discussed. The most often debated global problems related to the evolving industrial revolution include urbanization and inequality in wealth distribution, diminishing clean water, food and energy supplies, global warming and climate change, the ageing population and more recent concerns over physical-space and cyber-space security.

The medical profession will not be exempted from the disruption by the new digital revolution. In the 4th Industrial Revolution, Artificial Intelligence coupled with the 5G Technology is expected to enable hitherto unimaginable medical advances with the use of automation, machine-learning, big data analysis and the internet of things in patient care, public health management and advanced research for more rapid and accurate disease screening, diagnosis, and treatment. New technology breakthroughs demand the acquisition of new skill sets, particularly STEM skill sets, in the medical workforce. The medical profession needs to keep abreast with the latest developments in technology. Medical educators have to train future graduates who are armed with strong basic fundamentals of the natural sciences, who can embrace life-long learning and who are ready-to-evolve rather than just ready-to-market.

Address

Dr Liu Jianjun
President, Chinese Anti-Tuberculosis Association

I would like to express my sincere thanks to Universiti Tunku Abdul Rahman (UTAR) for inviting the Chinese Anti-Tuberculosis Association (CATA) to participate in the 2nd Biennial Medical Health Sciences Conference, 2019. I also congratulate the Conference on their successful opening today.

CATA was established in 1933 and has since played an important role in tuberculosis (TB) prevention and control in China. It is a member of the International Union against Tuberculosis and Lung Diseases. Its mission is to carry out domestic and foreign academic exchange, training, and anti-TB health promotion work. It participates in the development of relevant national laws, regulations and technical policies and promotes new technological developments. CATA has nearly 20,000 individual members, 18 TB professional branches, 5 working committees and 1 Youth Executive Council.

After the One Belt and Road Initiative (OBRI) of China was advocated by Chairman Xi Jinping in 2013, it got the attention of the international community. Under the umbrella of the OBRI, the China–Central Asian Forum, China-Pakistan on translational medicine platform and CATA-UTAR co-operation on TB Control were successively established to jointly cope with the challenges of global TB.

On 20th September 2018, CATA and UTAR signed the CATA-UTAR Memorandum of Understanding. In December 2018, a CATA delegation visited UTAR. During the visit, we refreshed our friendship and outlined details for our cooperation. At UTAR's invitation, CATA arranged for more than 20 delegates to attend the UTAR 2nd Biennial Medical and Health Sciences conference. At this conference and the post-conference workshop, experts from China will be making five presentations to share recent progress in scientific research and technology innovations in TB control and prevention in China.

CATA holds a national academic conference once every two years. On April 27-29, 2020, CATA will be organising the national academic conference in Qingdao city of Shandong province. Qingdao city is a very beautiful coastal city which had successfully held the Shanghai Cooperation Organization Qingdao Summit in 2018 and the Global Health Forum of Boao Forum for Asia in 2019.

I sincerely invite you all to attend the conference and share with us your knowledge and experience in cutting edge medical and health research.

This year, China and Malaysia marked the 45th anniversary of the establishment of diplomatic ties. I hope that academic exchange between Malaysia and China will grow deeper, better and stronger.

Lastly, I wish your conference all success with fruitful impact.

Thank you for attention.

PLENARIES

Plenary 1: Artificial Intelligence (AI) in Public Health

Professor Datuk Dr Awang Bulgiba Awang Mahmud
University of Malaya

In 1854, Dr. John Snow was able to deal with a London cholera outbreak using simple maps and relatively simple mathematics but that may no longer be possible in some of today's outbreaks. The advent of cheap air travel and a very globalised economy have led to a very connected world, a very large mobile population and consequently faster spread of diseases. The world therefore needs newer and faster methods of diagnosis and intervention to contain these disease outbreaks. This has led public health agencies to employ artificial intelligence (AI) to deal with the massive amounts of data, which are large in volume, high in velocity, of great variety and uncertain veracity. Research into the usage of AI in public health has increased in recent years to keep up with this demand. Although this is a welcome development, the use of AI must be tempered by a human understanding of public health.

Plenary 2: The Art of Medicine

Dr Milton Lum Siew Wah
Malaysian Medical Council

Medicine was an Art and a Science until the past six decades when there were phenomenal scientific advances. This was unfortunately not matched with similar attention to the Art of Medicine. The focus on person- and people-centred Medicine in the past two decades is an attempt to restore the patient to a central role in the practice of Medicine.

William Osler, the Father of Modern Medicine, stated "The good physician treats the disease; the great physician treats the patient who has the disease."

Doctors who practise the Art of Medicine are destined for the Oslerian transformation to that of healer, when they no longer prescribe and dispense therapies but rather embody therapy itself. Medicine then no longer becomes a living for doctors but rather a way of living.

Doctors who have perfected their Art are focused on compassionate care. Their patients believe them, trust them, and their mere presence induces healing.

Plenary 3: Global Perspective on Cell and Gene Therapies

Professor Dr John EJ Rasko AO
University of Sydney, Australia

Over the next five years a possible 900% increase in Gene and Stem Cell Therapy approvals has been forecast. Immunotherapies including checkpoint inhibitors and CAR-T cells have captured the attention of many scientists, physicians and cancer sufferers. The convergence of substantial incremental technical advances towards combined cell and gene therapy has led to improved clinical outcomes in immune deficiencies, haemoglobinopathies, blindness, immunotherapies and other inherited diseases. An audit of cell, tissue and gene products with marketing authorisation in 2018 worldwide identified 44 unique products, 37 of them are cell and tissue therapies (84%) and mainly autologous (55%).

The challenge of realising the full potential of genetic understanding has been in overcoming the hurdles of efficient gene therapy. Since the first human clinical trial using gene technology in 1989, there have been nearly 3000 approved clinical trials worldwide. The overwhelming majority of human clinical trials involve short-term gene expression or random integration of a therapeutic gene. Emerging technologies require controlled development in compliance with safety, regulatory and GMP requirements. More precise gene targeting tools were first described in the early 2000s. Targeted gene editing or replacement using Zinc Finger Nucleases or TALENS has been tested in about a dozen clinical trials since 2009. These include attempts to delete the CCR5 protein on T cells (completed 2015+) and therapeutic ZFN-mediated genome editing in mucopolysaccharidosis (recruiting 2016+) and the haemophilias (recruiting 2016+). The pace of clinical development has accelerated over nearly three decades of gene therapy. Within this context, its worth noting that the first ever (controversial) use of CRISPR to delete PD-1 in a lung cancer patient was administered in October 2016.

Highlights in the clinical cell & gene therapy field will be discussed with special reference to haemophilia, thalassaemia, graft versus host disease and cancer.

4 July 2019 – Symposium 1 (1040-1200 hrs)

Applications of AI in Clinical Medicine (1)

S1T1: Is Artificial Intelligence Ready for Prime Time in Medicine?

Professor Dr Ng Kwan Hoong
University of Malaya

Artificial intelligence (AI) has become pervasive in our life now. It aims to mimic human cognitive functions. It is making decisions that affect our lives whether we like it or not. It is revolutionising healthcare, spurred by increasing computing power, availability of healthcare data and rapid progress of analytics techniques.

In this talk, I will survey the current status of AI implementations in medicine and discuss its future. AI developments, status and issues in some specialties such as imaging, cardiology and neurology will be illustrated.

The rapid development of AI technology in medicine has generated concerns over how to ensure its safe and ethical use. There is also a need to develop a new regulatory framework that takes into consideration that these AI algorithms are continuously learning and evolving from experience gained in real-world clinical use.

To answer the question, 'Will AI be ready for prime time in medicine?' we need to consider the following:

What do doctors know about the applications and threats of AI?

What is the perception of patients and the public towards AI?

What strategies do governments intend to develop regarding ethical, legal issues?

Will AI doctors replace human physicians?

Will AI ever evolve to supplant human intelligence?

S1T2: Artificial Intelligence in Diagnostic and Interventional Radiology

Professor Dr Wah Tze Min
Leeds Teaching Hospital Trust, United Kingdom

This lecture aims to provide an insight into the role of Artificial Intelligence (AI) in the current application and future role for both the diagnostic (DR) and interventional (IR) radiology.

AI, especially the deep machine learning can enhance the workflow in both DR and IR. Historically, in DR practice, radiologists are trained to assess the large volume of radiology images qualitatively for the detection and characterisation of diseases as well as assessment of the treatment effect. AI allows automated complex patterns recognition of large volume imaging datasets and the ability to provide quantitative (instead of qualitative) assessment of the imaging characteristics. For example, convolutional neural networks (CNNs) are now being used to classify hepatic masses on ultrasound, CT and MR imaging, this may improve the overall quality of patient care-these models may facilitate workflow improvement and help to identify novel imaging biomarkers for effective diagnosis and staging.

In IR, especially in interventional oncology (IO), AI can improve the quantitative assessment of the cancer detection, case selection and post IO treatment effect. In addition, AI can also improve the image guided targeting of the cancer by using the navigation assistance systems, this can shorten the learning curve especially the novice in interventional radiology and also for better real time monitoring of the ablation margins to ensure the cancer is adequately treated.

The lecture will conclude by discuss the challenges regarding the implementation of AI in diagnostic and interventional radiology, and outlining the potential solutions in overcoming the challenges.

S1T3: Artificial Intelligence (AI) in Histopathology

Academician Professor Ulung Datuk Dr Looi Lai Meng
University of Malaya

Tissue and cellular images are central to histopathology practice. In principle, there are 3 essential components of image handling: (1) processing of tissues into thin sections to allow microscopic viewing of architecture and cellular details, (2) tools to capture microscopic images for study, and (3) the histopathologist who interprets the images and makes a diagnosis.

In histopathology, the beginning of AI was automation for processing and staining of tissues. However, it was the development of the virtual microscope, addressing the second essential component, which was the major enabler of AI in histopathology that paved the way for electronic images (digital pathology, e-slides). Today, advancements in computing power can support Whole Slide Imaging (WSI) that allows navigation through various magnifications on a computer monitor. E-slides also enable digital workflow, digital archives and integration into the e-health record.

Because digital data is highly amenable to analysis, automated image analysis is now addressing the third essential component of histopathology – image interpretation and diagnosis. Currently, this still requires considerable input by histopathologists to annotate cells and tissue components to train machines (machine learning), with the expectation that these machines establish their own patterns to interpret and act on new data. Deep learning, a subset of machine learning, leverages artificial neural networks to determinate its own interpretation or prediction.

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Our attempt at using convolutional neural networks (CNNs) for ER Allred scoring of breast cancer has helped us appreciate some of the challenges: the demands of annotating images (machine training), ambiguity in ground-truth definition, textural variability and dimensionality challenges. For AI to succeed, the pathologist has important roles in quality control, machine training, algorithm development and review of generated data and interpretation. Although there is good immediate potential for AI to "value-add" to the histopathology practice, it is more remote and challenging for AI to assume more human qualities for multidisciplinary discussions and clinical decisions.

S1T4: Artificial Intelligence (AI) in Ophthalmology

Professor Dr Jenny P Deva
Universiti Tunku Abdul Rahman

In Ophthalmology, as in many other branches of medicine, the arrival of AI is revolutionising our study and management of diseases. Despite reservations about the lack of the invaluable human touch as well as potential legal and ethical issues with the use of AI-based patient management, the advantages of AI are too numerous and obvious to be ignored.

Mega databases have been built with results of world-wide prospective and retrospective studies in ophthalmology practices. These databases provide massive information that lends credibility to evidence-based treatment of sight-threatening diseases such as infections, glaucoma, age-related macular degeneration, newborn retinopathy of prematurity and diabetes mellitus-linked proliferative or non-proliferative retinopathy.

AI innovations have enabled the linking of different imaging techniques such as Fundal photography, Ocular Coherence Tomography (OCT imagery) and Corneal Topography, to get exact and detailed mappings of eye disorders at different levels and different stages of the disease process. With the extensive screening of normal and diseased eyes and the use of machine-learning to integrate and process clinical, familial and public health information, researchers are able to arrive at conclusions of disease patterns and risk factors to inform on best practices, diagnostic approaches and prognostic predictions. Telemedicine and tele-consultations enable consultants practicing in remote parts of any country to get help with their patient management.

In many research projects, results by AI-based programs have been shown to be on par with results achieved by specialists in the respective fields and much better than the performance of junior doctors. Nevertheless, it is still too early for AI to replace the human intelligence that is required to create the perfect machine.

4 July 2019 – Symposium 2 (1320-1440 hrs)

Applications of AI in Clinical Medicine (2)

S2T1: Development of a Time-frequency Transformation Convolutional Neural Network and Its Applications in Cardiology and Sleep Medicine

Associate Professor Dr Lin Che-Wei
National Cheng Kung University, Taiwan

This research develops a novel time-frequency transformation convolutional neural network and applies it on cardiology (arrhythmia and structural heart disease) and sleep medicine for sleep apnea screening. In arrhythmia, this study explores atrial fibrillation, atrial flutter, ventricular premature contraction, and atrial premature contraction. In structural disease, this study explores aortic regurgitation, aortic stenosis, hypertrophic cardiomyopathy and congestive heart failure. For these studies, MEMS microphone are utilised to measure the sound of pulse on the radial artery of the wrist. The Pulse AudioGram (PAG) which is an analog sound signal is converted into digital form, and then transformed into a time frequency representation by continuous wavelet transform. Time frequency representation is the input of classifiers which are subjected to artificial intelligence (convolutional neural network) or machine learning (support vector machine) for cross-validation of the various cardiac conditions. In the sleep medicine application, this presentation proposes a sleep apnea detection algorithm based on time-frequency transformation spectrogram of ECG signal combined with artificial intelligence algorithm. The methods proposed in this study include signal pre-processing, ECG time-frequency transformation, AI-based classification and cross-validation procedures.

S2T2: Fighting Tuberculosis with AI

Dr Yi Li
JFHealthcare, China

Tuberculosis (TB) has caused more death than HIV/AIDS globally, becoming the world's top infectious disease, since 2015. The World Health Organisation (WHO) estimated that 1.8 million people died from TB in 2015, where most of the deaths occurred in developing countries with limited access to radiological expertise. TB is also a major public health problem in China and is the second largest cases in the world after India, causing around 37,000 deaths in 2017 estimated by WHO.

With the tremendous advances in AI, especially deep learning technologies, computer-aided screening based on chest X-ray becomes a new path to fight TB with affordable cost. In this talk, we present how AI technologies for TB screening have been developed, evaluated, and deployed on our cloud-based system at JFhealthcare, serving massive population living in rural China with limited access to radiological expertise. We show technical and clinical lessons we learned during practicing these technologies in Zhangjiakou, a prefecture-level city in China with a population of over four million people.

S2T3:   Applications of a Fully Automated Molecular Diagnostic System for Clinical Medicine & Public Health

Dr Qimin You
Zhejiang University, China

We have developed a fully automated molecular diagnostic platform consisting of a portable instrument and a disposable plastic tube. All reagents, including the enzyme, primers, probes, dNTP for nucleic acid isothermal amplification, nucleic acid extraction and sample preparation, are preloaded in the tube. The users need only to add the specimen. This integrated system combines the sample preparation, nucleic acid extraction and amplification into one step in a closed tube, sample-in, result-out. It is easy to use, and reduces the risk of cross-contamination to a minimum.
   We are facing two grand challenges in global health:
   1.   Advanced diagnostics not available for the poor countries
   2.   The risk of a global pandemic is growing, but we are not ready for it
Our mission: "Making molecular tests available to anyone, at anywhere!"
   This portable system can be operated by almost anyone with minimum training, and can be used at resource-limited settings. It is capable of on-the-spot detection and data upload. Combined with cloud & data visualisation technologies, this system can be used for monitoring a developing pandemic in real-time, visualisation on the screen, and helping the authorities to make critical decisions.

S2T4:   Artificial Intelligence in Gerontechnology Research and Applications

Associate Professor Dr Teh Pei Lee
Monash University, Malaysia

Monash University Malaysia launched the Gerontechnology Laboratory in 2016, the first of its kind in Malaysia. The aims of the Gerontechnology Laboratory are to translate research into new products, change existing business models and services, and shape public policies to improve the health and well-being of older adults and their caregivers. The Gerontechnology Laboratory is a multidisciplinary research platform that brings together students, researchers, business partners, universities, government and the broader community to lead on research and innovations for older adults within the five domains of human activity: health and self-esteem, housing and daily living, mobility and transport, communication and governance, and work and leisure. This talk will share how Monash University Malaysia builds the gerontechnology hub and develops the Artificial Intelligence (AI) research and applications such as soft robotics and emotionally intelligent robots for the study of gerontechnology in Malaysia.

4 July 2019 - Symposium 3 (1510-1610 hrs)

New Frontiers in Medical Research

S3T1: Whole Genome Sequencing in Perspective: The View from Clinical Microbiology

Professor Dr Yeo Chew Chieng
Universiti Sultan Zainal Abidin (UniSZA)

The advent of high-throughput sequencing technologies nearly fifteen years ago (in late 2005) has revolutionised the life sciences in ways that could not be imagined at the turn of the millennium. Obtaining the sequences of microbial genomes is now considered neither very challenging nor prohibitively expensive.
   Whole genome sequencing (WGS) has the potential to become a dominant technology in the routine diagnostic microbiology laboratory as it has already been widely reported and accepted in the literature for applications such as isolate identification and characterization, antimicrobial resistance (AMR) profiling and establishing sources of recurrent infections and other epidemiological investigations. Nevertheless, WGS has not been widely adopted in clinical microbiology despite its huge potential. Here, we discuss the current limitations of WGS such as its existing costs, the lack of computational infrastructure in hospitals and training of laboratory staff in bioinformatics. The role of artificial intelligence (AI) in hastening the adoption of WGS in routine clinical microbiology will also be deliberated.

S3T2: **Transmission of Multidrug-Resistant *Mycobacterium tuberculosis* in China**

Dr Qian Gao
Fudan University, China

Multidrug-resistant tuberculosis (MDR-TB) is a significant threat to tuberculosis (TB) elimination worldwide. Understanding the transmission pattern of MDR-TB is crucial for its control. We used a genomic epidemiological approach to assess the recent transmission of MDR-TB and found serious ongoing transmission of MDR-TB in the communities. Our research results suggest that efforts to control MDR-TB must develop strategies to reduce the transmission of the disease.

S3T3: **Speeding Up Data Analysis in Medical & Health Sciences Using Graphical Processing Unit (GPU)**

Dr Tee Yee Kai
Universiti Tunku Abdul Rahman

The use of GPU for image/video rendering is well known but their power for general parallel computation has only recently been explored. Parallel algorithms running on GPUs can often achieve speeds up to many times over central processing unit (CPU). This technology has been applied to many fields such as physics simulations, signal processing, financial modelling, neural networks and many others. In this talk, how GPU can be or has been used in medical and health sciences will be discussed.

S3T4: **Blockchain Technology in Medical Practice**

Associate Professor Dr. Lee Wai Kong
Universiti Tunku Abdul Rahman

Electronic Health Records are sensitive data that need to be protected for privacy reasons. However, there are also circumstances that require sharing of medical records across multiple parties (e.g. hospitals and research institutes) for various reasons (e.g. surgery, diagnosis and survey). Hence, it is important to protect the medical health records with sufficient security measures, yet provide flexibility to share among multiple parties.

In this talk, a system (BCMedRec) that allows sharing of medical health records based on Blockchain technology is presented. BCMedRec allows medical officers to request for viewing/editing patients' electronic health records. The interactions can be performed through web based GUI or mobile application. Sharing medical data among different parties is also made possible through smart contract. The data transactions (e.g. request, edit and view) are recorded into the Blockchain, which makes it very difficult to be modified. The use of Blockchain protects the integrity of data transactions between different parties. This proof-of-concept prototype shows that Blockchain can enhance the security of existing EHR and encourages information sharing in medical field**.**

5 July 2019 - Symposium 4 (0915-1055 hrs)

Medical Ethics & Legal Liabilities in the Era of AI

S4T1: **Ethical Aspects of Human Organ Transplantation in Malaysia**

Emeritus Professor Dr. Datuk Alex Delilkan
International Medical University

Ethical issues in organ transplantation relate to
    1. Organ donation
    2. Organ allocation
Issues relating to live donors (eg in liver transplantation) are regarded as non-maleficent yet can run into issues of mortality and morbidity both physical and psychological.

Moral dilemma of organ allocation to recipients, shortage of organs available for transplantation, commercialisation of organ donation and the consent for and religious beliefs in cadaveric organ donation can pose problems peculiar to the situation in Malaysia.

S4T2: Ethics and the Law in Clinical Practice

Professor Dr. Kulenthran Arumugam
University of Malaya

A simple definition of what is ethical behaviour is "to do what is morally right." This brings on a further problem of what *is* morally right. It is generally accepted that it is that which has been laid down by God, stands to reason and would be chosen by rational human beings. Again, there are problems to this concept. In short, it remains an enigma.

Amongst the many theories of ethics the most acceptable one to me is the utilitarian theory. In a nutshell, it is an action that must promote the best consequences and for the greatest benefit for the greatest number. However, in clinical practice we have to be more specific and precise. To me, the most accepted definition has been by Beauchamp & Childress. It has four components:
- There must be respect for autonomy and self determination
- There must be beneficence: to do good
- There must be non-maleficence `*primum non nocere*'
- There must be justice

But who is to decide where there is a conflict? The doctor, the patient or the parents? This is where the law steps in. In particular, the law of Equity.

Historically the Law of Equity developed beside the common law. It is based on maxims that promote justice based on what is morally right i.e. ethical; *he who come to equity must come with clean hands; delay defeats equity* are examples. It provides a remedy where the strict application of the common law gave rise to injustice. Throughout recent history, there has been many an ethical decision in clinical practice in which the courts have stepped in and intervened.

For the rest of the presentation, examples in clinical practice will be given to show the way of judicial thinking in resolving the issue.

S4T3: Ethical issues in Cell and Gene Therapies

Professor Dr John EJ Rasko AO
University of Sydney, Australia

In parallel with objectively proven therapies, 'stem cell tourism' has become a billion-dollar industry with increasing examples of false claims. Embryonic and induced pluripotent stem cells have been mired in controversy and clinical development has been forestalled. We reported an analysis of the global distribution of more than 400 unique businesses marketing stem cell-based interventions. Many of these online entities promote clinical applications of 'stem cells' beyond present-day standards of care. These data should be of immediate concern to governments and ethicist being lobbied to amend laws governing the manufacture, distribution and clinical use of human cell-based medical products. Unregulated, untested or unsafe stem cell 'therapies' place the field at a difficult crossroad. Blurring the lines that distinguish evidence-based cell therapies from those that are not remains a fundamental public health concern.

5 July 2019 - Symposium 5 (1120-1230 hrs)

New Frontiers in Medical Education

S5T1: Gamification in Medical Education: Prospect and Potential

Associate Professor Dr. Tan Wee Hoe
Universiti Pendidikan Sultan Idris

The use of games in the medical and health industry offers promising prospects and potentials of improving the quality of our lives in contemporary society. Games have been designed and developed as administration apparatus and devices, strategies of prevention, and means of teaching, learning and assessment. Such game-based practices involve using either leisure or serious games, wherein the potential of games are explored and exploited at four levels of evaluation, i.e. learners' satisfaction, learning effectiveness, on-the-job performance and return on investment. Similar outcomes can also be achieved through the gamification practice in which intended learning outcomes of non-game activities are constructively aligned to structural elements of the game in order to engage the targeted learners. In this sense, instead of acquiring off-the-shelf or bespoke games, medical professionals may introduce core mechanics of gamification, such as badges, levels, leaderboards, progress bar, virtual currency and competition in their lessons or assessment. This presentation shows examples of how the obstacles are cleared for healthcare-related projects when serious game experts cooperate with professionals in medical sciences to design, develop and validate games for medicine.

S5T2: Virtual and Augmented Realities: Challenges and Opportunities for Health Science Educators

Dr Carmen Nge Siew Mun & Dr Bong Mei Fern
Universiti Tunku Abdul Rahman

This presentation will provide an overview of definitions, taxonomies, and technologies of virtual (VR) and augmented realities (AR) in the context of technology-based educational instruction. It will summarise the key findings of academic research into the opportunities afforded by VR and AR in the field of health science education, as well as the technological and pedagogical challenges they pose. The presentation will also explore three categories of instructional and learning approaches derived from the use of VR and AR: roles, locations and tasks.

S5T3: New Futures in Nursing Education: Envisioning Technology-Enhanced Educational Innovations

Professor Dr Diana TF Lee
The Chinese University of Hong Kong, Hong Kong

Our world is on the brink of a technological revolution that will necessarily transform the way people live, work and relate to one another. Nursing education is of no exception and the use of technology-enhanced pedagogy is more visible than ever before. This presentation discusses this explosion of technology and its impact on nursing education. Commonly used technology-enabled educational platforms in nursing education are introduced and the impact of these new technological educational platforms on nurses' competencies with regard to quality and safety, patient-centred care, teamwork and collaboration are then discussed. The roles of artificial intelligence in nursing education will also be explored.

6 July 2019 – Symposium 6 (1445 – 1720 hrs)

Stem cell & cancer research updates

S6T1: Investigation of Stem-like Property and Stemness Signature in Cancer and Normal Cell

Professor Dr Chiou Shih-Hwa
National Yang-Ming University, Taiwan

A rare subpopulation of cells with chemo- and/or radio-resistant properties in each malignancy has greater potential of tumour initiation and displays accelerated regrowth after a sublethal treatment. In general agreement that prospectively isolated cells with the ability to self-renew, differentiate into multiple lineages, and initiate tumours that mimic the parent tumour, this subpopulation was termed cancer stem-like cells (CSCs). These fundamental characteristics make the CSCs the prime candidate for tumour maintenance and reoccurrence. Recently, Yamanaka and colleagues demonstrated that induced pluripotent stem (iPS) cells could be generated from mouse embryonic fibroblasts as well as from adult human fibroblasts via the retrovirus-mediated transfection of four transcription factors, i.e., Oct3/4, Sox2, c-Myc, and Klf4. These iPS cells were indistinguishable from embryonic stem (ES) cells in morphology, proliferative abilities, surface antigens, gene expressions, epigenetic status of pluripotent cell-specific genes, and telomerase activity. Herein we investigate the stemness signatures and self-renewing capacity in cancer and normal cell. Meanwhile, the reprogramming related factors will be further discussed in the pluripotent stem cell and iPS cells.

S6T2: Pre-differentiated Amniotic Fluid Mesenchymal Stem Cells Enhance Lung Alveolar Epithelium Regeneration and Reverse Elastase-Induced Pulmonary Emphysema

Professor Dr Chong Kowit-Yu
Chang Gung University, Taiwan

Pulmonary emphysema is a major component of chronic obstructive pulmonary disease (COPD). Emphysema progression attributed not only to alveolar structure loss and pulmonary regeneration impairment, but also to excessive inflammatory response, proteolytic and anti-proteolytic activity imbalance, lung epithelial cells apoptosis and abnormal lung remodelling. To ameliorate lung damage with higher efficiency in lung tissue engineering and cell therapy, pre-differentiating graft cells into more restricted cell types before transplantation could enhance their ability to anatomically and functionally integrate into damaged lung. In this study, we aimed to evaluate the regenerative and repair ability of lung alveolar epithelium in emphysema model by using lung epithelial progenitors which pre-differentiated from amniotic fluid mesenchymal stem cells (AFMSCs). An optimal lung epithelial progenitor-like cells (LEPLCs) pre-differentiation condition has been established in eGFP-expressing AFMSCs, which resulted in a yield of approximately 20% lung epithelial progenitors-like cells from AFMSCs in a 7-day period. In porcine pancreatic elastase (PPE)-induced emphysema mice, transplantation of LEPLCs significantly improved regeneration of lung tissues through integrating into the lung alveolar structure, relieved airway inflammation, increased expression of growth factors such as vascular endothelial growth factor (VEGF), and reduced matrix metalloproteinases

and lung remodelling factors when compared with mice injected with AFMSCs. Histopathologic examination observed a significant amelioration in DNA damage in alveolar cells, detected by terminal deoxynucleotidyltransferase-mediated dUTP nick end labelling (TUNEL), the mean linear intercept, and the collagen deposition in the LEPLCs transplanted groups. We conclude that transplantation of pre-differentiated AFMSCs showed better regeneration of lung tissue and reverse elastase-induced pulmonary emphysema than AFMSCs.

S6T3: Lung Tumor Heterogeneity and Targeted Therapy

Associate Professor Dr Chou Yu-Ting
National Tsing Hua University, Taiwan

Cancer progression has been attributed to tumour heterogeneity. The cross-talk between stem cell factor expression and epigenetic modifications regulates cell differentiation. However, how this cross-talk affects tumor heterogeneity and drug resistance remains elusive.

Here we report that lung cancer cell populations generate phenotypic and oncogenic plasticity by switching on and off stem cell factor *SOX2* and neurotrophic factor *VGF*, via histone modifications to alter proliferative and invasive capabilities and affect targeted therapies. Although tyrosine kinase inhibitors (TKIs) targeting mutated epidermal growth factor receptor (EGFR) in lung tumours have achieved a good response, resistance to TKIs eventually occurs in patients. We observed that EGFR mutations cross-talked with SOX2 to maintain cell proliferation and barrier properties. TKI selection diminished SOX2 but enriched VGF expression, causing epithelial-to-mesenchymal transition (EMT) with increased migratory and invasive behaviours in TKI-resistant lung cancer cells.

ChIP-seq analysis showed that the activation H3K27ac mark was enriched in differentiated neurones as well as in TKI resistant lung cancer cells, but not in both stem cells and EGFR-TKI sensitive lung cancer cells. We found that SOX2 expression was downregulated while VGF was elevated in TKI-resistant cells. SOX2 expression supported cell proliferation and barrier properties in EGFR-mutated lung cancer cells, while VGF expression promoted TKI resistance and EMT. Lung tumours harbour low SOX2 expression or high VGF expression predicted a poor survival in EGFR-mutated patients. Overall, our findings show how cancer plasticity elicited by the epigenetic modification on *VGF* and *SOX2*, followed by TKI selection, generates distinct oncogenic properties, providing critical insights into lung cancer progression and treatment.

S6T4: Concerns and Confusions in Research Publication in 2019: A Personal View (Fake Reviews, Fake Journals, Retractions, Open Access, Biased Citations …)

Professor Dr Choo Kong Bung
Universiti Tunku Abdul Rahman

When I started to write a manuscript from scratch, which I have not done for a long while since postgraduate students always wrote up the first draft, I first did a literature review on some keywords. I started to notice some anomalies in the literature, which threw confusions in my mind on how I should cite the references.

(i) I noticed that some journals no longer have impact factors (IF) since 2017. On further investigation, one of the journals retracted 107 papers in 2017, all from the same country, due to fake reviews.

(ii) In other journals, retractions are frequent for many other reasons, including questions on images/data and plagiarism. Some papers are under "expression of concern", not retracted, leaving it up to the scientific community to decide on the merit of the papers.

(iii) In most cases, retraction was done many years after the initial publication, and many retracted papers are still being cited years after retraction.

(iv) Due to the demand for publication and citation, open access publication through payment is gradually becoming a norm, making research publication a lucrative business. Thus sprouted fake journals and fake conferences.

(v) I also noticed that the bulk of citations of some journal papers in specific journals come from researchers of the same country, hinting biased citation rates.

In this talk, I will present evidence, in relation to my own research work, of the issues raised above. It is the aim of this talk to raise awareness and discussion of my concerns in some unhealthy developments in research publication in 2019.

POST-CONFERENCE WORKSHOPS

6 July 2019 - Workshop 1 (0830-1300 hrs)

Tuberculosis Updates

W1T1: Towards TB Elimination: The Role of the TB Laboratory in Sabah

Dr Jiloris FD
Kota Kinabalu Public Health Laboratory, Ministry of Health, Malaysia

An estimated 10 million people develop tuberculosis annually, with 1.3 million TB-related deaths (2017), and about 1.7 billion estimated to have latent TB infection. Sabah averages at about 13 cases daily and 5 deaths weekly. The difficulty in solving the TB problem is possibly attributed to its close evolution with human hosts. Major initiatives have been set up to combat TB such as the MDG and Stop TB Partnership (2000) and End TB Strategy (2014). SDG, the latest strategy, was launched by the WHO in 2015 targeting 90% reduction of TB deaths and 80% reduction of TB incidence by 2030 with 2015 figures as the baseline. The management and control of TB involves significant costs: time, finance, human resource etc. The current practice is to treat active TB, vaccinate uninfected populations and improve detection methods. However, the plateauing trend of TB due to the steady source of TB from populations with latent TB suggests that better approaches need to be established. Planning, execution and balancing of limited resources effectively and efficiently seem to be key for a successful TB program. The perfect solution however, still remains elusive.

In this talk, the chronology of TB Laboratory services in Sabah will be described to explain how the services have improved TB Management & Control, and to recommend possible measures to address some TB issues in the state. TB work performance data in Sabah from 2012-2018 obtained from TBIS registries, SIMKA and MyTB databases will be presented together with the results of a knowledge, perception and practice (KAP) survey on healthcare workers (HCW) in relation to TB Laboratory Services in Sabah, that was conducted in the 3rd quarter of 2018. Special attention will be directed to the dependence of HCWs on laboratory results for the proper management of TB patients; the improvement in TB reports with the use of more advanced diagnostic technology; contribution from the treatment of latent TB; and the need for close-knit collaboration and coordination between clinicians, laboratory scientists, medical and public health teams.

W1T2: Luminex Multiplex Platforms: Simplifying Academic and Clinical Research Complexities

Dr Mah Li Yen
Luminex Corporation

Multiplexing enables the detection of multiple analytes simultaneously within a single sample volume. One of the most reliable methods for multiplexing is the solution-phase Luminex xMAP® Technology, which combines advanced fluidics, optics, and digital signal processing with proprietary microsphere ("bead") technology. Microscopic beads are coated into many spectrally distinct sets, and each bead set can be coated with protein or nucleic acid to allow the capture of a biological target. Multiple bead sets can be pooled together, allowing the simultaneous capture of up to 50, 100 or 500 analytes from a single sample. xMAP® Technology is adaptable to a number of biological assays, including immunoassays, nucleic acid assays, and enzyme activity assays. The xTAG® Technology uses a proprietary universal tag system consisting of the Thymine (T), Adenine (A) & Guanine (G) bases that allows easy development and optimization of nucleic acid assays. The sequences have been optimized to minimize cross-hybridization, thus preventing cross-talk in multiplexed nucleic acid assays. Featuring a flexible open-architecture design, xMAP® and xTAG® Technology can be configured to perform a wide variety of assays quickly, cost-effectively, and accurately.

W1D1: Luminex Microbead-Based Spoligotyping Assay (Beamedex, France) for *Mycobacterium Tuberculosis* Complex (MTBC)

Ms Dawn C Paul
Kota Kinabalu Public Health Laboratory, Ministry of Health, Malaysia

The TB-SPRINT test is a multiplexed microbead-based spoligotyping technique performed on the Luminex platform. Spoligotyping is based on the presence or absence of 43 unique spacers in the direct repeat (DR) region of the MTBC genome.

In this demonstration, the protocol for spoligotyping using the TB-SPRINT kit (Beamedex, France) will be run through in a simple step by step approach. The conventional nitrocellulose membrane for spoligotyping is replaced by microbeads coupled with specific oligonucleotide capture probes.

The whole procedure includes three steps: DNA extraction, multiplex amplification of the extracted DNA with biotinylated / non-biotinylated primers mix, and the subsequent hybridisation of the amplicons with the microbeads. Utilising LED/Image-based analysis, the results are presented as numerical output on the Luminex platform and are then transferred to MS Excel macro to enable rapid and objective interpretation. Genotyping at a rate of 96 samples in less than 3 hours can be achieved. The test is robust, easy to perform and has high reproducibility.

W1T3: Molecular Diagnosis of Tuberculosis and Emerging Drug-Resistant Tuberculosis

Dr Kuan Chee Sian
NeoGenix Laboratoire Sdn Bhd

Tuberculosis (TB) is one of the top 10 causes of death and the highest killer among all infectious diseases. In Malaysia, the total number of TB cases in Malaysia increased by 1.6% to 26,168 in 2017 compared with 25,739 cases in 2016. The most formidable challenge is one-third of the world's population has latent TB infection, which means people have been infected by *Mycobacterium tuberculosis* but produces no symptoms unless it progresses to the active TB disease. Active TB is diagnosed based on the isolation of *Mycobacterium tuberculosis* from clinical samples and microscopic examination. Nucleic acid amplification is an alternative method for identification of both pulmonary and extra-pulmonary TB in clinical samples. Reported data indicate that TB-PCR is highly reliable and useful for rapid detecting *M. tuberculosis* DNA in various specimens.

The diagnosis of latent TB has conventionally relied on tuberculin skin test (TST). The World Health Organization (WHO)'s new 2018 guidelines recommend the use of commercial TB Interferon-Gamma Release Assays (IGRAs) to detect latent TB for at-high risk populations. Three IGRAs have been approved by the U.S. Food and Drug Administration (FDA): a.) T-SPOT TB test (Oxford Immunotec, UK), 3th-generation QuantiFERON-TB Gold In-Tube test (QFT-GIT, Qiagen, Germany), and 4th-generation QuantiFERON-TB Gold Plus (QFT-Plus, Qiagen, Germany). IGRAs demonstrated higher sensitivity and are unaffected by prior BCG vaccination, hence are more specific.

Drug-resistant TB burdened countries face huge obstacles in the rapid diagnosis and control of this infection due to expensive to treat and difficult to cure. Molecular methods such as PCR are one of the molecular diagnostic tools that allow the rapid detection of drug-resistant *M. tuberculosis* strains in clinical samples. In Malaysia, the first case of extensively drug-resistant TB (XDR-TB) was detected in 2013. Our work indicates that the strain belongs to an ancestral-like, non-Beijing clade of East Asia lineage. It harbours both classical and uncommon SNPs that allow it to escape from inhibition by many antibiotics.

W1T4: AI-based Construction of an Autoscanner

Dr Peng Jun
Hunan-Tech New Medical Systems Co. Ltd., China

The application of artificial intelligence can contribute to the public health significantly. Tuberculosis has been recognized as one of the urgent and public health problems in the world, causing enormous losses to human society every year. To find TB earlier is the key loop to achieve the END TB target.

In the past 100 years, we have used conventional microscopy to diagnose TB reliably. Now, artificial intelligence-based computer vision processing technology can help to find TB earlier than ever before.

Through the automatic examining system that is based on the deep learning algorithm, the examiner only needs to put the slide to be tested into the automatic digital microscope, and the system will complete the scanning of the slide and the identification of *Mycobacterium tuberculosis* according to the standards recommended by the WHO. The automatic examining system can be loaded with 5 slides (10 specimens) per batch, and the average single specimen scan time is 5 minutes. No manual participation is required during the scanning process.

After scanning and identification, the system will display the visual field images of all suspected targets and the probability of system judgment for verification by the inspectors. Therefore, the application of artificial intelligence-based algorithm in tuberculosis detection not only greatly saves labor costs, but also reduces the possibility of human factors causing missed detection. This cheap and efficient diagnostic method satisfies the requirements of contemporary tuberculosis prevention and treatment work. It also provides new opportunities for tuberculosis prevention and treatment.

W1D2: Automated AFB Staining with Vastly Improved Sensitivity

Chen Xi
Hunan-Tech New Medical Systems Co. Ltd., China

Tuberculosis is an urgent public health problem in the world. It is curable but many people have no access to the critical diagnostic tools. These critical diagnostic tools are supposed to be reliable, effective, affordable, rapid, safe, and easy to use.

The Sandwich Vessel Concentration Technology has been developed to contribute to better TB care and prevention. It combines the desirable characteristics of critical diagnostic tools. It is a reliable innovation based on morphological examination. It is effective, being able to concentrate the acid-fast bacilli in a sample by more than 50 times compared to conventional testing. It is safe as clinical samples are inactivated before testing. It is easy to use as both semi-automated and fully automated systems are available. It is affordable as the cost of testing is far less than the cost of molecular assays.

Workshop 2 (0830-1215 hrs)

Health Issues of the Elderly

Plenary: Applying the Principle of Traditional Chinese Medicine in Helping the Elderly Lead Healthier Lives

Professor Dr Zhu Xiao Shu
Western Sydney University, Australia

With the number of older adults on the rise, this presentation intends to address issues around factors that affect the older adult through reviewing common physiological and pathological factors around the ageing process, understanding the challenges from the Chinese medicine perspective and recommendations of life styles for older adults based on the Chinese medicine framework.

W2T1: An Innovative Community-Based Gerontological Education Programme

Professor Dr Diana TF Lee
The Chinese University of Hong Kong, Hong Kong

In addressing the challenge of a rapidly ageing population, a grant of HK$73.8 million has been obtained to launch a 5-year territory-wide interdisciplinary training programme (CADENZA Training Programme) in Hong Kong. The Programme aims at providing general and professional education in gerontology for the general public, informal and family caregivers, and professional health care and social workers.

The five thematic courses of the Programme are successful ageing and intergenerational solidarity, psychosocial and spiritual care, chronic disease management and end-of-life care, preventive and supportive care for older people with dementia, and community and residential care for older people.

This presentation will introduce the content, implementation and impact of this Programme.

W2T2: Healthy Diet for the Elderly

Associate Professor Dr Yang Zao
Universiti Tunku Abdul Rahman

Food-based nutrition is a main source of physical and spiritual energy and the basis of maintaining healthy growth, development and regular activity. Because the elderly experiences organ degeneration, insufficient energy and nutrition and together with chronic diseases, they need a diet that is able to overcome these issues. Such diets can help strengthen the physical condition, prevent diseases and even control and treat diseases. Therefore, dietary regimens have been viewed as the most basic form of geriatric care. They have also been proven to be highly effective.

Through three thousand years of accumulated experience in the implementation of dietary regimens for the elderly, the main Chinese medicine principles of healthy eating include set meal times (a hearty breakfast, an adequate lunch and a small dinner), food that is plain, soft and warm and in appropriate quantities, chewing carefully and swallowed slowly, maintaining a balanced diet, eating a mix of flavours, adjusting the diet as needed, choosing appropriate foods based on specific body needs/conditions/diseases, taking regular walks, rinsing the mouth and massaging the abdomen gently after meals. These principles, if followed properly, can contribute significantly to elderly health.

W2T3: Functional Exercise for Older Persons

Dr Maria Justine
Faculty of Health Sciences, Universiti Teknologi Mara

Although ageing is a natural process of life, it brings with it an inevitable progressive decline in the functional fitness that would affect the ability to perform activities of daily living. Exercise has long been established as the best non-pharmacological strategy for maintaining functional fitness. It can be challenging to design exercises for older persons that mimic the basic daily movement patterns of living such standing, sitting, pushing, pulling and rotating their bodies. In this lecture, we will explore the meaning of functional training and some of its basic elements. I will attempt to introduce the principles of training, its benefits and guidelines for designing functional exercises. Simply speaking, functional exercises train the body to move in the ways we move in everyday life safely and efficiently such as carrying groceries, preparing meals and cleaning the house.

POSTER PRESENTATIONS

Group 1 - MEDICAL MICROBIOLOGY

Poster 1. The MAB_3542c-Based Phylogenetic Grouping May Be Useful for Subspecies Classification of *Mycobacterium abscessus* Complex

Ng HF, Thaw Zin, Yap SF & Ngeow YF

Department of Pre-Clinical Sciences, Faculty of Medicine and Health Sciences, Universiti Tunku Abdul Rahman, Kajang, Selangor, Malaysia

Introduction: The *Mycobacterium abscessus* complex can be subdivided into three closely related subspecies named in brief as *M. abscessus, M. massiliense and M. bolletii*. *M. abscessus* and *M. bolletii* are generally more resistant to antibiotics than *M. massiliense*, and hence, are associated with a greater risk of treatment failure. This underscores the importance of subspecies identification in the clinical management of *M. abscessus* complex infections. However, the differentiation of these subspecies is not straightforward and usually requires the analysis of multiple genes. In this study, we describe the use of a single-gene approach for the subspecies identification of the *M. abscessus* complex. Methods: Clinical isolates previously identified as *M. abscessus* (n=15), *M. massiliense* (n=32), and *M. bolletii* (n=1) were screened for the MAB_3542c gene that encodes a mutated anti-sigma factor involved in mycobacterial stress response pathways. This gene was observed to have numerous synonymous mutations. To see whether these mutations could have phylogenetic signals, MAB_3542c was PCR-amplified and the amplicon sequences were used for phylogenetic analysis using MEGA 5.05. Results: The phylogenetic analysis results showed 100% concordance between the MAB_3542c-based subspecies grouping and subspecies grouping from previous analyses based on multiple house-keeping genes. Conclusion: The MAB_3542c gene appears to be useful for subspecies classification of the *M. abscessus* complex. Further investigations with a larger representation of different *M. abscessus* subspecies are needed to confirm its reliability for subspecies identification in the clinical setting.

Poster 2. Prevalence of *Salmonella* Species in Carrots and Cucumbers Collected from Hypermarkets and Wet Market in Kampar, Perak, Malaysia

Cheow M[1], Tan TY[1], Chen SK[1], Kuan CH[2] & Saw SH[1]

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Introduction: *Salmonella* serovars - particularly *Salmonella* Enteritidis and *Salmonella* Typhimurium - are foodborne pathogens. When vulnerable groups such as children, older people and immune-compromised individuals are infected with *Salmonella*, severe complications of diarrhoea such as dehydration may occur. The increasing trend of consuming fresh or minimally processed vegetables among Malaysians poses an increased risk of food poisoning via the consumption of fresh produce contaminated with *Salmonella*. Thus, information on the prevalence of *Salmonella* in ready-to-eat vegetables is needed to create public awareness on the associated risk of foodborne salmonellosis. The objectives of the present study were to detect and quantify the presence of *Salmonella* spp., *S*. Enteritidis, *S*. Typhimurium in carrots and cucumbers from retail markets in Kampar, Perak. Methods: Forty samples of carrots (*Daucus carota*) and cucumbers (*Cucumis sativus*) were randomly purchased, respectively from the wet market and hypermarkets A, B and C located in Kampar, Perak. The Most Probable Number-multiplex Polymerase Chain Reaction (MPN-mPCR) method was used to detect and enumerate the presence of bacteria in the vegetables. Results: There was no detection of *Salmonella* spp., *S*. Enteritidis, or *S*. Typhimurium in the 40 carrot samples collected, but, 17.5 % of the cucumbers were found to be contaminated by *Salmonella* spp., 10.0 % of which was determined to be *S*. Typhimurium. The microbial load in cucumbers was found to be in the range of <3 to 1,100 MPN/g. The most frequent occurrence of *Salmonella* contamination of cucumbers was in Hypermarket A, followed by hypermarket C and the wet market. These observations reflected improper produce handling and insufficient hygienic monitoring in the wet market and hypermarkets studied. The higher rate of bacterial contamination in cucumbers is probably due to it being more highly perishable compared to carrots. Conclusion: *Salmonella* fresh food contamination is a considerable public health problem for the residents in Perak.

Poster 3.   Expression of Genes Affecting Biofilm Formation in *Legionella pneumophila*

Chay MJ, Alan Ong HK & Ngeow YF

Faculty of Medicine and Health Sciences, Universiti Tunku Abdul Rahman, Jalan Sungai Long, Bandar Sungai Long, 43000 Kajang, Selangor

Introduction: *Legionella pneumophila*, the cause of Legionnaires' Disease, is a bacterium prevalent in natural and artificial aquatic environments where it exists as free-living plankton or sessile cells in biofilms anchored onto surfaces. In this study, *L. pneumophila* ATCC 33152 biofilms are examined for their expression of two genes, lpg1057and lpg 2731. The former encodes an enzyme for the production of cyclic di-GMP which directly influences biofilm production and the latter is a quorum sensing gene in *L. pneumophila* that controls biological behaviour including biofilm formation. Methods: The bacterium was grown in Feeley Gorman Broth in 6-well tissue culture plates, using an inoculum of 10^7 CFU/ml. After 5, 10 and 15 days of incubation at 25ºC in 5% CO_2, sessile cells were harvested for RNA extraction and quantification of lpg 1057 and lpg 2731 by qRT-PCR (Rotor-Gene). Results: The qRT-PCR analysis showed, for both genes, an approximately 3-fold upregulation from day 5 to day 10 of incubation followed by about one-fold decline from day 10 to day 15. The upregulation was associated with a 9.6-fold increase in cell mass and a small increase in the percentage of dead cells in the biofilm. Conclusion: In a laboratory model, biofilm promoting genes in *L. pneumophila* appear to be increasingly expressed in tandem with increasing biofilm cell mass until the cell density is high enough to repress further biofilm formation via the reduced expression of biofilm production genes.

Poster 4.   Investigation of Upper Respiratory Carriage of Bacterial Pathogens and Their Antibiotic Susceptibility Profile in the Kampar District, Malaysia

Ong HH[1], Thong LY[1], Lim YE[1], Phoon LQ[1], Chee HP[1], Kavitha S[1], Clarke S[2] & Eddy Cheah SG[1]

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Introduction: Some members of the normal microbiota of the human upper respiratory tract (URT) can be potentially pathogenic when they overgrow or translocate; the latter could lead to pneumonia and meningitis. The presence of these pathogens can be investigated via respiratory carriage studies, which have been recognised as a pragmatic solution to gaining large real-time epidemiological data on their carriage at the population level. Carriage studies of such nature are limited in Malaysia and therefore, the prevalence of their carriage in the URT remains poorly understood. This study aimed to investigate the upper respiratory carriage of *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Neisseria meningitidis*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa* among the population of Kampar district. Methods: Nasal, oropharyngeal, and nasopharyngeal swab samples (*n*= 292) from 123 participants aged 4-90 years were collected. Identification of the *S. aureus*, *K. pneumoniae*, and *P. aeruginosa* isolates obtained was done through assessment of their growth characteristics on mannitol salt agar, MacConkey agar and King's A medium, respectively. They were isolated from 28%, 14%, and 1% of subjects in this study, respectively. Results: In the Kirby-Bauer assay, 35*S. aureus* isolates were resistant to penicillin, 7 were resistant to tetracycline. All the *K. pneumoniae* isolates were resistant to ampicillin as expected, with one that was resistant to both tetracycline and chloramphenicol. The presence of *S. pneumoniae*, *H. influenzae*, and *N. meningitidis* was assessed via multiplex PCR on the swab DNA extracts, and 48%, 19%, and 1% were positive for these target bacteria, respectively. All these were from the oropharyngeal swabs except for five *S. pneumoniae*-positive samples, which were of nasal origin. Conclusion: The carriage rate for *S. pneumoniae* is the highest among the study population. The inclusion of pneumococcal conjugate vaccine in the National Immunisation Programme has the potential to reduce this carriage in the community.

Poster 5.   Multi-locus Sequence Analysis of *Candida albicans* for Strain Differentiation and Correlation with Pathogenicity

Zain I, Yap SF & Ngeow YF

Department of Pre-Clinical Sciences, Faculty of Medicine and Health Sciences, Universiti Tunku Abdul Rahman, Kajang, Selangor, Malaysia

Introduction: *Candida albicans* is a common fungal pathogen capable of causing superficial and systemic infections in humans. Various methods of genotyping have been applied in studying the epidemiology of the organism across the globe but there is a lack of data available for its genetic diversity in Malaysia. In this study, multi-locus sequence typing (MLST) is used to study the distribution of genotypes among carriers and infected hospital inpatients. Methods: Yeast-like fungi identified as *Candida albicans* by phenotypic observation and molecular analysis were genotyped by MLST. Genotype frequency was compared between pathogenic strains isolated from in-patients at a local hospital (50 isolates) and commensal strains sourced from asymptomatic individuals in the community (50 isolates). Results: Of the 100 isolates studied, MLST analysis yielded only 38 confirmed sequence types matching those in the international database (https://pubmlst.org/calbicans/). This could be due to geographical differences in the prevalence of *C. albicans* genotypes and a poor representation of Malaysian strains in the database. The local strains were grouped into 15 clusters (7 among carriers and 8 among patients) with two to six strains in each

cluster. Statistical analysis did not indicate any correlation between genotype and pathogenicity but the clustering pattern ruled out the likelihood of a nosocomial outbreak or frequent cross-infections between patients in the hospital where the pathogenic isolates were obtained. Conclusion: MLST genotyping is a useful tool for the study of *C. albicans* epidemiology in a hospital or community environment.

Poster 6.   Oncolytic Measles Virus Exhibits Efficient Oncosuppression against Radio- and Chemo-Resistant Nasopharyngeal Carcinoma Cell Line

Looi HK[5], Kiew LV[6], Chang LY[7], Ngeow YF[1,3,5] & Ong HT[1,2,3,4]

[1]Department of Pre–Clinical Sciences, [2]Centre for Cancer Research, [3]Centre for Research on Communicable Diseases, [4]Centre for Stem Cell Research, [5]Faculty of Medicine and Health Sciences, Faculty of Medicine and Health Sciences, Universiti Tunku Abdul Rahman, Sungai Long Campus, Bandar Sungai Long, 43000 Kajang, Selangor, [6]Department of Pharmacology, [7]Department of Medical Microbiology, Faculty of Medicine, University of Malaya, Jalan Universiti, 50603 Kuala Lumpur

Introduction: Nasopharyngeal carcinoma (NPC) is the fourth most common male cancer (National Cancer Registry 2007-2011) that predominantly affects Chinese and Bidayuh populations in Malaysia. Patients are often diagnosed in late stages (Stage III and IV), and 5-year relative survival with conventional treatments is less than 64% in Malaysia (MySCan 2018). In recent years, oncolytic measles virotherapy had shown promising oncosuppression with minimal and resolvable side effects. We postulate that this virus can infect and kill NPC cells overexpressing CD46, with or without resistance phenotypes. Methods: The expression of CD46 and infection efficiency of measles virus in C666-1 cells were quantitated using flow cytometry. To ensure accurate quantitation of infected cells, infected cells were cultured under the influence of fusion inhibitor peptide for 48 hours before the cells were recovered for fluorescence microscopy and flow cytometry. The infectivity of measles virus in C666-1 cells was assessed by fluorescence microscopy and cell viability assay every 12 hours from 24 to 60 hours after infection with 0.2 MOI virus. Results: Our results demonstrated an infection efficiency of 30%, 39% and 58% in Parental (P), chemo-resistant (DR), and radio-resistant (RR) C666-1 cells, respectively. In addition, 71%, 61% and 90% of P, DR and RR C666-1 cells were killed at 60 hours after infection, respectively. Discussion and Conclusion: At 60 hours after infection, the fraction of cells killed was at least 22% higher than the initially infected cells, highlighting the importance of lateral dissemination of virus particles via cell-to-cell fusion in the killing of P, DR and RR C666-1 cells. The higher infectivity (58% vs 39% DR and 30% P) and cell killing (90% vs 61% DR and 71% P) in RR C6661 cells, suggests that the cytoprotective response against radiation damage enhances viral infection and dissemination. However, the cytoprotective response against drug-induced damage appeared to make DR C6661 less susceptible to virus-induced death (61% vs 71% P). Our results demonstrated that, in vitro, oncolytic measles virus is able to infect and kill RR C6661 cells more efficiently compared to DR and P C6661 cells.

Poster 7.   Case Study: Repeated Isolations of Acid-Fast Bacilli in a Chronic Lung Infection

Lee CL[1], Tan OK[2] & Ngeow YF[1]

[1]Faculty of Medicine and Health Sciences, Universiti Tunku Abdul Rahman, Jalan Sungai Long, Bandar Sungai Long, 43000 Kajang, Selangor; [2]Physician, Pantai Hospital, Taman Cheras Makmur, 56100 Kuala Lumpur

Introduction: A 40-year-old female had recurrent chest infections in 2016-2017 that led to the development of ulcerative bronchitis and focal chronic lung consolidation. With positive sputum cultures of *Aspergillus fumigatus*, raised serum Galactomannan antigen and *Aspergillus* IgG, a diagnosis of chronic pulmonary aspergillosis was established. She was treated with posaconazole for 11 months and responded fairly well. However, the possibility of co-infection with non-tuberculous mycobacteria (NTM) had to be entertained as she was febrile on a few occasions while on the anti-fungal and the sputum acid-fast bacilli (AFB) smears were positive on numerous occasions, with intermittent isolation of NTM. The patient had a background history of papillary thyroid carcinoma in 2000 and pulmonary tuberculosis (PTB) in 2005. Both conditions were successfully treated and relapse/recurrence had been ruled out. Tests for HIV and primary immune-deficiency diseases were negative. Methods: The AFB from primary cultures were subcultured for further species and subspecies identification using PCR amplification followed by Sanger sequencing of 16S rRNA and *rpo*B genes. Strains identified as *Mycobacterium abscessus* subspecies *massiliense* were further differentiated with a variable-number tandem-repeat assay (*MaVa*). Results: The AFB recovered comprised at least five isolates of *Mycobacterium fortuitum*, two of *M. abscessus* subsp. *massiliense* and one *Tsukamurella tyrosinosolvens*. The two *M. massiliense* were identical in their *MaVa* genotype patterns and susceptibility to commonly prescribed anti-NTM antibiotics. This suggested that they were very likely to be the same strain persisting in the patient who had not been fully treated for NTM infection. Discussion and Conclusion: Individuals with a past history of PTB are prone to mixed opportunistic pulmonary infections. The NTM and *Tsukamurella* sp. are genetically closely related environmental bacteria that are often linked with opportunistic and healthcare-associated infections. Being acid-fast, their detection by microscopy alone may lead to a wrong diagnosis of tuberculosis in a patient with a chronic lung infection. As these bacteria are also common contaminants of healthcare instruments, positive cultures should be carefully interpreted in light of patient and laboratory information, to determine their clinical significance.

Poster 8.   Quality Assessment of Specimens for Mycobacterial Culture Received at NPHL: An Analysis

Mahfuzah MA, Zirwatul Adilah A, Noorliza MN, Puvaneswary R, Parvathy SR, Mohd Hatimi T, Khairunnisa R, Mohd Amin K, Wan Mazlina M, Rohayati MN & Khairul Azan H

National Public Health Laboratory, Ministry of Health, Sungai Buloh, Selangor, Malaysia

Introduction**:** Currently, clinical specimens received for mycobacterial culture are processed at NPHL regardless of specimen quality. The objective of this evaluation was to evaluate the quality of specimens received at NPHL and other possible factors that may affect mycobacterial cultures. Methods*:* The series of data for mycobacterial cultures in the study period of 2018 were extracted from the Public Health Information System (SIMKA). Incomplete data were rechecked against request forms especially for two important variables: time of specimen collection and temperature of specimen at reception. These two factors will affect the viability of mycobacteria. Results*:* A total of 5424 clinical specimens were received and processed for mycobacterial smear microscopy and culture in 2018. The time of specimen collection and the temperature of specimen at reception were available only for 3963 (73.1%) and 3480 (64.2%) of specimens respectively. Only the specimens with recorded time and temperature were analysed. Of the 3963 specimens with time data, 3179 (80.2%) were received within 0-3 days, 541 (13.7%) within 4-7 days and 243 (6.1%) more than 7 days. Most of the specimens (3093; 88.9%) were received at cold chain temperature, followed by 301(8.6%) at 9 – 15 C° and 86(2.5%) at >15°C. Of the specimens received within 7 days of specimen collection and at cold chain temperature, 20% were culture positive. Conclusion*:* Most clinical specimens were received within the acceptable range for time after specimen collection and temperature at reception. These factors contributed to the satisfactory culture positivity rate.

Poster 9.   Easy Spoligotyping for *Mycobacterium tuberculosis* Complex (MTBC) Utilizing the Luminex Platform

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[1]Kota Kinabalu Public Health Laboratory; [2]FMHS University Malaysia Sabah, [3]FMHS Universiti Tunku Abdul Rahman

Introduction: Spoligotyping is based on the presence or absence of 43 unique spacers in the direct repeat (DR) region of the MTBC genome. It is a simpler, lower cost method compared to other genotyping method. Conventional spoligotyping is performed by reverse hybridization of biotinylated PCR products to spacers applied on a nitrocellulose membrane In microbead-based assay on the Luminex platform, the membrane is replaced by microbeads. In the LED/Image-based analysis, the green LED and red LED interrogates the SAPE label and bead identity respectively with the CCD imager in MagPix®. The application possibilities of this technology in molecular epidemiology, serological and other assays is tremendous. This paper aims to showcase the advantages of the Luminex microbead-based spoligotyping assay in terms of its relatively simple and rapid screening of *Mycobacterium tuberculosis* Complex strains. Methods*:* DNA extraction was done on 1000MTBC isolates from Sabah (2017). They were then spoligotyped using the TB-SPRINT kit on the Luminex platform. Spoligotype matching was done using the SITVIT2 database. Genotype mapping was performed and followed by phylogenetic analysis. Results*:* Spoligotyping of the isolates was completed in about 20 days. 140 spoligotype patterns were identified comprising 78 orphans and 62 SIT patterns. Most of the orphans obtained in this study are related to the EAI2-Manila SIT 19 strain. The numerical output transferred to MS Excel macro enables rapid and objective interpretation. Conclusion: The test is robust, easy to perform and has high reproducibility. Shorter time is needed to perform microbead-based spoligotyping compared to the conventional method.

Poster 10. Prevalence of *Legionella* spp. in the Water Supply System of Klang Valley Integrated Transit System

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[1]Centre for Research on Communicable Diseases, Faculty of Medicine and Health Sciences, Universiti Tunku Abdul Rahman, 43000 Kajang, Selangor: [2]MBBS Year 2, Faculty of Medicine and Health Sciences, Universiti Tunku Abdul Rahman, 43000 Kajang, Selangor

Introduction: *Legionella pneumophila,* the cause of Legionnaires' Disease, is widely prevalent in natural and man-made aquatic environments. Although outbreaks of infection have been mostly attributed to contaminated water cooling towers and water distribution systems in large buildings, the source of sporadic infections is largely unknown. Methods: A cross-sectional study was conducted between 22 April and 5 May 2019 on 91 toilet faucets of the Klang Valley Integrated Transit System. Water samples collected from the faucets were filtered and heat treated before culturing on Buffered Charcoal Yeast Extract (BCYE) agar plates which were incubated at 37°C in 3% of CO_2 for up to 7 days. Colonies growing on BCYE were identified as *L. pneumophila* by their Gram staining, growth characteristics and positive agglutination with *L. pneumophila* serogroup 1-15 antisera. Results*:* Six (6.6%) of the samples grew *L. pneumophila*, of which, four were serogroup 1 and two were serogroups 2 to 15. Colony counts were all over 200 cfu/ml. Discussion and Conclusion*:* To the best of our knowledge, this is the first report on the isolation of *L. pneumophila* from the water obtained from toilet faucets in a rapid transit rail network in Malaysia. The identification of *L. pneumophila* serogroup 1 (the serogroup responsible for about 90% of human legionella infections) in two thirds of the positive samples raises concern over the health risk to commuters of this rail service used by more than 1 million passengers a day.

Group 2 - BASIC MEDICAL SCIENCES

Poster 11. Optimization of Polymerase Chain Reaction (PCR) Conditions for Detection of *Listeria monocytogenes* from Food Samples

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Introduction: *Listeria monocytogenes* is a ubiquitous and pathogenic bacterium causing listeriosis, particularly in the newborn, the elderly, pregnant women and immune-comprised individuals. A simple, rapid and sensitive molecular method is needed to detect the presence of this bacterium, especially in food samples. This study aimed to determine the optimum annealing temperatures used with different brands of reagents in a simple Polymerase Chain Reaction (sPCR) and a multiplex Polymerase Chain Reaction (mPCR) for the detection of *L. monocytogenes* in food samples and on food contact surfaces. Methods: Two primer sets were used. The first primer set consists of LM1 and LM2 for the indication of *L. monocytogenes* and the second primer set consists of LI1 and U1 for the indication of *Listeria* species. sPCR was performed using temperatures ranging from 45°C to 55°C, together with different reagent mixtures. mPCR was performed after the selection of the more effective reagents. Results: The annealing temperature of 53°C combined with the reagent mixture from Promega enabled the detection and amplification of both *Listeria* species and *L. monocytogenes* in a higher yield. Conclusion: The optimised protocol was able to validate various food and food contact surface samples that were culture positive for *L. monocytogenes*.

Poster 12. Oral administration of Epigallocatechin Gallate (EGCG) exerts vasoprotective and antihypertensive effects in angiotensin II-infused hypertensive mice

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Objective: The present study aims to investigate if EGCG plays a role in reducing oxidative stress and improving endothelial dysfunction in angiotensin II-infused hypertensive mice. Methods: Angiotensin II (1.2mg/kg/day)-infused C57BL/6J mice (8-10 weeks old, male) received oral administration of EGCG (50mg/kg) for 14 days. Throughout the treatment period, the average systolic blood pressure (SBP) of the mice is measured using the tail-cuff method. The vascular function of the animals is investigated using a myograph at the end of the treatment via relaxation of their aortic rings to endothelium-dependent relaxing agonist, acetylcholine (3 nM–10 μM) and endothelium independent vasodilator, sodium nitroprusside (1 nM–10 μM). Besides, the plasma nitrite level of the animals is determined. In addition to the *in-vivo* study, the vasoprotective effect of EGCG is also determined via the culture of aortic rings from C57BL/6J mice with angiotensin II (10 μM) in the presence or absence of EGCG (1 μg) in Dulbecco's Modified Eagle Medium (DMEM) for 24 hours. Results: *In vivo* treatment with EGCG for two weeks attenuates the increase in arterial SBP and improves the vascular relaxation in angiotensin II-infused hypertensive mice. Two weeks of treatment with EGCG also decreases the level of plasma nitrite in both normotensive and angiotensin II-infused hypertensive animals. Apart from that, aortic rings exposed to EGCG in the presence of angiotensin II for 24 hours exhibits increased relaxation compared to angiotensin II-cultured aortic rings without exposure to EGCG. Conclusion: This study shows that EGCG treatment improves endothelial function which in part contributes to the antihypertensive effect observed in angiotensin II-infused hypertensive mice.

Poster 13. Investigation of the effects of angiogenin gene (ANG) and its Amyotrophic Lateral Sclerosis (ALS) mutant over-expression in NSC34 mouse motor-neuron cell line

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Introduction: Angiogenin protein known to have neuroprotective function, is significantly expressed and secreted by adult motoneurons. Up to date, an increasing number of loss-of-function mutations of the human angiogenin (*ANG*) gene has been identified among ALS patients around the world that were found to alter the functions of the protein. Hence, the aim of this study is to gain insight on the effects of *ANG* gene and its mutants over-expression in a mouse motorneuron cell line, NSC34. Methods: For this purpose, human angiogenin wild-type and two angiogenin sporadic mutants, K17I and K40I, were over-expressed into NSC34. Stable cell lines were established by selection with antibiotic and the over-expression of wild-type and mutant protein were confirmed by Western blotting. Effects of angiogenin over-expression on cell viability and reactive oxygen

species (ROS) production were studied after subjecting the cells to sub-lethal concentration (LC_{50}) of an environmental toxin, Chlorpyrifos (CPF). <u>Results</u>: The outcomes revealed that wild-type angiogenin shows protective effects whereas the mutant cells were more sensitive to CPF with reduced cell viability compared to the control. Our study also found significant reduction in the level of ROS production by wild-type and K40I but not K17I compared to control cells upon treament with CPF. Our data provide more insight into the effects of OP pesticide on the motor neuron cell line, further highlighting the neuroprotective roles of angiogenin and how the ALS-linked mutations may alter these properties.

Poster 14. Expression and Purification of Zika Capsid Protein

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<u>Objectives</u>: The project aims to express the capsid protein of Zika virus using an *Escherichia coli*-based expression system and to purify the protein using column chromatography. <u>Methods</u>: The full-length of Zika capsid protein (pET-ZIKC) carrying a His-tag at the N-terminus was expressed using *Escherichia coli* strain Rosetta 2 (DE3). Protein expression was induced by 1 mM IPTG for 5 hours. Three temperatures (37°C, 30°C and 25°C) were tested for the highest expression yield and protein solubility. Results were analysed by SDS-PAGE. Preliminary protein purification was performed using nickel-charged IMAC column. <u>Results</u>: The expression of the full-length Zika capsid protein in soluble form was optimum with the induction by 1 mM IPTG at 37°C for 5 hours in *E. coli* Rosetta 2 (DE3). Soluble His-tag Zika capsid protein was purified using nickel-charged IMAC column. Targeted protein was eluted using imidazole at concentration range from 300 mM to 425 mM. <u>Conclusion</u>: Full-length Zika capsid protein with His-tag was purified using nickel-charged IMAC column. Further purification will be carried out using ion-exchange column and size-exclusion column. Purified protein will be assembled into nucleocapsid-like particles and to be evaluated as a candidate for vaccine development.

Poster 15. Leukemic Plasma Cells Masquerading as Hairy Cells Leukemia

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<u>Introduction</u>: Plasma cell leukemia is a rare and aggressive variant of myeloma characterised by the presence of circulating plasma cells. We describe a young man with plasma cell leukemia presenting with circulating plasma cells showing a cytoplasmic hairy projection leading to misdiagnosis of hairy cell leukemia based on morphology. Diagnosis was revised with peripheral flow cytometry that was consistent with plasma cell leukemia. <u>Case Report</u>: A 39-year-old Indian gentleman presented with headache and unresolving upper respiratory tract symptoms for 1 month.   On examination he has splenomegaly 2cm below left costal margin without lymphadenopathy. His presenting count was white blood cell 15.2 x 10^9/L, haemoglobin 12.2g/dl, platelet count 31x10^9/L. Lactate dehydrogenase was elevated, 615 umol/L.   Urea, creatinine and calcium level are within normal range. Bence-Jones protein in urine was negative. Contrast-enhanced computer tomography revealed splenomegaly. No bony lesion was detected. Peripheral blood film reported many ruptured cells, plasmacytoid and blastoid cells. Many of the abnormal cells have cytoplasmic projections giving a "hairy" like cell appearance. Bone aspirate was a dry tap. Trephine biopsy reported heavy infiltration with 90% of the nucleated cells are plasmacytoid cells. Peripheral blood flow cytometry shows 44% cluster of plasma cells expressing CD138, 38 and lacking all B cell markers which is consistent with plasma cell leukemia. He was treated with bortezomib based treatment. <u>Discussion</u>: The morphology of plasma cell leukemia varies from typical plasma cells to less mature forms like plasmablastic features leading to diagnosis difficult. Plasma cells leukemia with cytoplasmic projections is rarely seen and only reported in several case reports. This case illustrates the importance of flow cytometry in establishing the diagnosis and lineage of cells in the event of inconclusive or misleading morphology by light microscopy.

Poster 16. In vitro Antioxidant Activities and Neuritogenic effect of *Spirulina platensis*

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<u>Introduction</u>: In neurological diseases, neuronal loss is a common hallmark which is frequently associated with the overproduction of free radicals and reduced level of endogenous neurotrophic factors. Currently, the Food and Drug Administration (FDA) approved drugs are asymptomatic therapies with adverse side effects. Research attention is focusing towards exploring novel neurotrophic compounds from natural products. The blue-green microalgae, *Spirulina platensis* is a well-known superfood

with a high content of diverse nutrients and possesses several therapeutic properties. We aimed to investigate the *in vitro* antioxidant capacity and neuritogenic effect of *S. platensis* UMACC 159. Methods: Water, methanol and ethanol extracts of *S. platensis* UMACC 159 were screened for the phytochemical contents (total phenolic, total flavonoid, carotenoid, and terpenoid). Antioxidant capacity of the extracts was determined using ABTS, DPPH and FRAP assays. Cytotoxicity effect of extracts on the rat phaeochromocytoma cell line (PC-12Adh) was studied using MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) assay. Neuritogenic activity of extracts on PC-12Adh was investigated using the neurite outgrowth assay and the immunofluorescence imaging of neurofilaments. Results: Ethanol and methanol extracts showed the highest phenolic (49.09 ±1.35mg GAE/g) and flavonoid (151.84 ± 3.95mg QE/g) content respectively. Ethanol extract also showed the highest ABTS (EC$_{50}$ of 1.34 ± 0.01 mg/ml) and DPPH (EC$_{50}$ of 0.45 ± 0.04 mg/ml) scavenging activities. Methanol extract showed the highest ferric reducing power (EC$_{50}$ of 3.49 ± 0.05 mg/ml). All *Spirulina* extracts (0- 37.5µg/ml) were found to increase the percentage of neurite-bearing cells and upregulated the neuronal cytoskeleton of PC-12Adh cells. Ethanol extract exhibited the highest neuritogenic effect at 6.25 µg/ml. Conclusion: All extracts may possess potent bioactive compound(s) that mimic the neuritogenic activity of nerve growth factor for neuronal survival, development and differentiation. *S. platensis* has been suggested to be a promising dietary supplement for cognitive health in the prevention of neurological diseases.

Poster 17. Enzymatic and Mechanical Extraction of Virgin Coconut Oil

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Introduction: Virgin coconut oil (VCO) is gaining popularity due to its remarkable therapeutic effects. Past literature has demonstrated that pineapple is rich in protease (bromelain) which exhibits a demulsification effect. However, no reports on VCO extraction using bromelain from pineapple exist to date. Methods: The present study aimed to evaluate the effect of crude protease extract (CPE) from overripe pineapples on the recovery yield of VCO, compared with both microwave-assisted and ultrasound-assisted aqueous extraction methods. The physicochemical properties of the extracted VCO such as iodine value (IV), peroxide value (PV), saponification matter (SV), p-Anisidine value (AV), moisture content, melting and crystallisation profile, fatty acid compositions (FAC) and triacylglycerol profile analysis (TAG) were also examined. Results: Results revealed that the enzymatic approach exhibited the highest VCO yield (77.7%±1.8) at 50ºC for 2h, followed by microwave-assisted (58.6%±0.3), control without enzyme (24.4±0.9%) and ultrasound-assisted (24.1%±0.6). Physicochemical properties of VCO extracted were found to conform to APCC standards established. IV of VCO extracted with CPE was significantly higher (4.43%±0.03) than other methods (P<0.05). AV of the commercial VCO was significantly higher (1.86±0.08) than CPE (0.20±0.02) (P<0.05) and with no significant difference with other extraction methods (P>0.05). Lauric acid appeared to be most abundant fatty acids detected in all samples with no difference for different techniques (P>0.05). Similar exotherms and endotherms were observed in melting and crystallization profiles with two distinct peaks exhibited. For crystallization, the enthalpy required by VCO extracted with ultrasound assisted method (52.54J/g±1.86) was significantly lesser than others (P<0.05); for melting, commercial VCO exhibited the greatest enthalpy (73.63J/g±0.01) among the extracted VCOs. The TAG composition of the extracted VCOs were mainly CCLa, CLaLa, LaLaLa, and LaLaM. Conclusion: The results obtained from this study indicated that VCO extraction using CPE from overripe pineapple was feasible and the presented protocol would be useful at industrial scale with promising oil yield.

Poster 18. Identification of Medicinal Herbs Oldenlandia *diffusa* and *Odenlandia corymbosa* based on Macroscopic Morphological Characteristics, DNA Barcoding and Metabolite Composition

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Introduction: *Oldenlandia diffusa*, a local herb has been used for the treatment of cancer and urethral infection in Malaysia. The medicinal usage of *O. diffusa* has been recorded in Chinese Pharmacopoeia. However, another species of *O. corymbosa*, has been misidentified as *O. diffusa* and used to treat similar diseases. The misidentification is due to its similar macroscopic morphology. The objectives of this study are to differentiate these two species based on macroscopic morphological characteristics, DNA barcoding and metabolite composition. Methods: *Oldenlandia* species were collected from Negeri Sembilan and Johor in Malaysia. Based on the morphological characteristics, the samples were identified as *O. diffusa* and *O. corymbosa*. Genetic

markers such as rbcL, matK, and ITS were used to differentiate between *O. diffusa* and *O. corymbosa*. LCMS-MS was used to identify the putative metabolites present in *O. diffusa* and *O. corymbosa*. Herbarium voucher of *Oldenlandia* species were prepared, verified and deposited at Perdana Botanical Garden Kuala Lumpur. Macroscopic morphology characteristics enable the differentiation of *Oldenlandia* species. In order to identify the genus and species of these two *Oldenlandia* plants, DNA sequences obtained from these two species were compared against the National Center for Biotechnology Information (NCBI) plant sequence database. Results: The genetic markers of rbcL, matK, were able to identify *O. diffusa* and matK and ITS were able to identify *O. corymbosa*. LCMS-MS analysis was able to identify the putative compounds of *Oldenlandia* species.

Poster 19. Differentiation of Two Pegaga Varieties Based on Macroscopic Morphological Characteristics, DNA and Metabolites

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Introduction: Pegaga is a popular vegetable in Malaysia, which comprises several varieties of species from the family Umbelliferae. Pegaga is not only consumed as a salad, it also has been used as herbal remedy for the treatment of symptoms such as dizziness and dysentery. These two species are morphologically similar and in view of their medicinal value, differentiating the identity and chemical traits between the two species is necessary. The objectives of this study are to differentiate the Pegaga species based on macroscopic morphological characteristics, DNA barcoding and metabolite composition. Methods: These two Pegaga samples were collected from Broga hill, Selangor and Batu Pahat, Johor, respectively. Based on the macroscopic morphological characteristics, the collected samples were identified as *Centella asiatica* and *Hydrocotyle sibthorpioides*. The total DNA and PCR amplification were performed and the amplified fragments were sequenced by Sanger Method. The data analysis was conducted using BioEdit and Mega7. The metabolite composition of the samples from methanol/ chloroform extract was determined by liquid chromatography coupled with tandem mass spectroscopy (LC-MSMS) analysis. Herbarium vouchers of the Pegaga species were sent to Perdana Botanical Garden Kuala Lumpur for verification. In this study, three candidates of DNA barcode sequences of rbcL, matK and ITS were used as the target for sequence comparison. DNA sequences obtained from these two plants were compared against the National Center for Biotechnology Information (NCBI) plant sequence database. Results: The rbcL genetic marker showed a higher discrimination power between the species. Untargeted LC-MSMS analysis of the metabolites from *Centella asiatica* and *Hydrocotyle sibthorpioides* enabled the identification of 24 and 30 compounds, respectively which comprised of primary and secondary metabolites. Conclusion: The differentiation between the Pegaga species can be achieved via the comparison of macroscopic morphological characteristics, DNA barcoding and metabolite composition.

Poster 20. The Influence of Geographical Factors on the Metabolite Distribution of House-Cultivated Edible Bird's Nest in Perlis

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Introduction: Edible bird's nest (EBN) is produced from the salivary secretion of the *Aerodramus fuciphagus*. Recently, swiftlet house farming is increasing due to the high demand of EBN from the community. The study on the metabolite distribution in the EBN from different swiftlet houses has not been fully established. The objectives of this study were to reveal the metabolite distribution of EBNs obtained from different swiftlet houses in Perlis and to confirm the influences of the geographical factors on EBNs metabolite distribution. Methods: Five EBN samples were collected from five different swiftlet houses in Perlis. These EBN samples were coded as Sample 1, 2, 3, 4 and 5, respectively. The EBN Sample 1, 2 and 3 were collected from different swiftlet houses located in Arau, whereas EBN Sample 4 and 5 were collected from the different swiftlet houses located in Kangar. Liquid chromatography-mass spectrometry (LC-MS) was used to identify the total metabolites present in the EBNs. The differences in metabolite distribution of the EBNs obtained from different swiftlet houses in Perlis were elucidated by multivariate statistical analysis. Results: There are four clusters established among the five EBN samples through the hierarchical clustering. Sample 1, 2 and 3 were clustered into 3 different clusters named as Cluster 1, 2 and 3 respectively. The EBN Sample 4 and 5 were clustered under the same cluster and named as Cluster 4. Conclusion: This study indicates that the geographical factors such as the types of plantation, vegetation, water source and urbanisation are most likely the main factors that influence the distribution of metabolites in EBNs. However, more samples from wider geographical areas should be included for further study in order to substantially support this new finding.

Poster 21. Effect of Oral Administration of Tocotrienol-Rich Fraction on Vascular Endothelial Growth Factor in Streptozotocin-induced Diabetic Retinopathy in Rats

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Introduction: Retinal angiogenesis or neovascularisation is an important feature of diabetic retinopathy (DR). One of the aims of treatment in DR is to reduce expression of retinal vascular endothelial growth factor (VEGF), a major contributor to angiogenesis. In this study, we evaluated the effect of oral administration of tocotrienol-rich fraction (TRF), a potent antioxidant, towards retinal VEGF protein expression in streptozotocin (STZ)-induced DR in rats. Methods: Male *Sprague Dawley* rats weighing 230-250 g were divided into three groups; N group received citrate buffer intraperitoneally (IP) whereas DV and DT groups received IP STZ (55 mg/kg body weight) to induce diabetes. DT received treatment with TRF (100 mg/kg body weight), whereas N and DV received vehicle. Treatment was given through oral gavage, once daily for 12 weeks. At the end of experimental period, rats were sacrificed and retinas were analysed for VEGF using enzyme linked immunosorbent assay (ELISA) kit. Results: Retinal VEGF levels in DV and DT were higher compared to N (p<0.001). However, retinal VEGF level in DT was significantly lower compared to DV (p<0.05, 1.29 folds). Conclusion: Oral administration of TRF reduces retinal VEGF protein expression in rats with STZ-induced DR.

Group 3 - PUBLIC HEALTH, CLINICAL & MEDICAL EDUCATION

Poster 22. A Cross Sectional Study to Evaluate Obesity as Contributing Factor to Postural Instability

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Introduction: Postural stability has emerged as one of the popular issues in our society as well as in sports medicine. Poor postural stability contributes to poorer performance in sport, injury and falls. Sadly, as we evolve into the 4th industrial revolution, the prevalence of obesity is on the rise, which might be due to sedentary lifestyles and poorer sleep quality. Our study aims to evaluate the association between obesity and static and dynamic postural stability. Methods: A total of 216 healthy participants aged between 15 to 24 years were recruited via convenience sampling for this cross-sectional study. Ethical approval was obtained from AIMST University, complying with the Declaration of Helsinki. The weight (kg) and height (mt) of the participants were measured to determine the body mass index (BMI) followed by the measurement of static and dynamic balance using the balance error scoring system (BESS)and star excursion balance test (SEBT) respectively. To eliminate bias, all assessors were blinded from each other. The results were interpreted using SPSS version 23. All significant levels were set at a p-value of less than 0.05. Results: Our findings revealed that BMI was significantly associated with medial reach of SEBT with a negative correlation at p=0.02. However, there were no statistically significant associations between BMI and BESS and SEBT of anterior, anteromedial, posteromedial, posterior, posterolateral, lateral and anterolateral reach (p>0.05). Linear regression was then performed on the association of BMI in relation to medial reach of SEBT. A significant (p=0.02) but weak relationship (R square = 0.025) was observed between BMI and the medial reach of SEBT. Conclusion: Obese individuals may have poorer dynamic postural stability in the medial direction. However, such a relation is weak, suggesting other factors might also contribute to the medial reach, which requires further investigation.

Poster 23. Physical Activity Status Among Pre-schoolers in Kajang Requires Attention!

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Introduction: Generation Z was born and totally immersed in a world of digital technology. Due to the trend and the availability of such technology, children are more apt to be playing indoors with some sort of tech devices than going for outdoor activities. Hence, inactivity becomes the real problem among our generation Z. As inactivity is associated with various non-communicable diseases, our study aims to determine the prevalence of physical inactivity among pre-school children. Methods: Using a convenience sampling method, 219 healthy preschoolers aged 3 to 6 years old from five private preschools in Kajang, Malaysia were interviewed using a validated global physical activity questionnaire (GPAQ). Informed consent was obtained from parents prior to the study. The children were further categorised as physically active or inactive based on the cut-off point of exercising 420 minutes per week. Data were analysed using SPSS version 23. Results: 93 males and 126 female preschoolers (n=219) participated in this study. Based on our findings, 95% of the pre-schoolers in Sungai Long and Kajang were inactive without physical activity. Although it was believed that parents are more protective of their daughters as compared to their sons, our study reported no significant difference between gender and the physical activity status. An independent t-test performed to evaluate the association of the pre-schoolers age to physical activity reported significant association (p=0.039). Therefore, our study suggests that older children are physically more active. Conclusion: This study reveals that the pre-schoolers in Kajang area are mostly physically inactive, and efforts should be made to integrate technology into children's fitness. As we progress into the era of fourth industrial revolution, advancement in technology should help and not hinder the physical activity of our next generation.

Poster 24. Perception of Medical Students towards a Virtual Learning Environment in Basic Clinical Skills Training on Cardiovascular Examination

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Introduction: Medical students often find difficulty in translating and applying theoretical knowledge taught in the pre-clinical years into a clinical context during their hospital postings. Hence, computer-based simulation called "Virtual Patients" has been increasingly used in health care education to support clinical reasoning skills in integrating theory into practice. To assess the adaptability and perception of students towards Virtual Learning and the extent to which the Virtual Learning Environment can be used in enhancing the learning of Basic Clinical Skills in Pre-clinical medical education. Method: An institution-based cross-sectional survey was used to assess the adaptability, perception and need of Year 2 MBBS students (n=44) in the learning of Basic Clinical Skills during preparation for their clinical postings. VARK (visual, auditory, reading/writing or kinesthetics), was used to categorise learning styles of students and scored by a Five-point Likert Scale. In addition to traditional tools (lectures, videos, models etc.), 'Virtual Cardiology Lab' was incorporated into the learning of the Cardiovascular Examination. Results: The majority of students' learning style was kinaesthetic (34%; learn by practice) and the main learning time spent (63.7%; 6-12 hours per week) was spent studying alone. Discussion and Conclusion: Students felt that traditional models offer safe and realistic environment to learn and practice specific skills, and allow mistakes without risk of harm to the patients, but need to be practiced in groups, and within a specified place and time. An additional challenge is clinical reasoning and integrating knowledge and skill on a specific patient to reach one possible diagnosis. Individual students learn differently; being in groups, coupled with constraints of time and availability of models, not every student gets a fair chance to master such skills. Hence, 'Virtual Patients' not only offer the advantage in overcoming the challenge of integrating knowledge and skill, but also initiates self-directed learning (alone) irrespective of time and place, and the learning style of the individual.

Poster 25. Problem of Polypharmacy and Medication Errors among Institutionalised Elderly Malaysians Residing in Assisted Living Residences

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Introduction: Polypharmacy, or multiple drug usage, is common among the elderly population worldwide, a reflection of increasing lifespan and accompanying multiple co-morbidities. In assisted living residences (ALRs), self-medication remains an easy, cost effective, and time-efficient means of achieving health-care without burdening the care-givers. Since both polypharmacy and self-medication are known risk factors for adverse events in the elderly, "appropriateness", in terms of Beer's Criteria, has been used to identify drugs that can lead to increased morbidity and mortality when used irrationally

and long-term. The study investigates the prevalence and predictors associated with polypharmacy and self-medication among 214 elderly Malaysians institutionalised in ALRs in Klang Valley. Methods: A cross-sectional study using predesigned semi-structured questionnaires where, for practicability, drug medication was recorded under Multum Classification and the appropriateness assessed by 'Beer's Criteria' was performed. Results: A wide range of drugs, both Western and Chinese medicine was used by the residents, among whom 44.8% used 5 or more medications for chronic co-morbidities. The latter include hypertension (58.4%), diabetes (35.4%), IHD (27.3%), joint pain and immobility (19.3%), stroke (11.8%) and depression (5%). Medications were also used for minor ailments, including fever, cough, cold (27.5%), pain and stiffness (24.7&), fatigue and immobility (16.8%). Polypharmacy, which was seen mainly with Western Medicine, significantly correlated with the number of co-morbidities and the perceived difficulty in activities of daily living (p<0.05). Self-medication varies widely between individuals, their educational level, accessibility and availability of drugs and situation in the ALRs. Inappropriate use also varies between ALRs (27.8%-44.2%) and includes drugs for hypertension, diabetes (thiazides, beta-blockers, glyburide), CNS drugs (sedatives, antidepressants, antipsychotics, anti-Parkinsonism drugs), and drugs for pain, stiffness, cough and cold (indomethacin, codeine, diphenhydramine and baclofen). Conclusion: Proper education concerning dangers of self-medication and periodic 'Brown Bag' review of patient's medications using 'Beer's list' can assist in preventing unnecessary complications of medication errors and polypharmacy.

Poster 26.   Prevalence of Obesity and Overweight among the Youth Population in Northern Peninsular Malaysia

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Introduction: With the evolution of automated systems, robotics and electronic devices, everyday life has been made more sedentary, contributing to obesity and its associated problems. Overweight and obesity rates among Malaysians have risen from 29.1% and 14.5% (2006) to 30% and 17.7% (2015) respectively, increasing the risk of cardiovascular disease, type II diabetes and hypertension. In this study, the prevalence of obesity among youth in a sample population in northern peninsular Malaysia was assessed. Methods: In this study (convenience sampling), 248 healthy participants (15-24 years) residing in Penang, Kedah and Perlis were recruited (n=248; Male=131; Female=117; Age=15-24 years) in February 2019 during a medical camp. Their Body Mass Index (BMI) was calculated (BMI = weight (kg)/ [height (m)] 2 and categorised using the BMI scale for Asians – Low (<18.5); Normal (18.5-23.0); Pre-Obese (23.0-27.5) & Obese (≥27.5). Results were analysed and interpreted using Chi-square test via SPSS (v.23). Results: Our findings suggest that the 13.7% and 8.9% of the youth population in Northern Peninsular Malaysia are either overweight or obese. The overweight group (13.7%) consisted of Chinese (6.85%), Indians (5.24%) and Malays (1.61%) while the obese group had Chinese (6.05%), Indians (2.42%) and Malays (0.40%). Conclusion: As we move into the era of the 4th Industrial Revolution, lifestyle and psychosocial changes are likely to affect the health of our youth population. It is suggested that while development of modern technology is essential and inevitable, focus needs to be maintained on improving the physical wellness of the community.

Poster 27.   Prevalence of sarcopenic obesity among community-dwelling elderly: A pilot study

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Introduction: Sarcopenic obesity (SO) is characterised by age-related decline in muscle mass and function, with an increase in body fat. SO is associated with higher risk of physical disability, metabolic syndrome, cardiovascular disorders and mortality. The objective of this study was to determine the prevalence of SO among the community-dwelling elderly. Methods: 65 subjects aged 60 years and above were recruited using convenient sampling method. Muscle mass and percent body fat (PBF), muscle strength, and physical performance were measured using bioelectrical impedance analysis, handgrip strength (HS), and usual gait speed respectively. The diagnostic algorithm was adapted from European Working Group on Sarcopenia in Older People 2 (EWGSOP2), whereas the cut-off values were based on Asian Working Group for Sarcopenia (AWGS). Low muscle mass was height-adjusted appendicular skeletal muscle mass of <7.00kg/m^2 for male and <5.70kg/m^2 for female, and subjects were identified as obese if PBF was ≥25% for male and ≥30% for female. *Low muscle strength was defined as HS of* <26.00kg for male and <18.00kg for female. Usual GS of >0.8m/s was considered as low. Results: There were a total of 27 males (41.5%) and 38 females (58.5%). The overall prevalence of obesity was 32.3% (n=21), the prevalence of obesity was only found in one male (3.7%) and in 20 females (52.6%). Gender was found to be associated with obesity (p=0.035). The overall prevalence of sarcopenia was 7.7% (n=5) and was only seen in females, indicating gender is associated with sarcopenia (p=0.005). The prevalence of SO was 3.1% (n=2) and was associated with female gender only with insignificant association

(p=0.226). Conclusion: Prevalence of SO was relatively very low in Malaysian Chinese living in the community and was only exhibited by the female population. More studies will be carried out on a larger scale to get a better picture of the concerned issue.

Poster 28. Effectiveness of sprint interval training on anthropometric measures in physically inactive overweight adults

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Introduction: Prevalence of overweight and obesity is high among the physically inactive adults. Overweight is a risk factor of cardio-metabolic disease and all-cause mortality. Thus, it is important to develop a time-efficient training protocol to minimize these risks in this population. The purpose of the study was to investigate the effect of 4 weeks of sprint interval training on body mass index (BMI), waist circumference (WC) and fat percentage in the trunk region (FPTR) among physically inactive overweight adults. Methods: 30 participants in the age group of 18-25 years with a BMI of 23.0 kg/m^2 to 27.99 (Asian cut-off point) were recruited and divided into experimental (SIT=15) group and control (CON=15) group via lottery method. Participants were screened for eligibility using International Physical Activity Questionnaire and Physical Active Readiness Questionnaire. SIT group underwent 4 weeks of sprint interval training, three sessions/week on alternate days. For the first two training sessions, participants performed four repeated sprints for one minute each (85%-90% maximal heart rate) with 4 minutes' break (65%-70% maximal heart rate) in between each sprint. The number of sprints was increased by one after every two sessions. CON group did not participate in any training. Both groups were instructed to continue with their normal diet throughout this experiment. Results: The SIT group showed statistically significant changes in WC (mean difference= 2.32, p= 0.001), FPTR (mean difference= 1.48, p= 0.04), and a negligible difference in BMI (mean difference= 0.04. p= 0.63). In contrast, CON group exhibited an increase in all outcome measures; WC (mean difference=-1.34, p= 0.021), FPTR (mean difference= -0.49, p= 0.038), and BMI (mean difference= -0.31, p= 0.011). Conclusion: Short period of sprint interval training has positive effect on anthropometric measures, particularly on WC and FPTR and is a recommended time-efficient type of training protocol for overweight population.

Poster 29. Prevalence of musculoskeletal pain among secondary school students.

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Introduction: Prevalence of Musculoskeletal (MSK) conditions worldwide is increasing at an alarming rate. World Health Organization (WHO) claimed that MSK pain is the 2nd highest contributor to global disability, widespread across the life-course. However, MSK pain and its associated factors in adolescent population has not been intensively or systematically researched even though the prevalence of MSK pain increases drastically in this said population especially in Malaysia. The objective of this study is to determine the (i) prevalence of MSK pain and (ii) associated risk factors among secondary school students in Kajang, Malaysia. Methods: Questionnaire to identify prevalence, potential risk factors and location of MSK pain in the preceding 12 months was administered to the participants who are currently studying in Kajang government and private secondary schools. Results: 294 (87.4%) out of 340 respondents reported MSK pain in at least one body region in the preceding 12 months. The commonly reported MSK pain was in neck, shoulder and back areas. MSK pain was found statistically significant to age, gender, types of school, bag weight, method to carry bag, time spend carrying bag while walking and duration of class hours. Negative correlation was shown between MSK pain and BMI. Conclusion: MSK pain was highly reported among the school-going students in Kajang secondary schools. As possible risk factors have been determined in this present study, a further investigation into causal relationships is necessary. School is an ideal place for students to develop proper physical and motor function. Hence, both health and education sectors should construct relevant national policies to address problems regarding the safe use of backpack and take some necessary actions in the early prevention of MSK pain before the condition worsens.

Poster 30. Risk factors and work-related musculoskeletal disorders among dental students - A cross sectional study

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<u>Introduction</u>: Dentists are among the workers who are more susceptible to work-related musculoskeletal disorders (WMSDs). Studies on dental students are less compared to dental doctors and the aim of the study is to find out the prevalence of work-related musculoskeletal disorders among dental students. <u>Methods</u>: A cross sectional study was conducted among 212 final year and intern students at Saveetha dental college and hospital, Saveetha University, India. After obtaining informed consent the standardised Nordic Questionnaire was used to collect the data. Information about the individual's job history, characteristics, method of work, physical load and musculoskeletal problems were identified by the presence or absence of pain in each specific body region using standardised Nordic Questionnaire. <u>Results</u>: 72% had work-related musculoskeletal disorders (WMSDs) and the regions affected were the neck region (49.4%), low back region (39%), wrist/hands (33%) and other regions such as shoulder (24%), upper back (19%), knee region (18.2%), hip/thigh region (12.3%), elbow region (8%) and ankle/foot (5%). <u>Conclusion</u>: In this study, it was concluded that dental students are more prone for musculoskeletal disorders such as pain and discomfort in the neck, lower back, wrist and hand region. The prevention and reduction of musculoskeletal disorders among dental students should include their education in dental ergonomics and awareness regarding the importance of work-related risk factors.

Poster 31. Pattern of semen fluid abnormalities in male partners of infertile couples at a single Fertility Centre in Malaysia

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<u>Introduction</u>: Male factor is present in 40-50% of infertility cases. Nevertheless, there is still a lack of statistical data on the semen parameters of men in Malaysia. This study aims to determine semen quality of male partners of infertile couples, therefore to identify the contributions of male factor to infertility in Malaysia. <u>Methods</u>: Semen analysis performed during fertility consultations in the KL Fertility & Gynaecology Centre, Malaysia, from January 2016 to December 2017 were examined by using WHO standards. <u>Results</u>: A total of 1998 semen analyses were done, where the majority of patients (68.1%, n=1360) were from age group 30-39 years old. The patients from age groups 20-29, 40-49, 50-59 and 60-69 years old represents 9.7% (n=194), 19.1% (n=382), 2.5% (n=50), and 0.6% (n=12) of the population respectively, with an average age of 36 ± 6.2 years old. The mean volume of seminal fluids per ejaculate was 2.5 mL with minimum and maximum volume of 0.01 and 20 mL respectively. A total of 65.3% (n=1305) specimens had normozoospermia, 26.8% (n=536) had oligozoospermia, 1.6% (n=33) had cryptozoospermia and 6.3% (n=126) had azoospermia. Teratozoospermia were the most common abnormalities observed in 88.3% (n=1765) of the cases, and a total of 45.8 % (n=916) cases were shown to have asthenozoospermia. <u>Conclusion:</u> A high rate of teratozoospermia (88.3%) followed by asthenozoospermia (45.8%) and reduced sperm concentration (34.7%) in the semen samples indicates the need of improved public health strategy focusing on primary prevention.

Poster 32. Association of Physical Activity, Screen Time and Depression among Adult Population in Kajang

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<u>Introduction</u>: The World Health Organisation (WHO) defines physical activity as any bodily movement that uses energy, including activities such as working, playing, doing housework, travelling, and participating in any recreational activity. Adults aged 18-64 should have at least 150 minutes of moderate intensity physical activity or at least 75 minutes of vigorous intensity physical activity or combination of both per week. Studies have shown that sufficient amount of physical activity can prevent obesity and reduce depression levels. In recent years, the physical activity level among Malaysians has decreased dramatically while the rapid growth of technology and sedentary lifestyle have led to an increased duration of exposure to various screens like mobile phones, laptops, desktops and television. This is evident from the rise in obesity and non-communicable diseases lately. However, the relationship between physical activity and screen time with depression in Malaysian adults remain unknown. Physical inactivity and screen based sedentary behaviours are highly prevalent now among the adult age group and these habits are likely to continue in later life to lead to disease and depression issues. This study aims to find the association between physical activity, screen time and depression among the adult population in Kajang. <u>Methods</u>**:** A cross-sectional study design and simple random sampling was adopted for this study. Adults in the Kajang area were recruited and self-modified validated questionnaire and international physical activity questionnaire (IPAQ) were administered for the study. <u>Results</u>: 309 participants were recruited. Overall, 20.7%, 75.4% and 53.7% of the adults were found to be associated with insufficient

physical activity, high screen time and depression respectively. Employment status was significantly associated with physical activity whereas the association with age, gender, ethnicity, marital status, highest education level, household income and number of devices was not statistically significant. The results showed the prevalence of high screen time among the population in Kajang (75.4%). The current study found the prevalence of moderate to severe depression among the participants and that was also associated with less physical activity and high screen time. Meanwhile, screen time was significantly associated with depression. <u>Conclusion</u>**:** Findings from this study indicated that participants with high screen time, aged 18-35, single and with tertiary education level were significantly associated with high depression scores. Therefore, intervention for reducing screen time is required as a preventive measure against getting depression and other non-communicable diseases.

Poster 33.   Occupational Stress Level and Its Associated Factors Among Teaching Staff from Faculty of Medicine and Health Sciences in Universiti Tunku Abdul Rahman (UTAR) Sg Long Campus – A Cross Sectional Study

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<u>Introduction</u>:   Different learning styles of students and multiple roles of teachers lead to stress among teaching staff. Little research has been conducted to investigate the stress levels experienced by the teaching staff in private universities in Malaysia. The purpose of this study was to determine the occupational stress level and associated work-related stressors among the teaching staff of the Faculty of Medicine and Health Sciences (FMHS) in UTAR, Sg Long Campus. <u>Methods</u>: Universal sampling method was used in this research. 68 teaching staff from FMHS were included for the study. Perceived Stress Scale 10 items and UK Health and Safety Management Standards Work Related Stress Indicator Tool were used in this study. <u>Results</u>: Response rate of the study was 51.9%. There was 41.2% of teaching staff under low stress while 58.8% of teaching staff reported moderate stress. Demographic variables such as age, gender, higher educational level, academic rank and working experience were statistically significant ($p<0.05$) on occupational stress level. For work related stressors, job demand, job control, role in job, managerial support and job changes had significant ($p<0.05$) effect on occupational stress level. <u>Conclusion</u>: Demographic variables such as age, gender, higher educational level, academic rank and working experience showed significant association with occupational stress level. Work related stressors such as job demand, job control, role in job and job changes and managerial support showed significant association with occupational stress level.

Group 4 - INFORMATION & COMMUNICATION TECHNOLOGY

Poster 34. The Analysis of the Cost Function for Stan Melax in 3D Mesh Simplification

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<u>Introduction</u>: Geometric models with high details play an important role in computer graphics. A lot of triangles are required to form a high fidelity geometric model. 3D mesh simplification is a process to reduce the triangles of a 3D mesh based on its levels of detail (LOD), especially the redundant geometry of the polygon. Therefore, the runtime performance can be improved and the fidelity of the 3D mesh is preserved. In order to produce an optimal simplification algorithm, the calculation for edge cost is crucial to decide the minimum cost to be collapsed at each iteration. When collapsed will cause the smallest visual change to the model. <u>Methods</u>: In this research, the analysis of the cost function proposed by Stan Melax is studied, to understand in depth the geometry properties involved and the differences between collapsing an edge i) from vertex to vertex and ii) from vertex u to vertex v. Results: The examined edge cost functions are as follows:

$$\cdot\ cost(u,v) = \|v_i\text{-}v_{i+1}\| \times \max_{f \in T_{v_i}} \left\{ \min_{n \in T_{v_i v_{i+1}}} \{(1 - f.normal \bullet n.normal) \div 2\} \right\}$$

where T_{v_i} is the set of triangles that contain v_i and $T_{v_i v_{i+1}}$ is the set of triangles that contain both v_i and v_{i+1} .

$$\cdot\ cost(v,u) = \|u_i\text{-}u_{i+1}\| \times \max_{f \in T_{u_i}} \left\{ \min_{n \in T_{u_i u_{i+1}}} \{(1 - f.normal \bullet n.normal) \div 2\} \right\}$$

where T_{u_i} is the set of triangles that contain u_i and $T_{u_i u_{i+1}}$ is the set of triangles that contain both u_i and u_{i+1}.

<u>Conclusion</u>: The local geometrical properties (curvatures, distance and face normal) play a significant role in determining the cost function. Furthermore, the 3D mesh is well-preserved when the edge collapsed from vertex u to vertex v instead of the other way.

Poster 35. The Generation of Silhouette Shadows for 2D Images

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Introduction: Silhouette Shadow is the dark and solid shape of an image of a person, animal, object or scene in front of a light background. These 2-dimensional (2D) silhouettes are used to reconstruct a 3-dimensional (3D) shape which is acquired from several surrounding cameras. Apart from that, many researchers utilize the silhouette map (consists of the coordinates points on the silhouettes) to improve the quality of the shadow near the boundaries. In this preliminary project, a simple and straightforward algorithm to generate silhouette shadows for several 2D images is presented. Methods*:* Two different types of silhouette shadows are implemented- soft and hard silhouette shadows by manipulating the pixel values. The soft silhouette shadow portrays more realistic representation whereas the hard silhouette shadow produces well-defined edges along the outlines of an image. The software used was a sketchbook, Processing. Results*:* Five frames are displayed beginning with the original 2D image, and followed by silhouette with hard shadow, silhouette with soft shadow, real time light effect on the white silhouette, and real time light effect on the original image. Conclusion*:* Silhouette shadows were generated with our proposed algorithm. The resulting silhouette shadows can be applied in the traditional "Wayang Kulit" in future.

Poster 36. A Comparison of Whole Slide Imaging (WSI) Viewer Software

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Introduction: Pathologists diagnose disease and guide therapeutic decision-making through accurate interpretation of microscopic images on glass slides. With the advancement of technology, whole slide imaging (WSI) allows pathologists to view glass slides on the computer monitor like navigating through Google Maps. WSI consists of two processes. The first process is acquiring high quality images as tiles or stripes using a high-resolution camera, combined with one or more high-quality microscope objective glass slides. These individual images are combined to produce a single whole slide image. The second process is viewing or analysing the scanned images using specialised software - the virtual slide viewer. Methods: We reviewed a few WSI viewer software based on the following requirements - Documentation, Data management, Usability, Visualisation, Flexibility and Segmentation. We also performed a case study using the various viewer softwares. Results: We found that CaseViewer and QuPath are superior among the other reviewed viewer software such as Pathomation, ImageScope, Image J, Zen Blue and NIS-element viewer for basic slide viewing. However, software equipped with built-in functions (such as cell counts) and supportive of other programme languages (such matlab and phyton) are worthy to be explored further. Conclusion: We would recommend the CaseViewer or QuPath for basic viewing of whole slide imaging.

Poster 37. Digital mobile applications as alternatives to tabletop counters for manual white blood Cell (WBC) differential count

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Introduction: Traditionally, manual WBC differential count is done using a microscope to identify up to a hundred white cells in a peripheral blood film and then counting them using a tabletop counter, which could be mechanical or electronic. With the invention of smart phones and tablets, digital applications have been designed for WBC cell counting, as alternatives to manual tabletop counters. These applications can be downloaded to the mobile device, from a digital distribution site (such as Google Play Store for android devices), to be used anywhere at any time. Methods: A search was made through the Google Play Store. WBC differential count applications which are free of charge were selected and downloaded to a smart phone. Each application was then tested to determine whether it has a good user interface, efficiency in operation, desired features, user-friendliness and accuracy. Results: Five applications were downloaded for evaluation. The applications were: *Blood Counter, Haematology Counter, Bloodroid Cell Counter, WBC Counter, and WBC Counter – White Blood Cells Differential Count*. They all have a similar user interface, but come with different alert sounds and vibrations. Besides basic WBC differential count, some included extended differential counting for other cells and even allowed bone marrow differential counting. All applications were user-friendly and efficient. Conclusion: Digital mobile applications are acceptable alternatives to tabletop counters for manual WBC differential count. They have the potential of replacing their tabletop counterparts since they are free.