

ISSN: 2660-8114
TRI-ANNUAL PUBLICATION

YEAR 2018 ISSUE 3

PULSE@UM

FROM WORMS TO SCIENCE

AN INTRIGUING MALARIA PARASITE

ADVANCE CARE PLANNING IN MALAYSIA

CANCER RESEARCH SPOTLIGHTS

PILOT PROJECT ROSE

NANOTHERAPEUTICS

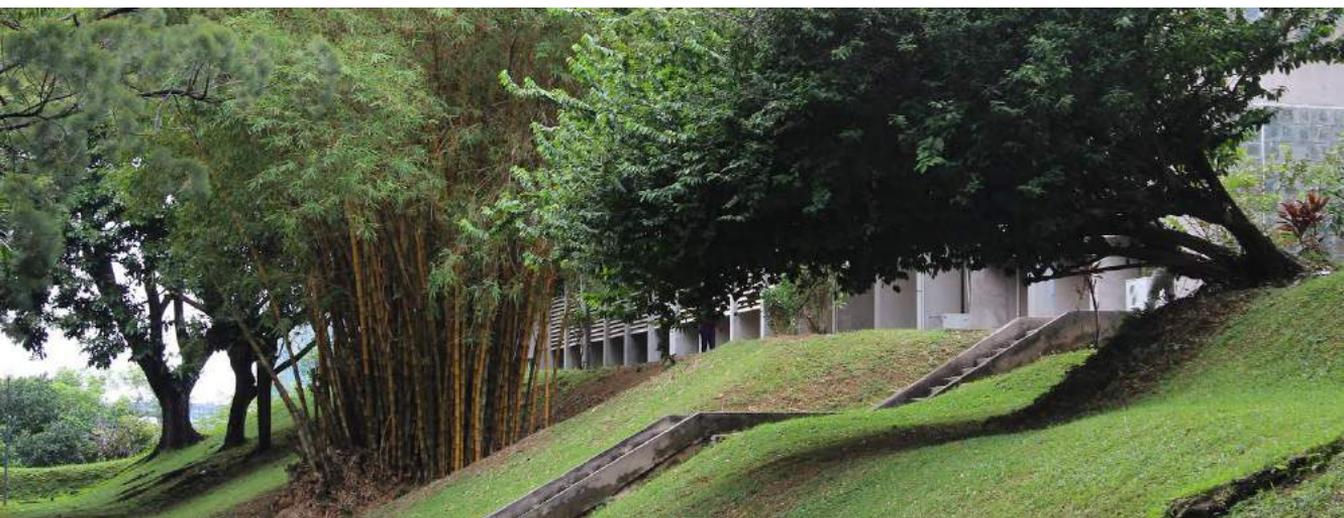


UNIVERSITY
OF MALAYA

FACULTY OF
MEDICINE

A RESEARCH BULLETIN BY THE FACULTY OF MEDICINE, UNIVERSITI MALAYA

CONTENTS



- 3 MESSAGE FROM THE DEPUTY DEAN**
- 4 OUR PEOPLE, OUR STORY**
PROFESSOR DR YVONNE LIM AI LIAN: DEBUNKING THE MYTH ABOUT GUT WORMS BY UNLOCKING THE SECRETS OF GUT MICROBIOTA
- 7 PROFESSOR DR FONG MUN YIK: THE INTRIGUING MALARIA PARASITE PLASMODIUM KNOWLESII: MONKEY, MAN, 'SPY' & DOUBLE IDENTITY**
- 10 CONNECT THE WORLD**
ARE PRIMARY CARE PHYSICIANS AND AMBULATORY PATIENTS IN MALAYSIA READY FOR ADVANCE CARE PLANNING?
- 12 RESEARCH SPOTLIGHT**
THE ABC'S OF UROLOGICAL CANCER RESEARCH
- 15 WHEN A CURE IS NOT ENOUGH: ADDRESSING CHALLENGES IN TREATING CHILDHOOD CANCER**
- 17 PATIENTS' NEEDS ASSESSMENT IN CANCER CARE**
- 20 BREAST CANCER RESEARCH: BRIDGING LABS, CLINICS AND COMMUNITY**
- 23 RESEARCH IMPACT ON COMMUNITY**
PILOT PROJECT ROSE – REMOVING OBSTACLES IN CERVICAL SCREENING
- 26 INNOVATION AND TECHNOLOGY**
FROM NANOTECHNOLOGY TO NANOTHERAPEUTICS: IMPROVING ANTICANCER CHEMOTHERAPY
- 29 SCIENCE CAFE**
A FOCUS ON CHILD AND ADOLESCENT DRUGS, NANOMATERIALS AND VENOMS
PATIENT-CENTRED CARE: EARLY AND LATE CANCER SURVIVORSHIP
- 33 READ TIP**
RESEARCH ON RISK AND PROTECTIVE FACTORS AFFECTING ADOLESCENTS' SEXUAL AND REPRODUCTIVE HEALTH IN SABAH AND SARAWAK
- 34 AWARDS AND RECOGNITION**
- 35 UPCOMING EVENTS**

MESSAGE FROM THE DEPUTY DEAN

PROFESSOR DR YVONNE LIM AI LIAN
DEPUTY DEAN (RESEARCH)



My warmest greetings to all!

Not long after the “birth” of new Malaysia (post 9 May), the prestigious journal *Nature* in its June 2018 issue highlighted Malaysia (i.e., University of Malaya) as being on par with Hong Kong, Singapore, South Korea and Taiwan in its research capacity. These are the five East Asian countries with world leading institutions based on international rankings and

publication statistics. The article also identified Malaysia as a world leader in encouraging women to participate in science.

This third issue of *Pulse@UM* begins with the research journey of two prominent parasitologists. If you missed the enlightening inaugural lectures of these two parasitologists on worms and malaria parasites respectively, the *Our People*, *Our Story* section brings you a summary of their exciting work on these parasites.

As we approach the month of October, which is the Cancer Awareness month, we would like to highlight the whole gamut of cancer research-related activities in our faculty which cover fundamental research, translational research and research that utilises nanotechnology.

We are also proud to highlight the story of a successful multi-agency collaboration. Project ROSE (Removing Obstacles to cervical Screening), led by University of Malaya, was shortlisted as one of the three finalists for the 2018 UICC (Union for International Cancer Control) Collaborative Award. This prestigious award recognises collaborative initiatives, whether national, regional or international that exhibit innovative models of engagement and outcomes.

Lastly, we would like to congratulate all the award winners. The dynamism of our faculty students and staff is once again recognised at the national and international arena. With that, I would like to leave you with this quote, “It is amazing what you can accomplish if you do not care who gets the credit” by the late Harry S. Truman (33rd President of United States).

Hope you enjoy this issue.

With best wishes,

Professor Dr Yvonne Lim Ai Lian

Pulse@UM is a tri-annual research bulletin in English published by the Faculty of Medicine at the University of Malaya. The views and opinions expressed here are those of the author(s) and do not necessarily reflect those of UM, and the editorial board. Materials from the Bulletin may be reprinted with proper attribution.

If you would like to learn more about anything from this bulletin, or would like to contribute or subscribe to future issues, please get in touch with us at editorialpulse@um.edu.my.

For the online version of this bulletin, visit: <https://resfom.um.edu.my/pulse@UM>

CONTRIBUTORS

We would like to acknowledge and thank the following contributors to this issue:

Pauline Lai Siew Mei, Azad Razack, Ong Teng Aik, Jasmine Lim, Retnagowri Rajandram, Hany Ariffin, Nur Aishah binti Mohd Taib, Chui Ping Lei, Woo Yin Ling, Kiew Lik Voon, Chung Lip Yong, Yeong Chai Hong, Noran Naqiah Mohd Hairi, Azlina Ahmad Annuar, Tan Choo Hock, Nur Aishah Taib, Tamil Selvee Ramasamy.

EDITORIAL BOARD

Advisors:
Adeeba Kamarulzaman
Yvonne Lim Ai Lian
Low Wah Yun

Editor-in-Chief:
Tan Choo Hock

Editors:
Fadzilah Hanum Mohd Mydin
Choo Wan Yuen
Tan Kae Yi
Kathleen Fernandez
Nurul Farhana Mohd Nasir
Carol Ann Cheah Wei Qi

COVER PHOTO

Digital illustration of lung cancer cells in color by RAJ CREATIONZS/Shutterstock.com.

For editorial use only.

OUR PEOPLE, OUR STORY

PROFESSOR DR YVONNE LIM AI LIAN: DEBUNKING THE MYTH ABOUT GUT WORMS BY UNLOCKING THE SECRETS OF GUT MICROBIOTA



On 5 April 2018, Professor Dr Yvonne Lim Ai Lian delivered her inaugural and ASM fellows' lecture entitled "Debunking the myth about gut worms by unlocking the secrets of gut microbiota" at the TJ Danaraj Auditorium, Faculty of Medicine.

The auditorium was packed with current and former colleagues, collaborators from various private and public universities and government agencies, students, friends, well-wishers and family members. Members of the Academy of Sciences Malaysia (ASM) and the Malaysian Society of Parasitology and Tropical Medicine (MSPTM) also graced this occasion.

In the words of Professor Dato Dr Adeeba Kamarulzaman, our Dean, the brilliant lecture

kept everyone enthralled for one hour on the subject of worms, of all things!

Professor Yvonne joined the Department of Parasitology, Faculty of Medicine, University of Malaya in November 2003. Prior to this, she lectured at the Faculty of Science and Technology, Universiti Kebangsaan Malaysia (UKM) and Tunku Abdul Rahman College (now Tunku Abdul Rahman University College).

Her passion is in teaching and nurturing students. To date, she has supervised more than 30 postgraduate students. With the many years of experience in teaching parasitology, she recently co-authored the book "Medical Parasitology: A textbook" which was published by Springer (2018). Besides teaching, she is also a keen researcher. Her research focuses on neglected tropical diseases, primarily among marginalised populations (e.g., Orang Asli communities, migrant workers). One of her greatest satisfactions in being a researcher is the opportunity to work alongside the Orang Asli community. This scientific endeavour with the Orang Asli community has been more than an intellectual pursuit for her. Over the years, the experience has unfolded a deep sense of appreciation for humanity and provided invaluable opportunities to give back to society, especially to these disadvantaged communities.

Although Professor Yvonne has received numerous awards, recognitions and was even recently featured as one of the 10 Science



Professor Yvonne, her students and team members at her recent UM inaugural lecture and ASM Fellow's lecture.

Stars of East Asia, she remains grounded and humble about her achievements. The following is a summary of her heartwarming story which she delivered with much humour, passion and sincerity.

DEBUNKING THE MYTH ABOUT GUT WORMS BY UNLOCKING THE SECRETS OF GUT MICROBIOTA

In her recent UM inaugural lecture and ASM Fellow's lecture, Professor Yvonne took us on a journey of discovery to unlock the secrets of gut worms and microbiota. Gut worms such as *Ascaris lumbricoides*, *Trichuris trichiura*, and hookworm have always been associated with poor health, which is why deworming programmes are conducted worldwide to eradicate these worms from our human gut. However, in recent years, there is a growing interest in using worms as therapeutic agents for inflammatory diseases.

Her journey to unravel the secrets of these worms started in 2007, when her team conducted a comprehensive study on the status of worm infections among the indigenous (Orang Asli) communities residing in Peninsular

Malaysia. Although some communities were already exposed to development, it was found that worm infections still persisted in the indigenous population with an overall prevalence of 73.2%. These results were then presented to the Director of the Department of Orang Asli Development (JAKOA) in 2010 and following the outcome of the National Action Council (MKN) in that same year, deworming programmes were re-initiated, benefitting approximately 1600 Orang Asli. This was a significant action by the government agency as large scaled deworming programmes have been discontinued in Malaysia since 1983.

To empower these communities to take ownership of their health issues, a health education project, aptly named HELP (Health Educational Learning Package) was developed and initiated, which involved school teachers, school children, and villagers. Coupled with deworming treatments, the programme was effective in decreasing the number of infections as well as the parasite load in infected individuals. Based on post-intervention evaluation, knowledge that was imparted to the school children was carried home to their

siblings and parents.

Given that resources to provide deworming programmes are scarce, Professor Yvonne and her team decided to utilise the Geographic Information System (GIS) technology to create a predictive map of worm infections. This tool was also able to estimate the number of individuals that needed to be treated with deworming drugs in 78 districts across Peninsular Malaysia. This effort enabled evidence-based decision making and assisted in the implementation of sustainable and cost-effective worm infection control programmes by the Ministry of Health.

Along the way, an intriguing finding was observed which led Prof Yvonne's research team down a new path. There was evidence in one of their studies that low prevalence of confirmed bronchial asthma (i.e., 1.4% of 716) was observed in communities with high prevalence of worm infections (i.e., 73.2% of 716). This observation was interesting as it highlighted that worms and their products have potential to provide protection against some diseases.

Around the same time, Prof Yvonne was approached by New York University researchers who were interested in evaluating the use of worms as a therapeutic agent for diseases such as inflammatory bowel diseases (IBD). After four years of toil and sweat, their team finally discovered a possible pathway that enables gut worms to potentially treat inflammatory bowel diseases (IBD) such as Crohn's Disease and ulcerative colitis. Their work, which was published in SCIENCE, discovered that infection with gut worms in mice model of Crohn's disease increased

the number of *Clostridia* bacterial species, which are known to be "anti-inflammatory", and decreased the abundance of *Bacteroides*: bacteria which are thought to promote IBD, as much as a thousand-fold.

In addition, their team simultaneously conducted a human field cross-sectional study and found that *Trichuris*-infected individuals in rural Malaysia have higher microbial diversity than *Trichuris*-negative individuals. By conducting a pilot longitudinal treatment study, stool samples collected from 75 infected individuals were analysed before and after deworming treatment with albendazole. Consistent with the earlier cross-sectional study, the diversity of microbial communities was significantly reduced after deworming and *Clostridiales* were the most significantly reduced order, whereas *Bacteroidales* (*Prevotella*) were significantly expanded after treatment. These findings were among the first to uncover the mechanisms by which worms could be potentially used as a therapeutic agent for IBD.

In their on-going study, they will be assessing the effects of deworming drug treatment in humans on the gut microbiota by metagenomics analysis. Along with dietary surveys, the proposed field studies will provide longitudinal analyses of worm-infected individuals to establish cause and effect relationship of gut worms on the gut microbiota composition and function. The team hopes to find strategies to improve deworming efficacy in communities that require deworming, and to develop new therapeutic strategies for manipulating the microbiota in individuals suffering from inflammatory diseases caused by microbial dysbiosis.

PROFESSOR DR FONG MUN YIK: THE INTRIGUING MALARIA PARASITE *PLASMODIUM KNOWLESI*: MONKEY, MAN, 'SPY' & DOUBLE IDENTITY



Professor Dr Fong Mun Yik obtained his PhD degree from University of Malaya in 1996. He joined the Department of Parasitology, Faculty of Medicine, University of Malaya (UM) in 1998 as a junior lecturer. He was promoted to the position of Associate Professor in 2003, and obtained full Professorship in 2008.

Professor Fong's main research interest is in molecular parasitology, especially in the areas of molecular epidemiology and development of recombinant antigens for serodiagnosis of parasitic infections. In addition, he is also interested in dengue virus research, particularly the molecular aspect of the virus. As a senior scientist, he has also been very active in various academic societies and editorial boards of scientific journals.

At the administrative level, Professor Fong has contributed in various ways to improve the quality management system of the faculty and the university by serving as the Head of Documentation Unit, QMEC Deputy Director and Senior Lead Auditor for Quality Management System at various times.

Despite the various awards and high achievements obtained, Professor Fong remains a friendly and approachable person to colleagues and students. He is always known for his humour and enthusiasm in sharing his knowledge. In his recent inaugural lecture titled "The intriguing malaria parasite *Plasmodium knowlesi*: monkey, man, 'spy' & double identity", he took us through his exciting journey of research on various medically important parasites, in particular the 5th human malarial parasite, *Plasmodium knowlesi* that later became the core subject of his research. The series of Professor Fong's studies on *P. knowlesi* culminated in the discovery of two genetically distinct types of the parasite, one mapping to Peninsular Malaysia and the other to Malaysian Borneo. In the lecture, he shared with the audience the fundamental aspects of the discovery and the medical implications of his findings, summarized as follows.

DIMORPHISM OF *P. KNOWLESI* PROTEINS
 Invasion of a malaria parasite into its host erythrocyte depends on the interaction between the parasite's protein and the corresponding receptor of the erythrocyte. *Plasmodium knowlesi* uses the Duffy blood group antigen as a receptor to invade erythrocytes. The Duffy binding protein of *P. knowlesi* (PkDBP)

is encoded by an α -gene, where its region II is known as PkDBPall. Professor Fong first revealed through nucleotide sequence analysis that there is a high level of genetic diversity in PkDBPall of the parasite from Malaysia. At the protein level, more than 30 PkDBPall haplotypes were clustered into two distinct groups, for which the majority were clustered into a large dominant group. Subsequently, through phylogenetic analysis, Professor Fong showed that there was an equally high diversity of PkDBPall in Malaysia Borneo, but the haplotype group was distinct from that of Peninsular Malaysia.

Subsequent to the binding of the *P. knowlesi* merozoite to the erythrocyte, the parasite pulls itself into the erythrocyte simultaneously creating a parasitophorous vacuole (PV) that separates it from the host-cell cytoplasm. The rhoptry-associated protein RAP-1 is one of the mediators that are involved in the invasion process, and it has been postulated that genes encoding RAP-1 are highly conserved in all Plasmodium species. Nonetheless, Professor Fong's study using a larger sample size of recent *P. knowlesi* isolates revealed that there is indeed high genetic polymorphism in PkRAP-1. Furthermore, PkRAP-1 could be separated into two Peninsular Malaysia and Malaysian Borneo haplotypic groups, thus, providing evidence of two distinct *P. knowlesi* types.

DIVERGENCE OF THE CIRCUMSPOROZOITE PROTEIN (CSP) REPEAT REGION MOTIFS

Besides efforts to elucidate the genetic basis and pathophysiology of malaria, Professor Fong also researches on effective vaccine to combat this deadly disease. A number of vaccines have been developed against *P. falciparum*. Most of them were based on the

circumsporozoite protein (CSP), which is the most abundant and immunodominant protein on the sporozoites of Plasmodium species. In contrast to the homogenous repeat motifs of *P. falciparum* and *P. vivax*, Professor Fong found that the *P. knowlesi* CSP repeat region is hyperpolymorphic. He discovered more than 60 different types of motifs with different lengths and compositions. Some of the motifs are common, i.e., found in *P. knowlesi* isolates from both Peninsular Malaysia and Malaysian Borneo. Others are found only in Peninsular Malaysia and are absent in Malaysian Borneo or vice versa. This hyperpolymorphic nature of the *P. knowlesi* CSP is likely a major obstacle in the development of a CSP-based vaccine for *knowlesi* malaria.

ULTIMATE PROOF OF GENETIC DICHOTOMY

In order to determine whether the *P. knowlesi* in Malaysia has differed and independently become zoonoses, Professor Fong's team focussed on two genes that have been extensively used for phylogenetic studies: the mitochondrial encoding the cytochrome oxidase subunit I protein (PkCOX1) and the nuclear encoding small subunit ribosomal 18S RNA (Pk18S rRNA). The results strongly support the conclusion that the two geographically separated regions (Borneo and Peninsular Malaysia) of this country harbour genetically distinct *P. knowlesi* populations.

Although *P. knowlesi* from the two geographic regions were genetically differentiated, there was a very low genetic differentiation between the human and macaque parasites in the regions, indicating that humans are susceptible to infection by any of the *P. knowlesi* types circulating in macaques and the *P. knowlesi*

types became zoonotic independently in the two regions.

IMPLICATION OF *P. KNOWLESI* GENETIC DICHOTOMY ON DISEASE SEVERITY

Plasmodium knowlesi is now the major cause of human malaria in Malaysia. The cases in Malaysian Borneo have a higher rate of severe (up to 39%) and fatal infections (up to 27%), which are not commonly observed in Peninsular Malaysia. Clinical symptoms of malaria are primarily attributed to the blood-stage of the parasite life cycle, which results from repeated rounds of erythrocyte invasion,

erythrocytelysis and release of free merozoites. Severity in malaria is multifactorial in nature, while the genetic factor of the parasite is an important contributing factor.

Professor Fong postulated that enhanced virulence and multiplication of the parasite are the result of genetic polymorphisms that increase the invasion ability of the parasites into human erythrocytes. His team now continues to investigate *P. knowlesi* erythrocyte-invasion genes, in the quest for genetic evidence that the Malaysian Borneo *P. knowlesi* has evolved into a more virulent form of this intriguing parasite.



Professor Fong and his research team at the Department of Parasitology, Faculty of Medicine.

CONNECT THE WORLD

ARE PRIMARY CARE PHYSICIANS AND AMBULATORY PATIENTS IN MALAYSIA READY FOR ADVANCE CARE PLANNING?



ASSOC PROF DR PAULINE LAI SIEW MEI
DEPT OF PRIMARY CARE MEDICINE

Advan­ce care plan­ning (ACP) - defined as “a process that aids a person regardless of their age and health status to understand and share their personal values, life goals and preferences toward future medical care” - is one of several strategies implemented in developed countries to promote active ageing. Based on the principle of autonomy, ACP ensures that care is concordant with a patient’s wishes, particularly when patients lose the capacity to decide on end-of-life care. ACP leads to an advance directive – otherwise known as a “living will”. A living will legally documents a patient’s preference of medical treatments for “end-of-life” (a terminal phase when a patient is dying a predictable death) and appoints a proxy decision-maker.

Family members of those who had an advance

directive reported less emotional stress, less depression and better quality of life compared to those who did not. Well implemented ACP policies reduce healthcare cost for terminally ill patients. However, despite the known benefits of ACP and the existence of legislative support for ACP in developed countries, the uptake of ACP remains low.

Decision making regarding ACP is complex and multifaceted, reflecting the conflicting needs and perception of end-of-life care among patients, healthcare professionals, and health care systems. Personal values, age, education level, stress, timing, environment, health status, knowledge, as well as the relationship with physicians, family, and proxies are factors that affect decision making regarding ACP. Race, religion, and cultural values also influence attitudes towards ACP.

Studies on ACP have been performed primarily

in cognitively impaired, older or seriously ill patients (such as patients with cancer, heart failure, or end-stage renal disease). The majority of these studies assessed the readiness of patients and proxies to engage in conversation regarding ACP and whether they would write an advance directive. With cancer patients, most physicians preferred to postpone the conversation regarding ACP to later in the illness trajectory, when patients had a major change in functional status, when poor prognosis is certain or when treatment options are exhausted. This reflects the physicians' belief that patients would simply not be interested in ACP until the issues are relevant.

Overall, available literature suggests that all stakeholders were reluctant to engage in ACP at an earlier time-point and preferred to dawdle until the issues were more clinically relevant and salient. Under normal circumstances, patients would have more time for non-pressured deliberation. In comparison, not many studies have been conducted among primary care physicians and ambulatory patients. However, if ACP is left till a later point in time, a patient may be pressured into making an ill-informed decision.

Currently, ACP is not legislated in Malaysia. A qualitative study performed among 15 older people (aged 65–83 years) in Malaysia found that they have never heard of ACP but were receptive to its concept. This observation concurred with another study conducted among 56 Malaysian patients undergoing haemodialysis which reported that 76% of patients have never heard about ACP.

As part of the “Enabling Malaysian to Actively Age Study” (EMAAS) program (funded by the University Malaya Research Grant), the University of Malaya Primary Care Research Group has developed and validated an instrument - the Advance Care Planning Questionnaire - to assess the knowledge, attitude, and practice of ACP in Malaysia. The Advance Care Planning Questionnaire has been validated in English. We have translated this instrument to Malay, and have completed its validation. We plan to use both the English and Malay versions of the Advance Care Planning Questionnaire to assess the knowledge, attitude and practice of Malaysians towards ACP, and to determine if Malaysians are ready for ACP.

Additionally, there is a gap in the literature regarding the views of Asians on ACP. Geographically, Asia is the largest continent in the world, and has the highest population. A better understanding of the views of Asians and those that have migrated (i.e. the effect of acculturation) can help policy makers navigate through the culturally-sensitive issues in the implementation of ACP in Asian or culturally-diverse countries. Hence, a systematic review on Asian views on ACP and the effect of acculturation will be conducted.

In addition, a qualitative study will also be conducted to identify barriers and facilitators of primary care physicians and ambulatory patients on when would be the best time to initiate a conversation regarding ACP. It is our hope that findings from these studies will guide policymakers on whether ACP should be legislated in Malaysia.

RESEARCH SPOTLIGHT

THE ABC'S OF UROLOGICAL CANCER RESEARCH: (A = PROSTATE CANCER; B = BLADDER CANCER; C = RENAL CELL CARCINOMA)



Professor Azad and Dr Jasmine attended and initiated the prostate cancer research collaboration with the PRACTICAL consortium during its annual meeting in London, 2013.

PROFESSOR DR AZAD RAZACK
PROFESSOR DR ONG TENG AIK
DR JASMINE LIM
DR RETNAGOWRI RAJANDRAM
DEPARTMENT OF SURGERY

“The UM urology research unit enjoys a close working relationship between urologists and scientists across nations. It has continued to flourish and produce numerous human capitals over the past decades through both national and international collaborations, enabling basic research findings to be translated into benefit for patients and vice versa.”

Uncontrollable growth of abnormal cell potentially invades and spreads to other body parts in the form of cancer. Urological cancers can develop in organs such as the bladder, kidney, prostate and testicles. Similar to other cancers, it is often unpredictable and can differ markedly across different racial

and ethnic groups, leading to the different pathophysiologies of the disease and treatment outcomes. To date, the understanding of the development of cancerous cells remain challenging, nevertheless, continuous effort is the key to unlock the unknown. With the passion of working on urological cancers, here, in Faculty of Medicine (FOM), research into the “ABC” is in full swing. The researchers are working from various aspects, looking into the genetics of cancer patients, searching for risk factors and genetic variants related to the increased risk of an individual to develop urological cancer, particularly in a multi-ethnic Asian population. The use of potential biomarkers obtained from the DNA databases has greatly improved the risk prediction for early detection that brings the prospect of a comprehensive DNA screening test and new treatments closer to reality, improving treatment and patient care.

PROSTATE CANCER

Prostate cancer has developed into the fifth commonest cancer diagnosed in Malaysian men in 2017. In 2013, the group leader Professor Dr Azad Razack initiated an international collaboration with PRACTICAL (Prostate Cancer Association Group to Investigate Cancer Associated Alterations in the Genome) consortium, which provided us with access to genetic prostate cancer samples from over 100 research groups worldwide. The collaboration has successfully identified 63 new genetic variations in high-risk populations (Nature Genetics, 2018; Nature Communications, 2018). Besides, The Malaysian Prostate Cancer (M-CaP) Study initiated in 2016, co-led by Associate Professor Dr. Ong Teng Aik and Dr. Jasmine Lim is also one of the efforts taken to increase the understanding of prostate cancer epidemiology. This inaugural prostate cancer registry in Malaysia is collaborating with 8 Ministry of Health Hospitals with the support of Malaysia National Institute of Health (NIH) and University of Tokyo, Japan. To date, the study has recruited more than 1,100 newly diagnosed prostate cancer cases nationwide.

BLADDER CANCER

With bladder cancer as the ninth commonest cancer worldwide, the urology bladder cancer research team, led by Associate Prof Dr Shanggar Kuppusamy is researching on the roles of histone modification proteins in bladder cancer. The team is exploring the protein and gene expressions of H3 lysine 27 (H3K27) demethylases and their significance in bladder cancer, in hopes of using it as tumour biomarkers for the early detection or recurrence prediction for the disease. This collaborative project is being carried out with the Department of Pathology, University

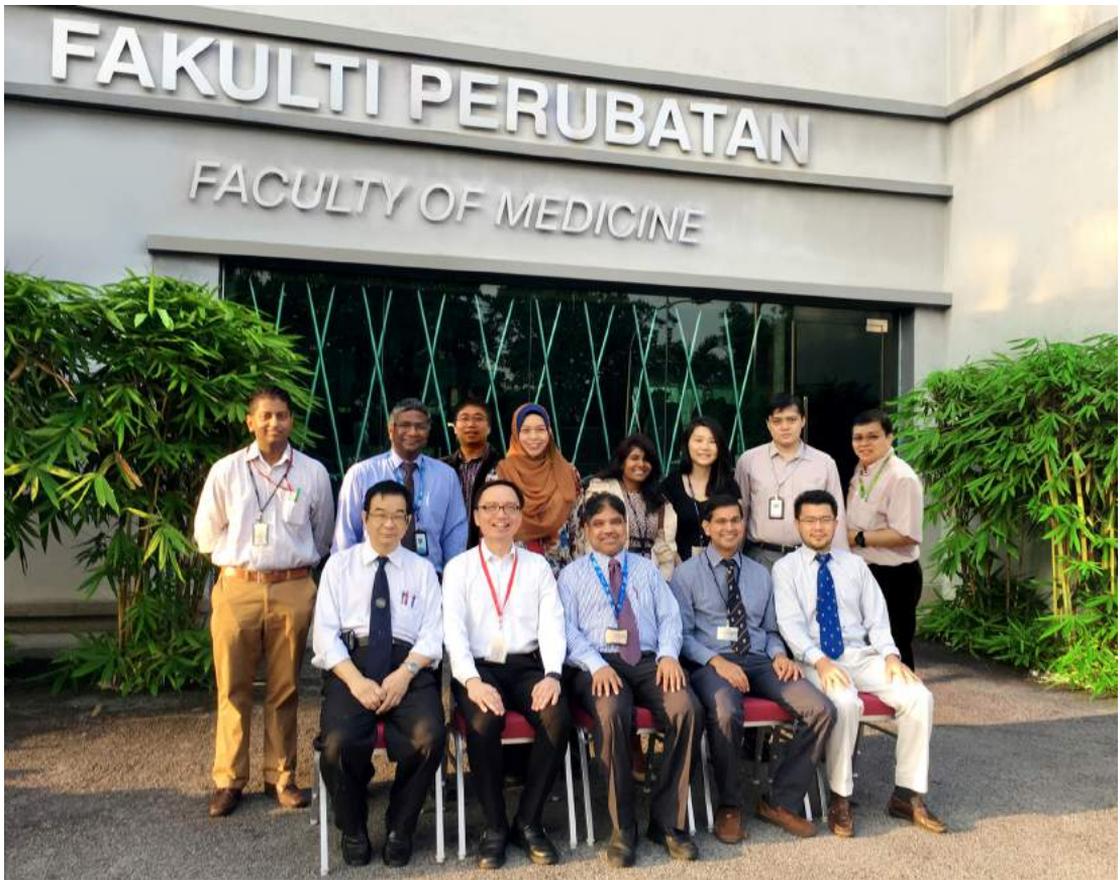


Gowri (left) and Glenda (right). The photo was taken at Pavillion, Kuala Lumpur during Glenda's visit to Malaysia.

of Malaya and University of Queensland, Australia. Another key interest of the team is to create an accurate and complete bladder cancer database in Malaysia, starting with University Malaya Medical Centre (UMMC) patient pools.

RENAL CELL CARCINOMA

Renal cell carcinoma (RCC) is one of the least known cancer types, but can cause significant mortality if not well treated. To address the knowledge gaps, the RCC research team works with other affiliates from the Faculty of Medicine especially from Pathology and Oncology via Associate Professor Dr Ong Teng Aik and Dr Retnagowri Rajandram, with long-term close collaboration with the Centre for Kidney Disease Research at Translational Research Institute, University of Queensland. The research established the Malaysian RCC cell lines as a potential in vitro tool for the study of RCC by Dr Yap Ning Yi.



The UM Urology Group.

The team has also initiated the collection of biological samples from RCC patients at UMMC and the growing repository of biological samples serves as an important source of research material for the evaluation of biomarkers in the serum and tumour tissue. These research discovered several promising biomarker proteins regulating cell apoptosis and proliferation such as TNF receptor-associated factor 1 (TRAF1) and nuclear factor kappa-light-chain-enhancer of activated B cells (NF- κ B), as well as the immune response protein, cluster of differentiation 14 (CD14). On the other hand, the research is paving the way towards investigating the link between obesity and RCC, specifically by investigating leptin and its receptor, both of which take part in regulating hunger and energy expenditure. It is believed that the study will provide a clue into the molecular profiling and pathway analysis of clinically aggressive RCC. Overall, these studies address both fundamental and clinical issues in the form of translational research work in the hope of improving patient treatment and management.

For further details regarding urological cancer research, please kindly contact Prof. Dr. Azad Razack at azadrazack@gmail.com

WHEN A CURE IS NOT ENOUGH: ADDRESSING CHALLENGES IN TREATING CHILDHOOD CANCER



The paediatric oncology team of clinicians and scientists in UMMC, led by Professor Hany Ariffin (second from the right).

PROFESSOR DR HANY ARIFFIN DEPARTMENT OF PAEDIATRICS

In the late 1970s, survival of children with acute lymphoblastic leukaemia (ALL), the commonest childhood cancer, in UMMC was reported to be between 30-40% (Sinniah, 1978). The adoption of the German BFM protocols in the mid-1980s with intensive chemotherapy and prophylactic cranial irradiation increased overall survival (OS) to 56% (Ng, 2000). In 2003, with the founding of the Malaysia-Singapore (MASPORE) Leukemia Study Group, the MASPORE-ALL2003 protocol was launched, incorporating cytogenetics and PCR-based minimal residual disease monitoring to deliver risk-adapted therapy to affected children. The trial closed in 2010, (n=556) and significantly improved OS for all risk categories to 81% (Yeoh, 2012).

Modern therapies have also elevated survival rates to 75-80% for children with various other

cancers such as Wilms' tumour, lymphoma and hepatoblastoma. However, these stellar achievements have come at a price. Many childhood cancer patients survive decades after completing treatment but experience premature development of chronic health conditions. A phenotype of accelerated ageing in these survivors with co-morbidities such as ischemic heart disease, diabetes mellitus, chronic renal failure, and frailty in their early forties is particularly striking (Bhakta, 2017). Clearly, paediatric oncologists have a central role in leading research to elucidate the effects of cancer and its treatment on growth, development, cognition, and overall health in these young adult survivors.

Our own studies on childhood cancer survivors (CCS) have revealed similar concerns. Although predominantly in their mid-20s and asymptomatic, we found that our Malaysian CCS cohort (n=101) had a cellular

research spotlight

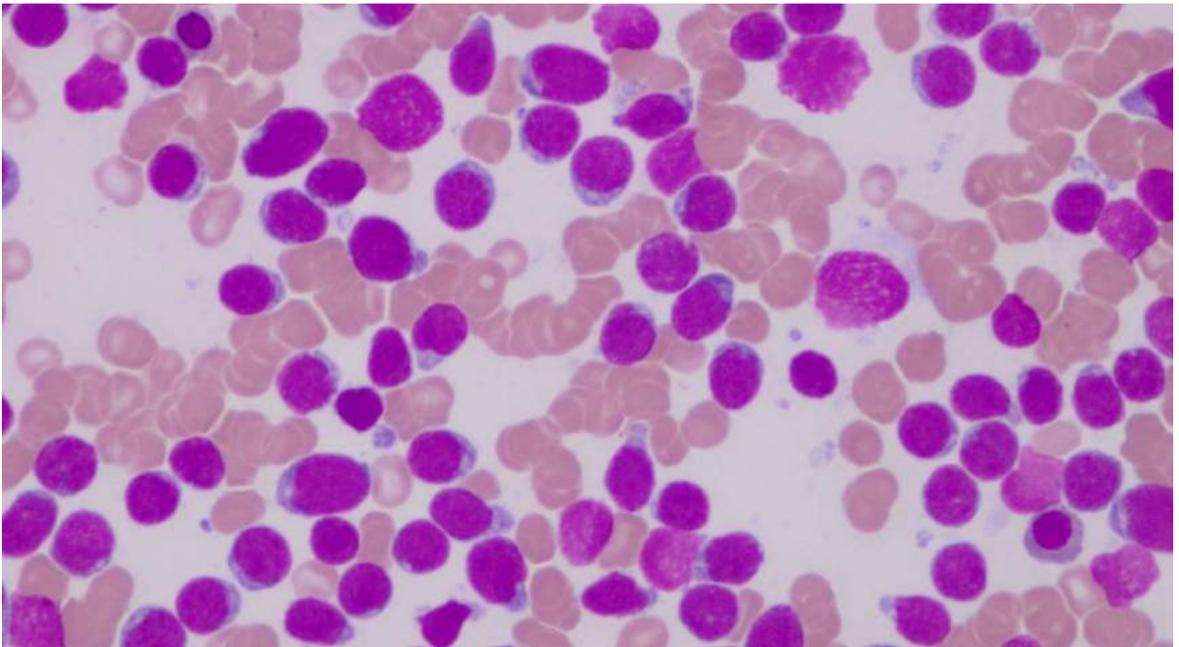
phenotype of senescence, inflammation, and telomere shortening similar to that observed in individuals three decades older. One in five of our survivors had already developed overt metabolic syndrome, whereas 50% demonstrated >1 abnormal metabolic parameters such as hypertension, dyslipidemia or elevated blood glucose (Ariffin, 2017).

Whilst a high survival rate is the aim and source of pride for every paediatric oncologist, an ever-increasing pool of young adult CCS with debilitating chronic co-morbidities necessitates serious reconsiderations on treatment philosophy. One of the key mitigation strategies is to re-think how these children are treated. Specifically, risk-adapted chemotherapy protocols with avoidance of irradiation, identification of novel molecular targets, and incorporation of small molecules are continuously being designed and improved to minimize long-term organ toxicities as

much as feasibly possible.

Prophylactic cranial radiotherapy, once a standard component of childhood ALL therapy, has almost universally been replaced by intrathecal and systemic methotrexate to reduce radiation-associated late effects. In the MASPORE-ALL2003 protocol, only 15% of patients received irradiation. The MASPORE-ALL2010 clinical trial (currently has recruited approximately 450 children) takes this one step further by excluding cranial irradiation altogether, irrespective of risk category. Additionally, for the standard-risk patients, anthracyclines which are implicated in the development of cardiac failure and second cancers, are also completely omitted.

UMMC is a collaborating site for the European BMT-FORUM trial which removes total body irradiation and also the alkylating drug cyclophosphamide, hitherto 'standard'



Photomicrograph of bone marrow (MGG, 200X). Despite almost identical morphology, lymphoblasts have heterogeneous biology. Children with ALL require individualized therapy to achieve a balance between cure and toxicity.

components of the transplant conditioning regimen; instead, using alternatives with lesser late effects. This is an attempt to avoid gonadal failure and subsequent neoplasms in children and adolescents with relapsed and refractory leukaemia undergoing bone marrow transplantation.

Central to the activities of the UMMC paediatric oncology unit has been the Paediatric Oncology Research Laboratory; now in its 15th year of existence. This laboratory is funded by a combination of charitable donations and research grants. It provides the necessary laboratory support to facilitate the on-going collaborative clinical trials and also serves

as the research hub for the unit whose main remit is to deliver high-quality therapies for Malaysian children with various malignancies.

The singular objective of curing a child with cancer is no longer adequate. Today, the challenge for the paediatric oncology community is to look beyond the mere search for new curative options; instead, their role is to champion good quality of life for CCS throughout their adulthood by making therapies not only effective but more importantly, safer. It is this dual goal that forms the ethos of the doctors and scientists of the UMMC paediatric oncology unit and is a duty cherished.

References:

Bhakta N. Lancet 2017; 390: 2569-82 | Ariffin H. Cancer 2017; 123: 4207-14 | Ng SM. J Trop Pediatr 2000; 46(2): 73-8 | Sinniah D. Cancer 1978; 42(4) : 1970-5 | Yeoh AE. J Clin Oncol 2012; 30(19): 2384-92

PATIENTS' NEEDS ASSESSMENT IN CANCER CARE

DR CHUI PING LEI

DEPARTMENT OF NURSING SCIENCES

Researchers from the Department of Nursing Sciences, Faculty of Medicine, have been actively involved in studying the needs of patients who are undergoing cancer treatment. This article shares some of their important findings on various aspects related to communication, lifestyle practices and complementary therapy involving the patients.

COMMUNICATION: WHAT DO PATIENTS WANT TO KNOW?

Cancer and chemotherapy are sources of anxiety and worry for cancer patients. Communication is thus vital because appropriate and accurate information may

assist the patients to understand the expected outcomes and to deal with the unfamiliar experience. In a longitudinal study, the team found that breast cancer patients exhibit a strong need for information at the beginning and mid-course of chemotherapy. They hope to receive more information pertaining to the disease and treatment relative to information from the subscales of physical care, investigative tests, and psychosocial needs. The results provided extremely valuable insights for doctors and nurses in dealing with cancer patients. An informational needs assessment should therefore precede the information giving sessions. A paradigm shift, with an emphasis on patients as the central focus, is needed to enhance the information



Dr Chui Ping Lei presented research findings at the East Asian Forum of Nursing Scholars in Chiba, Japan.

giving sessions based on the perception of the patients' themselves. Currently, a study on cancer patients' unmet supportive care needs (psychological, health system and information, physical and daily living, patient care and support, and sexuality) during chemotherapy is in progress.

COMPLEMENTARY ALTERNATIVE MEDICINE (CAM) USE AMONG CANCER PATIENTS DURING CHEMOTHERAPY

The team showed in a local study more than half of breast cancer patients undergoing chemotherapy were identified as CAM users. The main reason for using CAM was to improve emotional well-being, recommendation by others and to assist in treating cancer respectively. The most common CAM use was mind-body practices, followed by natural

products, and traditional medicine. Many patients perceived mind-body practices to be beneficial for improving overall well-being during chemotherapy. This finding is rather encouraging as mind-body practices are non-ingested therapies, and some of the therapies are relatively simple to learn, inexpensive and can easily be integrated into daily life.

An open discussion regarding CAM use, and specifically regarding the differences between mind-body practices, natural products and traditional medicine will empower patients to understand the potential benefits and anticipate potential adverse effects from CAM usage that may interfere with the therapeutic effects of chemotherapy. Currently, a study to examine the effects of mindful breathing on perceived stress and psychological well-being

of patients with cancer during chemotherapy is in progress.

ORAL CRYOTHERAPY: PREVENTION FOR ORAL MUCOSITIS AND PAIN DURING CHEMOTHERAPY?

An experimental study was conducted to evaluate the effect of oral cryotherapy on the prevention of oral mucositis and pain among colorectal cancer patients undergoing fluorouracil-based chemotherapy. The findings of the study reveal that 30 minutes of oral cryotherapy during chemotherapy followed by sodium bicarbonate mouthwash (3 times daily) post-chemotherapy until the next cycle can improve its efficacy for preventing and managing oral mucositis. This finding supports the use of oral cryotherapy which is cost-effective and has few side effects as a preventive strategy. Prevention of oral mucositis can help patients adhere to optimal chemotherapy dosages and reap the full

benefits of therapy with minimal discomfort.

AWARENESS ON LIFESTYLE-RELATED CANCER RISK FACTORS AND HEALTH-PROMOTING BEHAVIOURS AMONG NURSES

Nurses as role models for healthy living are often expected to be aware of the cancer risk factors and translate health-promoting behaviours into own self-care. The team found that the awareness of lifestyle-related cancer risk factors among nurses remained alarmingly low. They adopted a moderate health-promoting lifestyle. The highest score was in spiritual growth subscale while the lowest score was on physical activity subscale. This finding has provided a useful insight into the current health behaviours of nurses. It can be used as an important indicator as to where education and supportive services may need to be targeted.



Image: Sewcream/Shutterstock.com

Specific cancers are represented by one or more ribbon colours to raise awareness. Some common examples are as follows:

- Lavender: All cancers
- Pink: Breast cancer
- Purple: Pancreatic cancer
- Light blue: Prostate cancer
- Grey: Brain cancer
- White: Lung cancer
- Black: Melanoma
- Yellow: Sarcoma, bone cancer
- Gold: Childhood cancer
- Orange: Leukaemia, kidney cancer
- Teal & white: Cervical cancer

*Specific cancer may be represented by more than one ribbon colour. Some ribbon colours may also be shared by different cancers.

BREAST CANCER RESEARCH: BRIDGING LABS, CLINICS AND COMMUNITY



Show you care, be aware - Partnered with Worldwide Breast Cancer, Professor Nur Aishah and her team aim to promote early detection of breast cancer through an innovative, effective breast health education.

PROFESSOR DR NUR AISHAH BINTI MOHD TAIB DEPARTMENT OF SURGERY

Breast cancer research in University of Malaya has always had a multidisciplinary focus ranging from public health, clinical trials to precision medicine. The team aims to produce evidence for the advancement of humanity and specifically to improve breast cancer outcomes in Malaysia. In 2012-2016, the group was awarded the HIR grant which produced 96 Tier 1 papers, 10 PhD's and 4 Master students. Beyond HIR, the group has remained active in various research and community activities, highlighted as follows:

GENETICS RESEARCH

Collaboration with Cancer Research Malaysia (CRM) led by Adjunct Professor Teo Soo Hwang has brought our knowledge on the prevalence of BRCA 1, 2 and other hereditary genes in Malaysia through the Malaysian Breast Cancer Genetics Study (MyBRCA) inception in 2003. High-risk individuals and

their family members are managed by the Risk Management Clinic since 2009 by a team of senior consultants, and Risk Assessment Clinic since 2016 in collaboration with UMMC Medical Genetics Unit (headed by Professor Thong Meow Keong).

The genetics group has been awarded the Wellcome Trust and Newton Fund to study genes that can identify at-risk individuals in the population through GWAS, hence, bringing precision screening to Malaysia. UM has contributed patients in this large study through the UMMC mammogram cohort in collaboration with Professor Kartini Rahmat, Dr Farhana Fadzli and Professor Ng Kwan Hoong from the Department of Biomedical Imaging.

Bio-specimens and clinical data of cancer patients and controls were banked for research purposes. Using case-control design, Vitamin D as a risk factor has been studied. Biomarkers in early detection study are currently underway with Professor Onn Hashim's proteomics team at the Department of Molecular Medicine.

EPIDEMIOLOGICAL & PROGNOSTIC STUDIES

UMMC legacy data of about 8000 datasets inceptioned in 1993 by Emeritus Professor Yip Cheng Har has led to the first breast cancer outcome studies in Malaysia. The data was the first to show an improvement in survival by time periods and the prognostic effect of ethnicity. Currently, the project is led by Associate Professor Nirmala Bhoo Pathy (Department of Social and Preventive Medicine) who is also the principal investigator of the Singapore-Malaysia Breast Cancer Working Group.

SURVIVORSHIP RESEARCH

Results from these outcome studies brought about the impetus to study lifestyle factors, resulting in an ambitious cohort study: the Malaysian Breast Cancer Cohort (MyBCC) study (PI: Professor Nur Aishah Taib, Coordinator: Dr Tania Islam). This cohort study reviews patients at 6 months, 1 year and 3 years and collects information on lifestyle factors, anthropometry and clinical data.

The financial burden on cancer patients is also studied under the ASEAN CosTs In ONcology(ACTION) study, which comprises ~10,000 survivors from eight low- and middle-income Southeast Asia countries including Malaysia (PI: Professor Yip Cheng Har and Associate Professor Nirmala Bhoo Pathy).

HEALTH SYSTEMS RESEARCH

In collaboration with Ministry of Health, the group has shown a high incidence of late presentation, diagnosis delay and treatment delay for breast cancer in 6 public hospitals. Non-adherence to Tamoxifen is as high as 30 % in the first year. This study is the first to show disparities in care across the public sector in Malaysia.

CLINICAL TRIALS

The Phase 1b studies for Curcumin has been completed and currently the study for Tocotrienol is underway for its immunomodulatory effects on breast cancer. In UMMC, Intraoperative radiotherapy (IORT) equipment has also been provided to low-risk patients, and in 2017, UMMC became a participating site in a multicenter randomised controlled clinical trial (TARGIT B trial) to study the efficacy of IORT boost compared to external beam boost in high-risk patients. This study is currently recruiting respondents and is implemented by the UMMC IORT working group.

IMPLEMENTATION RESEARCH

Point of care data capture in Electronic Medical Records (EMR) and Machine Learning using Breast Cancer Data: In 2011 the UMCRI database initiative was started and produced a standalone data system. In 2015, EMR point of care data capture in the Breast Surgery Unit was done in collaboration with the Bioinformatics Lab leader, Associate Professor Sarinder Kaur and UMMC Jabatan Teknologi Maklumat. The research proforma had been successfully digitised and mapped to the clinical workflows, winning this group the prototype research grant entitled "Multidisciplinary Point of Care Data Capture for Innovative Healthcare: The i-Pesakit Breast Cancer Module Prototype, enhancement of the University Malaya Medical Centre i-Pesakit Electronic Medical Records".

The main objective of this implementation study is to auto-populate the National Cancer Registry form and research database. The automation of cancer registry reporting would be cost-effective in understanding institutional case mix and outcomes. Using new machines



Professor Dr Nur Aishah Taib and Datuk Professor Dr Awang Bulgiba b. Awang Mahmud at the 4th UMMC Breast Cancer Public Forum

and deep learning techniques on archived data are also being tested to produce a new way for survival and outcome analysis to uncover unknown associations with prognostic factors.

QUALITY IMPROVEMENT PROJECT

A research in collaboration with Infection Control Department to reduce mastectomy surgical site infection through SSI prevention bundle in UMMC was started in 2017.

COMMUNITY ENGAGEMENT

The team has partnered with AVON Malaysia in providing RM 100 000.00 charity funds to provide the underprivileged with access

to diagnosis. Partnered with Worldwide Breast Cancer, the group aimed to promote early detection of breast cancer through an innovative, effective breast health education “Know Your Lemons”, in conjunction with the 4th UMMC Public Forum. The 5th UMMC Public Forum (2018) will focus on “Genes and Cancer” in collaboration with “Jean for Genes” Group to hold a breast cancer awareness campaign and to promote breast health literacy among UMMC nurses.

For further details regarding breast cancer research, please contact Professor Nur Aishah Taib at: naisha@um.edu.my

RESEARCH IMPACT ON COMMUNITY

PILOT PROJECT ROSE – REMOVING OBSTACLES IN CERVICAL SCREENING: DESIGN THINKING APPLIED TO CERVICAL SCREENING IN MALAYSIA



Training session at one of the participating community clinics.

PROFESSOR DR WOO YIN LING DEPT OF OBSTETRICS & GYNAECOLOGY

Cervical cancer is one of the top three most common cancers in Malaysian women with four out of five cases occurring in women between 15 to 64 years of age. Worldwide, cervical cancer remains one of the gravest threats to women's lives with one woman dying of cervical cancer every two minutes. This need not be the case as cervical cancer is one of the most preventable and treatable forms of cancer if detected early, managed effectively, and with the use of HPV vaccination.

While Malaysia is internationally recognized and praised for its successful national school-based HPV vaccination programme which was implemented in 2010, the impact of HPV vaccination on cervical cancer incidence and mortality may not be realized for decades. To significantly reduce the incidence of cervical cancer and make it a rare disease in Malaysia,

an organized cervical screening programme that improves coverage and effectiveness is urgently required. The uptake of Pap smears in Malaysia is low despite campaigns and accessible healthcare facilities. The National Health & Morbidity Survey (NHMS) 2011 survey reported only 12.8% of eligible Malaysian women have had a Pap smear within the last 12 months. Barriers to cervical screening include 'patient factors' such as fear, embarrassment, inconveniences and 'health system factors' including inadequate screening infrastructure and human resources for conventional pap smear.

In June 2018, Dr Tedros Adhanom Ghebreyesus, WHO Director-General issued a 'call for coordinated action globally to eliminate cervical cancer'. The World Bank has endorsed HPV vaccination and HPV-based cervical screening as 'best buys' for cancer control in LMICs. Cervical screening with HPV testing is

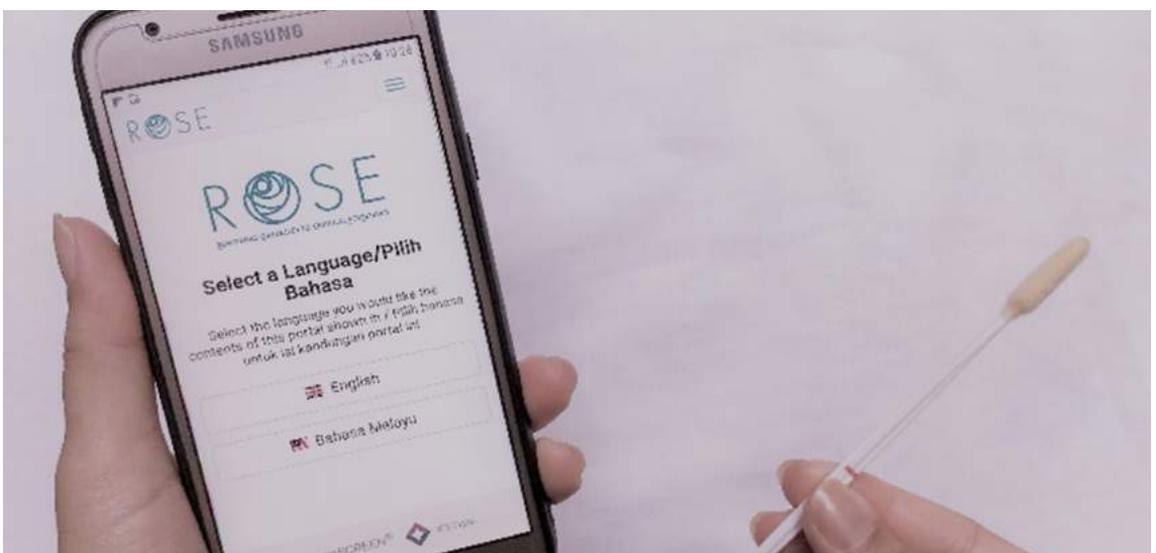
research impact on community

a scientifically validated and globally accepted intervention for identifying women at the pre-cancerous stage and enabling early treatment for cancer prevention. A Malaysian Integrated Cervical Cancer Control Programme of high-coverage, simple screening in 30 to 60 years old women, in addition to adolescent HPV vaccination, would not only more rapidly reduce the burden and cost of treating cervical cancer, but would serve as a critical model for the region. Hence, a novel cervical screening programme was developed using the principles of design thinking.

The proposed implementation model is being proven through a successful and innovative collaborative trial led by University of Malaya with global multidisciplinary experts in the field – Pilot PROJECT ROSE – Removing Obstacles in cervical ScrEening. Key components are: Self-sampling of women, HPV DNA testing, and digital e-Health platform for high connectivity to participants and real-time reporting. Pilot PROJECT ROSE is informing the road-map for implementation and scale-up of a phased, feasible, cost-effective, and sustainable national cervical cancer screening programme which complements the very successful HPV vaccination programme in Malaysia. Malaysia can be the first country in South East Asia to implement a population-wide, highly effective cervical cancer screening program, in conjunction with the leading HPV vaccination programme, establishing leadership to other countries in our region.

Editor's note: Recently, Project ROSE, led by Professor Woo Yin Ling has been shortlisted as one of the three finalists for the 2018 UICC (Union for International Cancer Control) Collaborative Award. This prestigious award aims to identify and celebrate best practices across UICC members and inspire the cancer control community. The award recognizes collaborative initiatives, whether national, regional or international, that exhibit innovative models of engagement and outcomes. PULSE@UM wishes the team every success.

For more information about cervical cancer prevention and Project ROSE, visit:
<https://www.facebook.com/ProjectROSE.my/>



CURRENT MALAYSIA PAP SMEAR PROGRAM
Opportunistic
Requires Pelvic Examination by healthcare professional: known barrier to screening uptake
Suboptimal uptake of screening
No formal monitoring or recall system for positive results
Will require up to 15 tests in a woman's lifetime
Health costs forecast to increase in the next 10 to 20 years
SELF-SCREENING PILOT PROGRAM (PILOT PROJECT ROSE)
Self-acquired screening test
HPV screening for the highest test sensitivity
Can be effective with two to five tests in a lifetime
Health portfolio budget savings over the long term
Backed by an advanced e-Health platform (registry) to provide real-time information quickly, accurately and securely within an Azure environment
CUSTOMIZED E-HEALTH SOLUTION
Scalable with population growth and configurable to new testing and treatment schedules (i.e.: HIV and Hepatitis C)
Promotes a framework for reporting of full programme information to Government (positivity rates, follow-up rates etc.)
Leverages mobile technology for high connectivity ensuring women are not lost for follow-up



INNOVATION AND TECHNOLOGY

FROM NANOTECHNOLOGY TO NANOTHERAPEUTICS: IMPROVING ANTICANCER CHEMOTHERAPY

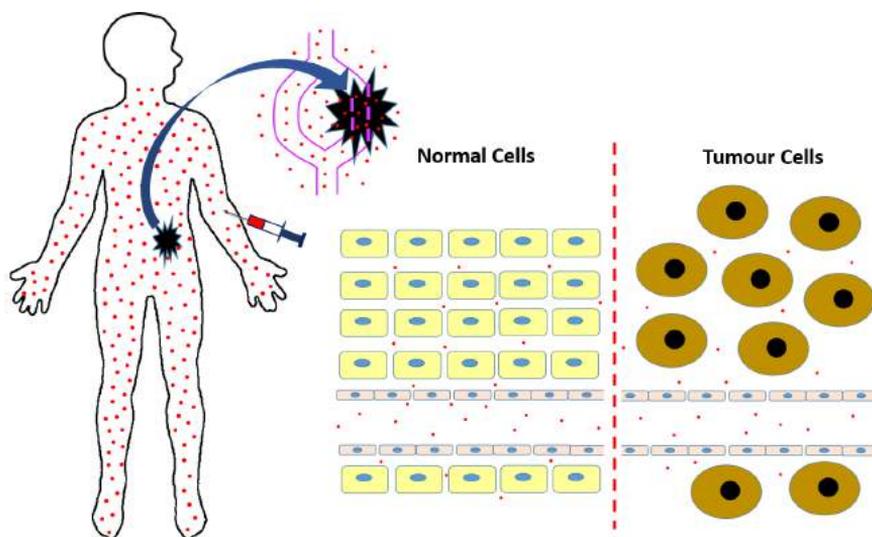


Fig. 1. Uncontrolled dissemination of anticancer in the body post-administration.

ASSOCIATE PROFESSOR DR KIEW LIK VOON DEPARTMENT OF PHARMACOLOGY,
FACULTY OF MEDICINE, UNIVERSITY OF MALAYA

PROFESSOR DR CHUNG LIP YONG DEPARTMENT OF PHARMACY, FACULTY OF
MEDICINE, UNIVERSITY OF MALAYA

ASSOCIATE PROFESSOR DR YEONG CHAI HONG SCHOOL OF MEDICINE (MEDICAL
PHYSICS), FACULTY OF HEALTH AND MEDICAL SCIENCES, TAYLOR'S UNIVERSITY

The applications of nanotechnology in our daily living are vast, spanning over a number of sectors including food, medicine, consumer appliances, electronics, civil, military, etc. According to BBC Research, the global nanotechnology market may reach \$90.5 billion by 2021 at a compound annual growth rate of 18.2% from present. In the field of medicine, the application of nanotechnology in improving the efficacy and safety of anticancer chemotherapeutic drugs is rapidly expanding.

Chemotherapeutic drugs are low molecular weight cytotoxic drugs that destroy tumour tissue through several mechanisms that interfere with cellular functions and cell replication, and they have been routinely used for curative, adjuvant or palliative treatments of cancer of all stages. However, the effective use of anticancer drugs is often hampered by their low therapeutic indices because of their uncontrolled dissemination in the body post-administration (Figure 1). Such undesirable drug dissemination reduces the amount of drug

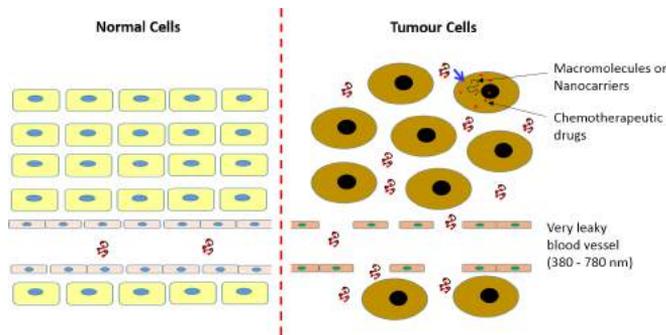


Fig. 2. Nano-carrier-drug-complexes for selective tumour-drug-delivery.

reaching the tumour and its metastases. At the same time, it causes non-specific toxicity to normal tissues and leads to adverse effects including myelosuppression, neurotoxicity, gastrointestinal disturbances, hair loss, and death.

For chemotherapeutic drugs to exert maximal anticancer efficacy and low adverse effects, they have to be selectively delivered to the tumour without random dissemination in the body. Such an ideal scenario can potentially be achieved via the assistance of nanotechnology. The use of active and passive-targeted nanodrug-delivery systems for selective tumour-drug-delivery is chiefly rooted in the key phenomenon of “enhanced permeability and retention (EPR) effect”, that is, the hyperpermeation and prolonged retention of macromolecular-sized nano-carrier-drug-complexes within the tumour tissues due to the aberrant anatomical features found in a number of solid tumours, i.e. leaky vasculature with multiple blood capillary fenestrations at the diameter of 380-780 nm, coupled with the lack of functional lymphatic drainage.

This discovery of EPR in 1986 has helped to kick-start a rapid development of nano-carrier-assisted tumour delivery of chemotherapeutic drugs. In the past three

decades, various clinical chemotherapeutic drugs were integrated into a great variety of biocompatible nano-carriers to form drug-loaded nanotherapeutics, and were tested both in vitro and in vivo. Currently, a number of the first generation nanotherapeutics (with one drug species housed within one nano-carrier structure as the common feature, Figure 3), such as Abraxane®, Doxil®, Myocet®, Genexol-PM®, etc. have passed clinical trials and entered into the market. As these nanotherapeutics received approval for clinical use, new generation nanotherapeutics are under development and are ready for clinical trials. However, only a handful of the new generation nanotherapeutics managed to enter into clinical trials successfully, due to the complexity in the development of policies on nanotoxicity/nanosafety, obtaining the necessary approval for clinical trial and the shortage of funding. In light of this, establishment of clear regulatory policies on nanotoxicity/nanosafety and clinical trials related to nanotherapeutics is necessary.

In Malaysia, although the field of nanotherapeutics research is still in its infancy, numerous developmental efforts from local universities have been reported over the past 2 decades. In the Faculty of Medicine, University of Malaya, a small group of researchers

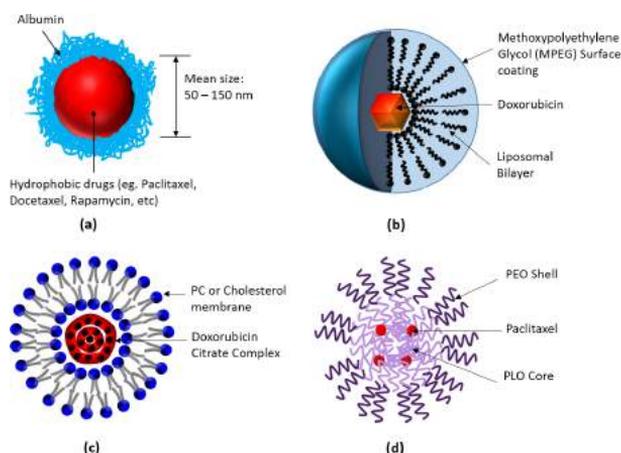


Fig. 3. First-generation nanotherapeutics.

from the Nanotherapeutics Lab (NTL) has been progressing well in the development of new generation anticancer nanotherapeutics and nano-drug-carriers for active and passive tumour delivery of anticancer drugs and imaging probes. Some of the notable products developed by the team include high-drug-payload nanotherapeutics, immuno-stealth-nanotherapeutics, free-radical-generating near-Infrared (NIR)-photodynamic nanotherapeutics, photothermal nanotherapeutics, etc. Although good progress is seen in the nanotherapeutics research both from within UM and respective institutions across Malaysia, greater investments from the public and private sectors are still very much needed not just to further excite the growth of the field, but also to encourage coalition among the local research groups and companies for greater advancements.

References:

1. McWilliams, A., *Global Markets for Nanocomposites, Nanoparticles, Nanoclays, and Nanotubes*. NAN021G, Global Markets, BBC Research Report Jan 2017.
2. Kiew, S. F.; Ho, Y. T.; Kiew, L. V.; Kah, J. C. Y.; Lee, H. B.; Imae, T.; Chung, L. Y., *Preparation and characterization of an amylase-triggered dextrin-linked graphene oxide anticancer drug nanocarrier and its vascular permeability*. *International Journal of Pharmaceutics* 2017, 534 (1-2), 297-307.
3. Voon, S. H.; Tiew, S. X.; Kue, C. S.; Lee, H. B.; Kiew, L. V.; Misran, M.; Kamkaew, A.; Burgess, K.; Chung, L. Y., *Chitosan-Coated Poly(lactic-co-glycolic acid)-Diiodinated Boron-Dipyrromethene Nanoparticles Improve Tumor Selectivity and Stealth Properties in Photodynamic Cancer Therapy*. *Journal of Biomedical Nanotechnology* 2016, 12 (7), 1431-1452.
4. Cheah, H. Y.; Gallon, E.; Dumoulin, F.; Hoe, S. Z.; Japundžić-Žigon, N.; Glumac, S.; Lee, H. B.; Anand, P.; Chung, L. Y.; Vicent, M. J.; Kiew, L. V., *Near-Infrared Activatable Phthalocyanine-Poly-L-Glutamic Acid Conjugate: Enhanced in Vivo Safety and Antitumor Efficacy toward an Effective Photodynamic Cancer Therapy*. *Molecular pharmaceutics* 2018, 15 (7), 2594-2605.
5. Saw, W. S.; Ujihara, M.; Chong, W. Y.; Voon, S. H.; Imae, T.; Kiew, L. V.; Lee, H. B.; Sim, K. S.; Chung, L. Y., *Size-dependent effect of cystine/citric acid-capped confetto-like gold nanoparticles on cellular uptake and photothermal cancer therapy*. *Colloids and surfaces. B, Biointerfaces* 2018, 161, 365-374.

SCIENCE CAFÉ

A FOCUS ON CHILD AND ADOLESCENT

ASSOCIATE PROFESSOR DR NORAN NAQIAH MOHD HAIRI DEPARTMENT OF SOCIAL AND PREVENTIVE MEDICINE

DR AZLINA AHMAD ANNUAR DEPARTMENT OF BIOMEDICAL SCIENCES

The Science Café held on April 23, 2018 showcased the research activities under the Public Health and Non-communicable Diseases Research Thrust, with a focus on programmes relating to “Child, Adolescent, and Young Adult Health”. Associate Professor Dr Noran Naqiah bt Mohd Hairi, head of the research thrust, explained that the aim of the programmes is to determine the social and environmental determinants of health issues of children, adolescents and young adults in Malaysia and to help these younger Malaysians to improve and sustain a healthy lifestyle.

Associate Professor Dr Hazreen Abdul Majid (Department of Social and Preventive Medicine) and Associate Professor Dr Muhammad Yazid Jalaludin (Department of Paediatrics) who are heading the Malaysian Health and Adolescents Longitudinal Research Team (MyHeART) described the prevalence of cardiovascular risk factors among adolescents in Peninsular Malaysia.

The MyHeART group is interested in determining how lifestyles during early adolescence can have an effect on cardiovascular, lung, and bone health in early adulthood. Furthermore, the psychological and social factors that influence ‘high risk’ behaviours during young adulthood are also

studied. Associate Professor Dr Muhammad Yazid also shared his clinical research findings from the MyBFF@school project (My Body is Fit and Fabulous@school project), which is an intervention study to combat obesity among school children.

Associate Professor Dr Moy Foong Ming (Department of Social & Preventive Medicine) subsequently shared with us the project on the assessment of sustainable diet among young adults. Through activities such as sharing of meals photos, the team was able to get a glimpse into the diets of Malaysian youth. Data from this study will help formulate dietary recommendations for the younger Malaysian public to address the broader environmental and social issues of sustainability.

The Malaysian Care for Adolescent Project (MyCAP) was presented by Dr Rafdzah Ahmad Zaki and Dr Nik Daliana Nik Farid from the Department of Social & Preventive Medicine. One of the main objectives of the project is to deliver effective sexual and reproductive health education to adolescents especially the poor, marginalized youth. An Internet-based programme for information dissemination has been developed to improve sexual and reproductive health (SRH) knowledge among Malaysian adolescents. The online approach will be complemented with conventional face-

to-face discussions regarding sexual health.

Last but not least, Associate Professor Dr Claire Choo Wan Yuen (Department of Preventive and Social Medicine) presented on behalf of Associate Professor Dr Sajaratulnisah Othman (Department of Primary Care Medicine) on their experiences in running the Community-Academic Programme (CAP), a programme designed for 'Supporting Youth Against Violence & Unhealthy Sexual Activities' in collaboration with Klinik Kesihatan Taman Medan (MoH), All Women's Action Society

(AWAM) and Pusat Aktiviti Kanak-kanak (Social Welfare Department). The programme included important workshops to examine the level of understanding amongst the youth about gender-based violence (GBV) and sexual reproductive health (SRH) issues, as well as running various activities to promote self-esteem, knowledge, attitudes, and skills related to healthy relationships and adolescent SRH.

For more information, please contact Research Management Centre (03-79677515).

DRUGS, NANOMATERIALS AND VENOMS: WHEN TOXICITY IS A CONCERN

DR TAN CHOO HOCK DEPARTMENT OF PHARMACOLOGY

The Science Café session held on 30th May, 2018 themed "Drugs, nanomaterials and venoms: When toxicity is a concern" showcased selected niche area research in the faculty. The session began with Dr Shamsul Mohd Zain from the Pharmacogenomics Laboratory, Department of Pharmacology. Dr Shamsul revealed that some medicines can turn toxic even though when the dosage taken by the patient is within the normal therapeutic range. This is largely due to the genetic makeup of certain people that makes them susceptible to the drug adverse effects. However, the study of genes and their association with adverse drug reaction (ADR) is often not feasible in the country as the study usually requires a large sample size. Furthermore, the incidence of certain ADR is relatively low and genetic variants exist among patients. To overcome this challenge, an international collaborative work has been set up: The South East Asian Pharmacogenomics Network (SEAPharm). SEAPharm has recently launched a kick-off project with a focus on carbamazepine-induced severe cutaneous adverse reactions (SCARs). The project aims to improve the guideline for the clinical implementation of a pharmacogenomics panel suitable for the Southeast Asian populations in ADR prevention. Research conducted by Dr Shamsul and his team will contribute to this international collaboration through sampling and analysis of the Malaysian patients.

The talk was continued by Dr Leo Bey Fen from the Central Unit for Advanced Research Imaging (CENTUARI). In her talk, Dr Leo shared with the audience the advancement of nanotechnology

in health and medical practice. Nanomaterials or nanoparticles have been used frequently for therapeutic purposes, for instance, in drug delivery to improve the efficacy and safety profile of anticancer drugs. Recently, the research findings from her team have shown many promising health benefits of silver nanoparticles, such as the reduction of brain inflammation and neurotoxicity; however, nanomaterials are not without toxicity, and this is an important emerging topic to be addressed by nanotechnology researchers. Dr Leo and team are currently working on characterizing nanoparticle toxicity and how this can be mitigated.

Dr Tan Choo Hock from the Venom Research and Toxicology Lab, Department of Pharmacology, subsequently talked on venom and antivenom research conducted by his team. Snakebite envenomation remains a WHO-listed neglected tropical disease and Dr Tan's team has been actively working on the profiling of various snake venoms using an integrated proteomic and pharmacological approach, in order to better understand the correlation between venom composition, the mechanistic actions of toxins, and the pathophysiology of envenomation. Antivenom shortage is another challenge faced in the management of snake envenomation. Currently, several international collaborations have been established with Dr Tan's lab to study ways of improving antivenom quality and supply in the region.

For more information, please contact Research Management Unit (03-79677515).

PATIENT-CENTRED CARE: EARLY AND LATE CANCER SURVIVORSHIP

PROFESSOR NUR AISHAH TAIB DEPARTMENT OF SURGERY
DR THAMIL SELVEE RAMASAMY DEPARTMENT OF MOLECULAR MEDICINE
DR TAN CHOO HOCK DEPARTMENT OF PHARMACOLOGY

The Science Café session held on 16th May showcased research and initiatives on “Patient-centred care” by clinicians and researchers clustered under the Cancer and Drug Discovery Research Thrust. Professor Nur Aishah Mohd Taib (Department of Surgery), who is also the thrust leader, chaired and started the session by sharing that healthcare providers treat patients not only from a clinical perspective, but also from an emotional, mental, spiritual, social and financial perspective. To address this holistic management approach in particular for cancer patients, various studies have been conducted by FOM investigators and their collaborators, and the topics involved can be categorically divided into “Early Survivorship” and “Late Survivorship”.

First, Dr Tania Islam (Department of Surgery) shared the findings with the audience about the development of a breast care nurse-led video orientation programme on information and navigation for newly diagnosed breast cancer patients at UMMC, which has effectively

improved the patients' knowledge and satisfaction. The programme also enhanced cancer care coordination among departments and the patient experience in UMMC.

Dr Chui Ping Lei (Department of Nursing) subsequently presented an on-going project on the effects of mindful breathing on perceived stress and mindfulness among cancer patients. Ms Stella Kong Yik-Ching (National Clinical Research Centre, MOH) presented the team's findings on financial needs of breast cancer patients in Malaysia, and the various coping strategies patients have adopted. Dr Caryn Chan Mei Hsien (Universiti Kebangsaan Malaysia) also explored the psychological distress faced by cancer patients and her collaboration with FOM researchers in conducting a trial of psycho-educational intervention for the patients. These studies highlighted the need for care and support to be extended to those patients in the early stage of cancer diagnosis and management.

The session continued with Ms Yoon Sook-Yee (Head of Familial Cancer, Cancer Research Malaysia) on the success of the national genetic study, "Mainstreaming Genetic Counselling" for genetic testing of BRCA1 and BRCA2 in Malaysian Ovarian Cancer Patients (MaGic Study), and psycho-social research on patients and their families. Ms Hamizah Sa'at (Department of Surgery) also presented her study on the exploration of decisional needs in Malaysian BRCA carriers in opting for risk-reducing salpingo-oophorectomy. The decision quality can be improved with better patient's knowledge, well-facilitated communication with doctor and reduced decisional conflicts. Ms Grace Yeoh Kar See (Department of Surgery) subsequently presented her PhD study on clinicians' perspectives on breast cancer risk management for BRCA mutation carriers in Malaysia. A patient decision aid is important to provide communication and delivery of personalised cancer risk management to BRCA carriers in Malaysia.

Lastly, Dr Lee Yew Kong (Department of Primary Care Medicine) shared with the audience his research on coping strategies of Malaysian women with recurrent ovarian cancer. It was found that the coping strategies were mostly in place for the women interviewed, and the strategies were unique to the Malaysian setting where there is a strong religious element and family involvement.

For more information, please contact Research Management Unit (03-79677515).

June is National Cancer Survivors Month in the USA and several other countries.

Information on cancer support groups in Malaysia is available here:

<https://www.cancer.org.my/about/what-we-do/support/support-groups/>



Image: Rawpixel.com/Shutterstock.com

READ TIP

RESEARCH ON RISK AND PROTECTIVE FACTORS AFFECTING ADOLESCENTS' SEXUAL AND REPRODUCTIVE HEALTH IN SABAH AND SARAWAK

AUTHORS: LOW WAH YUN, HALIMAH AWANG, CHEAH WHYE LIAN, CHANG CHING THON, HELEN BENEDICT LASIMBANG, CHUA TOCK HINWG, LEE WAI KHEW, DEV NATH KAUSHAL, TONG WEN TING

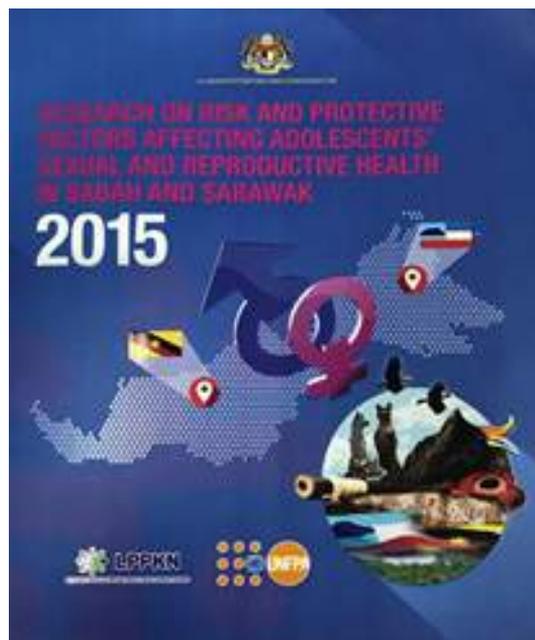
PUBLISHER: The National Population and Family Development Board (NPFDB)

ISBN: 978-983-3624-34-8

@National Population and Family Development Board, 2016

Although there has been limited data on teenage pregnancy in Malaysia, the increasing reports on incidences of abandoned babies indicate that increased premarital sexual intercourse resulted in unwanted pregnancies among unmarried adolescents. This consultancy report commissioned by the National Population and Family Development Board, under the Ministry of Women, Family and Community Development Malaysia, deals with the risk and protective factors affecting adolescents' sexual and reproductive health (SRH) in East Malaysia (Sabah and Sarawak) for effective policy and programme advocacy.

Different cultures in the East Malaysian region may influence the risk and protective factor affecting young Malaysian SRH there. Information for this study was obtained from adolescents aged 13 to 24 years which included school students, college/university students and out-of-school adolescents. Information gathered include knowledge, attitudes and practices related to sexual and reproductive health as well as risk and protective factors against premarital sex among adolescents in



Sabah and Sarawak.

Overall, the protective factor against premarital sex for school adolescents is strong religious beliefs, while for the college/university students, the protective factors are having good knowledge and positive attitudes toward sexual and reproductive health. Whereas for out-of-school adolescents, the protective factors are having high self-evaluation and involvement in community activities. The findings will provide policy makers and state implementers with a clear picture of the adolescent SRH situation in East Malaysia to help better address specific SRH issues in the states. The information gathered is crucial for public awareness on the adolescent SRH situation that needs attention and appropriate interventions to ensure the holistic development of adolescents and youth.

AWARDS & RECOGNITION

PULSE@UM WOULD LIKE TO CONGRATULATE THE FOLLOWING AWARD WINNERS FROM THE FACULTY:



Madam Faizatul Lela Jafar (Department of Medical Microbiology): International Federation of Biosafety Associations (IFBA)'s 2017 Biosafety Heroes.

Dr Sim Joong Hiong (Medical Education & Research Development Department): Association of Commonwealth Universities Fellowship Award.

Associate Professor Dr Veera Sekaran Nadarajan (Department of Pathology): Regional Director for the Western Pacific region, International Society of Blood Transfusion (ISBT).

Madam Vishala Sivapalan (Department of Pharmacology): 2nd runner-up, 2018 Famelab National Championship on science communication.

Associate Professor Dr Tengku Ain Fathlun (Department of Ophthalmology) and Dr Wong Won Fen (Department of Microbiology): 2018 Fulbright Malaysia Scholar Program.

Dr Cindy Teh (Department of Medical Microbiology): Malaysian Society for Infectious Disease and Chemotherapy (MSIDC) - Institut Mérieux Young Investigator Award 2018.

Faculty of Medicine Neuroscience Best Publication Awards: Associate Professor Dr Vairavan Narayanan (Department of Surgery) and Dr Tan Soon Hao

(Department of Biomedical Sciences).

Professor Dr Suresh Kumar Govind (Department of Parasitology), Dr Chandramathi Samudi@Raju (Department of Medical Microbiology) and Dr Rukumani Devi Velayuthan (Department of Medical Microbiology): Silver Medal, 46th International Exhibition of Inventions, Geneva.

Professor Dr Lydia binti Abdul Latif (Department Of Rehabilitation Medicine), Associate Professor Dr Faridah binti Mohd Hairi (Department of Social & Preventive Medicine) and Professor Dato Dr Zaliha Omar (UMSC): Special Award of High Impact Project (Anugerah Khas Projek Berimpak Tinggi), UMCares.

Dr Phan Chia Wei (Department of Pharmacy) and Professor Dr Murali Naidu (Department of Anatomy): Winner of the Health Cluster (Pemenang Kluster Kesihatan), UMCares.

Project ROSE, led by Professor Dr Woo Yin Ling (Department of Obstetrics and Gynaecology): finalists for the 2018 Union for International Cancer Control Collaborative Award.

**A complete list will follow in the next issue.*

UPCOMING EVENTS



SEPTEMBER 2018

6-7 September

Python Intermediate for Data Analytics

18-19 September

Managing Your References using EndNote

20-21 September

Qualitative Methodology Research in Health

Contact: Research Management Unit (RMUFOM),
rmctraining@um.edu.my

20-22 September

Kuala Lumpur Innovation Forum

Contact: Dr Leo Bey Fen, CENTUARI, beyfenleo@
um.edu.my

NOVEMBER 2018

27-30 November

Qualitative Research in Health Workshop by
Professor Pranee Liamputtong

Contact: Research Management Unit
(RMUFOM), rmctraining@um.edu.my

OCTOBER 2018

8-12 October

FOM eHealth Research Carnival

Contact: Dr Teo Chin Hai, Department of Primary
Care Medicine, teoch@um.edu.my

15-19 October

Bioinformatics Bootcamp

Contact: Research Management Unit (RMUFOM),
rmctraining@um.edu.my

DECEMBER 2018

19-20 December

Understanding Statistical Results in Clinical
Research

Contact: Research Management Unit (RMUFOM),
rmctraining@um.edu.my

INNOVATION FORUM KUALA LUMPUR : ENTREPRENEURSHIP IN HEALTHCARE



President ASM
Professor Dato'
Dr. Asma Ismail

**Director
General of Health**
Datuk
Dr. Noor Hisham
bin Abdullah



**Co-founder,
Privi Medical**
Mr. Prusothman
Sina Raja



**CEO/
Co-Founder
Naluri Hidup**
Mr. Azran
Osman-Rani



CEO MIMOS
Mr. Ahmad
Rizan Ibrahim



**Director Business
Operation SAS
Malaysia**
Mr. Sheikh Manzoor
Ghani



**Special Officer
(HealthTech) to
Minister of Health**
Dr. Dheshi Baha
Raja



**CEO
Mynews Holdings
Berhad**
Mr Dang Tai Luk



21 SEPTEMBER 2018
Bangunan Azman Hashim,
Faculty of Business and
Accountancy,
University of Malaya

22 SEPTEMBER 2018
Dewan Tunku Cancellor,
University of Malaya

WORKSHOP REGISTRATION FEE

21st SEPTEMBER 2018

Government : RM150
Industry : RM300

22nd SEPTEMBER 2018

UM & Outside UM: RM50

For registration, submission and further details, contact us:
Secretariat committee e-mail: ifkl@um.edu.my

*payment inclusive Saturday Forum

FOR MORE INFORMATION, VISIT OUR WEBSITE :

<http://kualalumpur.inno-forum.org/event/innovation-forum-kuala-lumpur-conference-2018/>

ORGANIZED BY

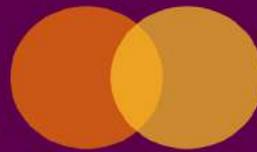
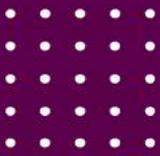


IN COLLABORATION WITH



CO-ORGANIZER





EHEALTH RESEARCH CARNIVAL 2018

HACKATHON

WHAT'S THE AIM?

- This hackathon aims to increase exposure on eHealth and build eHealth research capacity in students from health and IT backgrounds.
- It provides a platform for participants to brainstorm ideas and generate eHealth innovations that solve or improve health conditions.

WHO SHOULD PARTICIPATE?

- Undergraduate students from the Faculty of Medicine
- Pre-House Officer
- Undergraduate students from the Faculty of Computer Science and Information Technology or any faculty (with IT skills)

*Participants will be grouped in a team of 4 consisting of students with health as well as IT background (participants are free to form their own team)

WHY PARTICIPATE?

FREE registration

Experience to be involved in a hackathon

Mentorship by eHealth experts

Build network with students from other disciplines

Free Microsoft Azure credits

Cash prizes to be won!

1st - RM1600
 2nd - RM800
 3rd - RM400
 4th - RM200
 5th - RM200

*Class exemption can be arranged & refreshments will be provided throughout event

WHAT'S THE ACTIVITY?

1 Oct 2018 (Mon)

1:30-5:00pm Cafe session
 (pre-hackathon briefing)
 Venue: THE CUBE, FOM

2-10 Oct 2018

Discussion and meet the experts
 at own convenience

11 Oct 2018 (Thu)

8:30-5:00pm Hackathon - development
 Venue: THE CUBE, FOM

12 Oct 2018 (Fri)

8:30-12:15pm Hackathon - development and finalisation
 Venue: THE CUBE, FOM

2:30-5:00pm Hackathon - Pitching
 Venue: Clinical Auditorium, UMMC

Come and join the fun!

Seats are limited!

Register now at:

tinyurl.com/umehealthhackathon





UNIVERSITY OF MALAYA | FACULTY OF MEDICINE

FOM eHEALTH RESEARCH CARNIVAL 2018



Activities:

- **PLENARIES** on Global eHealth; eHealth in Malaysia; and Technology-Enhanced Learning in Medical Education
- **SYMPOSIA** on Electronic Medical Record; Technology Enhanced Learning; Latest Advances in eHealth; and eHealth governance & policies
- **SEMINARS** on Improving Systematic Review Processes Using Machine Learning; and Publish or Perish
- **WORKSHOPS** on Developing Effective E-Learning; Developing eHealth Intervention; and Science Communication
- **PUBLIC FORUM** on Reliable Health Information; and Useful eHealth Tools
- **HACKATHON** on eHealth

8TH - 12TH OCTOBER 2018
8.30AM - 5.00PM

FACULTY OF MEDICINE
UNIVERSITY OF MALAYA

Co-organised by:



Faculty of Medicine
Research Management Unit
(RMU)

Featured Speakers:



A/Prof Dr Adam Dunn

Associate Professor of Health Informatics
University of Macquarie, Australia



A/Prof Dr James Pickering

Associate Professor in Anatomy and eLearning
University of Leeds, UK



Prof Sungyoung Lee

Lead of Intelligent Medical Platform
Research Center, Kyung Hee University, Korea



Prof Dato Dr Jai Mohan

Professor of Health Informatics & Paediatrics
International Medical University, KL



A/Prof Dr Tay Pek San

Director of the Centre for Law and Ethics in
Science and Technology (CELEST), Faculty of Law



Dr Siti Khayriyyah Mohd Hanafiah

Winner of FameLab International 2018
Lecturer, University Sains Malaysia

FREE ADMISSION

*except workshops

Seats are limited. RSVP now at:

<https://goo.gl/forms/IN3rPtXywQY4Eh1s1>



HALF CENTURY BALL

at the Great Hall



DEWAN TUNKU CANSELOR, UNIVERSITY OF MALAYA

3RD NOVEMBER 2018, 8.15PM

RM2,500.00 PER TABLE (10 PAX)

For any inquiries, please contact:

ernadewi@um.edu.my (03-79492107), alumni.fom@um.edu.my (011-21493689), **Dress code: smart casual**



**RESEARCH MANAGEMENT UNIT (RMU),
DEAN'S OFFICE**
LEVEL 3, BLOCK I, FACULTY OF MEDICINE
UNIVERSITY OF MALAYA
50603 KUALA LUMPUR

TEL: 03-79677515

FAX: 03-79676790

email: resfom@um.edu.my

RMC website: <https://resfom.edu.my>

FOM website: <https://medicine.edu.my>

f Research Management Unit - FOM UM