

## **INTRODUCTION OF PABSC**

The Ministry of Higher Education of Malaysia has conducted a survey on the future direction of Biomedical Science in which the committee members were appointed among academicians of Biomedical Science from University of Malaya (UM), Universiti Kebangsaan Malaysia (UKM), Universiti Sains Malaysia (USM), Universiti Putra Malaysia (UPM) and International Islamic University of Malaysia (IIUM).

The committee has visited Mahidol University, Chulalongkorn University and Khon Kaen University on 14<sup>th</sup> to 19<sup>th</sup> of June 2011 in order to get more information regarding the future of Biomedical Science programme from the Asian perspective. Following the visit, a consortium known as ASIA-International Biomedical Science Consortium was suggested to be formed at Khon Kaen University, Thailand. The aim of this consortium is to strengthen the Biomedical Science and Medical Laboratory Technology programmes in Asia by initiating collaboration between participating universities in terms of research.

A memorandum of understanding was signed in 2012 involving nine universities and research institute from Thailand, Malaysia, Vietnam and Hong Kong. Consortium members agreed to organise a conference known as Pan-Asian Biomedical Science Conference (PABSC) as once in two years in rotation among the members. The 1<sup>st</sup> PABSC was hosted by Khon Kaen University at The Royal Orchid Khon Kaen Hotel, Thailand in 2012. The 2<sup>nd</sup> PABSC was hosted by The Chinese University of Hong Kong at Hong Kong Science Park in 2014. During the last consortium meeting on 13<sup>th</sup> December 2014, the members agreed to choose Malaysia as the host for the 3<sup>rd</sup> PABSC in 2016.

## **CONFERENCE OBJECTIVES**

- i. To create intellectual and professional platform on the current issues and development in Biomedical Science.
- ii. To encourage the exchange of opinions and experiences in the field of Biomedical Science at the Asian level in order to achieve excellence in teaching and learning, research and industry.
- iii. To build research collaboration among the universities in Malaysia with other members of ASIA-International Biomedical Science Consortium in the field of Biomedical Science.
- iv. To provide exposure to the researchers, academician, practitioners and students on the new discovery and alternative approaches in Biomedical Science.
- v. To strengthen the cooperation between academician and industry in the field of Biomedical Science, especially in terms of research.

## COMMITTEE MEMBERS

<b>Advisor</b>	:	Prof. Dr. Umah Rani a/p Kuppusamy (UM)
<b>Chairperson</b>	:	Assoc. Prof. Dr. Siti Balkis Budin (UKM)
<b>Secretary</b>	:	<b>Assoc. Prof. Dr. Nor Fadilah Rajab (UKM)</b> Assoc. Prof. Dr. Asmah Hamid (UKM) Dr. Izatus Shima Taib (UKM) Dr. Farah Wahida Ibrahim (UKM) Dr. Nurul Farhana Jufri (UKM)
<b>Treasurer</b>	:	<b>Assoc. Prof. Dr. Noraziah Mohd. Zin (UKM)</b> Assoc. Prof. Dr Pim Chau Dam (USM) Dr. Siti Fathiah Masre (UKM) Dr. Zaitunnatakhin Zamli (UIAM) Dr. Valsala Ramachandran (IMU) Dr. Adeline Chia Yoke Yin (TAYLOR's) Mr. Ng Wen Jie (UTAR) Miss Nur Faizah Abu Bakar (UKM)
<b>Publicity</b>	:	<b>Mr. Yuen Hawk Leong (UTAR)</b> Dr. Phoon Lee Quen (UTAR) Dr. Teh Lai Kuan (UTAR) Miss Alicia Ho Lai Yee (UTAR)
<b>Scientific</b>	:	<b>Assoc. Prof. Dr. Cheah Yoke Kqueen (UPM)</b> Prof. Dr. Patimah Ismail (UPM) Assoc. Prof. Dr. Latifah Saiful Yazan (UPM) Assoc. Prof. Dr. Sabrina Sukardi (UPM) Assoc. Prof. Dr. Abdah Md Akim (UPM) Dr. Hasiah Abd. Hamid (UPM) Dr. Manraj Sbingh Cheema (UPM) Dr. Nur Fariesha Md Hashim (UPM) Dr. Zulkefley Othman (UPM)

Dr. Seri Narti Edayu Sarchio (UPM)  
Dr. Melati Khalid (UPM)  
Dr. Sharifah Sakinah Syed Alwi (UPM)  
Dr. Suhaili Abu Bakar@Jamaludin (UPM)

**Publication :** **Assoc. Prof. Dr Ahmad Rohi Ghazali (UKM)**  
Assoc. Prof. Dr Dayang Fredalina Basri (UKM)  
Dr. Satirah Zainalabidin (UKM)  
Dr. Arimi Fitri Mat Ludin (UKM)

**Protocol/ Logistic/ : Dr. Wan Mazlina Md. Saad (UiTM)**  
**Technical and** Dr. Maimunah Mustakim (UiTM)  
**Social Visit** Dr. Valsala Ramachandran (IMU)  
Dr. Lim Chooi Ling (IMU)  
Dr. Audrey Lim Wei Ling (SUNWAY)  
Dr. Tommy Tong Yuh Koon (SUNWAY)  
Dr. Looi Mee Lee (TAYLOR's)  
Dr. Phelim Yong (TAYLOR's)  
Mdm. Masmadianty Muhammad (UiTM)  
Dr. Suzita Mohd Noor (UM)  
Dr. Ong Kien Chai (UM)

**Registration and: Dr. Mohd Arifin Kaderi (UIAM)**  
**Souvenirs** Assoc. Prof. Dr. Lim Boon Huat (USM)  
Assoc. Prof. Dr. Rapeah Suppian (USM)  
Dr. Ibrahim Adham Taib (UIAM)  
Dr. Ridhwan Abdul Wahab (UIAM)  
Dr. Norafiza Zainuddin (UIAM)  
Dr. Suhana Mamat (UIAM)  
Dr. Wan Amir Nizam Wan Ahmad (USM)  
Mr. Md. Lukmi Ismail (USM)  
Mr. Mohamad Noor Mohamad Roze (USM)

## **WELCOME MESSAGE FROM MINISTRY OF HEALTH MALAYSIA**



It is my immense honour and pleasure to be given the opportunity to welcome all delegates to the 3<sup>rd</sup> Pan-Asian Biomedical Science Conference 2016 in Kuala Lumpur, Malaysia. This biennial event is a great endeavour for the ASIA-International Biomedical Science Consortium to serve as a platform to promote biomedical science research and collaboration in the Pan-Asian Region. I am pleased to announce that this year, several renowned public and private universities of Malaysia offering Biomedical Science program have proactively taken the initiative to work together in sharing the effort and experience of co-hosting this conference.

The world's population is constantly facing serious health threats despite the economic and technological advances of the modern era. Emerging and re-emerging communicable diseases such as tuberculosis and typhoid fever have recently made public headlines. Outbreaks of dengue fever continue unabated, and with the Zika virus emerging as yet another mosquito-borne crisis; along with non-communicable diseases such as cardiovascular disease, diabetes and cancer, we are seeing the adverse impact of disease on the well-being and mortality rates of our nation.

Biomedical Science is at the forefront of life science research. With the advent of new technologies in laboratory medicine and research, biomedical scientists are crucial partners in the goal of

improving the quality of human health by ensuring disease transmissions can be curbed and by enhancing and improving diagnostic and treatment modalities.

This conference, which brings together local and international academics, scientists, researchers and exhibitors specialised in the various niches of Biomedical Science, will surely contribute to spur knowledge-sharing and the development of fresh ideas among biomedical experts in our region.

To our foreign delegates, especially to those who are here for the first time, I wish you a wonderful stay in Malaysia and I hope that you will enjoy our beautiful city, Kuala Lumpur. Last but not least, I congratulate Associate Professor Dr Siti Balkis Budin and her committee members for what will surely be a successful conference.

Yours sincerely,

**YBhg. Datuk Dr. Shahnaz binti Murad**  
**Deputy-Director General (Research and Technical Support)**  
**Ministry of Health Malaysia**

## WELCOME MESSAGE FROM THE CHAIRPERSON



First of all, I would like to express my gratitude to Allah Al-Mighty for this beautiful day. It is my greatest pleasure to welcome all PABSC members and participants to 3<sup>rd</sup> Pan Asian Biomedical Science Conference (3<sup>rd</sup> PABSC) here in Kuala Lumpur.

The Pan Asian Biomedical Science Conference (PABSC) is a biennial event that has been organized and hosted by universities in the Asia International Biomedical Science Consortium, offering Biomedical Sciences Programs. PABSC has attracted many participants through the years and is the best platform for academics and researchers to share in the latest developments and findings in the expansive field of Biomedical Science. The 1<sup>st</sup> PABSC has held at the University of Khon Kaen Thailand with resounding success, and two years later, the Chinese University of Hong Kong followed with an equally incredible event. Now here we are, Malaysians feeling absolutely honoured to be hosting the 3<sup>rd</sup> Pan Asian Biomedical Science Conference.

I am proud to announce that this conference is jointly organized by nine universities in Malaysia, namely Universiti Kebangsaan Malaysia, Universiti Putra Malaysia, Universiti Malaya, International Islamic University Malaysia, Universiti Teknologi MARA, Universiti Sains Malaysia, Universiti Tunku Abdul Rahman, Taylor's University, and the International Medical University. We bonded and collaborated, and this unity among the Malaysian biomedical science community has brought us to where we are today.

Biomedical research is at the heart of scientific and medical discoveries that will improve human and animal health. Our Frontier in Global Health Challenges topics relating to Emerging Infectious and Zoonotic Diseases, Non-Communicable Diseases, Diagnostics and Therapeutics, Natural Products and Health, Community Health and Epidemiology feature presentations from esteemed invited speakers and (how many participants) researchers. In addition to oral presentations, we have posters presented by (how many) by our Asian scientists and students. For two days, the best and brightest in Biomedical Science are here, together, making this the best venue to encourage our experts and participants to exchange ideas and realize key components in tackling current health issues.

I welcome all of you to our city, and I hope you will enjoy your stay. Thank you, to all of you, for joining us in making this 3<sup>rd</sup> PABSC a successful event. Last but not least, my sincerest thank you to our PABSC committee members who have worked tirelessly for the past year and a half so that our Asian Biomedical Science community can come together.  
Thank you.

Yours sincerely,

**Associate Professor Dr Siti Balkis Budin**  
**Chairperson**  
**3<sup>rd</sup> Pan Asian Biomedical Science Conference**  
**Kuala Lumpur, Malaysia**



## PROGRAMME

7 <sup>th</sup> December 2016 (Wednesday)		
0800 – 0830	Registration	
0830 – 0930	<b>Keynote 1:</b> <b>Prof. Dr. Mohd Hair Bejo</b> <b>Emerging Infectious and Zoonotic Diseases: Challenges and Opportunities (Hall 2)</b>	
0930 – 1000	Opening Ceremony by <b>Datuk Dr Shahnaz Murad, Deputy Director-General of Health (Research &amp; Technical Support), Ministry of Health Malaysia. (Hall 2)</b>	
1000 – 1015	Launching of 'MyBiomed' (Hall 2)	
1015 – 1030	Photography session	<b>Briefing on ASIA-International Biomedical Science Consortium to Institutional Representatives (Lounge, Level 8)</b>
1030 – 1100	Tea Break / <b>Poster Session</b>	
	<b>Hall 1</b>	<b>Hall 2</b>
	<b>Session 1:</b> <b>Emerging Infectious and Zoonotic Diseases</b> <i>Chair: Assoc. Prof. Dr. Noraziah Mohamad Zin</i>	<b>Session 2:</b> <b>Non-Communicable Diseases</b> <i>Chair: Assoc. Prof. Dr. Chanvit Leelayuwat</i>
1100 – 1130	Emerging Zoonoses <i>Prof. Dr. Victor Lim</i>	Tackling Major Non Communicable Diseases: What Has Gone Wrong? The Way Forward <i>Prof. Dr. Lekhraj Rampal</i>
1130 – 1200	Food and Water Borne Diseases: Public Health Management <i>Dr. Wan Mansor Hamzah</i>	The Cancer Epigenome: Shifting Linearity to Complexity <i>Dr. Abhimanyu Veerakumarasivam</i>

1200 – 1230	Adult-Onset Immune Deficiency Syndrome: Clinical Course And Outcome <i>Prof. Dr. Suputtamongkol Yupin</i>	A Host Defense Peptide Cathelicidin Protected Against <i>Helicobacter pylori</i> Infection And Inflammation In Stomach <i>Prof. Dr. Cho Chi Hin</i>
1230 – 1245	Role of Toll-like Receptor 2 in Inflammatory Response of Macrophage Infected with BCG and Recombinant BCG (rBCG) <i>Dr. Nor Munirah Zakariah</i> (EIZD-O-001)	Genetic Susceptibility Factors in Familial Nasopharyngeal Carcinoma <i>Dr. Mohd Arifin bin Kaderi</i> (NCD-O-003)
1245 – 1300		Whole Exome Sequencing of a Malaysian Family Reveals a Novel Candidate Gene for Autosomal Recessive Charcot-Marie-Tooth Disease <i>Dr. Azlina Ahmad Annuar</i> (NCD-O-004)
1300 – 1400	Lunch / <b>Poster Session</b>	

	Young Investigator's Session	
	Hall 1	Hall 2
1400 – 1445	<b>Keynote 2</b> <b>Non Communicable Diseases:  The Rise &amp; Rise of Diabetes</b> <b>By Prof. Dato' Paduka Dr. Mafauzy</b> <i>Chair: Prof. Dr. Cheong Sok Ching</i>	<b>Keynote 3</b> <b>The Future of Cancer Therapy –  Lessons Learnt from the  Management of Lung Cancer</b> <b>By Prof. Dr Pathmanathan Rajadurai</b> <i>Chair: Assoc. Prof. Dr. Cheah Yoke Kqueen</i>
1445 – 1505	Association of Atorvastatin and Lipid Parameters with Clopidogrel Responsiveness in Thai Patients with Acute Coronary Syndrome <i>Sornsith Jirungda</i> (NCD-O-002)	<i>Porcupine Bezoar</i> Exhibit Cell Cycle Arrest through Inhibiting Cyclin D/Cdk1 Complex and Apoptosis Mitochondria Mediated Dependent Pathway in A549 Cells <i>Al'aina Yuhainis binti Firus Khan</i> (NPH-O-004)
1505 -1525	<i>Hibiscus sabdariffa</i> Linn. Aqueous Extract Protects Against Post Myocardial Infarction Injury in Obese Rats <i>Lislivia Si Yiang Nee</i> (NPH-O-003)	<i>In vitro</i> Antiplasmodial and Chloroquine Chemosensitizing Effects of Selected Coumarins <i>Zaid Osamah Ibraheem</i> (NPH-O-007)
1525 – 1545	Association of ADAMTS13 Polymorphisms with Risk of Diabetes Mellitus <i>Supakanya Lasom</i> (NCD-O-001)	Molecular Epidemiology and Evolutionary Dynamics of HCV, HIV-1 and HPgV among Injecting Drug Users <i>Ng Kim Tien</i> (CHE-O-001)
1545 – 1605	<i>In vitro</i> Ethanol Extract Propolis Reduces <i>Cryptococcus neoformans</i> melanogenesis <i>Patcharin Thammasit</i> (NPH-O-002)	Screening of Antibacterial Effects of Synthetic Peptide Pam-5 against Selected Gram-Negative Pathogenic Bacteria <i>Chan Szn Yi</i> (DT-O-010)

1605 - 1625	Targeting Integrated Hepatitis B Viral DNA Sequences by Thymoquinone Loaded Nanostructured Lipid Carrier (TQ-NLC) for Treatment of Liver Cancer <i>Aminah Suhaila binti Haron</i> (NPH-O-009)	Effect of <i>Nigella sativa</i> Administration on Sub-Chronic Lead Acetate Induced Hematological and Biochemical Alterations <i>Mohammed Abdulrazzaq Assi</i> (NPH-O-001)
1625 – 1645	Application of Fluorescence In-Situ Hybridization (FISH) in the Diagnosis of Malaysian Lymphomas <i>Dayang Sharyati Datu Abdul Salam</i> (DT-O-001)	Effects of Modified Arm Swing Exercise on Pulmonary and Autonomic Nervous Functions in Metabolic Syndrome Patients <i>Arisa Sespheng</i> (DT-O-012)
1645 – 1715	Tea Break / <b>Poster Session</b>	
1715 – 1900	Meet and Greet with members of Young Scientist Network (Hall 1)	
	<i>ASIA-International Biomedical Science Consortium Meeting</i> (Hall 2)	
1930 – 2200	<b>Conference Dinner</b>	

8 <sup>th</sup> December 2016 (Thursday)	
	<b>Session 3:</b> <b>Diagnostics and Therapeutics (Hall 2)</b> <i>Chair: Prof. Dr. Wasna Sirirungsi</i>
0830 – 0900	The Role of Immunohistochemistry in the Diagnosis and Treatment of Cancer <i>Prof. Dr. Anthony Rhodes</i>
0900 – 0930	Relevance of NKG2D and Its Ligands in Cancer, Type II Diabetes and Aging <i>Assoc. Prof. Dr. Chanvit Leelayuwat</i>
0930 – 0945	Evaluation of Antibacterial Activity of Synthetic Peptide PAM-6 against <i>Pseudomonas aeruginosa</i> and its In vitro Toxicity <i>Yuen Hawk Leong</i> (DT-O-005)
0945 – 1000	<i>Engineered Salmonella enterica serovar Agona</i> Targeting Solid Tumor <i>Assoc. Prof. Dr. Cheah Yoke Kqueen</i> (DT-O-013)
1000-1030	Tea Break / <b>Poster Session</b>
1030 – 1045	Design, Synthesis, and Molecular Docking of Carvone Derivatives as Influenza Neuraminidase Inhibitors <i>Dr. Noorakmar binti Jusoh</i> (DT-O-002)
1045 – 1100	Mineral Content of Semen: Novel Findings <i>Dr. Fauziah Ismail</i> (DT-O-011)
1100 – 1115	Cellular and Humoral Immunogenicity of Recombinant <i>M. smegmatis</i> Expressing Antigen85B as a Potential Tuberculosis Vaccine Candidate <i>Nur Ayuni Kadir</i> (DT-O-007)
1115 – 1130	Retrospective Study of HLA Antigen of Spousal and Other Living-Related Donor in Renal Transplantation and Their Outcomes <i>Rhanye Mac Guad</i> (DT-O-008)

1130 – 1145	Development of Competitive Antibody-Based Biosensor for Tuberculosis Diagnosis by Detecting Secreted Antigen 85 Complex <i>Kantinan Chuensirikulchai</i> (DT-O-003)
1145 – 1200	Zinc L-Carnosine Suppresses Inflammatory Responses in Lipopolysaccharide-Induced Raw264.7 Cells via Activation of Nrf2/Ho-1 Signalling Pathway <i>Ooi Theng Choon</i> (DT-O-006)
1200 – 1215	Acute Nicotine Prevents Learning and Memory Impairment and Decreased Expression of pCREB in Hippocampal CA3 Region of REM Sleep Deprivation Rats <i>Norlinda Abd Rashid</i> (DT-O-009)
1215 – 1230	Development of Anti-Interferon Gamma Autoantibody Detection in Adult Onset Immunodeficiency Patients by Bio-Layer Interferometry <i>Sutpirat Moonmuang</i> (DT-O-004)
1230 – 1400	Lunch / <b>Poster Session</b>

	Hall 1	Hall 2
	<b>Session 4:</b> <b><i>Natural Products and Health</i></b> <i>Chair: Assoc. Prof. Dr. Nor Fadilah Rajab</i>	<b>Session 5:</b> <b><i>Community Health and Epidemiology</i></b> <i>Chair: Prof. Dr. Cho Chi Hin</i>
1400 – 1430	The Role of Natural Products in Mitigating Oxidative Stress <i>Prof. Dr. Umah Rani A/P Kuppusamy</i>	Analysis Of Spatio-Temporal Distribution Of Diseases: A Junction Between Epidemiology And Molecular Science <i>Prof. Dr. Virasakdi Chongsuvivatwong</i>
1430 – 1500	Chemotherapeutic and Chemopreventive Potential of Styryllactones: Current and Future Perspectives <i>Assoc. Prof. Dr. Chan Kok Meng</i>	Early Infant HIV Diagnosis and Entry to HIV Care Cascade in Thailand <i>Prof. Dr. Wasna Sirirungsi</i>
1500 – 1515	Effects of <i>Eurycoma Longifolia</i> on the Reproductive Cycle of Female Rats <i>Assoc. Prof. Dr. Suzanah Abdul Rahman</i> (NPH-O-006)	Particulate Matter (PM) and Respiratory Symptoms: A Study Case among Children in Selected Primary Schools <i>Hazrin bin Abdul Hadi</i> (CHE-O-003)
1515 – 1530	Pancreas Protective Efficacy Of Stingless Bee Honey in Streptozotocin-Induced Diabetic Rats <i>Muhammad Shakir Abdul Aziz</i> (NPH-O-010)	Comparative Characteristics of Spermatozoa Harvested in Culture Media With and Without Serum Proteins <i>Ghofraan A. Ata'Allah</i> (CHE-O-002)
1530 – 1545	Anti-Candida and Toxicity Evaluation of <i>Quercus infectoria</i> Cream Against <i>Candida albicans</i> <i>Nurul Shuhadah binti Ahmad</i> (NPH-O-008)	Development of Vitrification Solutions with Senary (Six) Combinations of Cryoprotectants for Application in Assisted Reproduction Technology <i>Oshini Basri</i> (CHE-O-004)

1545 - 1600	Screening Assessment of Antioxidant Properties in Three Combinations of Honey <i>Ainin Azwani binti Abdul Raza</i> (NPH-O-005)	Indoor Airborne Contaminants and Prevalence of Sick Building Syndromes (SBS) Among Children in Primary Schools in Pahang, Malaysia <i>Mohd Hizrri bin Arifin</i> (CHE-O-005)
1600 – 1630	Tea Break	
1630 – 1730	Closing Ceremony and Awards Presentation	

**9<sup>th</sup> December 2016 (Friday)**

0800 – 1100	Social visit for consortium members only
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## KEYNOTE 1

### Emerging Infectious and Zoonotic Diseases: Challenges and Opportunities

**Prof. Dr. Mohd Hair-Bejo**

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Disease is an adverse interaction between the host, agent and environment leading to formation of cellular changes (lesions) and functional abnormalities (clinical signs). It can be classified as classical, emerging and re-emerging diseases. The critical factors for emerging infectious and zoonotic diseases consist of microbial adaptation and change; host susceptibility; climate and weather; changing ecosystems, demographics, and populations, including issues of wildlife and exotic animals; economic development and land use; international trade and travel; technology and industry; reduction in animal and public health services or infrastructure; poverty and social inequity; war and dislocation; lack of political will; and intent to harm. It is estimated that up to 60% of human pathogens are found in multiple species and perhaps, up to 80% of animal pathogens are capable of infecting other species of animals. In a borderless world today, people, animals, food, and feed products can circumvent the globe faster than the incubation period of almost every pathogen known today. Thus, most microbes can reach almost any part of the world within hours and may cause a significant threat to the economy, environment, and health of living things. Enforcement of vaccination requirement and prophylaxis or treatment with drugs, control of movement, effective quarantine and hygienic practices could reduce the risk for infections. Around 868 zoonotic pathogens were identified; 19% is viruses or prions, 31% bacteria, 13% fungi, 5% protozoa and 32% helminths. About 60% of human pathogens are of animal origin and 75% of emerging animal diseases can be transmitted to human. Emerging infectious and zoonotic diseases are a continuing threat, and the challenges and burden is greatest for the developing world, although these pathogens are a growing threat to all nations. Thus, it is a

need for a global efforts to prevent and control these diseases and it can only be achieved effectively through One Health, a multi-disciplinary collaborative approach to improving the health of humans, animals and the environment; a new global strategy of cooperation. It encourages the collaborative efforts of multiple disciplines working locally, nationally and globally. Malaysia has experience the first outbreak of Nipah virus in 1988, SARS in 2003, localized outbreaks of H5N1 in 2004, H1N1 in 2009, MERS-CoV 2014 and Zika virus in 2016. A National Security Council and Inter-Ministerial Committee for Control of Zoonotic Diseases were established in the country during the Nipah virus outbreaks. Malaysia One Health University Network (MyOHUN) was established in 2012 to link and enable universities, government and relevant agencies to generate social and intellectual capital on One Health against infectious and zoonotic diseases. Currently, 17 universities (20 faculties), 2 government ministries and 5 government departments are members of MyOHUN. The OIE, WHO, FAO and USAID are among the world organization focusing on One Health and Global Health Security Agenda. In conclusion, each new disease brings unique challenges and opportunities, forcing us to continually adapt to ever-shifting threats. The battle against emerging infectious and zoonotic diseases is a continual process; winning does not mean stamping out every last disease, but rather getting out ahead of the next one. A holistic global strategy of cooperation through One Health approach hold promise of creating a world safe and secure from global health threats posed by emerging infectious and zoonotic diseases.

## KEYNOTE 2

### Non Communicable Diseases: The Rise & Rise of Diabetes

#### **Prof. Dato' Paduka Dr. Mafauzy Mohamed**

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Non-communicable diseases (NCDs) are diseases resulting from unhealthy lifestyle – tobacco use, physical inactivity, unhealthy diet and alcohol abuse. Heart and lung diseases, cancers and diabetes are the world's largest killers with most of the deaths being premature (<70 years of age). The burden of NCDs falls mainly on developing countries and tackling risk factors will not only save lives but also provide a huge boost for economic development of countries. Diabetes is a deadly and disabling disease as it causes premature deaths from cardiovascular diseases and renal failure and causes blindness and amputations. The prevalence of diabetes has been growing alarmingly over the years and the International Diabetes Federation has declared diabetes as a global emergency. The estimated number of diabetics globally was 382 mil in 2013, 415 mil in 2015 and is estimated to grow to 642 mil in 2040. More people die due to diabetes than the combined total due to HIV/AIDS, TB and malaria. The global healthcare expenditure due to diabetes was estimated to be USD 613 bil in 2015 and is estimated to grow to USD 802 bil in 2040. In Malaysia, the prevalence of diabetes was 11.6% in 2006 and grew to 17.5% in 2015. The number of diabetics in 2015 was estimated to be 3.5 mil in 2015 and is estimated to be 4.5 mil in 2020. As for control of diabetes, the majority of patients do not achieve satisfactory control and this has resulted in an increase in the prevalence of diabetes complications especially renal, eye and nerve. NCDs are to a great extent preventable by addressing the key risk factors of unhealthy diet (salty, fatty and sugary foods), physical inactivity and tobacco and alcohol use. Studies had shown that diet and exercise are effective in preventing or delaying the onset of diabetes. However, healthy lifestyle campaign and promotion alone are not sufficient to stem the

continuing rise in diabetes. Interventions must also include legislations and regulations to discourage unhealthy lifestyles. In summary, the rise in non-communicable diseases rates especially diabetes mellitus is a serious concern and the diabetes epidemic has been declared a global emergency. Diabetes mellitus and other non-communicable diseases are largely preventable and healthcare costs can be substantially reduced by health promotion and disease prevention. Healthy lifestyle campaigns need to be complemented with legislation and policy to discourage unhealthy lifestyles and encourage healthy lifestyle.

## KEYNOTE 3

### The Future of Cancer Therapy – Lessons Learnt from the Management of Lung Cancer

#### **Prof. Dr. Pathmanathan Rajadurai**

*Subang Jaya Medical Centre;*

*Monash Medical School, Sunway Campus,*

*Melaka-Manipal Medical College, Manipal Campus, Kanataka, India;*

*University of Malaya Medical Centre, Malaysia*

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The treatment of cancer has shifted from an era where patients were managed with a wide-ranging spectrum of potentially toxic substances - from a standpoint of “one size fits all” blunderbuss type therapy - to a more refined individualised therapy of the disease. This has come about because of the realisation derived from robust scientific evidence that every cancer that develops in a patient is as unique as the unfortunate individual who suffers from it. This new knowledge has come about from the precise molecular characterisation of many human cancer, which in turn has ushered in the age of “precision medicine” and “targeted therapy”. The lessons learnt from the management of lung cancer are a useful example of this, providing valuable insights that point the way to how in future, common human cancers will be managed very differently. The promise for the future is the ability to execute exquisitely fine-tuned therapeutic regimen with a view to maximising tumour cell kill while almost totally eliminating drug associated toxicity, by minimising damage to normal human cells. The molecular characterization of lung carcinoma has uncovered the concept of “oncogene addiction” in malignancies, leading to the characterisation of many reproducible molecular alterations in many cancer- the so called “driver mutations”. This has permitted the identification of specific molecular cohorts of patients who may benefit from therapy targeted at these driver mutations. The new knowledge has permitted such individualised therapy to be deployed across a wide range of cancers. This is a major improvement over conventional chemotherapy when applied to the appropriately selected patients. Evaluation for epidermal growth factor receptor (EGFR) mutations, anaplastic lymphoma kinase (ALK) and ROS-1 rearrangements are now considered by many to be the standard of care in advanced-stage pulmonary adenocarcinomas. Targeting molecular targets has

prolonged survival, and improved the quality of life in patients with haematological malignancies, colon and breast cancer, melanoma, and several rarer cancers. The list of potentially targetable malignancies continues to grow as powerful molecular technologies unravel carcinogenetic pathways that initiate the formation and spur the growth of cancers. Exciting developments in the field of immunotherapy are already making headway, and initiating paradigm shifts in this area – the prospect of harnessing the body's own immune response to kill cancer cells is thrilling. An exciting new era of personalized precision cancer medicine is here and the molecular testing of tumour specimens will be the overriding obligation for laboratory diagnosticians of the future. As more sophisticated and sensitive testing modalities evolve, it behoves practitioners in the health care industry and affiliated disciplines to remain 'future-proof' and relevant in facing the challenges ahead.

## INVITED SPEAKERS

### Session 1: Emerging Infectious and Zoonotic Diseases

#### Emerging Zoonoses

**Prof. Dr. Victor Lim Kok Eow**

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An emerging infection is defined as an infection that has newly appeared in a population while a re-emerging infection would be one that has existed in the past but its incidence has increased in recent times. Over 60% of emerging infections are zoonotic in nature and the majority of them are viral in origin. Such infections can have devastating consequences for mankind. HIV infection is a classic example of an emerging zoonosis that has had a profound effect on the practice of medicine globally. The reasons for the emergence or reemergence of an infection are not completely understood but they are multifactorial and complex in the nature of their interactions. These factors may be related to the etiological organism, the host or the environment. Human activity appears to be a major driver. Malaysia had to deal with outbreaks of several emerging zoonotic infections over the last two decades. They include Nipah virus infection, SARS and avian influenza. Human activity appears to be the key factor in the emergence and re-emergence of these infections. Our country needs to put in place a comprehensive plan to meet the challenge of emerging diseases. A multidisciplinary approach is required and the strategies involved should not merely be confined to medical and health strategies.

## Adult-onset immune deficiency syndrome: clinical course and outcome

### **Prof. Dr. Yupin Suputtamongkol**

Mahidol University, Thailand

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An adult-onset immune deficiency syndrome is a clinical syndrome of disseminated opportunistic infections, especially non-tuberculous mycobacterial (dNTM) infection in association with an acquired autoantibody to interferon-gamma (IFN- $\gamma$ ) which occurs among adult non-HIV infected patient. This syndrome is emerging as an important cause of morbidity and mortality among Asian population. Clinical course and outcome of this syndrome is not well described. We diagnosed and studied 80 non-HIV infected adults who developed this syndrome and presented to Siriraj Hospital, Bangkok, Thailand. The antibody to IFN- $\gamma$  in the serum was determined by enzyme-linked immunosorbent assay (ELISA). The optical density (O.D.) of greater 1 was defined as positive for antibody to IFN- $\gamma$  in this population. Among 67 patients who had at least one anti IFN- $\gamma$  level tested, 35 (52%) were female, with a mean  $\pm$ SD age of  $50 \pm 11$  years. We have followed them up for a median duration of 29 (range 3-55) months. dNTM disease was the most common clinical manifestation associated with this syndrome; half of them developed dNTM as an initial clinical manifestation, and overall 85% of them developed at least one episode of NTM disease. Among 62 patients who we have followed them up for at least 3 visits; 3 patients died; 13 patients developed frequent relapses which required intravenous antimicrobial therapy; and 37 patients had stable disease with only oral antimicrobial treatment. Only 9 patients were in remission state, with no antimicrobial treatment. The initial mean  $\pm$ SD concentrations of anti-IFN- $\gamma$  in the group of patient with remission or stable disease and in the group of patient with frequent relapses were  $3.25 \pm 0.9$  O.D. and  $3.77 \pm 0.84$  O.D. respectively ( $p=0.02$ ). Kinetics of anti-IFN- $\gamma$  concentrations, treatment options, and factors associated with clinical course and outcome of these patients will be presented and discussed.



## Food and Water Borne Diseases: Public Health Management

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The Food and Waterborne Diseases (FWBDs) are among the largest preventable public health problems especially in the developing countries. With the strong links with poverty, illiteracy, poor access to basic human needs like food, water and sanitation, and implicated with high number of death among children, its occurrence was closely monitored by the World Health organization (WHO) through Millenium Developmental Goal (MDG) and Sustainable Development Goals (SDG). FWBD is an faecal-oral transmission and its transfer from faeces to human or host were made possible through contamination of hands, environmental or water, or brought mechanically by flies to food. Its actual disease burden was not clearly known though it was estimated it caused four fifth of illnesses in the developing world. The WHO estimated that FWBDs account for 4.1% of the total DALY global burden of disease, and causing 1.8 million human deaths annually The difficulty to eradicate FWBDs were mainly due to multifactorial issues and challenges. Among them are poverty and illiteracy, lacking of manpower with poor technological support, scarcity of sustainable food and safe water supply, conflict, disaster, environmental degradation, and unresolved environmental issues like poor disposal of excreta and solid waste.

Hence in managing FWBDs, excellence in technical handling of cases like investigation, control and prevention of disease will not last longer without tackling those general issues of poor governance, lacking of infrastructure and community social problems. Every sector is health sector. Every sector need to play their respective roles, invest in an unusual way to overcome those challenges, collaborate and coordinate measures taken and activities carried out to curb the occurrence of FWBDs with the understanding that other than safety, health is the most important asset of life.

## Session 2: Non-Communicable Diseases

### A Host Defense Peptide Cathelicidin Protected Against *Helicobacter pylori* Infection and Inflammation in Stomachs

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A host defense peptide cathelicidin is critical for protection against different kinds of microbial infection in mammals. This study sought to elucidate the protective action of cathelicidin against *Helicobacter pylori* (*H. pylori*) infection and its associated inflammation in stomachs. Exogenous cathelicidin was found to inhibit *H. pylori* growth, destroy the bacteria biofilm and induce morphological alterations in *H. pylori* membrane. Additionally, knockdown of endogenous cathelicidin in human gastric epithelial HFE-145 cells markedly increased the intracellular survival of *H. pylori*. Consistently, cathelicidin knockout mice exhibited stronger *H. pylori* colonization, higher expression of pro-inflammatory cytokines interleukin (IL)-6, IL-1 $\beta$  and intercellular adhesion molecule 1 and lower expression of the anti-inflammatory cytokine IL-10 in the gastric mucosa upon *H. pylori* infection. It was noted that in the wild-type mice, *H. pylori* infection also stimulated gastric epithelium-derived cathelicidin production as a host defense mechanism. More importantly, pre-treatment with bioengineered *Lactococcus lactis* that actively secretes cathelicidin significantly increased mucosal cathelicidin levels and reduced *H. pylori* infection and its associated inflammation in stomachs. Collectively, these findings indicate that cathelicidin plays a significant role as a potential natural antibiotic for *H. pylori* clearance and a therapeutic agent for chronic gastritis in humans.

## Tackling Major Non Communicable Diseases: What Has Gone Wrong? The Way Forward.

### **Prof. Dr. Lekhraj Rampal**

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Noncommunicable diseases (NCDs) is the leading cause of death worldwide. Out of the 56 million deaths in 2012, 38 million (68%) death were due to NCD. Out of these 38 million, 28 (74%) million deaths occur in low or middle income countries. The costs to health-care systems from NCDs are high and projected to increase. Cost to individuals, families, businesses, governments and health systems is very significant and add up to major macro- economic impacts. Heart disease, cancer, stroke and diabetes cause billions of dollars in losses of national income each year in the world's most populous nations. Cardiovascular diseases are responsible for 42.6% of all NCDs deaths. Majority of pre-mature NCD deaths are preventable. Prevention is better than cure. It is estimated that during 2011–2025, cumulative economic losses due to NCDs under a “business as usual” scenario in low- and middle-income countries will be at US\$ 7 trillion. This sum far outweighs the annual US\$ 11.2 billion cost of implementing a set of high-impact interventions to reduce the NCD burden. The most important risk factors are hypertension, obesity, high blood cholesterol, cigarette smoking, diabetes, physical inactivity and having an unhealthy reaction to stress. In Malaysia, NCDs are the leading cause of death for the past 50 years. The prevalence of risk factors such as hypertension, obesity, physical inactivity, diabetes, smoking, unhealthy reaction to stress and high blood cholesterol continue to rise. This paper addresses ‘What Has Gone Wrong?’, ‘Are our strategies appropriate?’, If Yes, ‘Why are they Not Working? and the ‘WAY Forward’.

## The Cancer Epigenome: Shifting Linearity to Complexity

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Epigenetic modifications are essentially alterations that affect functional gene expression without modifying the DNA sequence in a cell. These reversible mechanisms enable genes to be activated or silenced in the context of gene expression. Common epigenetic mechanisms include DNA methylation, histone modification, nucleosome remodeling and non-coding RNAs. The spatio-temporal gene expression patterns observed in cells are often a product of epigenetic regulation. The dynamic nature of epigenetic regulation facilitates the cell's response to various environmental exposures. To maintain the general intrinsic stability and integrity of epigenetic regulation, multiple feedback mechanisms exist across the genome. Unsurprisingly, the perturbation of the delicate epigenetic-genetic homeostatic balance has been associated with a diverse group of diseases especially cancer. In cancer cells, epigenetics have been shown to control cellular growth and differentiation, proliferation, DNA repair, migration, invasion, metastasis and the evasion of host immune-response. Thus, many new techniques have been developed to decipher the precise epigenetic state in various different tumours across a spectrum of oncogenic states. The epigenome is the collective genome-wide map of epigenetic modifications. By delineating the precise epigenomic map that governs a specific tumour phenotype, essential epigenetic markers can be identified. The ability to remove or introduce these markers into disease cells may rescue the normal phenotype. Thus, epigenetic remodeling has become a hotbed for novel drug development strategies. More pertinently, the understanding of the epigenome will better help to understand cancer biology in totality and aid in disease stratification for more accurate diagnosis, prognosis and therapy.

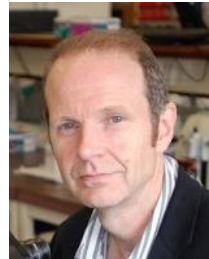
## Session 3: Diagnostics and Therapeutics

### The Role of Immunohistochemistry in the Diagnosis and Treatment of Cancer

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For many decades immunohistochemistry (IHC) has been used to assist in the diagnosis of cancers. In addition, since the mid 1990's, with technological advancements in methodology it has become the most efficient way of determining the biological behavior of specific tumours (prognosis) and helping clinicians decide whether patients are likely to respond to targeted therapies (predictive testing). The repertoire of antibodies now available to the pathologist to assist in the diagnosis and classification of disease is vast; and in the diagnosis of cancer is considered almost a 'special stain' to accompany the haematoxylin and eosin (H&E) stained slides, upon which the primary diagnosis of malignancy is made. Selection of antibodies is achieved using a 'diagnostic algorithm' in which specific markers are requested sequentially or in limited panels, rather than employing a 'screen' of many markers. A number of antibody markers, such as those to oestrogen receptors and Human Epidermal Growth Factor Receptor -2 (HER2) assist in prognosis, but are now also used in tests to predict the patient's likely response to targeted therapies. With some exceptions, IHC still remains the method of choice for this purpose. For example the routine IHC testing of all newly diagnosed breast cancers for HER2 over-expression for response to the drug Herceptin (trastuzumab) and the testing for oestrogen receptor expression for response to Tamoxifen, is common place throughout the World. Targeted therapies have also been developed for other cancers to include; Gleevec (imatinib) for the treatment of gastro intestinal stromal tumours (GISTs) and chronic myeloid leukemia (CML), Herceptin for treatment of gastric cancer, PD-1 inhibitor, erlotinib, gefitinib and crizotinib for the treatment of non-small lung

cancer. All these drugs, many of which are expensive and carry significant side effects, require laboratory testing for the molecular pathways they target. In most instances IHC is still the method of choice for determining a favorable response to these therapies.

## Relevance of NKG2D and Its Ligands in Cancer, Type II Diabetes and Aging

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The NKG2D system consists of an activating receptor, NKG2D, and diverse ligands which are MHC class I like molecules. The interactions between the receptor and ligands lead to several immune consequences depending upon cell types and conditions. In cancer, induced expressions of NKG2D ligands on cancer cells have been exploited for cancer immunotherapy either by enhancing immune clearance or drug targeting. We have developed a phage displayed anti-MICA, one of NKG2D ligands, conjugated with doxorubicin for MICA targeting chemotherapy in cancer. NKG2D is not normally expressed on CD4 T cells but was found in several pathological conditions such as autoimmune diseases. We hypothesized that this particular cell subpopulation existed in type II diabetes and might be the cause of chronic inflammation in diabetic patients. The CD4<sup>+</sup>/CD28<sup>null</sup>/NKG2D<sup>+</sup> cell subpopulation was more prevalent in type II diabetes mellitus (T2DM). Interestingly, this particular cell type produced IL-17, a potent inflammatory cytokine. The percentages of these cells had a positive correlation with the level of glycated hemoglobin A1c (HbA<sub>1c</sub>) indicating the association with poor glycemic control condition. Additionally, this cell subpopulation could be stimulated by specific monoclonal anti-NKG2D to produce IL-17. We hypothesized that this particular cell type could also be found in the elderly because low grade inflammation has been reported. Indeed, the CD4<sup>+</sup>/CD28<sup>null</sup>/NKG2D<sup>+</sup> cell subpopulation was also more prevalent in the elderly compared to people aged less than or equal to 35. In addition to T cells, we have found that NKT cells that express NKG2D could also produce IL-17 in T2DM. Consequently, we have identified pathological immune cell subpopulations producing IL-17 via NKG2D stimulation that could be targeted for monitoring and therapy in diabetes and aging.

## Session 4: Natural Products and Health

### The Role of Natural Products in Mitigating Oxidative Stress

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The oxidants (including free radicals) and antioxidants (endogenous and exogenous) exist in a state of redox balance in the human body. Normal cellular metabolism and various external stressors can form free radicals, which participate in a chain reaction of electron abstraction from other stable atoms or molecules, resulting in cellular damage. Fortunately, our body is equipped with endogenous (generated within the body) and exogenous (obtained through the diet) antioxidants that work together to curb or counteract the effects of the oxidants. A disturbance that leads to an imbalance, favouring the oxidants, results in a phenomenon called oxidative stress. This is implicated in the aetiology of numerous diseases, which include diabetes, obesity, cardiovascular disease, cancer and many others. Exogenous antioxidants from natural sources are generally believed to be agents that can help mitigate oxidative stress. Many of these natural compounds, which include those from plants, mushrooms and algae, have been commercialised. Globally, the growth of dietary supplement (which include antioxidants) industry has increased due to the increased awareness on health and disease. Numerous side/adverse effects of some supplements have also been noted. Our studies showed that plants generally have very potent exogenous antioxidant capacity as compared to the mushrooms and we have proven that the *in vitro* antioxidant capacity did not necessarily correlate with the *in vivo* ability to mitigate oxidative stress. In fact, we demonstrated that mushroom polysaccharides (glucans) from selected mushroom were able to attenuate oxidative stress and inflammation (in addition to regulating glucose and lipid homeostasis) in both *in vivo* and *in vitro* (adipocytes) and this action is not attributable to its exogenous antioxidant



capacity. In this presentation, the role (in terms of benefits and detriments) and mechanism(s) of antioxidants in health and disease in the context of oxidative stress will be highlighted.

## Chemotherapeutic and Chemopreventive Potential of Styryllactones: Current and Future Perspectives

**Assoc. Prof. Dr. Chan Kok Meng**

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Styryllactones are secondary metabolites consisting of a styryl moiety and lactone ring. These bioactive chemicals are abundantly found in tropical and subtropical plants especially from the genus *Goniothalamus*. Goniothalamine, being the simplest naturally found styryllactone, is being studied extensively ever since the first isolation in 1967. Styryllactones are reported to have a wide range of biological activities including cytotoxicity, apoptosis induction, anti-inflammatory, anti-plasmodial, anti-microbial and larvicidal effects. Styryllactones such as altholactone, goniothalamine, gonioheptolide and howiinol A had been reported to cause selective and potent cytotoxicity specifically through apoptosis induction on several cancerous cells of different origins. Structure-activity relationship studies further revealed the importance of styryl moiety and lactone ring in styryllactones. Chemical synthesis and modification were performed to produce a variety of structurally related derivatives which may lead to identification of novel molecular targets or possess enhanced anticancer properties. Throughout the years in styryllactone research, we had directed and contributed a number of studies in search of novel cytotoxic styryllactone as well as elucidation of molecular mechanisms of apoptosis. In this presentation, we will describe our recent findings on anticancer activities and the molecular mechanisms of apoptosis induced by these newly synthesized halogenated and methoxylated styryllactones on several leukemic cells. Furthermore, we will also describe the anti-inflammatory effects of goniothalamine and synthesized halogenated

styryllactone at non-toxic concentrations. These data exert important implications in the development of novel chemotherapeutic and chemopreventive drugs from styryllactones.

## Session 5: Community Health and Epidemiology

### Analysis of Spatio-temporal Distribution of Diseases: A Junction Between Epidemiology and Molecular Science

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Data on Public Health are usually collected with date/time, place and event. Conventional analysis usually employs only one dimension ie place or time, at a time. Relationship between place and time and possible linkage among records should also be examined. Recent advance in molecular genetics gives additional challenges on how the data should be analysed, interpreted and translated into action. Examples are given in the lecture. Spatio-temporal investigation of dengue hemorrhagic fever showed that the spray may not be effective enough in the disease control. Housing pattern of the primary dengue case is the most important modifiable risk factor. Analysis on cylinder of time-space cluster of hand, foot and mouth diseases suggested mixture of local outbreaks of severe cases and endemic area of less severe ones. Cluster analysis of hospital acquired *Acinetobacter baumannii* infection in a tertiary hospital suggested that genetic evolution wave covered several wards in the hospital. All these examples suggest the need for further analysis of interaction between epidemiologic and molecular data.

## Early Infant HIV Diagnosis and Entry to HIV Care Cascade in Thailand

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Scale-up of interventions for prevention of mother-to-child transmission (PMTCT) of HIV in the past decade had the goal of elimination of new paediatric infections by 2015. However, despite improving coverage, gaps remain in key regions and populations, with an estimated 220,000 children worldwide newly infected in 2014. In the absence of antiretroviral therapy (ART), up to half of children infected with HIV perinatally in low-income and middle-income countries will die within the first 2 years of life. Treatment initiated during the first 3 months of life reduces mortality and disease progression among infants, and WHO guidelines recommend immediate initiation of ART in all children with HIV aged younger than 2 years of age. In 2013, the treatment recommendation was extended to all children younger than 5 years of age if feasible. However, ART coverage in children in low-income and middle-income countries remains low, with 34% coverage of those in need compared with 64% in adults. Poor access to early infant HIV diagnosis is often cited as a crucial barrier to increased access to ART for children. Reports of early infant diagnosis scale-up programmes have highlighted operational issues relating to poor uptake and delays in provision of test results; in the few studies with follow-up data reported, many infants with HIV were not linked to care. In Thailand, early infant diagnosis (EID) was rolled out by the National Health and Security Office via the National AIDS Programme in 2006, initially requiring liquid blood samples that had to be transported to a laboratory within 24 h, posing logistical and cost-related issues. Use of dried blood spot testing overcomes these issues and provides hospitals and clinics in more rural and remote settings with access to testing. In 2007, the Faculty of Associated Medical Sciences, Chiang Mai University, became one of the 16 EID reference centres and the only centre until 2010 to provide EID with dried blood spot testing to hospitals across Thailand. Results after 7 years of roll-out,

including ART and vital status of children with HIV in Thailand have been reported (Lancet HIV: May, 2016). Dried blood spot samples were collected from HIV-exposed children in hospitals all over Thailand and mailed to the Faculty of Associated Medical Sciences, Chiang Mai University, where HIV DNA was assessed with real-time PCR to establish HIV infection. Data from children with an HIV infection were linked to the National AIDS Programme database to ascertain ART and vital status. Between April 5, 2007 and Oct 1, 2014; 16,046 DBS samples were sent from 8,859 children in 364 hospitals. 6,772 (42%) of samples were from small hospitals (of which 5,503 [81%] were from hospitals with 10-60 beds). In 2011, these samples accounted for about 40% of all early infant diagnosis tests done in Thailand. Median age at first dried blood spot test was 2.1 (IQR 1.8–2.5) months. Results were reported a median of 15 days after blood collection. Results were available online within 7 days of sample receipt for 10,041 (63%) and at 8–14 days for 4,817 (30%). Of 7,174 (81%) children with two or more samples, 223 (3%) were HIV positive (including 5 unconfirmed). Of 1,685 (19%) children with one sample, 70 (4%) were unconfirmed positive. Of 293 (3%) children who were HIV positive, 220 (75%) registered for HIV care and 170 (58%) initiated ART. Median age at ART initiation decreased from 14.2 months (IQR 10.2–25.6) in 2007 to 6.1 months (IQR 4.2–9.2) in 2013, and the number of children initiating ART aged younger than 1 year increased from 5 (33%) of 15 children initiating ART in 2007 to 10 (83%) of 12 initiating ART in 2013. Fifteen (9%) of 170 children who initiated ART died and 16 (32%) of 50 who had no ART record died. Conclusion: Early infant diagnosis with dried blood spot testing had high uptake in primary care settings. Further improvement of linkage to HIV care is needed to ensure timely treatment of all children with an HIV infection.

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**A Preliminary Study on The Effects of Radiation Exposure on Chondrocytes:  
sGAG Content using Cellular Model**

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Radiation is known to be harmful to human health. However, the effect of radiation at cellular level has yet to be established. This study evaluated the possible effects of radiation on monolayer cultured chondrocytes. Rabbit's chondrocytes were isolated, serially cultured and divided into two groups; (1) non-irradiated and (2) irradiated. Group 2 cells were subjected to irradiation after it reaches 80-90% confluency. Both groups 1 and 2 cells were taken out from the incubator, placed into a temperature-controlled container and were transported to a typical X-ray examination room. After irradiating group 2, both cell groups were returned into the incubator. Both groups were evaluated using morphological evaluation and sulphated glycosaminoglycan (sGAG) production at passages 0, 1, 2, and 3. All groups exhibited comparable morphological appearances throughout the passages. Both cell groups experienced gradual changes from chondrocytic to fibroblastic morphology. The non-irradiated group showed a decreasing trend of sGAG concentration after each successive passage. It is suggestive that when the optimum proliferating conditions of these cells were manipulated, stress was induced in the cells. Meanwhile, the irradiated group showed an increasing trend in relative sGAG concentration after each passage. This particular phenomenon is unexpected in view of the known harmful nature associated with radiation. This study suggested that the introduction of radiation exposure could have certain effects on the cartilaginous extracellular matrix (ECM) production. It is postulated that the induced radiation created a yet to be explained situation, where the cells tend to recover, regenerate and secrete

extracellular matrix. Basically, this finding warrants further evaluation where gene expression and histological analysis will be conducted. The limitation of study includes the number of samples used (n=2). Future work involving more samples and subjecting the cells to irradiation up to passage 5 will be conducted.

Keywords: Glycosaminoglycan; cartilage; chondrocyte; radiation; X-ray; cellular model