MILESTONE@UM NEWSLETTER
Vol. 5, No. 1, 2017

UNLOCKING THE CODE OF IMMUNOLOGICAL AGING PROCESS

Malaysia is expected to reach the status of ageing population by 2030. Although many age-related changes in the immune system have been described, little is known about how the decline in immune function is linked to the process of aging. Studies into two groups of patients who experienced premature aging, cancer survivors and people living with HIV, have begun to unravel some clues. Through her research, Dr. Reena aims to better understand the complex process of aging and help address the challenges that our aging population will face in the 21st century.

DECODING THE AGING PUZZLE

Dr. Reena's work focuses on finding the potential drivers of premature aging in HIV and cancer survivors. By identifying the causes, interventions that can slow the immunological ageing process could be developed, thus helping these individuals preserve a better quality of life as they grow older.

*"**My** skills in both clinical and basic science gives me a unique understanding of the issues faced by patients. We know that the pace we age is strongly influenced by the health of our immune system. I studied this phenomenon in HIV infected individuals and cancer survivors. In both groups we found significant signs of aging in the immune system earlier than their chronological age. Our immune system undergoes multiple stresses throughout our lifetime. These stresses like certain viral infections can sometimes take a toll on the health of our immune system leading to an earlier onset of age related issues for example cardiovascular diseases, osteoarthritis, muscular degenerative diseases, etc. My work is focused on trying to understand what and how these lifetime stresses alter the immune system and impact the process of aging." - Dr. Reena Rajasuriar*

FINDING ANSWERS LED TO DIFFERENT CAREER PATH

Dr. Reena's mother, a science teacher, played an important role in moulding her scientific career. She was encouraged to be always curious and this helped her to develop an inquisitive mind from a very young age. This curiosity has also led Dr. Reena to pursue a different career path. She started her career as a clinical pharmacist and later became a lecturer in the field. Her passion in infectious diseases and HIV as well as her work as a pharmacist led her to pursuit a PhD in the field of immunology. Over the years, Dr. Reena observed that many health issues faced by HIV young adult and cancer survivors resembled those experienced by the elderly, thus sparked her interest to explore the role of immune system in aging. Her research has won her the "L'Oréal-UNESCO For Women in Science Award for 2016".

Dr. Reena Rajasuriar won L'Oreal-UNESCO for Women in Science Award 2016

Contact information:
Dr. Reena Rajasuriar
Department of Pharmacy
Faculty of Medicine
University of Malaya
reena@um.edu.my

THE ENVIRONMENTAL CITIZENSHIP MALAYSIA (ECM 2005-2015) PROJECT

A COLLABORATION WITH WORLD WILDLIFE FUND FOR NATURE MALAYSIA

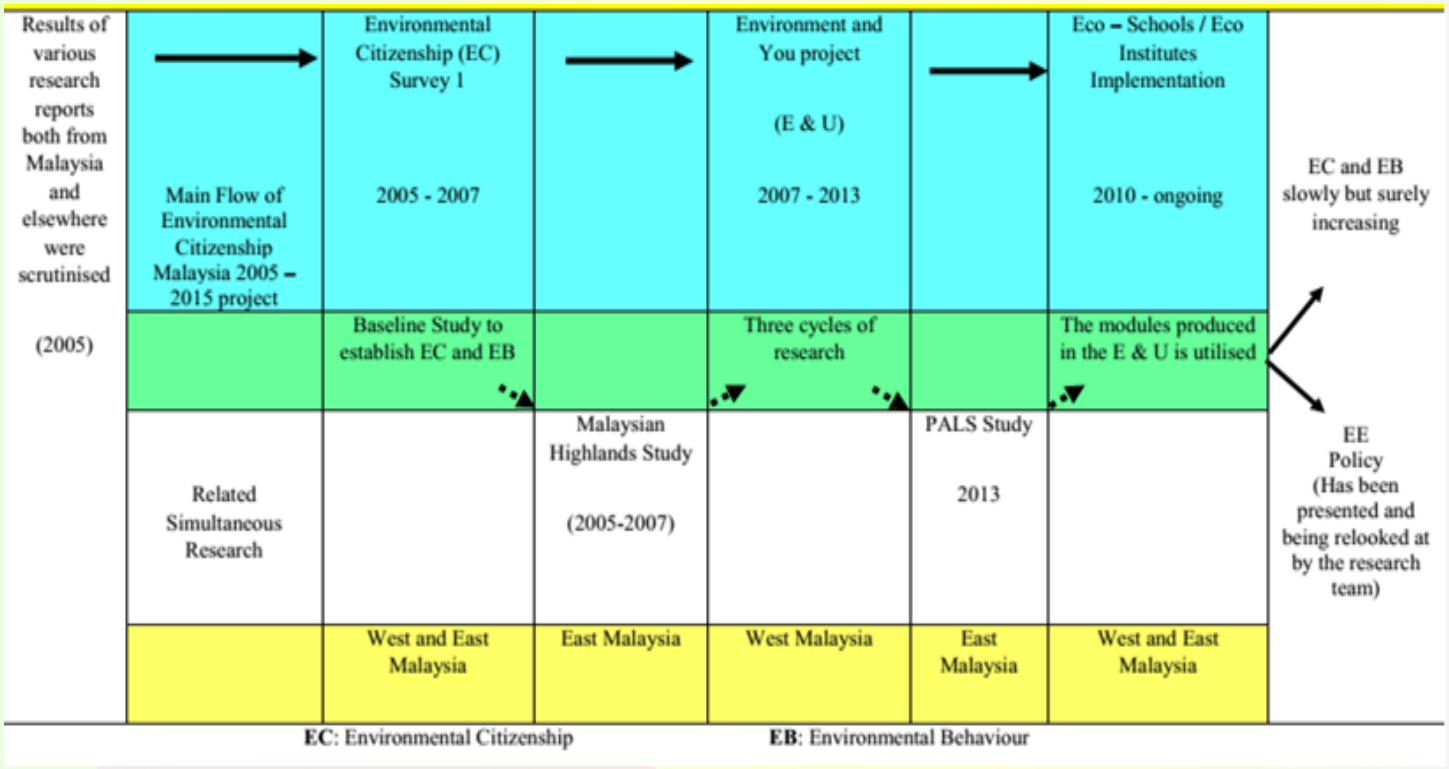

Figure 1: Conceptualization and Design: A Log Frame Analysis blended with the Theory of Change Approach

Why and What is ECM 2005 – 2015?

The United Nations decade for Education for Sustainable Development began in 2005. Pressing issues about the Malaysian environment in 2005 were; from 2000 till 2005; Malaysia's carbon emissions increased by 31.4%; A MOSTE study in 2000 revealed that Malaysia's temperature had increased 0.180^{o}C per decade since 1951 and Malaysian highlands and limestone hills were being poorly monitored. The United Nations Economic and Social Commission for Asia and the Pacific (2003) made known that environmental awareness is still in its preliminary stage in Malaysia. How would an Environmental Citizenship report card for Malaysia read at this point of time? The ECM 2005 – 2015 project aimed to plant the seeds for future generations, who would demonstrate a very positive Environmental Citizenship (EC) and Environmental Behaviour (EB) towards the Malaysian environment.

First, the ECM project determined the exact status of EC of Malaysians through the execution of a Nationwide Baseline Survey (sample- 6090), upon which action plans were anchored.

The ECM was conceptualized not as a static one-off venture, but an ambitious far-reaching nationwide long term **emergent and evolving** research endeavor, where the research team decided to undertake the task of continuous evaluation and re-examination of objectives to decide the next best steps.

The ECM targeted students and educators, and the communities within which they live, work and learn throughout Malaysia, both rural and urban. Various groups of stakeholders nationwide including government and non-government organizations were mobilized to bridge the gap between the Malaysian Formal Education System and conservation efforts. How was it emergent? Each of the components was initiated at different times from 2005 to 2015. Achieving Environmental Citizenship is a long-term continuous process and a concerted effort from various parties.

Overall Output and Impact

Research instruments for EC and EB have been constructed and tested. Teaching resources (EE Kits) relevant to educators were developed to integrate EE in Malaysian schools. The final version of these EE Kits has been uploaded on the MOE online platform for all Malaysian schools (1 Bestarinet.net). Eco-schools and Eco-Institutes have been established and the numbers continue to increase. The EC and EB among Malaysian students showed a slow but steady increase over 6 years. The impact has been nationwide.

Professor Dr. Esther was one of the three winners of the UNESCO Hamdan Bin Rashid Al Maktoum (United Arab Emirates) Prize for Outstanding Practice and Performance in Enhancing the Effectiveness of Teachers in 2016.

Award Ceremony of the UNESCO Hamdan Prize (Prof. Dr. Esther, fifth from the left)

Contact information:

Professor Dr. Esther Daniel

Department of Mathematics and Science Education

Faculty of Education

University of Malaya

esther@um.edu.my

COMBATING CANCER AND METASTASIS WITH METALS

The advent of modern medicine has brought an end to various ancient and deadly diseases. However, cancer still remains a major health threat in this post-genomic era. Acquired drug resistance and adverse effects of cancer drugs seems to be the main hurdles in the quest for safer and more effective cancer drugs.

The serendipitous discovery of the anticancer cisplatin by Rosenberg has precipitated a renaissance in metal based drug, but, the success of cisplatin was marred by toxic side effects and the development of cisplatin resistant cell lines. As such, the search for the analogue of cisplatin and other form of metallic drug is currently an active area of research.

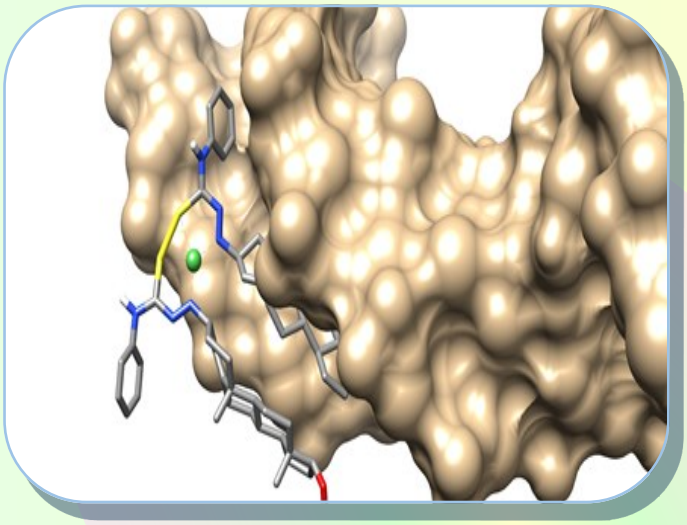

Figure 1: Marriage of metals ions with DNA binding agent or grafting the metal complexes with a delocalized lipophilic cation

In recent years, after losing a friend and a few colleagues to cancer, Dr. Tan Kong Wai came to realization that the major cause of death in cancer is actually metastasis - a process whereby the cancer spreads to the other part of the body. This realization has encouraged him to design a compound that can both kill and prevent the spread of cancer.

Dr. Tan and his colleagues aim to design metal complexes that are more affordable with minimal side effects by targeting specific biomolecules that are crucial for cancer survival, such as DNA, mitochondria and topoisomerase. Recently, they have identified some compounds that can kill and prevent metastasis of prostate cancer cells.

The strategy is to enable selective targeting of cancerous cells, which involves the marriage of metals ions with DNA binding agent or grafting the metal complexes with a delocalized lipophilic cation serve as a homing device to mitochondria (the powerhouse of cell (Figure 1). The metal can serve as a “glue” that combine molecules with different functionalities into one new compound with synergistic properties. In addition, some of the metals used may exert their effect by binding to ion transport protein or DNA and induce oxidative damage to cancerous cell through the production of free radicals (Figure 2).

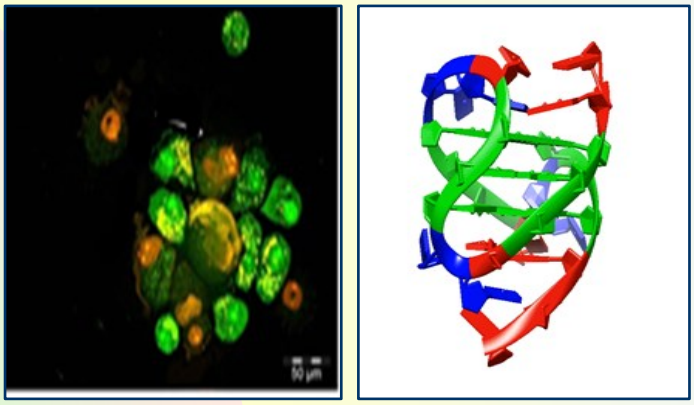

Figure 2. Damages to cancer cells (left) and DNA as a drug target (right)

Contact information:
Dr. Tan Kong Wai
Department of Chemistry
Faculty of Science
University of Malaya
kongwai@um.edu.my

THE WAY FORWARD FOR A CLEANER ENERGY SOURCE

Figure 1: Batu Arang, Selangor coal seams

Although commonly considered as an unfriendly source of energy due to high emissions of greenhouse and other gases during combustion, coal is still recognized as one of the most important source of energy globally for the foreseeable future. However, the continuity of coal as a viable source for power generation will always be debated over the adverse health and environmental effects.

Ash and sulphur content are the two main variables which influence coal quality. Coals with low ash yield and sulphur content are considered as 'clean coal'. Nonetheless, combustion of coal is also known to release toxic trace elements known or suspected to be carcinogenic, and may cause respiratory problems and a wide range of other health problems.

A clean technological approach was conducted by Prof. Dr. Wan Hasiah Abdullah and her team via liquefaction experiments. Coals were subjected to detailed petrological and geochemical studies prior to the liquefaction analysis, which include determination of coal maceral composition and vitrinite reflectance analysis. Ultimate and proximate analyses were also performed.

The research found that high coal conversion (89% - 95%) of the studied Batu Arang coals (Figure 1) correlate well with the high content of reactive macerals i.e. vitrinite and exinite (76% - 92%) in particular structureless vitrinite, cutinite and liptodetrinite. The inertinite maceral, in particular semifusinite, has also been identified to be partially reactive (Figure 2). These Batu Arang coals, or coals of similar petrographic properties, may therefore be considered as a potential alternative energy resource for liquid fuel in the future.

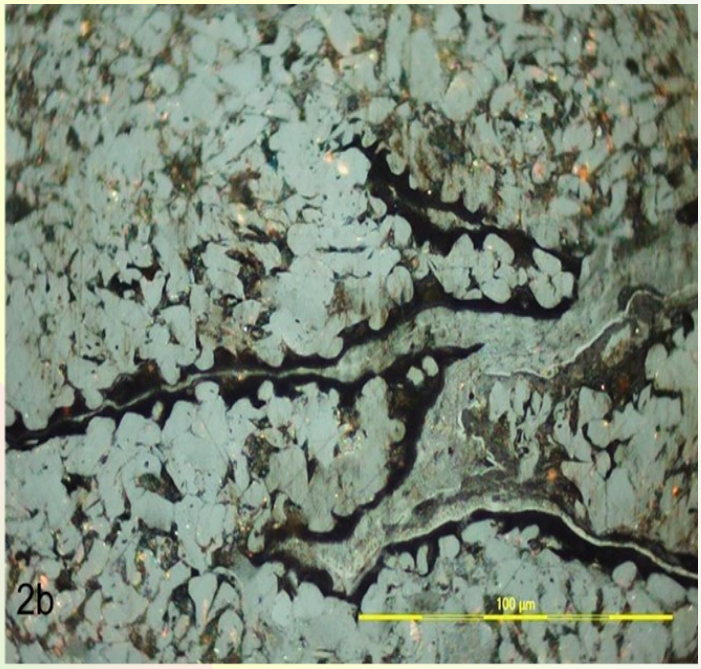

Figure 2: Low reflecting cutinite maceral associated with vitrinite in the analysed Batu Arang coal as observed under reflected white light microscope; Scale bar = 100µm

Contact information:
Prof. Dr. Wan Hasiah Abdullah,
Department of Geology
Faculty of Science
University of Malaya
wanhasia@um.edu.my

THE ROLE OF PEACE TOWARDS THE ECONOMIC AND POLITICAL STABILITY

Peace economics has drawn the attention of various parties recently. It deals with designing the socio-sphere's political, economic, and cultural institutions and their interacting policies and actions with the aim of preventing, mitigating, or resolving violent conflicts within and between societies.

The research led by Dr. Asmak Ab Rahman studied the role of peace towards the economic and the political stability which involves the government, opposition parties, religious leaders, Malaysian society and selected expatriate communities. The findings may significantly contribute to identify the ways affecting economic and political stability in terms of policies and social engagement.

The two factors of peace economics are Positive Peace and Negative Peace. Positive Peace offers a framework to help understand and address the multiple and complex challenges which are encountered by the whole world. The Positive Peace creates an optimal environment for human potential to flourish, while Negative Peace is "the absence of violence, absence of war" (Johan Galtung).

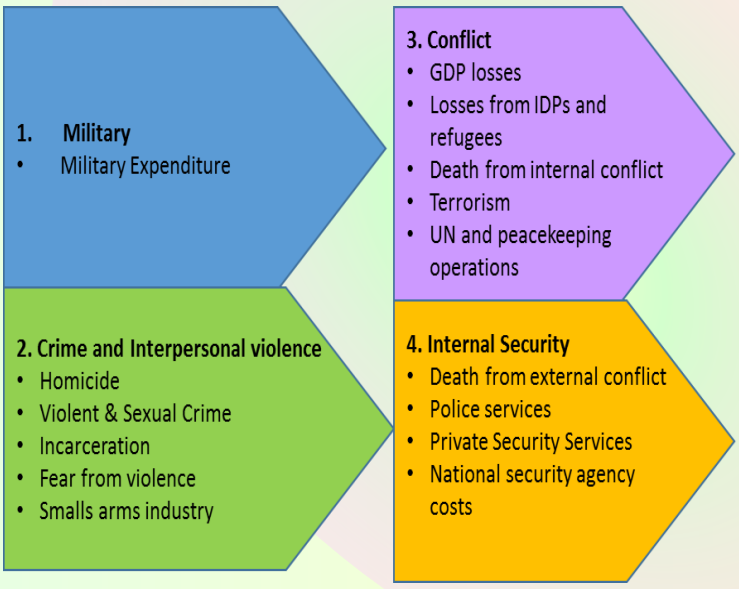

Figure 1: Factor of Negative Peace

Figure 2: Factor of Positive Peace

To spread the message of peace, several activities were jointly organised in conjunction with the #UM 111 and International Day of Peace by Humanities Research Cluster, Academy of Islamic Studies and Islamic Relief Malaysia, with the objectives:

- To explain the concept of peace in Islam and its impact on economic and political stability.
- To discuss the importance of maintaining peace in a country and its impact on people's welfare.
- To understand the relationship between peace and its impact on economic and political stabilities.
- To present the results of the preliminary findings and obtain related information from other researchers in this area by means of working papers to be presented by the researchers.

Highlights of related activities :

1. **NATIONAL CONFERENCE ON PEACE, ECONOMIC AND POLITICAL STABILITY (CPEPS 2016)**
   The conference has successfully brought together researchers in this field to exchange opinions and ideas. It is hoped that this conference may precipitate other conferences since conferences on peace, economics and politics gained very minimal attention in this country.

2. **Peace Talk**
   Four panelists (**Y.Brs S.S Datuk Dr. Zulkifli Mohamad Al-Bakri, Y.Brs Ir. Tn. Hj. Zairulshahfuddin Zainal Abidin, Y.Brs Pn. Shariffah Binti Mamat, Datin Norelan Binti Ismail)** who are experts in matters related to peace were invited as speakers for the Peace Talk.

3. **Dove of Peace**
   The Dove of Peace was a symbolic opening of the 'International Day of Peace' at the University of Malaya. The event was launched by Y.Bhg. Dato' Lokman Hakim Ali (Secretary General, Ministry of Youth and Sports, Malaysia), Prof. Dr. Noorsaadah Binti Abd Rahman (Deputy Vice-Chancellor (Research & Innovation), University of Malaya), Dr. Wasitah Hj Mohd Yusuf (CEO Institute for Youth Research Malaysia), and Prof. Datin Dr. Raihanah Abdullah (Dean of Humanities Research Cluster, UM).

4. **MOU between UM and IYRES (Institute for Youth Research Malaysia)**
   The signing of the MoU between UM and IYRES was intended to foster collaboration between UM and IYRES in developing as well as paying attention to the youth, especially students of UM.

5. **OKU Presentation for Peace**
   The aim of "Presentation for Peace" by OKU students from SK 1 Sultan Alam Shah was to spread awareness about peace.

6. **Book Launch**
   The Humanities Research Cluster's book launch event was officiated by Y.Bhg. Dato' Lokman Hakim Ali, the Secretary General of the Ministry of Youth and Sports. Participants pasted **#messageofhope** to express their hopes and the expectations in ensuring peace and stability in the country.

One of the panelists for Forum of Peace:
Y.Brs S.S Datuk Dr. Zulkifli Mohamad Al-Bakri,
Mufti Wilayah Persekutuan Kuala Lumpur.

Dove of Peace

MoU signing ceremony between UM and IYRES

Contact information:
Dr. Asmak Ab Rahman
Department of Shariah and
Economic, Academy of Islamic Studies
University of Malaya
asmak@um.edu.my

PPP SERVICES

Website: umresearch.um.edu.my

INFRA LABORATORY SERVICES

INFRA Analysis Laboratory
Centre for Research Services,
Level 3, Research Management & Innovation Complex,
University of Malaya,
50603 Kuala Lumpur

(Mdm. Farah / Mdm. Mardiana)
Tel: +603-7967 4619/7022 (extn: 2320)
Email: lab_infra@um.edu.my

PRINTING & PHOTOGRAPHY SERVICES

PREMIUM QUALITY

FAST PRINTING

EXCELLENT SERVICES

Centre for Research Services
Level 2, Research Management &
Innovation Complex,
University of Malaya,
50603 Kuala Lumpur

(Mr. Mohd Yani Bin Alias)
Tel: +603-7967 4651 / 6942
Email: yani@um.edu.my

BUNTINGS	MOCK CHEQUES
FLYERS	**BANNERS**
PHOTOGRAPHS	POSTERS

CITATION WORKSHOPS

Strategies to Enhance
Research Visibility, Impact & Citations

Centre for Research Services
Level 2, Research Management & Innovation Complex,
University of Malaya,
50603 Kuala Lumpur

(Dr. Nader / Dr. Bong)
Tel: +603-7967 4651 / 6942
Email: ppp_workshop@um.edu.my