

Photomicrographs of *Lignosus rhinocerus* (Tiger Milk mushroom) extract promoting neurite outgrowth of human embryonic stem cell (hESC)-derived neurons. The nuclei were stained with DAPI (blue) and neurites were stained with TUJ-1 antibodies (green), imaged by fluorescence microscopy. The results from this experiment suggests that the Tiger Milk mushroom extracts potentially can enhance the health of neuron cells in the brain. Scale bar, 100 μ m.

Source: Yeo Y *et al* (2019) BioMed Research International (Article ID 3126376)
Full paper available [here](#)!

HOD's Foreword



February has been a very eventful month. Besides chasing various tight deadlines as a result of the short semester, the department has continued its commitment to expose our students to different perspectives and opportunities in biological sciences. Creating a platform for our students to engage with different stakeholders is a critical part of their education. The student-led Sunway Biological Society (SBios) organised two lectures as part of our Biological Sciences Lecture Series. The first speaker from the University of Essex gave a fantastic primer on the evolution of genetic modification technologies and how these technologies will provide resilience to humans in the face of climate-change associated adversities. The second speaker talked about the importance of making science communication mainstream and the role of scientists to communicate effectively to create a culture where the society consciously use science and evidence in their everyday decision-making processes. These talks also shed light on the diverse roles of science graduates in society. Congratulations, SBios!

I also want to congratulate all our staff and students who have published papers in various journals this month. The need to publish extends beyond the obligation to satisfy job expectations. Publication of research findings or the review of literature is a critical component of advancing the global body of information as well as precipitating important knowledge from the vast ocean of information. I really hope that these publications take us closer to solving the real-world problems facing humanity. While the Covid-19 threat tells us how important biological sciences education and research is for humanity, it also reminds us that there are also so many unanswered questions that require new ideas and approaches – above and beyond the traditional boundaries of scientific disciplines. It reminds us that we cannot operate in silos if we truly desire to make a difference.

Prof. Dr. Abhi Veerakumarasivam

1. Mukheem A, Shahabuddin S, **Akbar N, Anwar A**, Sarih NM, Sudesh K, Khan NA, Sridewi N. (2020). Fabrication of biopolymer polyhydroxyalkanoate /chitosan and 2D molybdenum disulfide–doped scaffolds for antibacterial and biomedical applications. Applied Microbiology and Biotechnology.
<https://doi.org/10.1007/s00253-020-10416-2>

Abstract: Antibiotic resistance in pathogenic bacteria is a major health challenge, as the Infectious Diseases Society of America (IDSA) has recognized that the past simple susceptible pathogens are now very dangerous due to their non-stop growing resistance towards conventional antibiotics. Due to the emergence of multi-drug resistance, bacterial infections have become a serious global problem. Acute infections develop into chronic infections because of many factors; one of them is the failure of the effectiveness of antibiotics against superbugs. Modern research of two-dimensional nanoparticles and biopolymers are of great interest to identify bactericidal activity. In this study, we fabricated an antibacterial nanocomposite consisting of representative two-dimensional molybdenum disulfide (2D MoS₂) nanoparticles. Polyhydroxyalkanoate (PHA) and chitosan (Ch) were used to encapsulate MoS₂ nanoparticles into their matrix. This study reports the *in vitro* anti-bacterial activity and host cytotoxicity of novel PHA-Ch/MoS₂ nanocomposites. PHA-Ch/MoS₂ nanocomposites were subjected to time-dependent anti-bacterial assays at various doses to examine their anti-bacterial activity against multi-drug-resistant *Escherichia coli* K1 (Malaysian Type Culture Collection 710859) and methicillin-resistant *Staphylococcus aureus* (MRSA) (Malaysian Type Culture Collection 381123). Furthermore, the cytotoxicity of nanocomposites was examined against spontaneously immortalized human keratinocyte (HaCaT) cell lines. The results indicate significant antibacterial activity ($p < 0.05$) against *E. coli* K1 and MRSA. In addition, PHA-Ch/MoS₂ showed significant host cytocompatibility ($p < 0.05$) with HaCaT cells. The fabricated PHA-Ch/MoS₂ nanocomposites demonstrated effective antibacterial activity against both Gram-positive and -negative bacteria and exhibited better biocompatibility. Finally, PHA-Ch/MoS₂ nanocomposites are shown to be suitable for antibacterial applications and potentially for other biomedical applications.



Mr. Noor Akbar
PhD Biology candidate

2. **Lalani S** and Poh CL (2020). Flavonoids as Antiviral Agents for Enterovirus A71 (EV-A71). *Viruses*, 12 (2), 184. <https://doi.org/10.3390/v12020184>

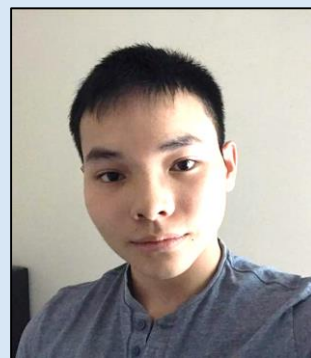
Abstract: Flavonoids are natural biomolecules that are known to be effective antivirals. These biomolecules can act at different stages of viral infection, particularly at the molecular level to inhibit viral growth. Enterovirus A71 (EV-A71), a non-enveloped RNA virus, is one of the causative agents of hand, foot and mouth disease (HFMD), which is prevalent in Asia. Despite much effort, no clinically approved antiviral treatment is available for children suffering from HFMD. Flavonoids from plants serve as a vast reservoir of therapeutically active constituents that have been explored as potential anti-viral candidates against RNA and DNA viruses. Here, we reviewed flavonoids as evidence-based natural sources of antivirals against non-picornaviruses and picornaviruses. The detailed molecular mechanisms involved in the inhibition of EV-A71 infections are discussed.



Ms. Salima Lalani
PhD Biology candidate

3. **Yong SJ, Tong T, Chew J and Lim WL** (2020). Anti-depressive Mechanisms of Probiotics and Their Therapeutic Potential. *Frontiers Neurosci.* <https://doi.org/10.3389/fnins.2019.01361>

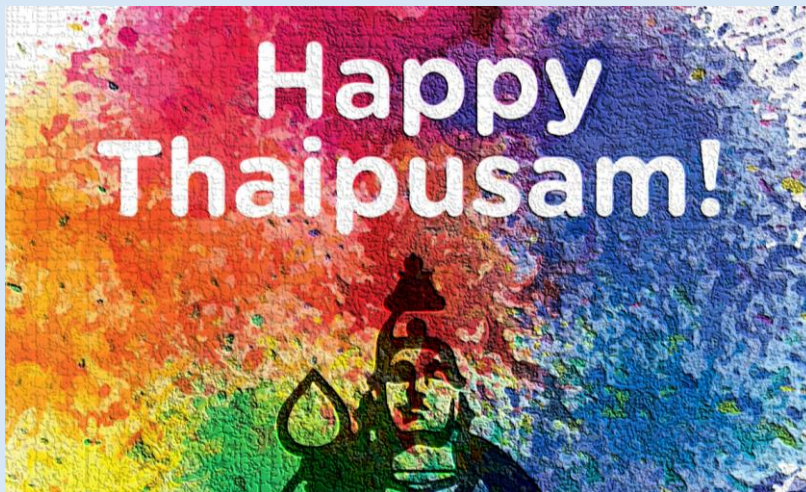
Abstract: The accumulating knowledge of the host-microbiota interplay gives rise to the microbiota-gut-brain (MGB) axis. The MGB axis depicts the interkingdom communication between the gut microbiota and the brain. This communication process involves the endocrine, immune and neurotransmitters systems. Dysfunction of these systems, along with the presence of gut dysbiosis, have been detected among clinically depressed patients. This implicates the involvement of a maladaptive MGB axis in the pathophysiology of depression. Depression refers to symptoms that characterize major depressive disorder (MDD), a mood disorder with a disease



Mr. Yong Shin Jie
BSc (Hons) Biology
with Psychology

Research Publications

burden that rivals that of heart diseases. The use of probiotics to treat depression has gained attention in recent years, as evidenced by increasing numbers of animal and human studies that have supported the anti-depressive efficacy of probiotics. Physiological changes observed in these studies allow for the elucidation of probiotics anti-depressive mechanisms, which ultimately aim to restore proper functioning of the MGB axis. However, the understanding of mechanisms has not translated into the isolation of probiotics in the treatment of MDD. Other challenges remain which include the heterogeneous nature of both the gut microbiota composition and depressive symptoms in the clinical setting. Nevertheless, probiotics offer some advantages over standard pharmaceutical antidepressants, in terms of residual symptoms, side effects and stigma involved. This review outlines anti-depressive mechanisms of probiotics based on the currently available literature and discusses therapeutic potentials of probiotics for depression.



Please share your updates (publications, events, funding) via [this link](#) by the 24th of each month, to be published in the upcoming bulletin.

Department Events

1. Biological Sciences Lecture Series #2 – Dr Ulrike Bechtold (University of Essex, UK)

Date: 12th September 2020

Location: LT3, Sunway University



We had the pleasure of having Dr. Ulrike Bechtold from the University of Essex to speak to us about "Genetic modification of plants in response to climate change" as part of the Biological Science Lecture Series. Dr. Bechtold is a plant molecular biologist with a special interest in understanding the effects of stress on plant resilience. Such research, as she highlighted is getting more important especially in this era of climate change. The abiotic factors against which she aims to find the ideal genes equipped with suitable responses include harsher draughts, floods and winters. Other than her research interests, Dr Ulrike also shared information regarding the different graduate programs within the School of Life

Sciences in the University of Essex, such as MSc in Biotechnology, Health Genomics, Tropical Marine Biology, Cancer Biology and Molecular Medicine. This event was co-hosted by the Sunway Biological Society (SBioS) and the Department of Biological Sciences.

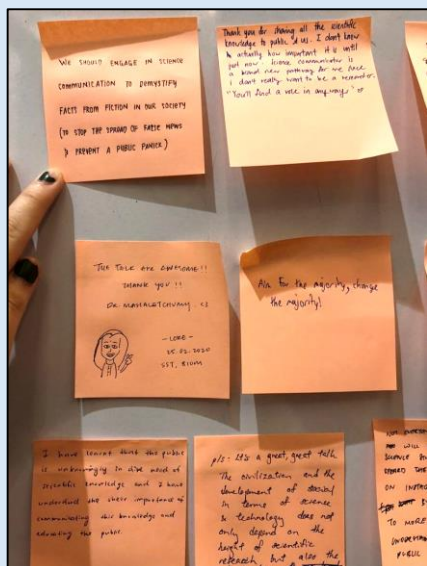


2. Biological Sciences Lecture Series #3 – Dr Mahaletchumy Arujanan (Malaysian Biotechnology Information Centre; MABIC)

Date: 25th February 2020

Location: LT4, Sunway University

Dr. Maha from the Malaysian Biotechnology Information Centre was the third speaker of our Biological Science Lecture Series. The title of her presentation was “The Kopitians and Science”, which touched upon bringing science communication to the everyday lives of people. In her talk, Dr. Maha talked about the importance of science communication which is to inform the public regarding science in a precise manner so that proper awareness can be developed. This can bring about important changes such as the democratization of science for greater citizen participant, and informing policymakers on what agendas to prioritize on.



Dr. Maha's talk obtained positive feedback from the students, where many cited that they were not aware that being a science communicator was a viable career option. This event was organized by the Sunway Biological Society (SBioS) and co-hosted by the Department of Biological Sciences.



(Above) Post-talk feedback by some of the students; (R) Dr. Maha with DBS faculty members and SBioS members

DBS Members In Action

1. Associate Professor Dr. Chandrajit visits Atmiya University, Rajkot, India



Assoc. Prof. Dr Chandrajit speaking to the upper management of Atmiya University

Associate Professor Dr. Chandrajit visited the Atmiya University in East India upon the invitation of their Head of the Department of Biotechnology, Dr. Shivani Patel. During this 2-day visit (3rd and 4th Feb 2020), Assoc. Prof. Dr. Chandrajit discussed the different areas of potential bilateral collaboration between the two universities, particularly focusing on the areas of research, capacity building and opportunities for students.



Assoc. Prof. Dr Chandrajit being felicitated by the Chancellor of the University P.P. Tyagvallabh Swamiji

Dr. Chandrajit also presented a talk titled “Simplifying Disease Complexity: A Systems Biological Perspective” in the National Seminar on the “Recent Trends in Systems Biology and Omics Technology” which was attended by over 700 participants. In his talk, Dr. Chandrajit described the application of Systems Biology in the study of infectious diseases and interactome analysis of key proteins in various pathways.

DBS Members In Action

2. “Boot Camp” in wildlife study design and data analysis

The Department of Biological Science hosted the 45th wildlife study design and data analysis workshop conducted by BCSS (Biodiversity Conservation Society of Sarawak). This edition of the 2-week long workshop saw 35 participants, from Malaysia as well as neighbouring countries such as Bangladesh, Cambodia, Indonesia and India. Mike Meredith (from UK) and Dr. Ngumbang (from Sarawak) were the lead facilitators of this course. This workshop is being held for the third time in Sunway University, and coordinated by Associate Professor Dr. Reuben and Associate Professor Dr. Shyamala.



Participants of the Wildlife study design and data analysis boot camp receiving their certificates of completion.

DBS Members In Action

3. Internal auditors for Sunway University compliance audit

Five faculty members from the Department of Biological Sciences, D. Tommy Tong, Dr. Yow Yoon Yen, Dr. Audrey Lim, Dr. Kavita Reginald and Prof. Abhi were invited by the Registry Department on 25th Feb 2020 to serve as the second batch of internal auditors for the Sunway University compliance audit by the Ministry of Education.

The team of auditors worked closely with members from the Registry department to check and cross-reference to ensure that all documents were complete, accurate and of high standard for the external auditors. At the end of the audit, the Group Registrar, Ms. Ng Beng Lean thanked the internal audit team for their meticulousness in checking all the relevant audit documentation.



The team of internal auditors (Dr. Tommy, Dr. Audrey, Dr. Yow, Prof. Abhi and Dr. Kavita) with the Group Registrar, Ms. Ng Beng Lean and her team members.

DBS Members In Action

4. Congratulations to Ng Wai Pak on the successful viva examination of his MSc Life Sciences thesis

Candidate : Ng Wai Pak
Programme : Master in Life Sciences
Thesis Title : Mammal species composition and habitat associations in a commercial forest and mixed-plantation landscape.
Supervisor : Shyamala Ratnayake
Date : 26th February 2020

5. Recruitment drive for new members for the Sunway Biological Society

The Sunway Biological Society (SBioS) participated for the first time in Sunway University's Club and Society Day to hold a recruitment drive for new members on 5th-6th February 2020. Students who visited the booth were briefed regarding SBioS's activities as well as updates on the current Coronavirus outbreak, and preventive measures that can be taken to curb the spread of the virus. Forty-two students from both Sunway University and Sunway College signed up as new members during this period.



Some SBioS members during the Club and Society day recruitment drive.

Feature Profile



Ms Dhaniah Mohamad
Senior Laboratory Officer, Department
of Biological Science
PhD Biology candidate

Tell us briefly about yourself.

I graduated with a BSc in Plant Biotechnology from Universiti Kebangsaan Malaysia, and an MSc in Biomedicine from Universiti Sains Malaysia. Besides science, I have passion for history and geopolitics issues. Because of that, I enjoy travelling both within and outside Malaysia. While enjoying the beautiful landscape of the place, I also get to better understand the history and cultural aspects of the place I'm visiting. Also, the best part of travelling for me is that I get to interact with the locals and its fun to learn a few new words in their native language!

You are currently a full-time staff at Sunway University, but have recently enrolled in the PhD in Biology program at our department. Could you tell us what motivated you, and how are you managing both roles?

I have always had an interest in doing research since my undergraduate study. Although I'm working full-time at Sunway University, this hasn't stopped me from pursuing my interest in furthering my studies. In fact, working in an educational environment motivates me more to pursue my postgraduate studies. Working and studying at the same can be exhausting. This is where discipline and time management is critical. So far, I am still able to manage both. I am really thankful to my colleagues who always give me support whenever I need it.

Feature Profile



Tell us briefly about your research area.

Dengue infections is a major public health problem especially in Malaysia. A variety of viral and host factors have been associated with the severity of dengue infections. However, the understanding of the role of immune cells (T-cells) in dengue immunity is still lacking. My research will focus on understanding the interactions between dengue virus and specific immune cells. These findings will provide useful information for future dengue vaccine development.

Who are the biggest champions in your life?

Since childhood I have been inspired by my parents. They never stop giving; independent of their own needs. They always advised me that helping others never hurts.

What do you plan in the near future? What are your long-term plans?

I haven't been doing scientific writing for a long time. I have recently started drafting a paper, and I hope that it will be published soon. After graduating, I hope to continue doing research in Sunway University and contribute to the university aspirations in promoting public health issues as well as in the development of a sustainable environment.



Marvel Stadium, Melbourne, Australia

Any unforgettable stories that you would like to share?

My research paper was rejected by reviewers several times. Disappointed, I went to my mentor and showed him the paper. After reading it, he gave me a few suggestions. One of it was to send this paper to a higher impact factor journal. I took his advice. Surprisingly, the paper was accepted!

How do you think the Department can improve on how it runs?

The Department of Biological Sciences as apart of Sunway University is doing great and is improving steadily under the new leadership. Some points that can be focused are such as starting a research resources management committee or a division that will be responsible for maintaining the stocks of all materials required by the researchers and students. This might help to make the research work flow in the university more efficient.



St Patrick's Cathedral , Melbourne, Australia

Any advice to current and future students?

For all those who work in research, please also learn how to operate and maintain the devices and equipment that you are using. Just knowing how to operate a device will not make you a good researcher. Be also a person who cares for your lab mates and develop your soft skills, which will eventually greatly benefit you in multiple aspects of your future career.

Upcoming Events

SUNWAY
UNIVERSITY



BioSciences EXPLORATION WEEKEND

TALK

Advancing BioSciences: Transforming our Future

15 March, 12pm - 1pm

Dr Chen Jit Ern, Senior Lecturer, Department of Biological Sciences,
School of Science and Technology

VENUE: Lecture Theatre 4, Ground Floor, Sunway University

MEET THE HEAD OF DEPARTMENT



Meet Professor Abhimanyu Veerakumarasivam

Professor and Head - Department of Biological Sciences

21 & 22 March, 12pm - 1pm

VENUE: Biology Lab 2, Level 4, Sunway University

WORKSHOPS

Focusing on Cells: Understanding Health and Disease

14 March, 1pm - 2pm

The average human body contains 30 trillion cells. In this workshop, you will discover the wonderful microscopic world of cells; how they look, interact and what happens when sometimes, things go wrong!

Cockroaches: Friend and Foe

15 March, 1pm - 2pm

In this workshop, you will test for cockroach allergy, and learn about how cockroaches are a great source for discovering new anti-bacterial drugs! You will also get to dissect the body of a cockroach. Did you know that a cockroach can live for a week without its head? Now, you do.

VENUE: Biology Lab 3, Level 4, Sunway University

Bioinformatics: Smart Drug Design for a Healthier Future

21 March, 1pm - 2pm

Bioinformatics uses computers to improve our understanding of biological information. In this workshop, you will learn how to use computers to discover new drugs to target infectious organisms and even cancer cells!

VENUE: Biology Lab 4, Level 4, Sunway University

Conserving our Biodiversity: The Time is Now

22 March, 1pm - 2pm

The current rate of biodiversity loss is comparable to the massive extinction of many animals over 65 million years ago. In this session, you will watch short videos, play a card game and spend some time with our resident scientists to learn about the kinds of skills needed to conserve our natural heritage.

VENUE: Biology Lab 3, Level 4, Sunway University

LAB TOUR

Into the Future: Biosciences Research @ Sunway

14, 15, 21, 22 March, 10am - 4pm

A walkabout tour around our postgraduate laboratory, with researchers/students sharing research work and explaining the workings of specific instruments and its applications.

VENUE: Biology Research Laboratory 1 & Student Project Laboratory



Upcoming Events

SUNWAY
UNIVERSITY



SCHOOL OF SCIENCE & TECHNOLOGY

Psychology Showcase

21 & 22 March, 10am - 4pm

VENUE: UC-3-3, Level 3,
Sunway University

Biosciences Showcase

21 & 22 March, 10am - 4pm

VENUE: UC-3-4, Level 3,
Sunway University

POSTGRADUATE *Info Day* 21 & 22 MARCH

Postgraduate
programmes
offered:

POSTGRADUATE DIPLOMA Primary Care for Elderly

MASTER'S DEGREE Actuarial Science • Business Administration • Computer Science (By Research) • Creative Arts and Media
• Human Resource Management • Information Systems • International Hospitality Management • Life Sciences • Marketing
• Psychology • Public Policy • Sustainable Development Management • Visual Communication and Media Studies

DOCTOR OF PHILOSOPHY Biology • Business • Computing • Creative Arts and Media • Mathematical Sciences
• Medical Science • Psychology