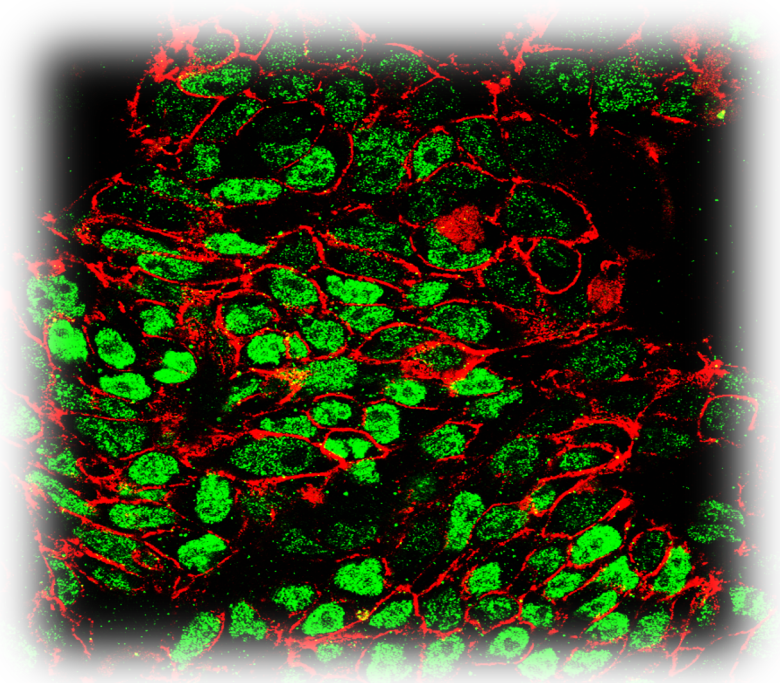


Department of Molecular Medicine

Faculty of Medicine



RESEARCH PROSPECTUS
2022



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Overview

Academic Staff Profiles

Head of Department / Professor

Professor Dr. Azlina Abdul Aziz	3
---------------------------------	---

Professor

Professor Dr. Sarni Mat Junit	4
-------------------------------	---

Professor Dr. Fung Shin Yee	5
-----------------------------	---

Associate Professors

Associate Professor Dr. Puteri Shafinaz Akmar Abdul Rahman	6
--	---

Associate Professor Dr. Shatrah Othman	7
--	---

Associate Professor Dr. Nurshamimi Nor Rashid	8
---	---

Associate Professor Dr. Muhammad Fazril Mohamad Razif	9
---	---

Senior Lecturers

Dr. Andrew Chan Mun Chiang	10
----------------------------	----

Dr. Jaime Jacqueline Jayapalan	11
--------------------------------	----

Dr. Kong Kin Weng	12
-------------------	----

Dr. Leo Bey Fen	13
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Dr. Tan Kae Yi	14
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Dr. Thamil Selvee Ramasamy	15
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Professor Dr. Azlina Abdul Aziz

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Research keywords: antioxidant, oxidative damage, natural products

Research Summary

Oxidative damage is implicated in the development of various disease conditions including cancers, diabetes and atherosclerosis. Studies have established the role that antioxidants play in providing protection against oxidative damage. Natural products are one of the major sources of antioxidants and extensive research has been conducted to discover the various types of antioxidant compounds.

Dr. Azlina's research focuses on the discovery of antioxidants from natural products, especially of Malaysian origin. Their research group is particularly interested in the identification and isolation of bioactive compounds from plant sources and establishing their mode of action as antioxidants and how they protect cellular components against oxidative damage. They work mainly on the dietary flavonoids and phenolic compounds, looking at their potential to protect against non-communicable diseases such as cancer, diabetes and cardiovascular disease. Together with their collaborators, they are investigating how some of these antioxidant-rich plant extracts may affect signaling pathways involved in disease development. In addition, with her collaborators, Dr. Azlina is also studying the antioxidant and redox status in patients with several disease conditions including precocious puberty, thyroid disorders and obesity.

Main Research Interest/Goals

- To isolate and identify bioactive compounds with antioxidant activities from natural products.
- To investigate the mechanism of how these bioactive compounds protect against oxidative damage and mediate disease development, using *in vitro* and *in vivo* approaches.
- To investigate the antioxidant and redox status of patients with precocious puberty, thyroid disorders and obesity

Selected Publications

Vergara D, Scoditti E, **Aziz AA** and Giudetti AM (2021) Editorial: Dietary Antioxidants and Metabolic Diseases. *Front. Nutr.* 8:617859. doi: 10.3389/fnut.2021.617859

Dyg Mastura Adenan, Zulkarnain Jaafar, Jaime Jacqueline Jayapalan, **Azlina Abdul Aziz** (2020). Plasma antioxidants and oxidative stress status in obese women: correlation with cardiopulmonary response. *PeerJ* 8:e9230 <http://doi.org/10.7717/peerj.9230>

Ivan Y. M. Ho, **Azlina Abdul Aziz**, Sarni Mat Junit (2020). Evaluation of Anti-proliferative Effects of *Barringtonia racemosa* and Gallic Acid on Caco-2 Cells. *Scientific Reports*. 10:9987, <https://doi.org/10.1038/s41598-020-66913-x>

Iman Fahmi Mahmoud, M.S. Kanthimathi, Azlina Abdul-Aziz (2020). ROS/RNS-mediated apoptosis in HT-29 colorectal cancer cells by methanolic extract of *Tamarindus indica* seeds. *Eur. J. Int. Med.* <https://doi.org/10.1016/j.eujim.2020.101244>

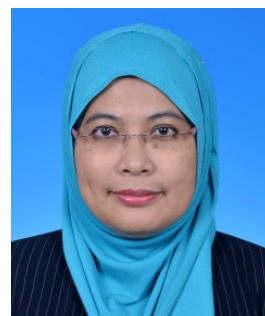
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Research keywords: molecular endocrinology, thyroid disorders, thyroid cancers, nutrigenomics

Research Summary

Prof. Dr. Sarni Mat Junit's research interest is in Molecular Endocrinology and nutrigenomics. With her collaborators, they currently investigate the similarities and differences in the underlying molecular mechanisms associated with benign and malignant thyroid cancer subtypes. Hydrogen peroxide (H₂O₂) is one of the key components in thyroid hormone biosynthesis. The level of H₂O₂ is carefully guarded by various antioxidative mechanisms. However, oxidative imbalance can occur and its ability to cause molecular damage can contribute towards cancer progression and aggression. Prof. Sarni and her research collaborators are also actively involved in nutrigenomics-related research with the main aim to provide molecular evidence for the beneficial properties of plants that are widely used in traditional medicine.

Main Research Interest/Goals

- Investigation on the role of molecular alterations and oxidative imbalance in patients with benign and malignant thyroid cancers
- Investigation on the molecular mechanisms associated with the medicinal properties of selected local plants.

Selected Publications:

Ivan Y.M. Ho, Azlina Abdul Aziz and **Sarni Mat Junit** (2020). Evaluation of Anti-proliferative Effects of *Barringtonia racemosa* and Gallic Acid on Caco-2 Cells. *Scientific Reports* 10, 9987

Kong KW, **Mat-Junit S**, Aminudin N, Abdul-Aziz A (2020), Phytochemicals in *Barringtonia* species: Linking their traditional uses as food and medicine with current research, *Journal of Herbal Medicine*, 19, 100299

Mardiaty Iryani Abdullah, **Sarni Mat Junit**, Khoon Leong Ng, Jaime Jacqueline Jayapalan, Barani Karikalan, Onn Haji Hashim (2019). Papillary Thyroid Cancer: Genetic Alterations and Molecular Biomarker Investigations. *International Journal of Medical Sciences*. 16(3):450-460



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Research keywords: medicinal mushroom, enzymology, drug discovery

Research Summary

Dr. Fung Shin Yee is a biochemist, receiving her degree from the University of Malaya. She actively pursues her interest in natural compounds focusing on medicinal mushrooms. She leads the Medicinal Mushroom Research Group (MMRG) and has immense interest in the Malaysia's National Treasure, the Tiger Milk mushroom (*Lignosus* sp.) amongst other medicinal mushrooms. Her innovative work with *Lignosus* sp. has won her several prestigious international and local prizes, and Malaysian patents. Her interest also includes other prized medicinal mushroom such as the *Ophiocordyceps sinensis* and *Inonotus obliquus*. Her involvement with the Venom and Toxin Research Group (VTRG) in the Department of Molecular Medicine that works on snake venom toxinology has granted her a lucrative experience in the field of toxinology and toxicology; and has propelled her current research interest. Her research endeavours utilize a multidisciplinary approach in her methodology with multiple collaborators both local and international. She is the Founder and CTO of Essenti Nutrien Sdn. Bhd. who specialises and pioneers the ACE Technology.



Main Research Interest/Goals

- Biomedical studies of traditional medicine and natural products (medicinal mushroom)
- Safety assessment of medicinal mushrooms
- Bioactive components from medicinal mushrooms for drugs discovery

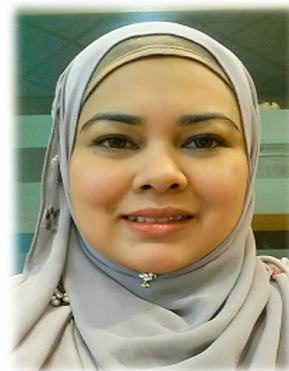
Selected Publications

Hui Yeng Yeannie Yap, Boon Hong Kong, Chee Sum Alvin Yap, Kien Chai Ong, Rosnah Binti Zain, Soon Hao Tan, Zuraiza Mohamad Zaini, Szu Ting Ng, Chon Seng Tan and **Shin Yee Fung** (2022). Immunomodulatory Effect and an Intervention of TNF Signalling Leading to Apoptotic and Cell Cycle Arrest on ORL-204 Oral Cancer Cells by Tiger Milk Mushroom, *Lignosus rhinoceros*. Food Technology and Biotechnology, doi: <https://doi.org/10.17113/ftb.60.01.22.7296>

Kong, B. H., & **Fung, S. Y.** (2021). Longitudinal Assessment of the Tiger Milk Medicinal Mushroom, *Lignosus rhinoceros* (Agaricomycetes), Sclerotium Cultivar: Uniformity of Bioactive Components. International Journal of Medicinal Mushrooms, 23(10), 61-68.

Kong, B. H., Yap, C. S. A., Razif, M. F. M., Ng, S. T., Tan, C. S., & **Fung, S. Y.** (2021). Antioxidant and Cytotoxic Effects and Identification of *Ophiocordyceps sinensis* Bioactive Proteins Using Shotgun Proteomic Analysis. Food Technology and Biotechnology, 59(2), 201-208.

Fung, S.Y., & Tan, C.S. (2019). Tiger Milk Mushroom (The *Lignosus* Trinity) in Malaysia: A Medicinal Treasure Trove. In Agrawal, D.C. & Dhansekaran, M. (Eds), *Medicinal Mushrooms: Recent Progress in Research and Development*, Springer Nature, New York, USA.

Dr. Puteri Shafinaz Akmar Abdul Rahman*Associate Professor***Office:** +603 7967 5743**Email:** terisar@um.edu.my<http://umexpert.um.edu.my/terisar>**Research keywords:** proteomics, biomarkers, human milk biology**Research Summary**

Dr Puteri's primary expertise is in the field of comparative proteomics. Her team employs the use of proteomic platforms in developing proteome profiles of biological samples. By comparing the generated proteome profiles (disease vs non-disease state, treated vs untreated, different stages or time-points), dysregulated or aberrant proteins of interest are detected and identified via mass spectrometry approaches. Using this workflow, her team has analysed profiles of sera from patients with gynaecological, nasopharyngeal and bone cancers in search of potential biomarkers for early detection of cancers. In addition to biomarker studies, her team has utilised proteomics technologies for studies on natural products and herbal medicine to understand the benefits of these extracts/compounds and unravel their mechanistic basis for the treatment of various diseases. Her team is also actively profiling proteins associated with the milk fat globule and soluble fraction of human milk. Their current project focuses on the proteome, metabolome and circadian profiles of milk from mothers in the early stages of breastfeeding up to 2 years of age. The aim is to investigate the interrelationship of the bioactive milk constituents and their roles in the infants' immune protection, cognitive and physical growth development.

Main Research Interest/Goals

- Application of proteomics technologies for discovery of disease biomarkers
- Application of proteomic technologies in studies of herbal plants and natural products.
- Human milk as biological systems (omics profiling of bioactive molecules in milk)

Selected Publication

Kwan, S. H., & **Abdul-Rahman, PS** (2021). Clinical Study on Plant Galactagogue Worldwide in Promoting Women's Lactation: a Scoping Review. *Plant Foods for Human Nutrition*, 76(3), 257-269. doi: 10.1007/s11130-021-00901-y

Wong KC, Sankaran S, Jayapalan JJ, Subramanian P, **Abdul-Rahman PS**. (2021) Melatonin improves cognitive behavior, oxidative stress, and metabolism in tumor-prone lethal giant larvae mutant of *Drosophila melanogaster*. *Arch Insect Biochem Physiol*. 107(1), 20. doi: 10.1002/arch.21785

Subramanian P, Jayapalan JJ & **Abdul-Rahman PS** (2021). Inevitable interlinks between biological clock and metabolism in mammals. *Biological Rhythm Research*. <https://doi.org/10.1080/09291016.2021.1928386>

Kwan SH, Wan-Ibrahim WI, Juvarajah T, Fung SY & **Abdul-Rahman PS** (2020). Isolation and identification of O- and N-linked glycoproteins in milk from different mammalian species and their roles in biological pathways which support infant growth. *Electrophoresis* doi: 10.1002/elps.202000142

Ramdas P, Radhakrishnan AK; Sani AAA; Kumari M; Anandha JS & **Abdul-Rahman, PS** (2020). Advancing the Role of Gamma-Tocotrienol as Proteasomes Inhibitor: A Quantitative Proteomic Analysis of MDA-MB 231 Human Breast Cancer Cells. *Biomolecules* 2020, 10(1), 19; doi:org/10.3390/biom10010019

Ramdas P, Radhakrishnan AK, Sani, AAA & **Abdul-Rahman PS** (2019). Tocotrienols Modulate Breast Cancer Secretomes and Affect Cancer-Signaling Pathways in MDA-MB-231 Cells: A Label-Free Quantitative Proteomic Analysis. *Nutrition and Cancer* 2019. doi: 10.1080/01635581.2019.1607407



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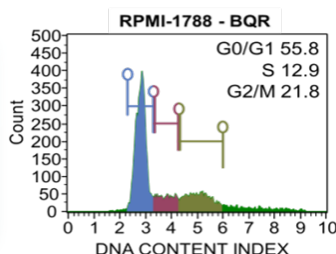
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Research keywords: pathogenesis of viral infections, drug discovery, anti-cancers, DHODH inhibitors

Research Summary

Dr. Shatrah has worked on several projects that revolve around viruses and cancer studies, focusing on the immunopathogenesis of dengue and human papillomavirus (HPV). These are primarily to facilitate the discovery of antivirals that ultimately depends on fully defined pathogenesis of both dengue infection and cervical cancer, respectively. Concurrently, work on cancer therapeutic is also on-going, focusing on the effects of DHODH inhibitors on various types of cancers. As a member of the Drug Design and Development Research Group (DDDRG), University of Malaya, she is also involved in the hits-to-lead projects and bioassay analysis of compounds from natural products, synthetic small molecules and novel peptides with improved antiviral properties in collaboration with international entities and other local universities.



Main Research Interest/Goals

- Elucidation of the cancer pathogenesis and anti-cancer therapeutics.
- Design and synthesis of small molecules and peptides as antivirals.
- DHODH inhibitors as a potential cancer therapeutic

Selected Publications

Gandhi, S., Rashid, N. N., Razif, M. F. M., & **Othman, S.** (2021). Proteasomal degradation of p130 facilitate cell cycle deregulation and impairment of cellular differentiation in high-risk Human Papillomavirus 16 and 18 E7 transfected cells. *Molecular Biology Reports*, 48(6), 5121-5133. doi: 10.1007/s11033-021-06509-4

Kadir, M. F. A., Nellore, K. & **Othman, S.** (2020). Dihydroorotate Dehydrogenase Inhibitors Promote Cell Cycle Arrest and Disrupt Mitochondria Bioenergetics in Ramos Cells. *Curr Pharm Biotech*, 21(15), 1654-1665

Abdullah, AA; Lee, YK; Chin, SP; Lim, SK; Lee, VS; Othman, R; **Othman, S**; Rahman, NA; Yusof, R; Heh, CH 2020. Discovery of Dengue Virus Inhibitors. *Current Medicinal Chemistry*, 27: 4945-5036.

M. Hariono, S B Choi, R F Roslim, M S Nawi, M L Tan, E E Kamarulzaman, N Mohamed, R Yusof, **S Othman**, N Abd-Rahman, R Othman, H A. Wahab. (2019) Thioguanine-based DENV-2 NS2B/NS3 protease inhibitors: Virtual screening, synthesis, biological evaluation and molecular modelling. *PLoS ONE* 14(1): e0210869

S Mohamad Zaid, N M. Kassim and **S Othman.** (2018) Protective role of *Ficus deltoidea* against BPA-induced impairments of the follicular development, estrous cycle, gonadotropin and sex steroid hormones level of prepubertal rats. *J. Ovarian Research*. 11:99

Dr. Nurshamimi Nor Rashid*Associate Professor***Office:** +603 7967 4916**Email:** nurshamimi@um.edu.my<http://umexpert.um.edu.my/nurshamimi>

Research keywords: molecular virology, cancer, anti-aging, natural compounds

Research Summary

Dr. Nurshamimi's research is focused on the fundamental studies of SARS-CoV-2, dengue and zika viruses. Currently, she's investigating the role of ACE-II protein in the SARS-CoV-2 infected cells and determining the role of dengue virus in reducing the platelet in megakaryocytes. While for zika virus, she has shown that the virus replication is dependent on glucose and glutamine in the neural cells. She is also working on colorectal cancer (CRC) research and natural products. Her team managed to proof that one compound from local plant is highly potential as an antiproliferative agent against CRC. This data has been disseminated to the New Straits Times, Malaysian Gazette and Bernama. Dr. Nurshamimi's other

area of expertise is skin anti-aging. She collected local plants and screen them for anti-aging activities. This work has gained attention from Malaysian Agricultural Research and Development Institute (MARDI) and Forest Research Institute Malaysia (FRIM) and won special prize and gold award from Korea International Women's Invention Exposition 2021 (KIWIE). She is also started to explore the possibility/potential of local antiaging compounds as a target for diabetic wound healing.

Main Research Interest/Goals

- Human papillomavirus, Zika virus and Dengue virus, SARS-CoV-2
- Antiproliferative agents against colorectal cancer
- Skin anti aging and diabetic wound healing

Selected Publications

Nurshamimi Nor Rashid* (2022). The pandemic of coronavirus disease 2019 (COVID-2019). *Curr Mol Med*, accepted

Khazali AS, Rashid NN*, Fung S-Yee, Yusof R (2021). Lignosus rhinoceros TM02 Sclerotia Extract Inhibits Dengue Virus Replication and Infection. *J. Herbal Medicine*

Gandhi, S., Nor Rashid, N*, Mohamad Razif, M.F., Othman, S. (2021). Proteasomal degradation of p130 facilitate cell cycle deregulation and impairment of cellular differentiation in high-risk Human Papillomavirus 16 and 18 E7 transfected cells. *Mol Biol Rep* 48, 5121 5133 (2021).

Nor Rashid, N.1, Yusof, R.1 and Rothan, H.A.2 (2020). Antiviral and virucidal activities of sulphated polysaccharides against Japanese Encephalitis virus. *Trop. Biomed*, in press.

Nor Rashid N, Yusof R and Watson RJ (2011) Disruption of repressive p130-DREAM complexes by human papillomavirus 16 E6/E7 oncoproteins is required for cell cycle progression in cervical cancer cells. *Journal of General Virology*, 92, 2620-2627.



Dr. Muhammad Fazril Mohamad Razif

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Research keywords: genetics, molecular biology, synthetic biology

Research Summary

Dr. Muhammad Fazril Razif has worked on numerous research projects including the expression and validation of synthetic proteins, genomic and transcriptomic studies on acute lymphoblastic leukaemia, diabetes and schizophrenia, and studies on medicinal mushrooms and mitochondria. In 2017, he joined the Medicinal Mushroom Research Group (MMRG) and has a great interest in studying the genomics, transcriptomics and proteomics of medicinal mushrooms. His current research focuses on the expression of novel proteins found in medicinal mushrooms and the identification of their bioactivities *in vitro* and *in vivo*. A substantial amount of data has been generated in the past few years and research is actively ongoing in our laboratory to elucidate more scientific data of these much sought-after medicinal mushrooms (*Lignosus rhinocerus*; *Lignosus tigris*; *Cordyceps sinensis*).

As a PI, Dr. Fazril has published 3 Book chapters and 17 research articles, and have received a total of 8 research grants (3 as Principal Investigator). He has also successfully supervised 2 PhD and 2 MSc students. In 2021, he was nominated by the Deputy Vice Chancellor (Research & Innovation) to represent University of Malaya for the National Young Scientist Award 2021.

Main Research Interest/Goals

- Biomedical studies of traditional medicine and natural products (medicinal mushroom)
- Safety assessment of medicinal mushrooms
- Bioactive components from medicinal mushrooms for drugs discovery

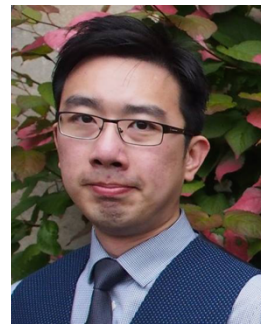
Selected Publications

Goh NY, Mohamad Razif MF, Yap YH, Ng CL, Fung SY. In silico analysis and characterization of medicinal mushroom cystathionine beta-synthase as an angiotensin converting enzyme (ACE) inhibitory protein. Comput Biol Chem. 2022 Feb;96:107620. doi: 10.1016/j.compbiolchem.2021.107620. Epub 2021 Dec 23. PMID: 34971900.

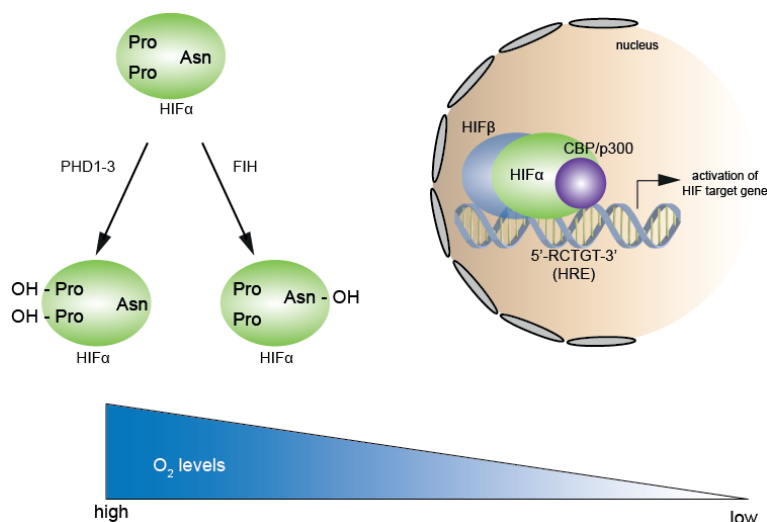
Boon-Hong Kong, Chee-Sum Alvin Yap, Muhammad Fazril Mohamad Razif, Szu-Ting Ng, Chon-Seng Tan, Shin-Yee Fung (2021). The Antioxidant and Cytotoxic Effects of *Ophiocordyceps sinensis* and Identification of Bioactive Proteins Using Shotgun Proteomic Analysis, Food Technology and Biotechnology, 59(2)

Yap, A.C.S., Li, X., Yap, Y.H.Y., Razif, M.F.M., Jamil, A.H.A., Ng, S.T., Tan, C.S., Chi, P.K.C., Fung, S-Y. (2020) The Immunomodulating Properties of *Lignosus rhinocerus* TM02 Cultivar and Its Associated Carbohydrate Composition. International Journal of Medicinal Mushroom. 10.1615/IntJMedMushrooms.2020035658

Yap, ACS., Li, X., Yap, YHY., Razif, MFM., Jamil, AHA., Ng, ST., Tan, CS., Chi, PKC., Fung, SY., (2020) Immunomodulatory properties of water-soluble polysaccharides extracted from the fruiting body of *Ophiocordyceps sinensis* cultivar OCS02, International Journal of Medicinal Mushroom 10.1615/IntJMedMushrooms.202003565

Dr. Andrew Chan Mun Chiang*Senior Lecturer***Email:** chanmunchiang@um.edu.my<http://umexpert.um.edu.my/chanmunchiang>**Research keywords:** hypoxia, chemical biology, drug discovery**Research Summary**

In animals under limiting oxygen, the expression of a set of genes is transcriptionally activated as part of the cellular oxygen homeostasis and adaptation response. The hypoxia-inducible factors (HIFs) are key transcription factors mediating this response. Prolyl hydroxylation of HIF α is catalysed by the HIF prolyl-hydroxylases (PHD1-3 in human), leading to HIF α degradation. Factor inhibiting HIF (FIH) catalyses the asparaginyl hydroxylation of HIF α , which blocks HIF α association with co-activators p300/CBP, thereby reducing HIF transcriptional activity. Under limiting oxygen, the activity of both the PHDs and FIH are suppressed, leading to the stabilisation and activation of HIF.



Dr. Andrew's research focuses on understanding the hypoxia pathway using a chemical biology approach, through the use of selective and potent chemical inhibitors (chemical probes). Drugs designed to inhibit the HIF prolyl hydroxylases to induce the production of erythropoietin via the activation of the HIF pathway are currently in the late stages of clinical trials for treating anaemia. Understanding the biology of the hypoxia pathway is therefore therapeutically important.

Main Research Interest/Goals

- Selective inhibition of proteins within the hypoxia signaling pathway using chemical probes
- Functional and mechanistic studies of the hypoxia signaling pathway
- Molecular understanding of the role of hypoxia in human diseases

Selected Publications

Chan, M. C., Atasoylu, O., Hodson, E., Tumber, A., Leung, I. K. H., Chowdhury, R., ... Schofield, C. J. (2015). Potent and selective triazole-based inhibitors of the hypoxia-inducible factor prolyl-hydroxylases with activity in the murine brain. *PLoS ONE*, 10(7).

Chan, M. C., Holt-Martyn, J. P., Schofield, C. J., & Ratcliffe, P. J. (2016). Pharmacological targeting of the HIF hydroxylases - A new field in medicine development. *Molecular Aspects of Medicine*.

Chan, M. C., Ilott, N. E., Schödel, J., Sims, D., Tumber, A., Lippl, K., ... Schofield, C. J. (2016). Tuning the transcriptional response to hypoxia by inhibiting Hypoxia-inducible Factor (HIF) prolyl and asparaginyl hydroxylases. *Journal of Biological Chemistry*, 291(39), 20661–20673.



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Research keywords: biomarkers, lectin, cancer

Research Summary

Dr. Jaime's area of research revolves around cancer (or other diseases) biomarker research using proteomics technology and lectin. Identification of unique protein biomarkers for cancer lies in the understanding and real-time assessment of the perturbed biological processes that orchestrate the onset and progression of the disease. Interestingly, the neoplastic transformation from a healthy to cancer cells brings about tangible and detectable changes at protein levels, either by rendering aberration in protein expression, modification or localisation. As such, the application of proteomics technologies offers vast real-time cellular biochemical information for identification of 'biomarker molecules' that are unique and most reflective of cancer.

Main Research Interest/Goals

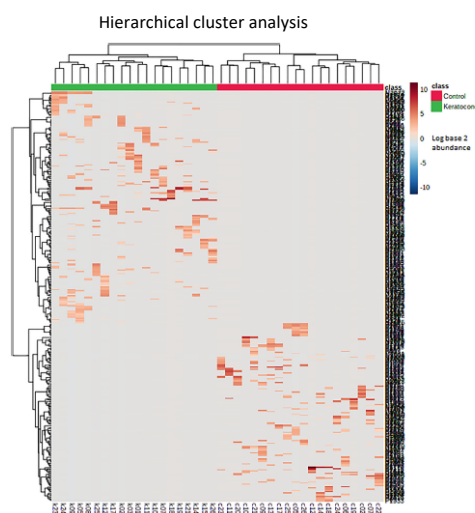
- Application of proteomics (and metabolomics) technologies in cancer and/or disease biomarker discovery.
- Application of lectins as an effective tool for screening of potential cancer biomarkers.
- Molecular understanding of the perturbed biological processes that orchestrate the onset and progression of cancer/ human diseases using fruit fly model.

Selected Publications

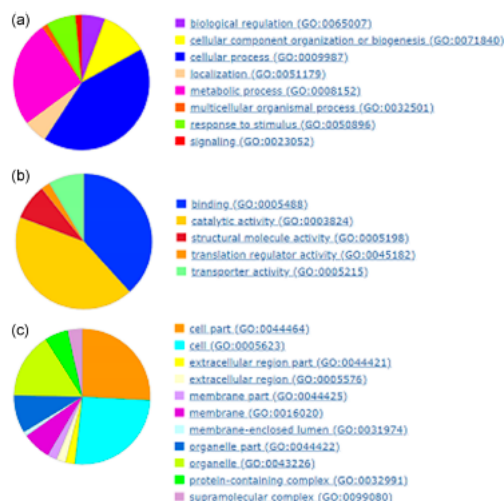
Teh Ai Lin, D., **Jayapalan, J. J.**, Loke, M. F., Wan Abdul Kadir, A. J., & Subrayan, V. (2021). Identification of potential serum metabolic biomarkers for patient with keratoconus using untargeted metabolomics approach. *Exp Eye Res*, 108734.

Perumal, S., **Jayapalan, J. J.**, & Puteri Shafinaz, A.-R. (2021). Cancer proteomics: New horizons and insights into therapeutic applications. *Current Proteomics*, 18(3), 266-278.

Mohamed Nasir, N., Hiji, J., **Jayapalan, J. J.**, & Hashim, O. H. (2020). Potential use of human hair shaft keratin peptide signatures to distinguish gender and ethnicity. *PeerJ*, 8, e8248.



Gene ontology studies: PANTHER classification system



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<http://umexpert.um.edu.my/kongkm>**Research keywords:** natural products, nutrition, drug discovery**Research Summary**

Plants have been extensively employed in traditional medicine or used as food. Many of the edible or medicinal plants are identified as underutilised and they are mostly the indigenous species. These plants are underutilised due to under-exploitation, less popular, or being neglected but they are at least important to rural communities either as food or medicine. Malaysia is one of the countries with the richest biodiversity. However, much ethno-medico botanical knowledge of the available species is unrecorded and lack of scientific evidence. Despite the diverse medicinal properties of many plant species, much information is only based on testimonials and the scientific reports on their major biological effects particularly the underlying molecular mechanisms are yet to be identified. Our lab has employed different biological assays as well as molecular approaches to provide a comprehensive molecular signature of the human cells in response to the plant extracts.

**Main Research Interest/Goals**

- Characterisation of phytochemicals in fruits and vegetables.
- Unveiling the health benefits of underutilised crops for human well-being.
- Conducting cell- and non-cell-based approaches in measuring the biological activities of the phytochemicals.
- Employing molecular approaches to study the medicinal or functional aspect of plant products.
- Exploiting the potential use of food processing by-products as ingredients of functional foods.

Selected Publications

Kong KW, Mat Junit S, Aminudin N, Abdul Aziz A (2020). Phytochemicals in *Barringtonia* species: Linking their traditional uses as food and medicine with current research. *Journal of Herbal Medicine*, 19, 100299.

Lau BF, **Kong KW**, Leong KH, Sun J, He X, Wang Z, Mustafa MR, Ling TC, Ismail A (2020). Banana inflorescence: Its bio-prospects as an ingredient for functional foods. *Trends in Food Science and Technology*, 97, 14-28.

Chang KA, Ley SL, Lee MY, Yaw HY, Lee SW, Chew LY, Neo YP, **Kong KW** (2021). Determination of nutritional constituents, antioxidant properties, and α -amylase inhibitory activity of *Sechium edule* (chayote) shoot from different extraction solvents and cooking methods. *LWT-Food Science and Technology*, 151, 112177.

**Dr. Leo Bey Fen***Senior Lecturer***Email:** beyfenleo@um.edu.my<http://umexpert.um.edu.my/beyfenleo>**Research keywords:** advanced imaging, biosensor, nanotechnology, toxicology**Research Summary**

Dr. Leo Bey Fen is a senior lecturer / research manager at the Faculty of Medicine, University of Malaya (UM). She is the research fellow at the Central Unit of Advanced Research Imaging (CENTUARI) and Nanotechnology and Catalysis Research Centre (NANOCAT). Her research focuses on the effect of physicochemical properties of engineered nanomaterials (ENMs) on their stability as well as their toxicity with in vivo or in vitro models. Besides, Dr. Leo also interested to fabricate a portable, rapid and sensitive point-of-care biosensor in detecting bacterial/virus using electrochemistry analysis. In her research projects, Synchrotron Small Angle X-Ray Scattering (SAXS) at DIAMOND Light Source, High Resolution Transmission Electron Microscopy (HRTEM), Time of Flight – Secondary Ion Mass Spectroscopy (TOF-SIMS), Focused Ion Beam – Scanning Electron Microscopy (FIB – SEM), RAMAN spectroscopy, confocal microscopy and ICP-MS analysis were used to characterise as-synthesised nanomaterials and investigate the stability of ENMs in biologically relevant environments.

Main Research Interest/Goals

- Nanomaterials (nanoparticles/nanofibers/nanowires) synthesis and characterization
- Catalyst (Fabrication of Electrochemical Biosensors for Bacterial/Virus Detection; Environmental Remediation and Magnetic Gloves etc.)
- Mechanism understanding of the antibacterial activity and toxicology of nanomaterials using advanced imaging techniques (High-Resolution Electron Microscopy, Secondary Ion Mass Spectrometry, Focused Ion Beam etc.)
- Nanosafety and Toxicology Assessment according to OECD and ISO Standards.

Selected Publications

Leo, B.F., Sarah, F., Daniel, G.C., Ioannis, T., Pakatip, R., Angela, G., ... Mary, P.R. (2019). Label-free TOF-SIMS imaging of sulfur producing enzymes inside microglia cells following exposure to silver nanowires. *ACS Analytical chemistry*. DOI: 10.1021/acs.analchem.9b01704.

S Muniandy, SJ Teh, JN Appaturi, KL Thong, CW Lai, F Ibrahim, **Leo, B.F.** (2019). A reduced graphene oxide-titanium dioxide nanocomposite based electrochemical aptasensor for rapid and sensitive detection of *Salmonella enterica*. *Bioelectrochemistry*, 127, 136-144

Thiruchelvi, P., Kwai, L.T., Ali, M.E., Jimmy, N.A., Zhan, Y.O., **Leo, B.F.** (2019). Graphene Oxide Exhibits Differential Mechanistic Action towards Gram-positive and Gram-negative Bacteria. *Colloids and Surfaces B: Biointerfaces*. DOI: 10.1016/j.colsurfb.2019.05.023

Leo, B.F., Daniel, A., Pakatip, R., Shu, C., Angela E., Ioannis, G., ... Alexandra E. P. (2017). Silver nanoparticles reduce brain inflammation and related neurotoxicity through induction of H₂S-synthesizing enzymes. *Scientific Reports*, 22(2):170-177.

Dr. Tan Kae Yi*Senior Lecturer***Office:** +603 7967 4953**Email:** kytan_kae@um.edu.myhttp://umexpert.um.edu.my/kytan_kae**Research keywords:** toxinology, venom, antivenom, drug discovery**Research Summary**

Venomous snakes secrete venoms that contain myriads of toxins with diverse pharmacological actions. Antivenom is the definitive treatment for snakebite envenomation, however, its limited supply and high specificity has hampered the effort in snakebite management. Considering venom variability across genus and/or within the same species, the understanding of venom composition is therefore crucial for an effective treatment. Dr. Tan's lab focuses on understanding the toxinological and pharmacological actions of snake venoms in the areas of venom proteomics, toxinological characterization, antivenom assessment and snakebite diagnostics. Dr. Tan's also adopt a multidisciplinary approach towards toxin-based drug discovery, through the study of venom gland transcriptomics, in search of sequences of bioactive toxins that serve biomedical potential.

**Main Research Interest/Goals**

- Isolation, purification, identification and profiling the venom of medically important snake species to relatively quantitate their toxin compositions.
- Toxinological and functional characterisation of snake venoms, proteins and toxins for correlation with the clinical pathophysiology of envenomation
- Assessment of commercially available antivenom with aims to improve its manufacture and production.
- Snakebite diagnostics for identification of biting snakes and treatment option
- Venom gland transcriptomics in search for sequences of bioactive toxins, paving the way to toxin-based drug discovery for its biomedical potential

Selected Publications

Tan, C. H., Bourges, A., & **Tan, K. Y.** (2022). King Cobra and snakebite envenomation: on the natural history, human-snake relationship and medical importance of *Ophiophagus hannah*. *Journal of Venomous Animals and Toxins including Tropical Diseases*, 27.

Tan, C. H., Lingam, T. M. C., & **Tan, K. Y.** (2021). Varespladib (LY315920) rescued mice from fatal neurotoxicity caused by venoms of five major Asiatic kraits (*Bungarus* spp.) in an experimental envenoming and rescue model. *Acta Tropica*, 106289.

Palasuberniam, P., Chan, Y. W., **Tan, K. Y.**, & Tan, C. H. (2021). Snake venom proteomics of Samar Cobra (*Naja samarensis*) from the southern Philippines: Short alpha-neurotoxins as the dominant lethal component weakly cross-neutralized by the Philippine Cobra Antivenom. *Frontiers in pharmacology*, 12, 727756-727756.



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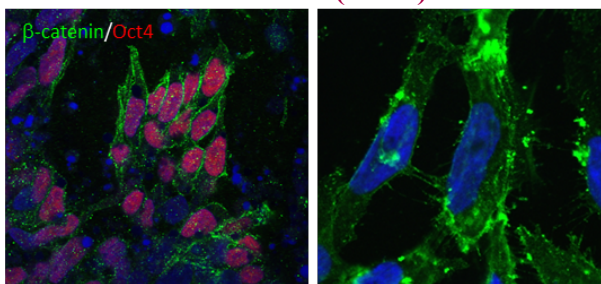
<http://umexpert.um.edu.my/selvee>

Research keywords: stem cells, tissue engineering, cancer

Research Summary

Dr. Selvee is interested in exploring the potential of human embryonic stem cells and multipotent adult stem cells in developing cell therapy for various diseases including liver, brain, and orthopedic-related disorders using various culture and molecular systems including tissue engineering approaches. Understanding the role of epigenetic reprogramming, cell cycle and cellular signaling as regulators in defining the cell fate into desired cell types would be invaluable in deriving cellular resources for cell therapy. With great work, we hope that one day we can secure targeted cell therapies tailored to suit the needs of patients and to provide a good cellular model system for drug development processes.

Stem Cells and Epithelial Mesenchymal Transition (EMT)



Main Research Interest/Goals

- Development of stem cell-based therapeutic strategies for ageing and degenerative diseases
- Understanding the behaviour of cancer stem cells and the underlying regulatory mechanism for the development of next-generation therapeutics

Selected Publications

Ong ALC & **Ramasamy TS** (2018). Role of Sirtuin1-p53 regulatory axis in aging, cancer and cellular reprogramming. *Ageing Research Reviews*. 43 (2018) 64-80

Sundararajan V, Sarkar FH, **Ramasamy TS** (2018). The versatile role of exosomes in cancer progression: diagnostic and therapeutic implications. *Cellular Oncology*. 2018 Jun;41(3):223-252.

Yu J, **Ramasamy TS**, Murphy N, Holt M, Czapiewski R, Wei SK and Cui W (2015) PI3K/mTORC2 regulates TGFβ/Activin signalling by modulating Smad2/3 activity via linker phosphorylation. *Nature Communications*, 6, 7212.

Srijaya ST, **Ramasamy TS**, Abu Kasim NH (2014) Advancing stem cell therapy from bench to bedside: lessons from drug therapies. *Journal of Translational Medicine*. 12, 243.

Ramasamy TS, Yu J, Selden C, Hodgson H, Cui W (2013) Application of three-dimensional culture conditions to human embryonic stem cell-derived definitive endoderm cells enhances hepatocyte differentiation and functionality. *Tissue Engineering*. 19(3-4), 360-367.

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