AY1819 Semester 1 Postgraduate Seminar

19 September 2018

S4 Level 2, PPS Hub

2 - 6 pm

Program

2 - 2.15 pm	Opening Address (Assoc Prof Eric Chan)
2.15 - 2.45 pm	Mr Wee Hai Ning
2.45 - 3.15 pm	Mr Justin Tan Jia Yao
3.15 - 3.45 pm	Ms Foo Wen Chin
3.45 - 4.15 pm	Ms Aysu Selcuk
4.15 - 4.30 pm	Break
4.30 - 5 pm	Mr Samuel Agyei Nyantakyi
5 - 5.30 pm	Ms Zou Shui
5.30 - 6 pm	Mr Chang Hao-Chun

ALL ARE WELCOME

*** mandatory for all PG students**

NUS National University of Singapore | Department of Pharmacy, Faculty of Science

Medicinal plants with anti-inflammatory activity

by Wee Hai Ning
Supervisor: Assoc Prof Koh H. L.

ABSTRACT Inflammation is the body's inherent biological response to injury. However, excessive inflammation triggered by pro-inflammatory mediators is harmful and directly linked to pathogenesis of diseases such as arthritis and ulcerative colitis. Important anti-inflammatory drugs that originated from plant-derived natural products included aspirin, ibuprofen and colchicine. The aim of this presentation is to review medicinal plants with anti-inflammatory activity. An electronic literature search of PUBMED was conducted using the key words "plants" and "anti-inflammatory activity" for in vitro, in vivo and clinical studies focusing on single herb and/or single-plant extracts. Studies with multi-plant mixtures are excluded. An overview of anti-inflammatory medicinal plants and methods to screen for such activity will be presented. In addition, andrographolide from Andrographis paniculata and ginsenosides from the genus Panax will be discussed as promising candidates for drug discovery in the area of rheumatoid arthritis and neuroinflammation.

BIOGRAPHY Wee Hai Ning graduated with a Double Degree in Biomedical Science and Chinese Medicine from Nanyang Technological University. He is pursuing his PhD under the supervision of A/Prof Koh Hwee Ling. His research focus is on the identification and characterisation of anti-inflammatory components from medicinal plants.

A simple and preliminary *in-vitro* screening of bioactives isolated from a Chinese proprietary medicine for properties against androgenetic alopecia

by Justin Tan Jia Yao
Supervisor: Prof Paul Ho

ABSTRACT Androgenetic alopecia (AGA) is characterized by a progressive and patterned transformation of thick, pigmented terminal scalp hairs into short, hypo-pigmented vellus-like hairs. Minoxidil works only in the early years of the condition and for a proportion of individuals while Finasteride is associated with limited efficacy and side effects. Therefore, there is need to search for alternative treatments for the problem of AGA.

In this seminar, we will examine the potential hair growth properties of six individual compounds isolated from a Chinese proprietary medicine known as Yangxue Shengfa capsule (YSC), used in China for many years for treating AGA. The compounds include 2,3,5,4'-tetrahydroxystilbene-2-O-b-D-glucoside (TSG), Chlorogenic acid, Emodin, Ferulic acid, Isoimperatorin, and Paeoniflorin. The enzyme 5α-reductase, and multiple genes associated with AGA, including IGF-1, DKK-1, and TGF-b1, were found to be modulated by these compounds, thereby concluding the potential of these bioactives to be used in the treatment against AGA.

BIOGRAPHY Justin graduated with BSc (Pharmacy) Hons from The National University of Singapore (NUS) in 2014. He is currently pursuing his PhD under the supervision of Dr Kang Lifeng and Professor Paul Ho. His research interests are in-vitro compound screening for properties against androgenetic alopecia and 3D hair follicle engineering.

A novel unit-dose approach for the pharmaceutical compounding of an orodispersible film

by Foo Wen Chin
Supervisor: Assoc Prof Chan S. Y.

ABSTRACT Personalized medicine is touted to be the new healthcare paradigm. A key dimension of personalized medicine is individualized pharmacotherapy, which is set to drive the need for small-scale manufacture at point-of-care. This opens up a window of opportunity for pharmaceutical compounding. Orodispersible films (ODF) are well-suited as small-scale pharmacy preparations due to its relatively simple manufacture by solvent-casting. Compared to conventional extemporaneous oral suspensions, ODFs offer the advantages of administration convenience and dose accuracy.
The conventional method of ODF preparation using a film applicator is associated with content uniformity challenges arising from changes in solution viscosity and operator manipulation. To circumvent these hurdles, the unit-dose plate for compounding individual ODFs was developed. Using a design-of-experiments approach, an extemporaneous ODF formulation of an antiemetic drug, ondansetron hydrochloride, at a clinically relevant dose was established. Results from this study will provide a framework for an extemporaneous ODF platform.

BIOGRAPHY Foo Wen Chin holds an MPharm (Distinction) from the University of Strathclyde and has 4 years of practice experience as a hospital pharmacist in Penang. She joined NUS in Jan 2015 to pursue her PhD under the supervision of A/P Chan Sui Yung. Her research focuses on the development of orodispersible films for personalized pharmacotherapy.

Antimicrobial Use in Singapore Nursing Homes: Result of A Point Prevalence Survey

by Aysu Selcuk
Supervisor: Assoc Prof Chan S. Y.

ABSTRACT The National Strategic Action Plan on Antimicrobial Resistance in Singapore called for urgent and enhanced strategies such as research and optimization of antimicrobial use to combat antimicrobial resistance. Inappropriate antimicrobial use is one of the key factors for the development of the antimicrobial resistance in health care settings including nursing homes. Therefore, the evaluation of the level of antimicrobial use in nursing homes is essential for identifying gaps in appropriate antimicrobial use to justify future efforts and resources. Many developed countries have published the prevalence of antimicrobial use in nursing homes. However, little is known in Singapore and Asia. In this seminar, I will focus on antimicrobial use in Singapore nursing homes from the results of a point prevalence survey.

BIOGRAPHY Aysu Selcuk graduated with BSc Pharmacy from Ankara University in 2012 and MSc Clinical Pharmacy from Marmara University in 2014. She worked as a research assistant before joining NUS with a SINGA scholarship. She is pursuing her PhD under the supervision of A/Prof Chan Sui Yung and co-supervision of A/Prof Christine Teng and Dr Yap Kai Zhen.
Her TAC members are Prof Paul Tambyah and A/Prof Priscilla How.

Membrane depolarizing effects of indolylpentyl TPP analogues with antimycobacterial properties

by Samuel Agyei Nyantakyi
Supervisor: Assoc Prof Go M. L.

ABSTRACT Agents that selectively target the mycobacterial membrane could potentially shorten treatment time for tuberculosis, reduce relapse, and curtail emergence of resistant strains. The lipophilicity and extensive charge-delocalized state of the triphenylphosphonium cation (TPP) strongly favor accumulation within bacterial membranes. Here, we explored the antimycobacterial and membrane-targeting properties of indolylalkyltriphenylphosphonium analogues. The most active analogues preferentially inhibited growth of Mycobacterium tuberculosis H37Rv (MIC50 2–4 μM) and were bactericidal against Mycobacterium bovis BCG (MBC99 3 μM). Despite their propensity to accumulate within membranes, we found no evidence that these compounds permeabilized mycobacterial membranes or induced cell-envelope stress. Our investigations indicated that their bactericidal effects stem from sustained depolarization of mycobacterial membranes and ensuing disruptive effects on electron transfer and cell division.

BIOGRAPHY Samuel Agyei Nyantakyi graduated with a bachelor's degree (Hons.) in Pharmacy from the Kwame Nkrumah University of Science and Technology (KNUST), Ghana in 2010, and has been a registered member of the Pharmaceutical Society of Ghana since 2012. He also holds a master's degree in Drug Discovery and Pharmaceutical Sciences from the University of Nottingham, UK (2014). In January 2015, he enrolled as a graduate student in the department of Pharmacy, NUS under the supervision of A/P Go Mei-Lin courtesy of the SINGA scholarship. His research focus has been on synthesis and antimycobacterial evaluation of novel indole-based compounds for tuberculosis and non-tuberculous mycobacteria (NTMs).

The Development of Novel Delivery Systems For Anti-Obesity Treatment

by Zou Shui
Supervisor: Asst Prof Esther Woon
Co-Sup: Assoc Prof Giorgia Pastorin

ABSTRACT Obesity is a worldwide pandemic; however, there is currently a lack of safe yet effective treatment modalities. A novel anti-obesity approach is to promote the transformation of white adipose tissue to beige adipose tissue, thereby increasing energy expenditure and fat oxidation, where several miRNAs are able to induce the browning process. However, lacking of suitable delivery systems to adipocytes limits the application. Although endogenous exosomes are able to transfer miRNAs and other biomolecules intercellularly, the isolation yield is low, procedurally complex and present with issues regarding efficient loading of miRNAs. In this project, we developed a novel hybrid cell-derived delivery platform - micro Cell Vesicle Technology (mCVT) with potential targeting effect towards different cells. The successful development of such a delivery system will not only facilitate the study of the browning process in adipocytes and the associated metabolic dynamics, it would also pave the way for novel anti-obesity treatments.

BIOGRAPHY Zou Shui completed her bachelor degree (with honours) in Chemistry (2014) from National University of Singapore (NUS). She is currently pursuing her PhD in Department of Pharmacy, NUS, under supervision of Assistant Professor Esther Woon and Associate Professor Giorgia Pastorin. Apart from the passion in medicinal chemistry, she found her interests in bionanotechnology and drug delivery during her early PhD study. Her research interest focuses on the development of hybrid cell-derived delivery platform for nucleic acids to adipocytes for the treatment of obesity. By delivering obesity-related miRNAs and proteins to white-like adipocytes directly or indirectly, “evil” fat cells for energy storage will transform into “nice” brown-like fat cells which are more thermogenic and consume the greater amount of energy.

The Pro-apoptotic Protein MOAP-1 is Required for Efficient Autophagosome Formation under Starvation-induced Autophagy Signalling

by Chang Hao-Chun
Supervisor: Assoc Prof Victor Yu

ABSTRACT Autophagy is a highly-conserved cellular process to permit degradation of the non-essential cytosolic molecules and organelles as a survival mechanism to counteract environmental stresses such as starvation. Increasing evidence suggests that dysregulation of autophagy signaling could be an important factor contributing to major diseases such as neurodegeneration and cancers. Over the few decades, many autophagy related proteins have been identified in the mammalian system and their roles in initiating the formation process, forming the double-membrane autophagosome, and fusing with the lysosome for substrate degradation and recycling has been widely documented. However, how the autophagosome membrane expansion and maturation is remain largely unknown. MOAP-1 (Modulator of Apoptosis 1) is a Bax-associated protein which has been shown to be required for facilitating Bax-dependent mitochondrial outer membrane permeabilization and apoptosis (Tan et al., PNAS, 2005). Recently, we reported that MOAP-1 knockout (KO) mice were remarkably resistant to hepatocellular apoptosis and lethality triggered by in vivo activation of the Fas signaling (Tan et al., Cell Rep, 2016). Intriguingly, while MOAP-1 KO MEFs were generally more resistant to apoptotic stimuli, they were more sensitive to cell death triggered by nutrient starvation. As autophagy serve as a protective mechanism during starvation, we evaluated the possible role of MOAP-1 in regulating autophagy signaling using nutrient starvation paradigm. Our preliminary data revealed that while initiation of autophagy signaling remained unaffected in the MOAP-1 KO cells, A decrease of LC3 puncta and a dysmorphology of autophagosome membrane structure was observed in the MOAP-1 KO cells using confocal and electron microscopy analysis, respectively. These observations suggested that formation of autophagosome appears to be impaired in the absence of MOAP-1 during starvation. Further analysis suggests that MOAP-1 regulates autophagosome formation through its ability to interact with LC3. Overexpressed of WT, but not LC3-binding defective mutant form of MOAP-1 is able to rescue the autophagy defective phenotype in vitro. A more in-depth study on how MOAP-1 regulates autophagosome formation and its role in physiology conditions is currently underway.

BIOGRAPHY Chang Hao-Chun received his M.Sc in Biochemistry and Molecular Biology from National Cheng Kung University (Taiwan) where he studied cancer cell metabolism. In 2014, he joined Prof Victor Yu's PhD program to investigate the physiological and pathological roles of MOAP-1 in regulating stress responses including autophagy.