

Botanical Symposium

Exploring Innovative Approaches in
Chinese Medicines:
from Bench to Bedside



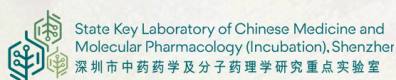
PROGRAMME BOOK

Date: 1 December 2022 (Thursday)

Time: 9:00 a.m. - 5:30 p.m.

Venue: Senate Room (M1603), PolyU
(Hybrid Conference)

ORGANISERS



Hosted by:

The State Key Laboratory of Chinese Medicine and Molecular
Pharmacology (Incubation)
The Hong Kong Polytechnic University

The State Key Laboratory of Research on Bioactivities and
Clinical Applications of Medicinal Plants
The Chinese University of Hong Kong (CUHK)



Organising Committee

Prof. Man-Sau WONG (Conference Chair)

Associate Dean (Industrial Partnership), Faculty of Science
Director, Research Centre for Chinese Medicine Innovation
Professor, Department of Applied Biology and Chemical Technology
The Hong Kong Polytechnic University

Prof. Clara Bik-San LAU

Associate Director, Institute of Chinese Medicine and State Key Laboratory of Research on
Bioactivities and Clinical Applications of Medicinal Plants
The Chinese University of Hong Kong

Dr. Daniel Kam-Wah MOK

Associate Director, Research Centre for Chinese Medicine Innovation
Associate Professor, Department of Applied Biology and Chemical Technology,
The Hong Kong Polytechnic University

Dr. Sai-Wang SETO

Associate Director, Research Centre for Chinese Medicine Innovation
Assistant Professor, Department of Applied Biology and Chemical Technology,
The Hong Kong Polytechnic University



Event Secretariat

PolyU Academy for Interdisciplinary Research

Programme



WELCOMING REMARKS & GROUP PHOTO

09:00 - 09:10

Welcoming Remarks & Group Photo

Prof. Larry Ming-Cheung CHOW

Department of Applied Biology and Chemical Technology, The Hong Kong Polytechnic University

SESSION 1: CLINICAL APPROACHES

Chairman: Prof. Chun-Guang LI, Western Sydney University

9:15 - 10:00

Botanicals from Bench to Bedside - What Do We Need to Get It Right?

Prof. Michael HEINRICH, School of Pharmacy, University College London, United Kingdom

SESSION 2: RESEARCH DEVELOPMENT IN THE STATE KEY LABORATORIES

Chairman: Prof. Chun-Guang LI, Western Sydney University

10:00 - 10:20

The Latest Development of State Key Laboratory of Research on Bioactivities and Clinical Applications of Medicinal Plants (CUHK)

Prof. Ping-Chung LEUNG, Institute of Chinese Medicine and State Key Laboratory of Research on Bioactivities and Clinical Applications of Medicinal Plants, The Chinese University of Hong Kong

10:20 - 10:40

Research Updates of State Key Laboratory of The State Key Laboratory of Chinese Medicine and Molecular Pharmacology (Incubation), Shenzhen

Dr. Daniel Kam-Wah MOK, The State Key Laboratory of Chinese Medicine and Molecular Pharmacology (Incubation), Shenzhen, The Hong Kong Polytechnic University

10:40 - 10:55

Break

SESSION 3: NATURAL PRODUCT DEVELOPMENT

Chairman: Prof. Chun-Kwok WONG, The Chinese University of Hong Kong

10:55 - 11:25

Discovery of Novel Lead Compounds from Medicinally Important Plants and their Endophytic Fungi

Prof. Pema-Tenzin PUNO, Kunming Institute of Botany, Chinese Academy of Sciences, China

11:25 - 11:55

The Exploratory Studies on PPAP, a Special Kind of Hybrid Natural Products

Prof. Gang XU, Kunming Institute of Botany, Chinese Academy of Sciences, China

12:00 - 14:00

Lunch Break

SESSION 4: SCIENTIFIC APPROACHES

Chairman: Prof. Chun-Tao CHE, University of Illinois at Chicago

14:00 - 14:30	Research and Development of <i>Sambucus williamsii</i> as Herbal Drug for Postmenopausal Osteoporosis Prof. Man-Sau WONG, Research Centre for Chinese Medicine Innovation, The Hong Kong Polytechnic University
14:30 - 15:00	The Novel Medicinal Value of a Well-Known Herb <i>Andrographis paniculata</i> in Esophageal Cancer – a Discovery Journey from Laboratory to Clinic Prof. Clara Bik-San LAU, Institute of Chinese Medicine and State Key Laboratory of Research on Bioactivities and Clinical Applications of Medicinal Plants, The Chinese University of Hong Kong
15:00 - 15:30	Janus-faced WAT Browning in Human Diseases Prof. Junli LIU, School of Medicine, Shanghai Jiao Tong University, China
15:30 - 15:40	Break
15:40 - 16:10	Scientific Insights into <i>Panax notoginseng</i> Prof. Simon Ming-Yuen LEE, State Key Laboratory of Quality Research in Chinese Medicine, Institute of Chinese Medical Science, University of Macau, Macau SAR (China)
16:10 - 16:40	Emerging Role of the Gut Microbiome in Irritable Bowel Syndrome: From Pathogenesis to Treatments Using Chinese Medicine Dr Lixiang ZHAI, Centre for Chinese Medicine Drug Development Limited, Hong Kong Baptist University
16:40 - 16:50	Break

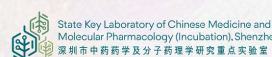
SESSION 5: NATURAL PRODUCT SAFETY

Chairman: Dr Sai-Wang SETO, The Hong Kong Polytechnic University

16:50 - 17:20	Pharmacovigilance for Botanicals and Other ‘Natural Health’ Products: Identifying and Responding to Safety Issues Prof. Joanne BARNES, Faculty of Medical and Health Sciences, University of Auckland, New Zealand
17:20 - 17:25	Award Presentation
17:25 - 17:30	Concluding Remarks

ORGANISERS

End of Symposium



Opening Remarks



Prof. Wing-Tak WONG

Deputy President and Provost
Chair Professor of Chemistry, Department of Applied Biology and Chemical Technology
Director, State Key Laboratory of Chinese Medicine and Molecular Pharmacology
(Incubation), Shenzhen
The Hong Kong Polytechnic University

Dear Honoured Guest and Colleagues,

It is with great pleasure that we welcome you to The Hong Kong Polytechnic University to participate in the Botanical Symposium 2022 (“The Symposium”) on discussing ways to integrate new scientific platforms to enhance the understanding of botanicals and natural products after years of pandemic turbulence. Co-organised by the State Key Laboratory of Chinese Medicine and Molecular Pharmacology (Incubation) of The Hong Kong Polytechnic University (PolyU) and the State Key Laboratory of Research on Bioactivities and Clinical Applications of Medicinal Plants of The Chinese University of Hong Kong (CUHK), it is our first hybrid symposium, featuring in-person and online keynotes as well as virtual poster presentations. With a wider frame in drug discovery, we are delighted to present the theme of the year: Exploring the Innovative Approaches in Chinese Medicine: from Bench to Bedside.

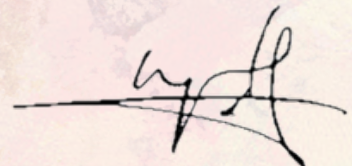
Once again, we welcome our guest speakers from Hong Kong, Macau, Mainland China, Macau, USA and Europe to this year's conference. By bringing such an esteemed gathering of people to PolyU for this meeting, we look forward to bridging the gap between basic and clinical research and continuing the discussions on translating the achievements of basic science into everyday clinical practice. In this way we hope to contribute new research strategies to provide scientific data that could substantiate the health claims to support a wider acceptance of botanicals and herbs in the world.

Since 2013, the Botanical Symposium attempts to consolidate the research efforts of the two research units, to recount the recent achievements and endeavours in natural product developments and herbal medicine researches in the Greater Bay Area and international arena, and to provide impetus for further exploration of more rigorous scientific researches. It is promising to see that scientific and international communities have recognised TCM with introductions and initiations of international regulations, interdisciplinary projects and development blueprints.

In the wake of pandemic which posed an enormous threat to public health and safety, TCM has made important and lasting contributions in the battle against COVID-19. Even so, we realize that there are more to be done to fully elucidate the complexity and effectiveness of TCM as well as to enhance and refine the regulatory system to ensure its safe use.

With this fifth Symposium, we hope to address the key scientific aspects to maintain safety and the highest standards of botanical preparations. The one-day programme consists of five major themes which cover every stage of the translational research journey, namely (1) Clinical approaches, (2) Research Development in the State Key Laboratories, (3) Natural Product Development, (4) Scientific Approaches, and (5) Natural Product Safety. I hope that you will find this Symposium instructive and enjoyable.

We hope this Symposium will provide some insights for future development. On behalf of the organizing committee, we wish you a fruitful stay in Hong Kong and success at this year's first hybrid symposium on this important theme.

A handwritten signature in black ink, appearing to read 'Wing-Tak Wong', with a horizontal line drawn through the middle of the signature.

Prof. Wing-Tak WONG

State Key Laboratory of Chinese Medicine and Molecular Pharmacology (Incubation), Shenzhen



The State Key Laboratory of Chinese Medicine and Molecular Pharmacology (Incubation) (SKLTTCM) under The Hong Kong Polytechnic University Shenzhen Research Institute is a laboratory that focuses on modernized Chinese medicine research. SKL Incubation is located at the Shenzhen Hi-tech Industrial Park with an area of 2,000 square meters. There are various functional laboratories for the pre-clinical studies of drugs or health food, such as the Specific Pathogen Free (SPF) Animal Laboratory, Pharmacology Laboratory, Tissue Culture Laboratory, Analytical Chemistry Laboratory and NMR Laboratory. These laboratories are equipped with state-of-the-art equipment.

The SKLTTCM focuses on the study of classical Chinese medicine formulae and single herbs on geriatric and chronic diseases. We aim at elucidating the chemical composition and action mechanism responsible for the efficacy of Chinese medicine on the prevention and treatment of such diseases. By multidisciplinary researches comprising analytical chemistry, pharmacology, system biology, etc. Our goal is to demonstrate the science of traditional Chinese medicine using modern scientific means, and further, to provide scientific evidence for its clinical application. Our vision is to improve the global acceptance of Chinese medicine and thus expanding its influence worldwide.

Message from The State Key Laboratory of Research on Bioactivities and Clinical Applications of Medicinal Plants (The Chinese University of Hong Kong)



The State Key Laboratory of Research on Bioactivities and Clinical Applications of Medicinal Plants (The Chinese University of Hong Kong) has been an extension from The Partner State Key Laboratory of Phytochemistry and Plant Resources in West China (CUHK), partnering with Kunming Institute of Botany which has been approved by the Ministry of Science and Technology, The People's Republic of China since 2009. We carry the mission of modernizing Traditional Chinese Medicine and is committed on areas of great clinical need, using evidence-based research methodology, to create simple Chinese Medicine combinations to supplement modern clinical practices. The unique research direction of clinical orientation is leading to the creation of specific health supplements and proprietary drugs. In parallel with clinical research efforts, basic studies on phytochemistry and bioactivities of the selected herbs and combinations are essential requirements. Much collaborations between research groups in Hong Kong and experts in China have been established.

This Botanical Symposium demonstrates the importance of collaboration. We are most grateful to our expert friends and collaborators in the State Key Laboratory of Chinese Medicine and Molecular Pharmacology at The Polytechnic University for organizing this wonderful occasion. Since more than a decade ago, we have learned so much from Prof. F.T. Chow on chemometrics and herbal fractionations, and from Prof. M.S. Wong on osteoporosis research. We look forward to more active ties between our Key Laboratories.

While the practice of Traditional Chinese Medicine is expected to further flourish, better and richer development of Research on Traditional Chinese Medicine: not only confining to conversion of medicinal herbs to chemical drugs and pharmaceuticals, but more innovative creations of new medicinal supplements for specific health needs, would be logical visions. Our State Key Laboratories in Hong Kong may happily carry out such special responsibilities, and strive to achieve more in the New Challenge.

Botanicals from Bench to Bedside – What Do We Need to Get It Right?



Prof. Michael HEINRICH

Professor of Ethnopharmacology and Pharmacognosy
School of Pharmacy
University College London, United Kingdom

Abstract

In all areas of science including research on herbal medicines and natural products, it is essential to remind us of some core aspects of science needed to r-e-a-f-f-i-r-m that the approach is valid and this needs to be based on a consensus within the research communities:

- **R**eproducible [i.e. transparent reporting of a sound methodology and approach]
- **E**ndorsed [scientifically, i.e. are we using valid approaches]
- **A**cceptable [by all stakeholders / Is there any potential bias in the approach?]
- **F**easible [can we answer the questions we are posing?]
- **F**actual [Is it based on validated methodologies and does it results in well-defined evidence]
- **I**nterdisciplinary [while not mandatory, research now more and more requires complex cooperations]
- **R**esponsible [following ethical and legal guidelines and adhering to the principle of transparency]
- **M**eaningful [Does it make a meaningful contribution to science?]

Research on medicinal plants and bioactive natural products differs from studies performed with single compounds. Therefore, there is a need for a consensus on best practice in the characterisation of extracts used in pharmacological, toxicological and clinical research. The consensus statement on the Phytochemical characterisation of Medicinal Plant extracts (ConPhyMP [1]) was developed using a Delphi process, based on an initial stakeholder survey. This document defines what needs to be reported in order to allow for reproducibility and accurate interpretations of studies using medicinal plant extracts. Specifically, the consensus-based statement focuses on explaining the requirements needed for: (1) Defining the plant material/herbal substances, herbal extracts and herbal medicinal products used in these studies, and (2) Conducting and reporting the phytochemical analysis of the plant extracts used in these studies in a reproducible and transparent way.

In this talk I will discuss the wider context of what we need to reaffirm that we use a scientific approach and what the main messages of the ConPhyMP statement are: Guidelines on the chemical characterisation of medicinal plant extracts, and the chemical methods recommended for defining the chemical compositions of the plant extracts used in such studies. The checklist is primarily intended for authors in medicinal plant research as well as peer reviewers and editors assessing such research for publication.

1. M Heinrich, B Jalil, J Echeverria, Z Kulic, L J McGaw, J M Pezzuto, O Potterat, M Abdel-Tawab, J-B Wang with the ConPhyMP Advisory Group (n.d.) Best Practice in the chemical characterisation of extracts used in pharmacological and toxicological research – The ConPhyMP – guidelines. *Fr. Pharmacol.* 13:953205. <https://doi.org/10.3389/fphar.2022.953205>

Biographical Sketch

Prof. Michael HEINRICH obtained his Masters of Arts in anthropology from Wayne State University, USA (1982), his 'MSc' in Biology (1985) and Dr. rer nat. habil. (1989/1997) from the University of Freiburg, Germany.

He is a Professor of Ethnopharmacology and Medicinal Plant Research (Pharmacognosy) at the UCL School of Pharmacy (School of Pharmacy – Univ London from 1999 – 2011) and was until 2017 the head of the research cluster 'Biodiversity and Medicines' at the UCL School of Pharmacy. Since 2017 he serves as the joint chair of UCL's Research Ethics Committee (with Dr. L. Ang, Institute of Education, UCL). Currently he is one of the two vice-presidents of the Society for Medicinal Plant and Natural Product Research (GA).

For many years the group (currently eight PhD students and two postdocs, one part time) has worked on understanding local uses of plants in indigenous communities, most notably in México, Guatemala, Spain, but also other regions as well as on anti-inflammatory natural products. More recently his group's research has centered on value chains of herbal medicines in a globalized context (incl. their impacts on livelihood and quality of products) and on the use of herbal medicines in the management of chronic diseases. Since 2000 he has developed diverse research collaborations in China, Thailand and other Asian countries focusing on the pharmacological effects and quality of herbal medicines. In both cases the use of plant metabolomics proved to be a very successful tool for analysing the complexity of these products.

He has many years' research experience in transdisciplinary aspects of medicinal and food plant research (especially bioactive natural products), as well as more broadly at the interface of cultural and natural sciences.

The Latest Development of State Key Laboratory of Research on Bioactivities and Clinical Applications of Medicinal Plants (CUHK): Greater Bay Area May Appreciate Clinical Research Outcome



Prof. Ping-Chung LEUNG

Emeritus Professor, Orthopaedics & Traumatology, Faculty of Medicine
Director, Centre for Clinical Trials on Chinese Medicine, Institute of Chinese Medicine
Director, State Key Laboratory of Research on Bioactivities and Clinical Applications of Medicinal Plants
The Chinese University of Hong Kong

Abstract

Universities and Research Laboratories have devoted a lot of resources in attempts to develop pharmacological drugs from Traditional Chinese Medicinal herbs. Apart from offering excellent academic training, attempts to develop chemical drugs directly from herbs have been quite disappointing. On the other hand, herbal products remain popular as “Off the Counter” drug (OTC), accepted as effective in a lot of important disease areas of common concern.

Our State Key Laboratory has diligently worked on the phytochemistry and bioactivities of medicinal herbs chosen because of their great potentials related to Drug Development. We enjoy close collaboration with experts in China.

In 2020, the State Administration of Traditional Chinese Medicine issued “Recommendations on the Clinical Application Guidelines for OTC”. Users could refer to the guidelines which have properly evaluated the OTC drugs (中成藥) in the market and graded them systematically as “effective”, “probably effective” or “slightly effective”. The Recommendations are meant to help users and at the same time encourage producers to upgrade the quality of their products.

For research institutes like our State Key Laboratory, we are excited to receive the Recommendations which guide us in the following directions: -

- (i) To engage in popular and important areas of health need,
- (ii) To go along the line of “Evidence-based innovation”, and
- (iii) To change the old concept of “Health Supplement” to the current demand of “Evidence-based Supplement with Specific Health Indications” (特殊醫學用途實證為本健康補充品).

We have followed this line of approach for over 20 years. Examples related to cardiovascular health will be discussed: Atopic Dermatitis, and Prevention of Upper Respiratory Infection.

Biographical Sketch

Professor Ping-Chung LEUNG, OBE, JP, Hon DSSc, DSC, MBBS, MS, FRACS, FRCS(Edin), FHKCOS, FHKAM(Orth), is Emeritus Professor of Orthopaedics & Traumatology, Faculty of Medicine; Director of Centre for Clinical Trials on Chinese Medicine, Institute of Chinese Medicine; Director, The Hong Kong Jockey Club Centre for Osteoporosis Care and Control, The Chinese University of Hong Kong (1996-2013), and Director, State Key Laboratory of Research on Bioactivities and Clinical Applications of Medicinal Plants (The Chinese University of Hong Kong).

Prof. LEUNG’s research areas include Orthopaedics, Osteoporosis, Microsurgery, Public Health, Traditional Chinese Medicine and General Education. He is also the author of over 800 scientific manuscripts in journals and 27 books.

Research Updates of State Key Laboratory of The State Key Laboratory of Chinese Medicine and Molecular Pharmacology (Incubation), Shenzhen



Dr Daniel Kam-Wah MOK

Deputy Director, The State Key Laboratory of Chinese Medicine and Molecular Pharmacology (Incubation), Shenzhen
Associate Director, Research Centre for Chinese Medicine Innovation
Associate Professor, Department of Applied Biology and Chemical Technology
The Hong Kong Polytechnic University

Abstract

The State Key Laboratory of Chinese Medicine and Molecular Pharmacology (Incubation), Shenzhen (SKL Incubation) under The Hong Kong Polytechnic University Shenzhen Research Institute was established in 2007 which focuses on modernized Chinese medicine research. We aim at elucidating the chemical compositions and action mechanism responsible for the efficacy of Chinese medicine on the prevention and treatment of geriatric and chronic diseases. By multidisciplinary approaches including analytical chemistry, pharmacology, and system biology, our goal is to demonstrate the scientific aspects of traditional Chinese medicine using modern techniques, and to provide scientific evidences for its clinical application. The talk summarizes our recent activities.

In order to facilitate more impactful research of Chinese Medicine in the University, PolyU established The Research Centre for Chinese Medicine Innovation (RCMI) in 2021 as the university-level platform to facilitate interdisciplinary collaborations. With our interdisciplinary expertise, and by making use of modern tools, RCMI's researches will be focused on providing scientific evidence to the TCM theories for diagnosis, prescription and for treatment using complex collections of botanicals and other ingredients. With the support from the University, we are looking forward for more collaborations with researchers in Greater Bay Area to advocate the application of Chinese Medicine in primary care and provide one-stop service for CM-based projects.

Biographical Sketch

Dr MOK obtained his Ph.D. in the University of Hong Kong and worked as a post-doc on theoretical chemistry in Cambridge University, UK. He is now an Associate Professor in the Hong Kong Polytechnic University, Associate Director of Research Centre of Chinese Medicine Innovation and Deputy Director of The State Key Laboratory of Chinese Medicine and Molecular Pharmacology (Incubation), Shenzhen.

Dr MOK's research interests include the application of chemometric techniques in the identification of Traditional Chinese Medicine and herbal materials, chemical analysis of herbal materials and metabolomics studies. He is developing innovative techniques for quality control of Traditional Chinese Medicine, such as the application of Near-Infrared Spectroscopy. Dr MOK participated in the Hong Kong Chinese Materia Medica Standards administrated by the Department of Health and published a Chinese book on Authentication of Valuable Chinese Materia Medica. His recent works focus on the use mass-spectrometry based targeted and untargeted metabolomics to provide information to elucidate the molecular mechanisms of the actions of Chinese medicines related to chronic diseases and healthy aging. He published more than 130 papers in various international scientific journals (Science citation Index) on Theoretical Chemistry, Chemical analysis of herbs, Chemometrics Techniques in Chemistry, Near-Infrared Spectroscopy and Metabolomics.

Discovery of Novel Lead Compounds from Medicinally Important Plants and their Endophytic Fungi



Prof. Pema-Tenzin PUNO

Professor
Kunming Institute of Botany
Chinese Academy of Sciences, China

Abstract

The Schisandraceae family and the genus *Isodon* are medicinally important phytogroup in China. Our research group has phytochemically investigated 54 species, and about more than 1800 new compounds with different oxygenation and cleavage patterns, including 62 unprecedented skeletons, have been isolated and characterized. The above results further enrich the novel structure type of schinortriterpenoid, diterpenoid and meroditerpenoid, and also aroused great attention in the field of synthetic organic chemistry and pharmacology, and most importantly, a breakthrough has been made about the anticancer activity, some diterpenoids have been found to be promising anticancer candidates. In addition, our group also carry out an exploratory research on the secondary metabolites from the endophytic fungi of the above mentioned species, and also got some interesting results. We built a new research platform, and 200 new compounds were isolated from 23 strains, including 25 novel skeletons, and found that some compound exhibited antimigratory and antifibrotic effects.

Biographical Sketch

Professor Pema-Tenzin PUNO, received his PhD in 2007 from Kunming Institute of Botany (KIB), Chinese Academy of Sciences, and then joined the KIB. He is mainly engaged in the research of Natural Products Chemistry, and majorly focused on the basic and applied basic research on secondary metabolites from two economically and medicinally important phytogroups (the Schisandraceae family and the genus *Isodon*) and their endophytic fungi. He has published 141 related papers (Nature Index: 21 ones) in SCI-listed journals, including *Angew. Chem. Int. Ed.* (3 ones), *J. Am. Chem. Soc.*, and *Org. Lett.* (15 ones). Eighteen patents, including 3 PCTs, have been granted. He has received several awards, like the special prize of the YNSA (Yunnan Natural Science Award), and the first class prize of the YNSA, and also has been granted by the National Science Fund for Excellent Young Scholars, and the excellent members of Youth Innovation Society of CAS.

The Exploratory Studies on PPAP, a Special Kind of Hybrid Natural Products



Prof. Gang XU

Professor
Kunming Institute of Botany
Chinese Academy of Sciences, China

Abstract

Polycyclic polyprenylated acylphloroglucinols (PPAP) are a special class of structurally fascinating and synthetically challenging natural products featuring with highly oxygenated and various acylphologlucinol-driven core decorated with prenyl or geranyl side chains. They are specifically rich in the plant family Guttiferae, especially *Hypericum* and *Garcinia* genera. Structurally, PPAPs can be divided into bridged-cyclic with bicyclo[3.3.1]nonane-2,4,9-trione cores, adamantane, *homo*-adamantane, spirocyclic, and some other complicated architectures according to their different scaffolds. Due to complicated structures and a broad range of biological activities, PPAPs has become a hot topic in the research of natural products.

Our lab have focused on this type of natural products for more than ten years, and 620 PPAPs with different oxygenation and carbon rings, including 30 unprecedented skeletons, have been isolated and characterized from 15 species of Guttiferae. In addition, a dozen of mis-defined structures, including the skeleton of type C PPAPs, have been revised and reassigned. Importantly, a number of these metabolites have been found to possess promising antitumor and potent ion channel activities. In this talk, I will present a selection of recent work in the identification, structural revise and biological activities of PPAPs.

Acknowledgments: We are grateful for the financial support from the NSFC-Joint Key Foundation of Yunnan Province (U1902213, Y91N22121), the Second Tibetan Plateau Scientific Expedition and Research (STEP) program (2019QZKK0502-0303), Yunnan Science Key Fund (2019FA003), and West Light Foundation of the Chinese Academy of Sciences Interdisciplinary Innovation Team Program (2021).

Biographical Sketch

Prof. Gang XU was born in Jingzhou, Hubei, P. R. China, he received his Ph.D. degree with Professors Han-Dong Sun and Qin-Shi Zhao from Phytochemistry at Kunming Institute of Botany (KIB), Chinese Academy of Sciences (CAS) in 2005. In 2007–2008, he worked at Hong Kong Jockey Club Institute of Chinese Medicine as a senior fellow. He is currently a professor of natural products chemistry at State Key Laboratory of Phytochemistry and Plant Resources in West China, KIB, CAS. His group focused on the exploration and utilization of traditional medicinal herbs in the west of China as well as the systematic phytochemical studies of natural *Polycyclic Polyprenylated Acylphloroglucinols* (PPAP). As the first or corresponding author, he has published 80 scientific research papers in peer-reviewed journals such as “*Chem. Rev.*”, “*J. Med. Chem.*”, “*Chem. Commun.*”, and “*Org. Lett.*”. He also received 13 authorized Chinese invention patents. He also is a deputy director of the State Key Laboratory of Phytochemistry and Plant Resources in West China and editor of *Bioorg. Chem.*

Research and Development of *Sambucus williamsii* as Herbal Drug for Postmenopausal Osteoporosis



Prof. Man-Sau WONG

Associate Dean (Industrial Partnership), Faculty of Science
Professor, Department of Applied Biology and Chemical Technology
Director, Research Centre for Chinese Medicine Innovation
The Hong Kong Polytechnic University

Abstract

Worldwide, approximately one in three women and one in five men over the age of 50 will suffer an osteoporotic fracture in their remaining lifetime. It is expected that more than 50% of the world's fractures will occur in Asia by 2050. The annual expenditures of hip fracture amount to \$6.35 billion in China, \$6.5 billion in Japan, \$17 million in Singapore. The current therapeutic regimens for postmenopausal osteoporosis are effective but their long-term uses are limited by the associated side effects. Therefore, the development of alternative novel therapeutic agents for prevention and treatment of postmenopausal osteoporosis are needed. *Sambucus williamsii* Hance (SWH) is a folk herbal medicine that has been applied to treatment of bone and joint diseases since Tang Dynasty. Our previous studies clearly demonstrated the bone protective effects of SWH. The aim of this project is to develop a safe and effective herbal extract from SWH for treatment of postmenopausal osteoporosis. In order to bridge the gap between early stage drug discovery and drug development, herbal resource investigation and pilot-scale research work, such as the development of extraction and formulation protocols for manufacturing, the development of quality standard, pharmacodynamic study, the evaluation of toxicity and stabilities of extract and product should be performed according to the requirements of CFDA. The work in this project is to provide preclinical evidence for the application of clinical trial license, which is the first step for registering as a new drug at CFDA. Our ultimate goal is to develop a new herbal drug, which could be registered as a class 1 TCM drug in the Chinese mainland.

Biographical Sketch

Professor Man-Sau WONG is currently the Director of the Research Center for Chinese Medicine Innovation, Associate Dean of the Faculty of Science, and Professor at the Department of Applied Biology and Chemical Technology at the Hong Kong Polytechnic University. She received her B.S in Food Science at the University of Illinois, Urbana-Champaign, and her Ph.D in Human Nutrition and Nutritional Biology at the University of Chicago. Her research interests include Chinese herbal medicine and bone health; molecular actions of bone protective phytochemicals and phytoestrogens; drug-herbs interactions between the use of selective estrogen receptor modulators (SERMs) and Chinese herbs used for the management of menopausal syndromes as well as the role of microbiota in mediating the therapeutic actions of Chinese herbs. She has published more than 160 referred journal articles in the field of pharmacology, endocrinology and nutrition. She has received awards for her work in Traditional Chinese medicine and bone health, including the Higher Education Outstanding Scientific Research Output Awards (Science and Technology) from the Ministry of Education of PRC in 2014 and the Shenzhen Virtual University Park National Technology Project Pioneer Award from Shenzhen Technology and Innovation Committee, PRC in 2012.

The Novel Medicinal Value of a Well-Known Herb *Andrographis paniculata* in Esophageal Cancer – a Discovery Journey from Laboratory to Clinic



Prof. Clara Bik-San LAU

Associate Director

Institute of Chinese Medicine and State Key Laboratory of Research on Bioactivities and Clinical Applications of Medicinal Plants

The Chinese University of Hong Kong

Abstract

Esophageal cancer (EC) is the 8th most frequently diagnosed cancer worldwide. Being the 6th leading cause of cancer-related death, EC is associated with poor median survival rate in patients due to diagnosis at advanced stage with high frequency of metastasis. In conventional treatment, adjuvant chemotherapy following surgery could improve survival but with unwanted side effects. Hence, adjuvant treatments for metastatic EC, such as herbal medicines, may provide an alternative for EC patients. For almost 10-years of research work, our team has successfully demonstrated the new adjuvant value of a well-known medicinal herb *Andrographis paniculata* (AP) in EC. The anti-tumor and anti-metastatic activities of AP aqueous extract (APW) in human EC cell-based and animal models were firstly reported in our previous studies. The subsequent investigations on the gene expression profiling in APW-treated squamous EC cells elucidated the pathways involved in the anti-metastatic effects of APW, whereas the *in vitro* and *in vivo* absorption studies revealed the absorbed bioactive components of APW. Besides, the adjuvant effects of APW on EC chemotherapeutics were further confirmed in preclinical models including EC xenografts-bearing and carcinogen-induced esophageal carcinogenesis mice. With the promising results obtained, a phase II open-label clinical trial was conducted to investigate the effect of APW for palliative management and quality of life outcomes for patients with metastatic and locally advanced esophageal squamous cell carcinoma. In addition, the change in gut microbiota composition in patients after AP treatment was also investigated. This talk will cover our novel findings on APW for esophageal cancer, including preclinical efficacy, underlying mechanisms, as well as clinical trial results.

Biographical Sketch

Prof. Clara LAU is currently the Associate Director of the Institute of Chinese Medicine and the State Key Laboratory of Research on Bioactivities and Clinical Applications of Medicinal Plants at The Chinese University of Hong Kong. With BPharm and PhD in Pharmacy (Pharmacognosy) from King's College London, University of London, UK, she has a continuous interest in Pharmacognosy and herbal medicines, and has over 28 years' experience in natural products research. Her current main research areas include anti-cancer natural products and beneficial herb-drug combinations. She has published over 270 refereed journal articles (*h-index*=43) and 10 book chapters, and has edited 1 book. She has successfully supervised or co-supervised 35 MPhil or PhD postgraduates in Chinese Medicine, Pharmacognosy or Biochemistry. She is the co-inventor of 9 US non-provisional or PRC patents. Currently, she serves as member of ChP-USP Advisory Group on Monographs for TCM Ingredients and Products; Acting Secretary-General of The Consortium for Globalization of Chinese Medicine (CGCM); President-Elect and Secretary-General of Good Practice in Traditional Chinese Medicine Research Association (GP-TCM RA); Council member and Associate Chief Executive of Modernized Chinese Medicine International Association (MCMIA); Associate Editor of *Journal of Ethnopharmacology* and *Journal of Traditional and Complementary Medicine* (eJTCM), Consulting Editor of the journal *Pharmacological Research*, and Editorial Board member of various journals including *Phytomedicine*, *Scientific Reports*, *Journal of Natural Products*, *Journal of Pharmacy and Pharmacology*, and *Integrative Medicine Research*.

Janus-faced WAT Browning in Human Diseases



Prof. Junli LIU

Professor of Endocrinology, Shanghai Jiao Tong University School of Medicine
Deputy Director, Shanghai Key Laboratory of Diabetes Mellitus
Principal Investigator, Shanghai Jiao Tong University Affiliated 6th People's Hospital,
Shanghai Diabetes Institute, China

Abstract

White adipose tissue (WAT) browning plays an indispensable role in maintaining homeostasis of lipid and glucose metabolism. Prof. Junli LIU dedicates to the exploration of molecular mechanisms underlying WAT browning and regulation of metabolic homeostasis, and his findings significantly contributes to the disclosure of the novel regulatory mechanisms of WAT browning and its pathologic functions in various diseases. Firstly, his study has unraveled a previously unidentified mechanism by which cold exposure directly stimulated WAT browning and he has also discovered a novel anti-obesity compound based on this mechanism. Secondly, he has validated that WAT browning played a critical role in the bi-directional communication between ccRCC tumor and adjacent perinephric adipose tissue, therefore promoted the proliferation and metastasis of renal cancer. Additionally, the applicant has also developed limited proteolysis-mass spectrometry and other new strategy, and explored WAT browning and metabolic mechanisms with these new techniques. He has published 16 papers in *Cell*, *Cell Metabolism*, *Science Translation Medicine*, etc, among which one paper has been cited for 476 times, while another paper cited for 342 times has been selected as “Most cited paper” by ESI. The applicant’s publications have been so far highlighted by 8 Research Highlights published in *Nature Medicine*, *Nature Reviews Endocrinology* and other high-profile and decent journals.

Biographical Sketch

Prof. LIU has been engaged in the study of metabolic diseases such as obesity and diabetes. He has published 2 research papers in *Cell Metabolism* and 1 paper in *Science Translation Medicine* as corresponding author, and 3 research papers in *Cell* and 1 paper in *Nature Medicine* as first or co-first author. In response to Prof. LIU's previous work, Prof. Matthias H. Tschöp, a member of the German National Academy of Sciences, published a peer review in *Nature Medicine* commenting that Dr. Liu's research is an important contribution to overcoming the challenge in metabolism research. Collectively, his published has been highlighted for 6 times by different famous experts in *Nature Medicine*, *Nature Reviews Drug Discovery*, *Nature Reviews Endocrinology*, *Nature Reviews Nephrology* and *Cancer Discovery*.

Scientific Insights into *Panax notoginseng*



Prof. Simon Ming-Yuen LEE

Distinguished Professor and Deputy Director
State Key Laboratory of Quality Research in Chinese Medicine,
Institute of Chinese Medical Science, University of Macau, Macau SAR (China)

Abstract

The global ginseng market, including *Panax ginseng* (Asian ginseng), *Panax quiquefolium* L (American ginseng), and *Panax notoginseng* (Sanqi ginseng), was estimated to be worth over 2,000 million US dollars. Although these three ginseng species have very close phylogenetic relationships, interestingly, their biological functions and therapeutic uses are very different. Unlike *Asian ginseng* and *American ginseng*, the root of *P. notoginseng*, named Sanqi or Tenchi in Chinese, can mainly be cultivated in a highly specific mountainous area constituting about 8,300 hectares in Wenshan Prefecture, Yunnan Province, China, and thus is less well known worldwide. Sanqi ginseng is very popular in China, and is commonly used in foods and pharmaceutical products for management of trauma and ischemic cardiovascular health problems. Recent biomedical research on Sanqi ginseng provides a strong scientific rationale supporting the historical use of Sanqi ginseng in the prevention and treatment of cardiovascular disease. Also, the discovery of a family of major bioactive ingredients, named ginsenosides, present in these ginseng species, which have diverse biological activities, provide insight into why these ginsengs exhibit very different therapeutic effects. However, long-term domestic cultivation has rendered Sanqi ginseng highly vulnerable to disease and pathogen infection. The issue of ensuring a sustainable supply of Sanqi ginseng and preserving this unique medicinal plant urgently requires our attention.

Biographical Sketch

Prof. Simon Ming-Yuen LEE is currently Deputy Director and Distinguished Professor (Biomedical Sciences), State Key Laboratory of Quality Research in Chinese medicine of the Institute of Chinese Medical Sciences and also Department of Pharmacological Science of the Faculty of Health Science, at the University of Macau. Simon's research interests lie in the discovery of drug-like agents from natural products including small molecule and biologics for use in various therapeutic areas, including oncology and neurodegenerative diseases. His dedication to education and research in the fields of genomics, pharmacology and toxicology has led to over 300 scholarly articles, including *Nature Genetics*, *Nature Communications* (4×) and *Science Advances*. Simon is a life member of Clare Hall, University of Cambridge. He has served as a member for board of director of different professional associations and government committees (e.g. Chair of Council, Macau Pharmacology Association; Executive President, Consortium of 'Belt and Road' and Portuguese-Speaking Countries for Natural Medicine Innovation (Macao); *Chinese Medicine Regulatory Advisory Board*, Pharmaceutical Administration Bureau of Macao SAR government; Technical Expert of Accreditation Assessment for the Innovation and Technology Commission of Hong Kong SAR government).

Emerging Role of the Gut Microbiome in Irritable Bowel Syndrome: From Pathogenesis to Treatments Using Chinese Medicine



Dr Lixiang ZHAI

Post-doctoral Fellow
Centre for Chinese Medicine Drug Development Limited
Hong Kong Baptist University

Abstract

Diarrhea-predominant irritable bowel syndrome (IBS-D) is a common functional bowel disorder characterized by abdominal pain, bloating, abdominal distention, and diarrhea. Our current understanding and treatment options for the pathogenesis of visceral hypersensitivity in IBS-D are still limited. Gut-microbial metabolites are involved in the pathogenesis/treatment of IBS-D including diarrheal symptoms and abdominal pain symptoms and our group has done a series of research work to understand the correlation and causative roles of gut microbiota and gut-microbial metabolites on the pathogenesis of IBS-D (*Microbiome*, 2018, *Journal of Clinical Investigation*, 2020, *The ISME Journal*, 2020 and *Cell Host & Microbe*, 2022, under revision). According to the TCM theory, Liver Stagnation and Spleen Deficiency (LSSD) is believed to be the major mechanism of IBS-D. Based on Traditional Chinese Medicine theories and clinical experiences, we develop a new Chinese medicine formula JCM-16021 that aims to treat IBS-D. Herein, we conducted a multi-center, randomized, double-blind, placebo- controlled clinical trial to further evaluate the efficacy and safety of the Chinese medicine JCM-16021 for IBS-D (*Chinese Medicine*, 2021). We showed that JCM-16021 improved the IBS-D-related symptoms and modulated gut microbiota dysbiosis as well as abnormalities of gut-microbial metabolites. Fecal microbiota transplantation showed that JCM-16021-shaped gut microbiota effectively improved IBS D-related symptoms. Therefore, the effects of JCM-16021 are partially mediated by the regulation of gut microbiota.

Biographical Sketch

Dr. Lixiang ZHAI obtained his B.Sc. degree in Pharmacy in Chinese Medicine from Guangdong Pharmaceutic University in 2015 and his Ph.D. degree in Chinese Medicine from Hong Kong Baptist University in 2021. He is currently a post-doc research fellow at the Centre for Chinese Medicine Drug Development Limited (@InnoHK), Hong Kong Baptist University. Dr. ZHAI's research interests are host-microbe metabolomics and the impact of gut-microbial metabolites on metabolic disorders (T2D) and gastrointestinal diseases (IBS and IBD). In addition, Dr. ZHAI is also interested in developing novel treatments for metabolic disorders and gastrointestinal diseases through the modulation of gut microbiota using natural products and diet intervention. Dr. ZHAI has published articles in journals including *Gut*, *Nature Metabolism*, *Nature Communications*, *Journal of Clinical Investigation*, *Phytomedicine*, *Phytotherapy Research*, *Frontiers in Pharmacology*, *Biomedicine & Pharmacotherapy* and *Food & Function*.

Pharmacovigilance for botanicals and other 'natural health' products: identifying and responding to safety issues



Prof. Joanne BARNES

Associate Professor in Herbal Medicines
School of Pharmacy
University of Auckland, New Zealand

Abstract

Herbal and traditional medicines (HTMs) are used worldwide in healthcare for general well-being and health maintenance, as well as for prevention/treatment of symptoms and chronic medical conditions. HTMs (and other 'natural health' products), are regulated in many countries as 'low-risk' products, or are not regulated at all, and are perceived by users as being natural and 'safe'. However, some HTMs can cause serious harms and it is important to monitor the safety of HTMs in real-world use. In general, comprehensive information on the safety profile of most HTMs is lacking.

Pharmacovigilance (PV) for HTMs continues to rely almost exclusively on analysis of (usually) voluntary unsolicited spontaneous reports of suspected adverse reactions reported to national pharmacovigilance schemes. However, numbers of reports remain low despite initiatives aimed at improving reporting; under-reporting is substantial. There are many other challenges for HTMs, particularly collecting information that is sufficiently detailed at the product/preparation level, coding and classifying that information using comprehensive dictionaries, and determining at what level to apply statistical signal detection techniques. Key drivers in PV for HTMs – at least for product sponsors- will continue to be the introduction and enforcement of regulatory requirements for PV activities. There is international recognition of the need to improve pharmacovigilance for HTMs, including through modifying methods, such as intensive monitoring, used for conventional medicines.

This presentation will discuss approaches to identifying ADRs associated with HTMs, and consider future directions for pharmacovigilance for these products.

Biographical Sketch

Prof. Joanne BARNES BPharm(Hons) PhD MPS RegPharmNZ FLS FISO is Associate Professor in Herbal Medicines, School of Pharmacy, University of Auckland, New Zealand. Previously, she has held academic positions at the Centre for Pharmacognosy and Phytotherapy, School of Pharmacy, University of London, UK, and the Department of Complementary Medicine, Postgraduate Medical School, University of Exeter, UK. Jo's research explores the use, safety and efficacy of herbal medicines and other natural health products and, particularly, pharmacovigilance for these products. Jo has a Professional Certificate in Pharmacovigilance and Pharmacoepidemiology from the London School of Hygiene and Tropical Medicine, UK.

Jo is an herbal-medicine safety signal reviewer for the Uppsala Monitoring Centre (UMC), which co-ordinates the World Health Organisation's Programme for International Drug Monitoring. Jo led the International Society of Pharmacovigilance (ISoP) Herbal and Traditional Medicines Special Interest Group (2017-2022), and co-ordinates the ISoP Western Pacific chapter (since 2020); served as an elected member of the ISoP Executive Committee (2006-09). In 2006, Jo developed and led a 3-day conference on Pharmacovigilance for Herbal Medicines with the Royal Pharmaceutical Society of Great Britain, ISoP, WHO-UMC, European Scientific Co-operative on Phytotherapy, and other partners. Jo is a member of the Advisory Board of the American Botanical Council, an Associate Editor of *Phytochemistry Letters*, and long-standing member of the editorial boards of *Drug Safety*, *International Journal of Pharmacy Practice*, and *Phytotherapy Research*.

Jo has published two editions of the reference text *Herbal Medicines* (Barnes J, Anderson LA, Phillipson JD. Herbal Medicines (2nd ed, 3rd ed). London: Pharmaceutical Press, 2001, 2007) as principal author, and is a co-author of all three editions of the contemporary reference textbook *Fundamentals of Pharmacognosy and Phytotherapy* (Elsevier: 2004, 2012, 2018). She has recently published a new book Barnes J (editor). *Pharmacovigilance for herbal and traditional medicines: advances, challenges and international perspectives*. Springer, 2022 (doi.org/10.1007/978-3-031-07275-8). Jo has published more than 100 research papers and articles, and has an *h*-index of 24 (2021; excluding citations of books).

Jo is a registered pharmacist in New Zealand, and was elected as a Fellow of the Linnean Society of London in 2003, and as a Fellow of the International Society of Pharmacovigilance in 2020.

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2	Arnicolide D induces endoplasmic reticulum stress associated oncosis via PERK-ATF4-CHOP pathway in hepatocellular carcinoma	Dr CHEN Guo-qing	State Key Laboratory of Chinese Medicine and Molecular Pharmacology (Incubation)
3	Lasiokaurin Inhibits Triple Negative Breast Cancer Growth by Suppression of PI3K/Akt/mTOR and STAT3 Signaling Pathways	Dr CHEN Sibao	State Key Laboratory of Chinese Medicine and Molecular Pharmacology (Incubation)
4	An investigation of the Pharmacological Effects of Danggui Buxue Tang on bEnd.3 Cells under Oxygen-Glucose Deprivation and Reoxygenation (OGD/R)	Ms CHEUNG Yuen Ching Karry	The Hong Kong Polytechnic University
5	Quality control of herbal medicines using multiclass classification methods	Dr DONG Nai-ping	The Hong Kong Polytechnic University
6	Component Matcher: Automatic detection of common components in chromatographic fingerprints	Dr DONG Nai-ping	The Hong Kong Polytechnic University
7	<i>Lantana camara</i> L. water extract modulates phagocytosis and nitric oxide production of macrophages against bacterial and fungal pathogens	Mr HAU Pak Ting	The Hong Kong Polytechnic University
8	Epimedium aqueous extract disrupted osteoclast differentiation, maturation and function via inhibition of Autophagy	Ms HU Xueling	Jinan University
9	Aqueous cinnamon extract ameliorates bowel dysfunction and enteric 5-HT synthesis in IBS rats	Mr HUANG Chunhua	Hong Kong Baptist University
10	A preliminary pharmacophylogenetic study of medicinal plants from genus Oxytropis DC.	Ms HUANG Congying	Baotou Medical College

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12	The protection of Coicis Semen on hypoxia and ischemic/reperfusion injury in cellular model	Ms KO Patricia Evienne	The Hong Kong Polytechnic University
13	Anti-inflammatory and anti-bacterial properties of water extract of Medulla Tetrapanacis in RAW 264.7 cell	Mr KWOK Tsun ka Carsten	The Hong Kong Polytechnic University
14	Bile Acid Receptor (TGR5) Agonists Induced Renal and Extra-renal 25-hydroxyvitamin D-1 alpha hydroxylase (CYP27B1) Expression and Activities in vitro and in vivo	Ms LAM Chung Yan	The Hong Kong Polytechnic University
15	A study of the bone protective effects of Danggui Buxue Tang through serum untargeted metabolomics	Mr LI Mengheng	The Hong Kong Polytechnic University
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17	To explore the medicinal values of plants in Hyoscyameae based on the Pharmacophylogeny	Ms LI Siqi	Baotou Medical College
18	A study of the bone protective effects of Danggui Buxue Tang through serum untargeted metabolomics	Ms LIN Yushan	The Hong Kong Polytechnic University
19	<i>In vitro</i> and <i>in vivo</i> evaluation of a traditional Chinese medicine formula Si Ben Cao for skin application	Ms LIN Yushan	The Hong Kong Polytechnic University
20	Study on insect resistant activity and mechanism of natural products based on visual analysis	Dr LV Lijuan	Tianjin Agricultural University

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22	Fragrance from the periphery and beyond: Mapping the origins of foreign spices in Chinese materia medica	Mr PARTI Gábor	The Hong Kong Polytechnic University
23	Kidney-tonifying Chinese herbal medicine Fructus Ligustri Lucidi (FLL) promotes myogenesis in C2C12 myoblasts via increasing vitamin D sensitivity	Dr POON Christina Chui-wa	The Hong Kong Polytechnic University
24	Local Chinese medicine practitioners' consensus of Traditional Chinese Medicine patterns, symptoms and herbal formulas for Hong Kong Coronavirus Disease 2019 survivors: A modified Delphi study	Ms RUAN Jiayin	The Hong Kong Polytechnic University
25	The Effect of San Huang Tang on Conventional Outflow Facility in Mice	Dr SHAN Samantha SW	The Hong Kong Polytechnic University
26	Effects of Traditional Chinese Medicine on insomnia-like phenotype and movement deficiency in Zebrafish	Mr SO Chunpang	The Hong Kong Polytechnic University
27	Metabolomics analysis of tetrandrine-treated mouse liver revealed the activity of tetrandine in lipid metabolism	Mr TANG Hok Him	The Hong Kong Polytechnic University
28	A Novel C21 Steroidal Saponin Isolated From Qingyangshen Mitigates Amyloid- β Defects By Activating Cellular Autophagy in Vitro Study	Ms TANG Zi-ling	Jinan University
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33	Anti-inflammatory effects of Fructus Ligustri Lucidi on a human retinal pigment epithelial cell line	Dr WONG Ka Ying	Centre for Eye and Vision Research Ltd
34	Beneficial effects of ginsenoside Rg1 in a calcipotriol-induced atopic dermatitis mouse model	Ms WU Ying	Hong Kong Baptist University
35	Inhibitory effects of chrysoeriol on collagen-induced rheumatoid arthritis in mice	Ms WU Jia-ying	Hong Kong Baptist University
36	The influence of gut microbiota on bone properties and on the bone protective effects of SECO in ovariectomized mice with antibiotic intervention	Dr XIAO Huihui	State Key Laboratory of Chinese Medicine and Molecular Pharmacology (Incubation)
37	Immunomodulatory and anti-invasive effects of Coriolus versicolor	Dr YANG Cindy LH	BAGI Biosciences Ltd
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39	Lycorine inhibits hepatocellular carcinoma cell growth and metastasis via blocking LIF/TREM1/MYC/ST2 axis to regulate tumor associated macrophages	Prof. YU Haiyang	Tianjin University of Traditional Chinese Medicine
40	Effects of oleanolic acid (OA) on bone marrow adipose tissues and adipogenesis of bone marrow stromal cells (BMSCs)	Dr YU Wenxuan	The Hong Kong Polytechnic University

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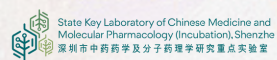
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Notes

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