University of Macau - Dr. Stanley Ho Medical Development Foundation

"Set Sail For New Horizons, Create The Future" Grant

2024 Distinguished Scholars Forum

Programme Booklet

22 November 2024

Official Website

Dr. Stanley Ho Medical Development Foundation "Set Sail for New Horizons, Create the Future" Grant

Background of Dr. Stanley Ho Medical Development Foundation

Dr. Stanley Ho Medical Development Foundation (SHMDF), founded in January 2005, is a nonprofit juridical person which has been declared of public administrative utility, registered at the Identification Department of the Government of the Macau Special Administrative Region. Donations to the Foundation are deductable from the donor's income up to 2% of the gross revenue generated by sales/services.

Mission of the Foundation

The aim of the Foundation is to promote, develop and finance socially beneficial, educational, academic, economical, charitable, cultural, recreational, athletic, scientific and technological research activities, whereby the knowledge level and quality of the above activities may be enhanced – especially those activities relating to improving the quality of medical service in Macau and other regions in China and financing the training of medical practitioners and workers in the techniques and technologies in their areas of expertise.

Establishment of Dr. Stanley Ho Medical Development Foundation "Set Sail for New Horizons, Create the Future" Grant

To celebrate the 40th anniversary of the University of Macau (UM), the Foundation established a designated fund titled "Set Sail for New Horizons, Create the Future" Grant which was first opened for applications in 2021, granting MOP 1 million per year for 10 years. The allocated funding is to support the nurturing of talents in the areas of health sciences and big data healthcare applications, and to support young scholars to venture into innovation and breakthroughs in their research areas.

Purpose of the Distinguished Scholars Forum

Since 2022, UM and the Foundation have jointly held the Distinguished Scholars Forum for the awardees to share their research achievements under the grant programme. In addition, experts and scholars from China and abroad have been invited to deliver talks on their latest research results. These academic exchange activities provide a platform for experts and scholars to showcase the latest research progress and applications, as well as an opportunity for researchers and students to interact and explore collaboration with scholars from home and abroad.

All in all, the "Set Sail for New Horizons, Create the Future" projects have achieved remarkable progress and significant results in terms of research promotion, academic exchange and talent nurturing. It will continue to encourage the development of health sciences at UM.

PROGRAMME RUNDOWN

Time	Event	Speaker
14:45 – 15:05	Welcome Remarks	**Prof. Wei GE** Vice Rector (Research), University of Macau **Mr. Wing Ming Patrick HUEN** Chairman, Board of Trustees and Board of Directors, Dr. Stanley Ho Medical Development Foundation
15:05 – 15:10	Group photo	

GUEST SPEAKER'S PRESENTATION

Time	Event	Speaker
15:10 – 15:40	Development of Next Generation Diagnostic Probe for Parkinson's Disease	**Prof. Keqiang YE** Faculty of Life and Health Sciences, Shenzhen University of Advanced Technology

GRANTEES' SHARING OF RESEARCH ACHIEVEMENTS

Time	Event	Speaker
15:40 – 15:55	AI-Assisted Discovery of Anti-Alzheimer's disease compounds from Traditional Chinese Medicine	**Prof. Jiahong LU** Institute of Chinese Medical Sciences, University of Macau
15:55 – 16:10	Artificial Intelligence for Drug Delivery	**Prof. Defang OUYANG** Institute of Chinese Medical Sciences, University of Macau
16:10 – 16:25	Recent Advances in Research on Venom Peptide Prototype Drugs: Insights from My Visiting Scholar Experience at Monash Institute of Pharmaceutical Sciences (Monash University)	**Prof. Henry Hang Fai KWOK** Faculty of Health Sciences, University of Macau
16:25 – 16:40	Single-cell Cancer Drug Screening on Integrated Circuit Chip	**Prof. Yanwei JIA** Institute of Microelectronics, University of Macau
16:40 – 16:45	Closing Remarks	**Prof. Peng LI** Acting Director of Institute of Chinese Medical Sciences, University of Macau
16:45 – 17:15	Refreshment & Exchange	

Development of Next Generation Diagnostic Probe for Parkinson's Disease

Invited Speaker

Prof. Keqiang YE

Department Chair and Chair Professor
Department of Biology, Faculty of Life and Health Sciences, Shenzhen University of Advanced Technology

Biography

Professor Ye Keqiang is currently the Department Chair and Chair Professor of the Department of Biology, Faculty of life and health sciences at the Shenzhen University of Advanced Technology. He was a tenured professor at Emory University in the United States. Professor Ye is recognized internationally as a leading scientist in the development of small-molecule compound therapies, particularly for neurodegenerative diseases. He has led projects funded by the National Institutes of Health and the American Cancer Society/Foundation, with a total research funding of over $30 million. He has published more than 240 papers, with an H-index of 69 and over 16,900 citations. Many of his articles have appeared in prestigious international journals, including Nature, Cell, Neuron, Nature Neuroscience, Nature Medicine, Nature Genetics, Nature Communications, and PNAS. He holds 13 invention patents. His main research areas include: 1. Mechanisms and early diagnosis of neurodegenerative diseases; 2. Development and study of new small-molecule drugs for neurodegenerative diseases; 3. Drug screening, chemical synthesis, modification, and drug design.

Abstract

Synucleinopathies are characterized by the accumulation of a-synuclein (a-Syn) aggregates in the brain. Positron emission tomography (PET) imaging of synucleinopathies requires radiopharmaceuticals that selectively bind a-Syn deposits. Recently, we report the identification of a brain permeable and rapid washout PET tracer [18F]-F0502B, which shows high binding affinity for a-Syn, but not for Ab or Tau fibrils, and preferential binding to a-Syn aggregates in the brain sections. This small molecular PET tracer is brain permeable and specifically binds to aggregated a-Syn but not Ab or Tau in the brains of animal model and synucleinopathies' patient brain. Development of the diagnostic probe for Parkinson's disease will allow us to therapeutically treat or cure this devastating disease in the future.

AI-Assisted Discovery of Anti-Alzheimer's disease compounds from Traditional Chinese Medicine

Grantee

Prof. Jiahong LU

Associate Professor, Institute of Chinese Medical Sciences, University of Macau

Biography

Dr. Lu is an Associate Professor and Deputy Director at the Institute of Chinese Medical Sciences, University of Macau. He obtained his PhD from Hong Kong Baptist University in Hong Kong and completed his postdoctoral training at the Icahn School of Medicine at Mount Sinai in New York City, US before moving to University of Macau.

Dr. Lu's primary research interests are neurobiology and the pharmacological study of Chinese medicine. He has published more than 130 papers in high profile journals such as Nature Biomedical Engineering, EMBO Molecular Medicine, Cell Discovery, Advanced Science, Autophagy (7), Molecular Neurodegeneration, Acta Pharmaceutica Sinica B (3), and others, accumulating over 11,000 citations. Dr. Lu has received several notable awards for his work, including the "Future of Science Fund Scholarship" from Keystone Symposia in 2014, and the "Annual Young Scientist Award" from the TCM Brain Science Conference in 2022. Dr. Lu serves the scientific community as an Editorial Board member for scientific journals including Acta Pharmaceutica Sinica B and Neurochemistry International.

Abstract

Autophagy, a highly conserved cellular mechanism within eukaryotic cells, plays a pivotal role in efficiently removing damaged organelles and abnormally aggregated proteins. Research suggests that modulating autophagy/mitophagy levels hold substantial promise as a therapeutic approach for Alzheimer's disease. However, most presently reported autophagy/mitophagy inducers have been identified through small-scale screenings. Traditional drug development faces various challenges, including increasing costs, insufficient knowledge regarding underlying mechanisms of disease, and a high rate of failure. To address these issues, our team harnesses the formidable computational capabilities and deep learning techniques of artificial intelligence (AI) to accelerate drug development. Through AI-driven virtual screening and prediction of brain-penetration property, we identified high-quality autophagy/mitophagy inducers from vast repositories of traditional Chinese medicines and natural products. Furthermore, we validated their neuroprotective potential through cross-species models of Alzheimer's disease.

Artificial Intelligence for Drug Delivery

Grantee

Prof. Defang OUYANG

Associate Professor, Institute of Chinese Medical Sciences, University of Macau

Biography

Prof. Ouyang has a multidisciplinary background in pharmaceutics & computer modelling, with experience in academia and industry. He obtained his bachelor (2000) and master (2005) in pharmaceutics from Shenyang Pharmaceutical University, China. He completed his PhD in pharmacy at The University of Queensland, Australia, in 2010 and progressed directly to his faculty position (Lecturer in Pharmaceutics, PI) at Aston University (UK). From the end of 2014, he moved to the University of Macau.

Since 2011, he has pioneered the integration of AI and multi-scale modeling techniques in the field of drug delivery – "computational pharmaceutics". He has published 2 books, 5 book chapters and over 100 refereed SCI journal papers. He held over 10 approved patents, which had been used in medicinal products. He edited the first book <Exploring Computational Pharmaceutics – AI and Modeling in Pharma 4.0> (2015 & 2024) in this research area. He serves as the associate editor of <Drug Delivery and Translational Research>, the editorial board or scientific advisor of <Asian Journal of Pharmaceutical Sciences>, <Pharmaceutical Research>, <npj Drug Discovery> and <Journal of Pharmaceutical Sciences>. He established the first global in silico formulation platform "FormulationAI". He successfully trained 6 PhD and over 30 master students.

Abstract

In recent decades, the fields of pharmaceutics and drug delivery have become increasingly vital in the pharmaceutical industry, driven by the longer timelines, higher costs, and reduced productivity associated with new molecular entities (NMEs). However, the current formulation development process still depends heavily on traditional trial-and-error methods, which can be time-consuming, expensive, and unpredictable. Over the past ten years, the rapid advancement of computing power and algorithms has led to the emergence of a new discipline known as "computational pharmaceutics". This field integrates big data, artificial intelligence, and multi-scale modeling techniques into pharmaceutics, presenting significant opportunities to transform drug delivery practices. In this presentation, two examples—solid dispersion and mRNA lipid nanoparticles—will illustrate the application of various computational tools in drug delivery. Computational pharmaceutics provides significant advantages to the pharmaceutical industry by minimizing the number of trial-and-error cycles and improving the R&D success rate.

Recent Advances in Research on Venom Peptide Prototype Drugs: Insights from My Visiting Scholar Experience at Monash Institute of Pharmaceutical Sciences (Monash University)

Grantee

Prof. Henry Hang Fai KWOK

Professor, Faculty of Health Sciences, University of Macau

Biography

Professor Henry Kwok is currently the Department Head and a Professor in the Faculty of Health Sciences at the University of Macau (UM). Prior to joining UM in 2014, he served as a Senior Research Fellow in the Department of Oncology at the Cancer Research UK Cambridge Institute, University of Cambridge. His research focuses on proteins (antigens), venom-based peptides, and antibodies for targeted therapy and immunotherapy, aimed at novel prototype drug discovery and treatment of infectious diseases and cancer. Professor Kwok has led multiple projects funded by the Ministry of Science and Technology (MoST), the National Natural Science Foundation of China (NSFC), and the Science and Technology Development Fund of Macao (FDCT). In 2022, he was elected a Fellow of the Royal Society of Biology (FRSB) and a Fellow of the Royal Society of Chemistry (FRSC). He has published over 160 papers in SCI-indexed journals, including Molecular Cancer, Drug Resistance Updates, Trends in Cancer, and PNAS; and he holds seven invention patents.

Abstract

Venom-based peptides have been utilized in prototype drug development for the past three decades, representing a significant natural drug library. However, fewer than one in a thousand bioactive peptides have been identified and characterized. In this presentation, we will discuss the medicinal chemistry approaches employed in peptide pharmaceuticals that I experienced as a SHMDF Visiting Scholar in Professor Raymond Norton's laboratory at the Monash Institute of Pharmaceutical Sciences. We will explore how to use an Artificial Intelligence (AI)-Assisted Machine Learning platform in identifying and characterize novel venom-based peptides with anticancer properties, as well as review the latest advancements in delivering these anticancer peptides into cancer cells.

Single-cell Cancer Drug Screening on Integrated Circuit Chip

Grantee

Prof. Yanwei JIA

Associate Professor, Institute of Microelectronics, University of Macau

Biography

Jia Yanwei is an Associate Professor at the Institute of Microelectronics and the State Key Laboratory of Analog and Mixed-Signal VLSI, University of Macau. Her research interest is about Microfluidics for DNA identification, drug screening and precision medicine. Over 10 of her patents in the US, China and Singapore have been licensed to industry for commercialization.

Abstract

Drug screening of primary tumor cells on microfluidics directly assesses the drug efficacy on specific tumors, promoting personalized cancer treatment. However, the presence of normal cells and immune cells in patient tumor samples would mask the specific effects of drugs on cancer cells evaluated with cell viability. Here, we introduce a system integrating single-cell identification and drug screening on one integrated circuit (IC) chip so that both drug efficacy on cancer cells and drug toxicity on normal cells can be obtained simultaneously. The work is under revision with Nature Communications. A start-up company, ProMedicine Technology has been registered in Hengqiin.

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