Project Abstracts for PhD Student Recruitment AY2025/26

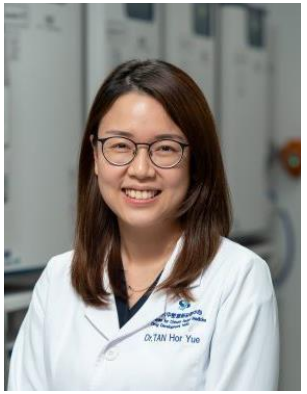
School of Chinese Medicine

Project title	**Search for novel bioactive compounds from medicinal plants in the Lingnan region of China**	
Research Clusters	☐Creative Media/Practice **√ Health and Drug Discovery** ☐ Data Analytics and Artificial Intelligence in X ☐ Humanities and Cultures	 ***Prof ZHANG Hongjie*** *Email address:* *zhanghj@hkbu.edu.hk* *Learn more:* *https://scholars.hkbu.edu.hk/en/persons/ZHANGHJ*
Keywords	*Medicinal plants, phytochemisty, medicinal chemistry, bioactive compounds, drug discovery and development*	
Project abstract	Our drug discovery program has evaluated over 6,000 plant extracts targeting a range of pathogens, including cancer, viruses such as influenza and SARS-CoV-2, as well as bacteria, inflammation, and fibrosis. These extracts are sourced from various plant parts collected primarily in the Lingnan region of China. Many of these extracts have demonstrated significant anticancer, antiviral, antibacterial, and antifibrotic properties. Our project is designed to discover novel bioactive compounds from selected active plants through phytochemical investigations. The identified active compounds will undergo further studies on structure modification, biological activity, and mechanisms of action. This project is a multidisciplinary effort involving collaboration with other researchers.	

Project title	Intracellular sclerostin promotes tumor progression and metastasis in triple-negative breast cancer (TNBC)	
Research Clusters	☐Creative Media/Practice **√ Health and Drug Discovery** ☐ Data Analytics and Artificial Intelligence in X ☐ Humanities and Cultures	 ***Prof ZHANG Ge*** *Email address:* *zhangge@hkbu.edu.hk* *Learn more:* *https://scholars.hkbu.edu.hk/en/persons/ZHANGGE* *https://tmbj.hkbu.edu.hk/*
Keywords	*Triple-negative breast cancer, aptamer-based PROTAC, sclerostin*	
Project abstract	There is an urgent need to identify promising targets for TNBC. Interestingly, sclerostin, an osteocyte-derived secretory protein, was detected in most clinical TNBC tissues. Tumor progression and metastasis almost halted in established TNBC tumors that loss of sclerostin. Neither recombinant sclerostin protein nor sclerostin antibody had any effects in TNBC cells and mouse models, suggesting that the role of extracellular and systemic sclerostin could be excluded. Our genetic and pharmacologic approaches suggested the important role of intracellular sclerostin in TNBC. Thus, we uncovered an unrecognized role of intracellular sclerostin in TNBC and proposed an aptamer-based PROTAC strategy for clinical translation.	

Project title	The roles of small extracellular vesicles in obesity-associated comorbid conditions	
Research Clusters	☐Creative Media/Practice **√ Health and Drug Discovery** **√ Data Analytics and Artificial Intelligence in X** ☐ Humanities and Cultures	 ***Dr KWAN Hiu Yee*** *Email address:* *hykwan@hkbu.edu.hk* *Learn more:* *https://orcid.org/0000-0002-6088-7323*
Keywords	*sEVs, Obesity, T2D, MAFLD*	
Project abstract	Small extracellular vesicles (sEVs) play a crucial role in the pathophysiology of obesity and its associated comorbid conditions. sEVs facilitate intercellular communication, transporting lipids, proteins, and RNAs that influence metabolic processes and inflammatory responses. In obesity, sEVs contribute to chronic inflammation, insulin resistance, liver diseases, and altered lipid metabolism, exacerbating conditions such as type 2 diabetes (T2D), metabolic dysfunction-associated fatty liver disease (MAFLD) etc. Additionally, sEVs may serve as potential biomarkers for obesity-related disorders and therapeutic targets. Understanding the multifaceted roles of sEVs in obesity could provide novel insights into prevention and treatment strategies for these prevalent health issues.	

Project title	The Role of Interleukin 24 in Regulating Ocular Inflammation: a Novel Cytokine for the Treatment of Autoimmune Uveitis	
Research Clusters	☐ Creative Media/Practice **√ Health and Drug Discovery** ☐ Data Analytics and Artificial Intelligence in X ☐ Humanities and Cultures	
Keywords	*Immunology, Autoimmunity, Uveitis, Nanomaterials, Immunotherapy*	
Project abstract	Our published studies indicate Interleukin (IL)-24's potential to reduce ocular inflammation in uveitis (Chong et al., Immunity, 2020; Zhang et al., IJMS, 2022). To transition to clinical trials, we will (1) elucidate IL-24's molecular mechanisms against retina-infiltrating autoreactive T cells and RPE cells using single-cell RNA-sequencing, (2) enhance IL-24 delivery to inflamed eyes with a novel hydrogel-based vehicle, and (3) validate IL-24's anti-inflammatory effects in a human eye-on-chip uveitis model. Our prior studies confirm IL-24's safety and efficacy in animal models and its safety in clinical settings, supporting its potential as a uveitis immunotherapy.	 ***Dr CHONG Wai-po*** *Email address:* chongwp@hkbu.edu.hk *Learn more:* https://scholars.hkbu.edu.hk/en/persons/CHONGWP

Project title	Investigation of novel gene target for immune-mediated colitis progression and development of Chinese herbal medicine for Ulcerative colitis treatment	
Research Clusters	☐ Creative Media/Practice **√ Health and Drug Discovery** ☐ Data Analytics and Artificial Intelligence in X ☐ Humanities and Cultures	
Keywords	*Ulcerative colitis, Innate immunity, Chinese herbal medicine, Risk gene, Inflammation*	
Project abstract	Ulcerative colitis (UC) is a chronic relapsing intestinal disorder that characterized by mucosal inflammation as a result of robust pro-inflammatory cytokine production. Current therapies targeted on dampening inflammation, yet failed to achieve complete remission in most UC patients due to lack of understanding on the mechanism underlying the perpetuated intestinal inflammation. My research primarily focuses on understanding the risk genes associated with UC development. In addition, I am interested in the development of Chinese herbal medicine that could potentially reverse disease progression.	 ***Dr TAN Hor Yue*** *Email address:* *hyhtan@hkbu.edu.hk* *Learn more:* *https://scholars.hkbu.edu.hk/en/persons/HYHTAN*

Project title	Aptamer-based Translational Research and Drug Discovery	
Research Clusters	☐ Creative Media/Practice **√ Health and Drug Discovery** **√ Data Analytics and Artificial Intelligence in X** ☐ Humanities and Cultures	 ***Dr YU Yuanyuan*** *Email address:* *yuyuanyuan@hkbu.edu.hk* *Learn more:* *https://scholars.hkbu.edu.hk/en/persons/YUYUANYUAN*
Keywords	*Aptamers; Drug Discover; AI; osteoporosis; Cancer*	
Project abstract	Aptamers, short single-stranded oligonucleotides, have gained significant attention for their ability to specifically interact with target molecules through conformational complementarity. Aptamers has the advantages of low cost, lack of immunogenicity, high stability and easy of production. More importantly, aptamer can be specifically selected against small domains or even individual residues of the target proteins through positive and negative selections. Additionally, aptamers demonstrate excellent internalization abilities when targeting intracellular proteins. My research interests focus on optimization of aptamer selection methodologies against various targets and aptamer-based translational medicine and drug discovery for therapeutics.	

Project title	Autophagy regulation in the Pathogenesis of neurodegenerative diseases (NDs) and Drug Discovery from Chinese medicine for NDs	
Research Clusters	☐ Creative Media/Practice **√ Health and Drug Discovery** ☐ Data Analytics and Artificial Intelligence in X ☐ Humanities and Cultures	 ***Prof LI Min*** *Email address:* limin@hkbu.edu.hk *Learn more:* https://scholars.hkbu.edu.hk/en/persons/LIMIN
Keywords	*Neurodegenerative diseases; Alzheimer's disease; Parkinson's disease; Chinese medicine; Autophagy*	
Project abstract	Regulation of Autophagy in the Pathogenesis of Neurodegenerative Diseases, including Alzheimer's Disease (AD), Parkinson's Disease (PD), and Amyotrophic Lateral Sclerosis (ALS). Utilization of Chinese Medicine (CM) for the Prevention and Treatment of Neurodegenerative Diseases, including PD, AD, and ALS. Development of Molecular Targets for Drug Discovery from CM for NDs.	

Project title	Pilot Investigation of Using Mitophagy Activators from TCM Compounds for the Treatment of Alzheimer's Disease	
Research Clusters	☐ Creative Media/Practice **√ Health and Drug Discovery** ☐ Data Analytics and Artificial Intelligence in X ☐ Humanities and Cultures	 ***Dr CHEUNG King-ho*** *Email address:* *kingho@hkbu.edu.hk* *Learn more:* *https://scholars.hkbu.edu.hk/en/persons/KINGHO* *Dr. Cheung's research interests are:* • *Structure-function of intracellular calcium release channels (inositol trisphosphate receptors, ryanodine receptors, and two-pore channel) and their roles in health and disease.* • *Molecular mechanisms for the pathogenesis of Alzheimer's disease and Parkinson's disease (calcium disruption and neuronal autophagy)* • *Development of pharmacological compounds from Chinese medicine for neurodogeneration therapy.*
Keywords	*Alzheimer's disease; Parkinson's disease; Chinese Medicine; New drug discovery; Mitophagy*	
Project abstract	Alzheimer's disease (AD), the leading cause of dementia, faces challenges with current treatments targeting beta-amyloid (Aβ) and tau pathologies, which often fail in clinical trials. There is an urgent need for new therapeutic targets. Damaged mitochondria accumulate in neurodegenerative diseases like AD, and enhancing mitophagy may improve mitochondrial health and reduce Aβ and tau pathologies. Traditional Chinese Medicine (TCM) contains compounds that boost mitochondrial quality, yet they remain underexplored for AD. Our screening identified several TCM compounds as potent mitophagy promoters. We aim to synthesize derivatives and evaluate their therapeutic potential in cellular and animal models of AD.	

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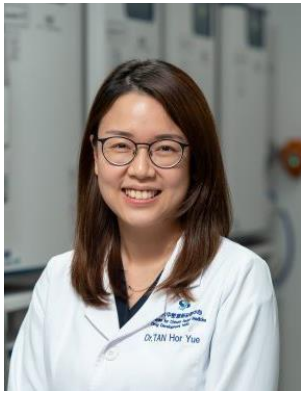
Project abstract	Ulcerative colitis (UC) is a chronic relapsing intestinal disorder that characterized by mucosal inflammation as a result of robust pro-inflammatory cytokine production. Current therapies targeted on dampening inflammation, yet failed to achieve complete remission in most UC patients due to lack of understanding on the mechanism underlying the perpetuated intestinal inflammation. My research primarily focuses on understanding the risk genes associated with UC development. In addition, I am interested in the development of Chinese herbal medicine that could potentially reverse disease progression.	 ***Dr TAN Hor Yue*** *Email address:* *hyhtan@hkbu.edu.hk* *Learn more:* *https://scholars.hkbu.edu.hk/en/persons/HYHTAN*

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