

### ACADEMIC ACTIVITIES

#### Publication(s) of the week

- Mulero, M. C., Wang, V. Y., Huxford, T., and Ghosh, G. (2019) Genome Reading by the NF-κB Transcription Factors. *Nucleic Acids Res* [IF=10.727]
- Luo, L., Iqbal, M. Z., Liu, C., Xing, J., Akakuru, O. U., Fang, Q., Li, Z., Dai, Y., Li, A., Guan, Y., and Wu, A. (2019) Engineered Nano-Immunopotentiators Efficiently Promote Cancer Immunotherapy for Inhibiting and Preventing Lung Metastasis of Melanoma. *Biomaterials* 223, 119464 [IF=9.55]
- 3. Jiang, M., Chen, Z. G., Zheng, J., and Peng, B. (2019) Metabolites-Enabled Survival of Crucian Carps Infected by Edwardsiella Tarda in High Water Temperature. *Front Immunol* **10**, 1991 [IF=5.789]
- Hao, D., Wang, G., Yang, W., Gong, J., Li, X., Xiao, M., He, L., Wang, L., Li, X., and Di, L. (2019) Reactive Versus Constitutive: Reconcile the Controversial Results About the Prognostic Value of PD-L1 Expression in Cancer. *Int J Biol Sci* 15, 1933-1941 [IF=4.306]
- Li, S., Chaudhary, S. C., Zhao, X., Gaur, U., Fang, J., Yan, F., and Zheng, W. (2019) Artemisinin Protects Human Retinal Pigmented Epithelial Cells against Hydrogen Peroxide-Induced Oxidative Damage by Enhancing the Activation of AMP-active Protein Kinase. *Int J Biol Sci* 15, 2016-2028 [IF=4.306]
- Zhou, H., Tan, J., and Zhang, X. (2019) Nanoreactors for Chemical Synthesis and Biomedical Applications. *Chem Asian J* [IF=3.522]
- Zhang, S., Yu, S., Hou, W., Li, X., Ning, C., Wu, Y., Zhang, F., Jiao, Y. F., Lee, L. T. O., and Sun, L. (2019) Diagnostic Extended Usefulness of RMI: Comparison of Four Risk of Malignancy Index in Preoperative Differentiation of Borderline Ovarian Tumors and Benign Ovarian Tumors. *J Ovarian Res* 12, 87 [IF=2.717]
- Zhao, S., Ding, Z., Wang, C., Wang, S., Li, S., Zhang, Z., and Zhang, X. (2019) Coordination-Directed Assembly of Luminescent Semiconducting Oligomers and Weak Interaction-Induced Morphology Transformation. ACS Omega 4, 14294-14300 [IF=2.584]
- Dong, M., Zeng, L. N., Zhang, Q., Yang, S. Y., Chen, L. Y., Najoan, E., Kallivayalil, R. A., Viboonma, K., Jamaluddin, R., Javed, A., Hoa, D. T. Q., Iida, H., Sim, K., Swe, T., He, Y. L., Park, Y., Ahmed, H. U., De Alwis, A., Chiu, H. F. K., Sartorius, N., Tan, C. H., Chong, M. Y., Shinfuku, N., Lin, S. K., Avasthi, A., Grover, S., Ng, C. H., Ungvari, G. S., and Xiang, Y. T. (2019) Prescription of Antipsychotic and Concomitant Medications for Adult Asian Schizophrenia Patients: Findings of the 2016 Research on Asian Psychotropic Prescription Patterns (REAP) Survey. *Asian J Psychiatr* 45, 74-80 [IF=N/A]



#### Seminar Series

# Targeting MT1-MMP: Therapeutic Opportunities in Obesity, Type 2 Diabetes and Other Associated Diseases – Prof. Hoi Leong Xavier WONG

Prof. Hoi Leong Xavier WONG, Research Assistant Professor of School of Chinese Medicine, Hong Kong Baptist University, presented "Targeting MT1-MMP: Therapeutic Opportunities in Obesity, Type 2 Diabetes and Other Associated Diseases" on 17 September.

Prof. WONG reported that obesity and diabetes are the major causes of morbidity and mortality. Obesity is known to be the main risk factor for various non-communicable diseases, in particular type 2 diabetes. He claimed that there is an ongoing need to identify non-invasive therapeutic approaches for the management of obese patients with type 2 diabetes to achieve their goals on glycemic and weight loss.

Prof. WONG discussed the role of MT1-MMP in energy and glucose homeostasis and the molecular mechanism by which MT1-MMP regulates body weight and insulin sensitivity. He reported his research that MT1-MMP contributed to the development of metabolic disorders through increasing energy intake and impairing insulin sensitivity. Obesity increased the expression of MT1-MMP systematically. Ectopic expression of MT1-MMP in mouse liver induced insulin resistance in regular chow-fed mice. Conversely, inhibition of MT1-MMP activities by either genetic knockout or pharmacological approaches led to the weight loss along with improved insulin sensitivity in both young mice with high-fat-diet induced obesity and aged mice fed with regular chow diet. Moreover, Prof. WONG introduced his newly identified central nervous system circuit that regulated metabolism and food intake in response to stress, and MT1-MMP was a suppressor for GDF15-GFRAL signaling pathway. MT1-MMP also impaired insulin signaling in the control of peripheral insulin sensitivity and glucose metabolism.

Prof. WONG finally concluded that MT1-MMP constituted an important modulator of insulin sensitivity and energy homeostasis. Targeting MT1-MMP showed potential therapeutics for the management of obesity and type 2 diabetes, and these two diseases need combined treatment strategies.





### Seminar Series Towards Decoding and Restoration of Visual and Motor Functions – Prof. Jiayi ZHANG



Prof. Jiayi ZHANG, Principle Investigator, Associate Professor and Assistant Dean of Institutes of Brain Science, Fudan University, presented "Towards Decoding and Restoration of Visual and Motor Functions" on 18 September.

Prof. ZHANG presented her recent research on the long-term spastic limb paralysis. She found that transferring the seventh cervical nerve (C7) from the nonparalyzed side to the paralyzed side resulted an increase of 17.7 in Fugl-Meyer score. One strategy for further improvement in voluntary arm movement was selective

activation of five target muscles innervated by C7 during recovery process. In her latest research, Prof. ZHANG's team developed an implantable multisite optogenetic stimulation device (MOSD) based on shape-memory polymer. Two-site stimulation of sciatic nerve bundles by MOSD induced precise extension or flexion movements of the ankle joint, while eight-site stimulation of C7 nerve bundles induced selective limb movement. Long-term implant of MOSD to mice with severed and anastomosed C7 nerve was proved to be safe and effective.

Prof. ZHANG finally concluded that their work opened up the possibility for multisite nerve bundle stimulation to induce highly-selective activations of limb muscles, which could inspire further applications in neurosurgery and neuroscience research.

#### Seminar Series

### (Pro-)Fluorescent Substrates for Oxidizing and Conjugating Enzymes of Drug Metabolism – Prof. Risto Olavi JUVONEN

Prof. Risto Olavi JUVONEN, Professor of Drug Toxicology of School of Pharmacy, Faculty of Health Sciences, University of Eastern Finland, presented "(Pro-)Fluorescent Substrates for Oxidizing and Conjugating Enzymes of Drug Metabolism" on 18 September.

Prof. JUVONEN introduced how coumarin derivatives were used to measure four different types of drug metabolizing enzymes, CYP, UGT, ST and COMY, and the application of these assays. He also introduced the mechanism of the drug metabolism and the fluorescence properties of coumarins. Prof. JUVONEN summarized the reactions in his research that CYP enzymes oxidized pro-fluorescent coumarin derivative to fluorescent metabolite, Glucuronosyltransferases and Sulfotransferases conjugate fluoresced 7-hydroxycoumarin derivative to non-fluorescent coupling to strongly fluorescent scopoletin.

Prof. JUVONEN concluded that the assays could be used to study different types of samples, enzyme kinetics, and inhibition of enzymes.





#### Seminar Series Novel Immunomodulators for Treating Solid Tumors – Prof. Rihe LIU

Prof. Rihe LIU, Associate Professor of The University of North Carolina at Chapel Hill, presented "Novel Immunomodulators for Treating Solid Tumors" on 20 September.

Prof. LIU introduced his research on the sophisticated directed evolution technologies for the development of the next generation trapping or affinity molecules. He presented how he applied mRNA-display technology for in vitro selection of proteins with desired functions from various natural proteome libraries and synthetic protein domain/polypeptide libraries. He then successfully developed a series of trap molecules that can bind to chemo/cytokines (i.e. CXCL12, CXCL13, CCL2, CCL5, IL-6), immune checkpoints (i.e. PD-1, PD-L1, PD-L2), cell surface receptors (i.e. HER3), and PAMP-mediated innate immune targets (i.e. LPS and STING).

At the end, Prof. LIU introduced his on-going research on developing the next-generation biologics using various formats, including the protein, the mRNA as well as the engineered T cells (CAR-T), for both mechanistic studies of the TME immunosuppression and translational combination mmunotherapies for major solid tumors.



#### COMPETITION

Prof. Tzu-Ming LIU's Team Successfully Enters the Innovation and Entrepreneurship Final Competition

On 17 September, Prof. Tzu-Ming LIU led a team, CATYDID, with Ms. Yin-Lin LU, a FHS research assistant, and Mr. Steven Kan Min HSU, a FHS undergraduate student, to participate in a startup competition "2019·JingNiuihui The Innovation and Entrepreneurship Competition of Chinese Academy of Science (Zhuhai Division)" at Macau Young Entrepreneur Incubation Center. Their team won the semi-final competition from hundreds of innovation teams with the project "Developing and Commercializing the Blood Fluorescence Meter for the Evaluation of Organ Function". They will compete with other teams in the final competition in Zhuhai on 28 October. Let's wish them good luck!







#### ARTICLE SHARING

### Metal-organic Frameworks for Multimodal Bioimaging and Synergistic Cancer Chemotherapy - Prof. Yunlu DAI

With the rapid development of nanomaterials in recent years, thousands of coordination compounds were synthesized and reported annually. Just like C60 and graphene, Metal-Organic Frameworks (MOFs) are becoming rising stars in the field of biomedicine, chemistry, and physics. Based on years of research foundation and existing research results, Prof. Yunlu DAI, along with his Ph.D. students Zhan ZHANG, Wei SANG as well as

post-doctoral research fellow Dr. Lisi XIE have summarized the recent progresses of MOFs in the field of biomedicine. The study titled "Metal-organic frameworks for multimodal bioimaging and synergistic cancer chemotherapy" has been published in the renowned journal *Coordination Chemistry Reviews* with a 5-year impact factor of 13.364.



MOFs are a novel class of porous materials made from metal ions and organic ligands, and have been widely explored as multifunctional nanoplatforms. In this study, the developing history and modification of MOFs were introduced, with an emphasis on the recent progress of chemotherapy-based synergistic combination therapy and bioimaging techinques, including computed tomography, magnetic resonance imaging, positron emission tomography and optical imaging. Future prospects and challenges of MOFs in the research of translational medicine are also discussed.

MOFs present unique physicochemical characteristics, such as large surface area, tunable size and structure, and easy modification, thereby making them promising candidates for drug delivery, biomedical imaging, and therapeutic applications. Simultaneous utilization of organic linkers and various metal ions as the coordination centers provides possibility to generate multifunctional MOFs with a number of advantages. Moreover, MOFs provide a nanoplatform for the combination of diagnosis and treatment. Meanwhile, different treatment methods can be achieved in one platform, thereby leading to the reduction of side effects and improvement of therapeutic efficacy. The development of nanomaterials and nanotechnology provide more possibility for precision medicine.



MOFs-based Synergistic Cancer ChemotherapyImage: Space Synergistic Cancer Chem

MOFs as nanoplatforms for cancer diagnosis and treatment. Combina

Combination of different cancer treatment therapies based on MOFs.

UM Macao This project was funded by and the Science and For Technology Development Fund. more information. please visit: https://www.sciencedirect.com/science/article/pii/S0010854519303704#t0005





### VISIT

### **Ministry of Education of China visits FHS**

A delegation led by Zhaozi LEI, Director General, Department of Science and Technology, Ministry of Education of the People's Republic of China paid a visit to FHS on 17 September, and they were warmly received by Prof. Chuxia DENG. Prof. DENG oriented the guests of FHS's latest developments, academic programmes, research achievements, the cultivation of high-calibre students and the internationalization of FHS. LEI recognized FHS's effort in teaching and research.

At the meeting, both parties had an in-depth discussion on higher education and scientific research. LEI encouraged FHS to pursue their hard work for the establishment of the Frontier Science Center which is supported by the Ministry of Education. He further advised FHS to deepen and broaden the cooperations in higher education with the mainland universities. The delegation provided valuable advice that benefit FHS.

The delegation then visited the core facilities, including the Proteomics, Metabolomics & Drug Development Core and the aquatic room and the mouse holding room of Animal Research Core of FHS. The delegation was impressed by the research accomplishment and the state-of-the-art equipment of FHS. The delegation members included Yuhong LI and Hui ZOU, Chief of Department of Science and Technology, Ministry of Education of the People's Republic of China.



#### Visit to Kwang Wu Hospital

On 18 September, Prof. Guokai CHEN led 20 bachelor students of the Endocrinology and Metabolic Diseases (HSCI3001) class to visit the Clinical Laboratory of Kwang Wu Hospital. Dr. Frank K.L. NGAI, the head of the Clinical lab, guided them for the tour, and the doctors in the lab showed them how the analyses of hormones for medical diagnosis was conducted in a hospital.





### **STUDENT ACTIVITY**

# FHS Postdoc Student Seminar - Presented by Prof. Garry WONG's group and Prof. Yutao XIANG's group

On 19 September, Ms. Menglei ZHANG of Prof. Garry WONG's group presented "Genomic Data of Pelodera Strongyloides Provide Clues about Understanding the Evolution of Parasitic Lifestyles in Nematode Worms" and Mr. Wenwang RAO of Prof. Yutao XIANG's group presented "Prevalence and Correlates of Major Depressive Disorder in the Adult Population in Hebei Province".

The next seminar will be held on 3 October and presented by the group members of Prof. Chuxia DENG and Prof. Edwin CHEUNG.



FHS is going to have the 2<sup>nd</sup> Macau Stem Cell Symposium on 27 September 2019. Let's join together! For details, please refer to the related information posted on the website: https://fhs.um.edu.mo/2nd-macau-stem-cell-symposium/

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**Macau Stem Cell Symposium** 

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27 September 2019



# UPCOMING

September				
Mon	Tues	Wed	Thurs	Fri
23	24 Bio-Rad Protein Day Workshop and Instrument. Demonstration Session 1: 11:00 – 12:30* Session 2: 14:30 – 16:00 Session 3: 16:00 – 17:30 * For Current users Venue: N22-4037	25	26 <u>Technical Seminar</u> 3-D Cultures / Organoids and its Applications Speaker: Dr. Ching-Huan CHEN Host: Gene Company Time: 14:30 - 16:30 Venue: N22-4028	27 <u>2nd Macau Stem Cell</u> <u>Symposium</u> Time: 09:00 Venue: N22-G002
30	1 National Day of the People's Republic of China	2 The Day following the National Day of the People's Republic of China	3 FHS Postdoc/ Student. Seminar Host: Prof. Chuxia DENG and Prof. Edwin CHEUNG Time: 17:00-18:00 Venue: N22-G002	4
7 Chong Yeung Festival	8	9	10	11

For more information or submission of articles to be featured, please contact Ms. Mathilde CHEANG at mathildec@um.edu.mo or 8822 4909.