

ACADEMIC ACTIVITIES

Publication(s) of the week

1. Gao, J., Wang, H., Li, Z., Wong, A. H., Wang, Y. Z., Guo, Y., Lin, X., Zeng, G., Wang, Y., and Wang, J. (2018) *Candida albicans* gains azole resistance by altering sphingolipid composition. *Nat Commun* **9**, 4495
2. Jiang, M., Gong, Q. Y., Lai, S. S., Cheng, Z. X., Chen, Z. G., Zheng, J., and Peng, B. (2018) Phenylalanine enhances innate immune response to clear ceftazidime-resistant *Vibrio alginolyticus* in *Danio rerio*. *Fish Shellfish Immunol*
3. Wang, Y. Y., Wang, F., Zheng, W., Zhang, L., Ng, C. H., Ungvari, G. S., and Xiang, Y. T. (2018) Mindfulness-Based Interventions for Insomnia: A Meta-Analysis of Randomized Controlled Trials. *Behav Sleep Med*, 1-9
4. Zhang, W., Hu, X., Chakravarty, H., Yang, Z., and Tam, K. Y. (2018) Identification of novel pyruvate dehydrogenase kinase 1 (PDK1) inhibitors by kinase activity-based high throughput screening for anticancer therapeutics. *Acs Comb Sci*

BCAT Recap

Design of Molecular Probes for Bioimaging and Sensing - Prof. Xuanjun ZHANG

On 7 November, Prof. Xuanjun ZHANG presented his recent research on nanoprobe and small molecular probes for bioimaging and sensing applications. In the first part, Prof. ZHANG introduced the strategy for nanoprobe design. By controlling of the energy transfer ON-OFF or weaker-stronger, a series of nanoprobe for sensing of ROS, pH and temperature were designed and fabricated, which showed excellent ratiometric fluorescence response upon sensing. In the second part, Prof. ZHANG introduced the design of small molecular probes by controlling intramolecular charge transfer. A series of fluorescent probes for sensing of H₂S were synthesized for *in vitro* and *in vivo* imaging of H₂S. He also introduced activatable small molecular photoacoustic probes, which can effectively cross Blood Brain Barrier for *in vivo* imaging of Cu(II) in Alzheimer's Disease mice. These probes are very promising for the diagnosis and studying complicated biological processes.

Seminar Series

Diet, Nutrition and Diseases - Prof. Henry KWOK

On 5 November, Prof. Henry KWOK together with Dr. Vicki FONG and Ms. Carmen MAN from Hong Kong Institute of Vocational Education shared a talk about public health with all UM members on "Diet, Nutrition and Diseases".



ACADEMIC ACTIVITIES

Seminar Series

Intravital imaging and micromanipulation of stem cell niches in bone - Prof. Charles LIN



Prof. Charles LIN, Assistant Professor of Wellman Center for Photomedicine, Massachusetts General Hospital, Harvard Medical School, presented his work on “Intravital imaging and micromanipulation of stem cell niches in bone” at FHS on 8 November.

Bone and the bone marrow including hematopoietic stem cells (HSCs) and mesenchymal stem cells (MSCs) are rich sources of stem cells. HSCs are responsible for the sustained regeneration of all blood cells after bone marrow transplantation. In addition, a population of skeletal stem cells (SSCs) are capable of bone regeneration in the sutures between cranial bones contain. Therefore, Prof. LIN’s team develops the optical techniques to study the bone and the bone marrow. They have also used intravital microscopy and laser micromanipulation to gain deeper insights into the

biology of HSCs and SSCs in their native microenvironments.

Seminar Series

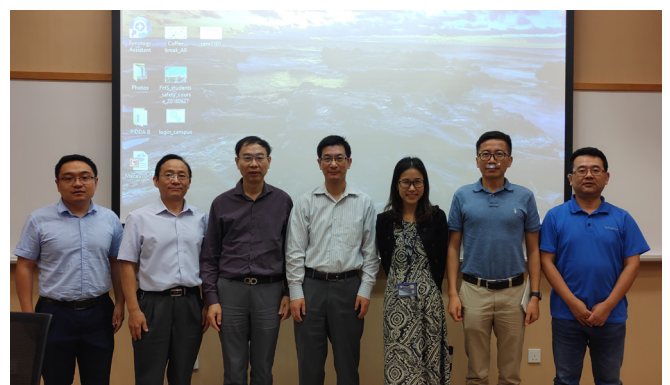
Evans blue-based theranostics - Prof. Xiaoyuan (Shawn) CHEN



Prof. Xiaoyuan (Shawn) CHEN, a Senior Investigator and Chief of the Laboratory of Molecular Imaging and Nanomedicine (LOMIN) in the National Institute of Biomedical Imaging and Bioengineering (NIBIB) of NIH, shared his work and experiences on “Evans blue-based theranostics” in FHS on 8 November.

Theranostics (Rx/Dx) aims to develop molecular diagnostic tests and targeted therapeutics with the goals of individualizing treatment by targeting therapy to an individual’s specific disease subtype and genetic profile. Not only can it be diagnosis followed by a therapy to stratify patients who will likely respond to a given treatment, it can also be a therapy followed by diagnosis to monitor early response to treatment and predict treatment efficacy. Moreover, there is possibility to co-develop both diagnostics and therapeutics (nanotheranostics).

Prof. CHEN’s lab puts special emphasis on high-sensitivity nanosensors for biomarker detection and theranostic nanomedicine for imaging, gene and drug delivery, and monitoring of treatment. Evans blue is used as an example in this seminar to illustrate how this reversible albumin binder can be suitable for vasculature and lymphatic system imaging, as an enhancer to prolong circulation half-life of drugs for diabetes treatment, radioligand cancer therapy, cancer vaccine and cancer nano prodrug development.



ACADEMIC ACTIVITIES

Seminar Series

Single Molecule Biosensors for Dynamic Multigene Analysis in Complex Tissue Environments - Prof. Pak WONG

Prof. Pak WONG, Professor of Department of Biomedical Engineering, Mechanical Engineering and Surgery, the Pennsylvania State University, shared his analysis on “Single Molecule Biosensors for Dynamic Multigene Analysis in Complex Tissue Environments” in FHS on 9 November.

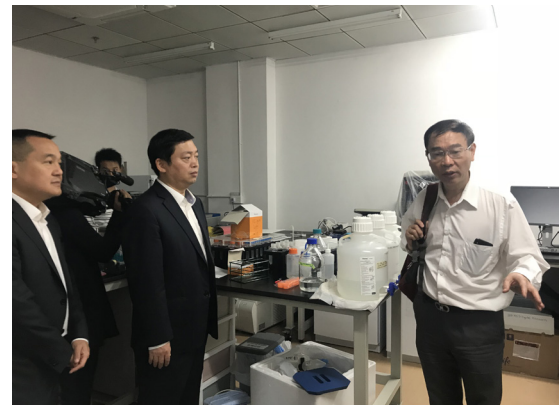
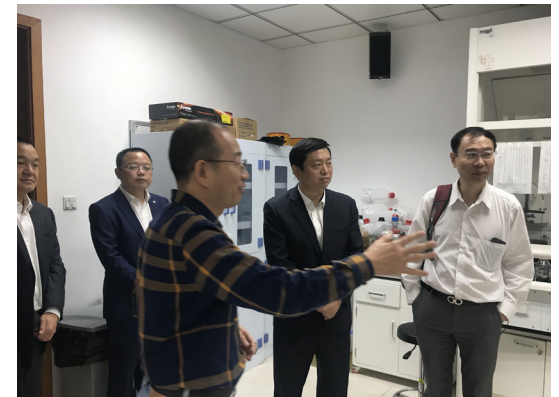
Prof. WONG discussed the application of the nanobiosensing platform for probing leader cell formation during wound healing and bladder cancer heterogeneity in this seminar. The nanobiosensing platform is aimed to address the challenge in current biomedical research. Heterogeneity is a common feature of biological systems. The heterogeneity across multiple levels collectively drives a variety of biological processes, such as tissue morphogenesis and cancer invasion. However, a large number of cells are required for the conventional biosensing approaches for characterizing molecular and cellular heterogeneity. Research works are limited with this large requirement. Furthermore, the existing single cell analysis techniques often require physical isolation or lysis of cells to “snapshot” RNA and protein biomarkers in a small subset of cells. The features of the complex microenvironment, such as hierarchical organization and dynamic cellular processes, are inherently lost by studying cells in isolation, fixation, and lysis.

The nanobiosensing platform he promoted enables dynamic single cell gene expression analysis in the complex tissue environments. The nanoengineered probes designed by his team enable endocytic uptake for a real-time, dynamic intracellular detection of mRNA/miRNA, protein, and small molecules in living cells and tissues. These can enhance the efficiency of the biomedical research. Prof. WONG’s research also focuses on bioengineering techniques for elucidating collective cell migration in tissue regeneration and cancer metastasis, and developing microfluidic systems for medical diagnostics.



FHS News

Sichuan Luzhou delegation visited FHS



Sichuan Luzhou delegation visited FHS on 9 November 2018. The Facilities and research visions of FHS are introduced to the delegation.

During the meetings, Sichuan graduates expressed that they wish to bring their medical and research techniques back to Sichuan to promote the technology and development of the scientific research in Sichuan.

N22 Research Building Fire Drill



Laboratory safety is very important for doing research. The FHS members participated in the fire drill and practice the escape path on 9 November. The use of various fire extinguishers was also demonstrated.

NOVEMBER				
Mon	Tues	Wed	Thurs	Fri
12	13	14	15	16
<p><u>Preparing for Graduate School in the US</u> Georgetown University Time: 10:30-12:45 Venue: E12-G004</p>	<p><u>Seminar Series</u> Caught in Action: Molecular Mechanisms of the Deadly Type VI Protein Secretion System Prof. Tao DONG Time: 11:00-12:00 Venue: E12-G004</p>	<p><u>B-CAT Meeting #29</u> Prof. Henry KWOK Time: 17:00 Venue: E12-G003</p>	<p><u>FHS Postdoc/ Student Seminar Series</u> Host: William CHAU, Gang LI Time: 17:00-18:00 Venue: E12-G004</p>	<p><u>Seminar Series</u> Bacterial cGAS-like Enzymes Synthesize Diverse Nucleotide Second Messengers Prof. John MEKALANOS Time: 14:30-15:30 Venue: TBC</p>
19	20	21	22	23
	<p><u>Seminar Series</u> The Roles of Gut Microbiota, Innate Myeloid Cells and Host Genetic in Determining the Age-related HBV Clearance in Mice Prof. Hurng-Yi WONG Time: 10:30-11:30 Venue: E12-G004</p>			
26	27	28	29	30
	<p><u>Seminar Series</u> New Gold-based Anti-Cancer Drugs and Biodegradable Porous Polymers Prof. Murray BAKER Time: 14:00-15:00 Venue: E12-G004</p>		<p><u>University of Edinburgh – University of Macau Brain Science Forum</u> Time: 14:30 – 17:00 Venue: N21-G013</p> <p><u>FHS Postdoc/ Student Seminar Series</u> Host: Wei GE and Garry WONG Time: 17:00-18:00 Venue: E12-G003</p>	