ACADEMIC ACTIVITIES

Publication(s) of the week

1. Baek, H. J., Kim, S. E., Kim, J. K., Shin, D. H., Kim, T. H., Kim, K. G., Deng, C. X., and Kim, S. S. (2018) Inhibition of AKT suppresses the initiation and progression of BRCA1-associated mammary tumors. *Int J Biol Sci* **14**, 1769-1781

2. Chen, L., Sun, H., Wang, C., Yang, Y., Zhang, M., and Wong, G. (2018) miRNA arm switching identifies novel tumour biomarkers. *EBioMedicine*

3. Li, E., Zhang, Z., Jiang, B., Yan, L., Park, J. W., and Xu, R. H. (2018) Generation of Mesenchymal Stem Cells from Human Embryonic Stem Cells in a Complete Serum-free Condition. *Int J Biol Sci* **14**, 1901-1909

4. Rajendran, B. K., Xavier Suresh, M., Bhaskaran, S. P., Harshitha, Y., Gaur, U., and Kwok, H. F. (2018) Pharmacoinformatic Approach to Explore the Antidote Potential of Phytochemicals on Bungarotoxin from Indian Krait, Bungarus caeruleus. *Comput Struct Biotechnol J* **16**, 450-461

5. Zhao, Z., Hao, D., Wang, L., Li, J., Meng, Y., Li, P., Wang, Y., Zhang, C., Zhou, H., Gardner, K., and Di, L. J. (2018) CtBP promotes metastasis of breast cancer through repressing cholesterol and activating TGF-beta signaling. *Oncogene*

6. Zhu, D., Zhao, Z., Cui, G., Chang, S., Hu, L., See, Y. X., Lim, M. G. L., Guo, D., Chen, X., Robson, P., Luo, Y., and Cheung, E. (2018) Single-Cell Transcriptome Analysis Reveals Estrogen Signaling Coordinately Augments One-Carbon, Polyamine, and Purine Synthesis in Breast Cancer. *Cell Rep* **25**, 2285-2298 e2284

ACADEMIC ACTIVITIES

Seminar Series

The roles of gut microbiota, innate myeloid cells, and host genetic in determining the age-related HBV clearance in mice - Prof. Hurng-Yi WANG

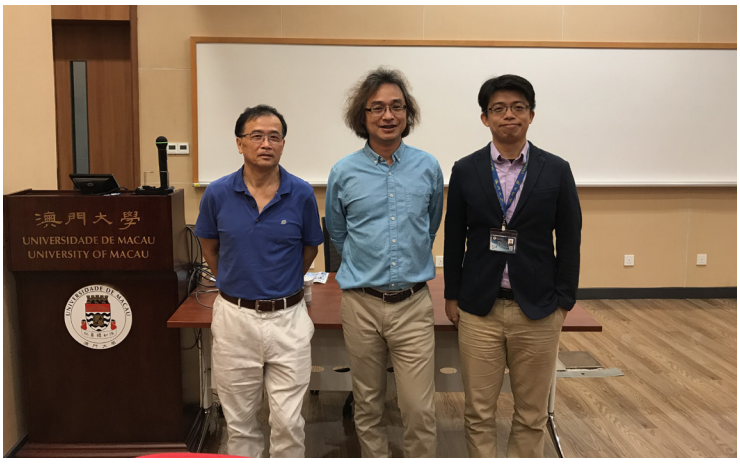
Prof. Hurng-Yi WANG, Professor of Taiwan University, presented a talk on “The roles of gut microbiota, innate myeloid cells, and host genetic in determining the age-related HBV clearance in mice” on 20 November.

Hepatitis B is a life-threatening liver infection caused by the hepatitis B virus (HBV). It is a major global health problem, and an estimated 257 million people are living with hepatitis B virus infection (defined as hepatitis B surface antigen positive). It may cause chronic infection and puts people at high risk of death from cirrhosis and liver cancer.

A unique feature of hepatitis B virus (HBV) infection in humans is that viral clearance heavily depends on the age of exposure. However, the reason for this remains unclear. Therefore, Prof. WANG’s team had established an age-related HBV mouse model to understand the mechanism(s) of age-dependent outcomes of HBV infection in humans. In the model, six-week-old (N6W) C3H/HeN exhibited virus tolerance while 12-week-old (N12W) counterparts represented virus clearance. There were similar phenomena between three- (B3C) and six-week-old (B6C) BALB/c, but not in C57BL/6. This indicates that host genetic is important in determining the outcomes of HBV transfection.

Prof. WANG has investigated the hepatic myeloid cell dynamics in N6W and N12W mice and found that N12W had a significantly higher number of TNF-α-secreting Ly6C+ monocytes and fewer IL-10-secreting liver residential macrophages at D3 in the liver than their younger N6W counterparts after HBV transfection. In addition, they found that the elevated number of IFNγ+TNFα+CD8+ T cells at D7 was only seen in the older cohort.

Moreover, Prof. WANG’s team has performed the sterilization respectively of gut microbiota using antibiotics from 6 to 12 weeks or 3 to 6 weeks to prevent N12W or B6C mice from rapidly clearing HBV. Then they had compared to the control mice and found that antibiotic treated B6C showed significantly fewer Ly6C+ monocytes at D3 and CD8+ T cells at D7 in the liver. This result shows that gut microbiota may shape liver immune responses and contribute to dynamics of hepatic monocytes. Furthermore, Ly6C+ monocytes and residential macrophages represent the resistance and tolerance arms of host defenses respectively. These two cell types orchestrate liver immune responses to determine HBV clearance/tolerance.



健康科學學院
Faculdade de Ciências da Saúde
Faculty of Health Sciences

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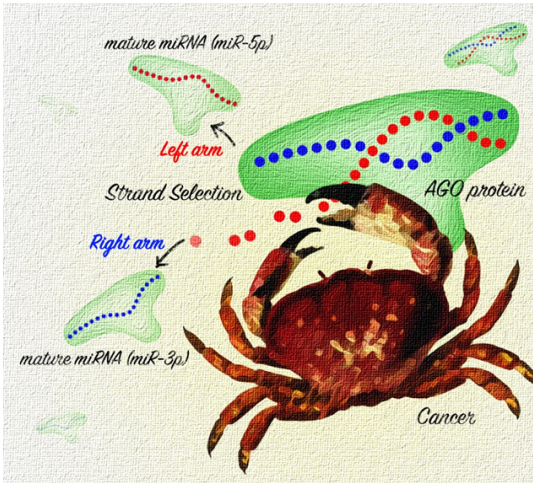
FHS Article

Cancer cells switch arms to beat-up the body in Tumour tissues - Prof. Garry WONG

Cancer cells are very hard to fight and they have evolved many mechanisms to beat-up a healthy body, to evade bodily defenses, and to block drugs designed to kill them. One way they successfully defend against death is to change the expression levels of tens of thousands of genes that are expressed in their tissues. One way they can change gene expression levels is using a small genetic switch called microRNA (miRNA). The switch has a left arm and a right arm. Each arm is a near mirror image of the other and has a different function that acts as a volume control to make genes expressed at higher or lower levels.



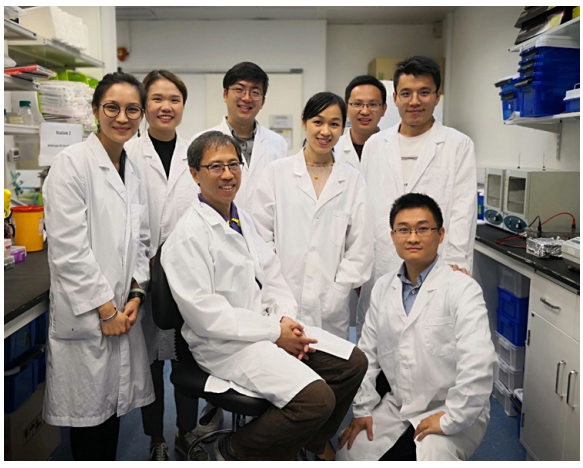
MicroRNA arm switching schema. The red and blue dotted lines represent the mature miR-5p and miR-3p arms, respectively. The crab illustrates cancer. AGO protein is in green and wraps around the RNA duplex.

Dr. Liang CHEN, post-doctoral fellow of Prof. Garry WONG, and his coworkers found that in some cancers, the left arm was switched to the right arm and in other cancers, the right arm was switched to the left. This switch was not random since some of the switching actually predicted a significant decrease in the survival rate from the cancer. They further predicted that depending upon the arm switch, a completely different set of genes would be programmed to be expressed in a totally different pattern.

This work was performed on data taken from the Cancer Genome Atlas, a public database containing cancer and gene expression data from thousands of cancer patients. Dr. CHEN, a computer scientist, exemplifies the synergies that can be achieved using Bioinformatics tools in the era of Big Data to tackle very complex biological problems.

“This work is ripe to be exploited to identify biomarkers for diagnostic purposes in humans, or provide mechanistic insight for basic science studies in cancer. I am most enthusiastic about this study because it can be translated to aid human cancer patients to predict their outcome and possibly guide their therapeutic options” Prof. WONG states enthusiastically.

“Early detection of cancer and early treatment can greatly prolong the survival of patients. miRNA has been used in the diagnosis of cancer for a long time. In this study, we apply machine learning techniques to explore novel microRNA biomarkers based on microRNA arm switching. We hope that our research can contribute to the discovery of cancer biomarkers with clinical use.” Dr. CHEN.



The research paper appears as a publication in EBioMedicine which is published by THE LANCET, one of the world’s leading publishers in the Clinical Medicine Field. For more information about the research article, please visit: https://doi.org/10.1016/j.ebiom.2018.11.003.

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UPCOMING

NOVEMBER/DECEMBER

Mon	Tues	Wed	Thurs	Fri
26	**27** **Seminar Series** New Gold-based Anti-Cancer Drugs and Biodegradable Porous Polymers Prof. Murray BAKER Time: 14:00-15:00 Venue: E12-G004	**28**	**29** **FHS Postdoc/ Student Seminar Series** Host: Prof. Wei GE and Prof. Garry WONG Time: 17:00-18:00 Venue: E12-G003	**30** **The University of Edinburgh and University of Macau Forum on Biomedical and Brain Science Research** Time: 10:00 – 12:15 Venue: N21-G013 **Oral Defense** Shichao WANG Supervisor : Prof. Xuanjun ZHANG Time: 15:00 Venue: N6-G010
3	**4**	**5** **Oral Defense** Xiaoyan WANG Supervisor : Prof. Ren-he XU Time: 15:00 Venue: N6-2022	**6** **Seminar Series** Skin Regeneration: stem cells and their niches Speaker: Yaojiong WU Host: Renhe XU Time: 09:30-10:30 Venue: E12-G004	**7**
10	**11**	**12** **Seminar Series** The Exosome-Mediated Autocrine and Paracrine Role of Plasma Gelsolin in Ovarian Cancer Chemoresistance Speaker: Benjamin Tsang Host: Lijun DI Time: 11:00-12:00 Venue: E12-G004 **Year-end Tea Gathering** Time: 15:00-16:30 Venue: E12-Learning Common	**13** **FHS Postdoc/ Student Seminar Series** Host: Prof. Yutao XIANG and Prof. Jun ZHENG Time: 17:00-18:00 Venue: E12-G003	**14**

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