

#### Publication(s)

- Luo, W., Wang, D., Zhang, T., Zheng, P., Leng, D., Li, L., Liu, Y., Sun, B., and Zhang, X. D. (2020) Prevalence Patterns of Allergen Sensitization by Region, Gender, Age and Season among Patients with Allergic Symptoms in Mainland China: A Four-Year Multicenter Study. *Allergy* [2019 IF = 8.706]
- Guan, X., Deng, H., Choi, U. L., Li, Z., Yang, Y., Zeng, J., Liu, Y., Zhang, X., and Li, G. (2020) Ezh2 Overexpression Dampens Tumor-Suppressive Signals via an Egr1 Silencer to Drive Breast Tumorigenesis. *Oncogene* [2019 IF = 7.971]
- Li, L., Lok, G. K. I., Mei, S. L., Cui, X. L., An, F. R., Li, L., Cheung, T., Ungvari, G. S., and Xiang, Y. T. (2020) Prevalence of Depression and Its Relationship with Quality of Life among University Students in Macau, Hong Kong and Mainland China. *Sci Rep* 10 (1), 15798 [5yr IF = 4.576]

#### Article Sharing

#### FHS Makes Major Progress in Breast Cancer Metastasis Research

Prof. Xiaoling XU has discovered a tumour evolution process through which the tumours initiate from cells with single nucleotide variants (SNVs) by performing simultaneous single nucleotide variant (SNV) and copy number variation (CNV) analysis. The team has also identified a novel tumour metastasis suppressor 'PLEKHA5', which deficiency promotes cancer metastasis to the liver and/or lung. This discovery represents a significant progress in breast cancer metastasis research. The study has been published in the internationally renowned journal *Nature Communications*.

Breast cancer gene 1 (BRCA1) mutation is the main cause of nearly 25% of hereditary familial breast cancer cases, and the estimated lifetime risk of developing breast cancer for women with BRCA1 germline mutations is between 40 and 80%. The driver events vary from person to person, and even in the same patient, the driver events for different tumours might be different and need to be elucidated. At present, the biology governing the initiation of BRCA1-associated tumours and the evolution from the early premalignant stage to tumour progression and metastasis stage are not fully understood. Over the past few years, single-cell whole-exome sequencing (scWES) has become a powerful approach to decipher intratumour heterogeneity and identify cancer drivers. However, simultaneous analysis of single nucleotide variants (SNVs) and copy number variations (CNVs) of a single cell remains challenging.

To understand the genetic features and evolution of BRCA1-deficient breast cancers and identify their drivers, the research team performed simultaneous SNV and CNV analysis in bulk and single cells of BRCA1-deficient mammary glands and tumours using WES; they also conducted functional validation for candidate driver genes with CRISPR-Cas9-mediated knockouts in vitro and in vivo. Several notable findings that have not been clearly illustrated previously have been uncovered in this study. These include: 1) A tumour evolution process was identified through which tumours initiate from cells with SNVs affecting putative driver genes during premalignant stages and malignantly progress later via CNVs acquired in chromosomal regions with many cancer driver genes. 2) These are random events that hit many putative cancer drivers besides p53 to generate unique genetic and pathological features for each tumour. 3) Cancer drivers or metastasis drivers, when they are present at low frequency or occur during premalignant stages, could be missed by bulk DNA sequencing due to high heterogeneity but could be identified by analysing only a small number of single cells. 4) One of the examples is the PLEKHA5 gene, the mutation of which is present in a small population of cells in the primary tumour but became dominant in liver metastases. 5) The scWES results combined with CRISPR-Cas9-mediated knockout studies provide solid evidence that PLEKHA5 does not affect primary tumour growth; however, it is a metastasis suppressor, whose deficiency promotes cancer metastasis to the liver and/ or lung.





This study was led by Prof. Xu and her PhD student Jianlin LIU is the first author. Prof. Chuxia DENG, Prof. Chris WONG, Prof. Kai MIAO, research assistant Ragini ADHAV, and PhD student Sek Man SU also made important contributions to the project. This study was funded by UM (file no: MYRG2016-00138-FHS, MYRG2017-00088-FHS, MYRG2019-00064-FHS) and the Science and Technology Development Fund (FDCT), Macao SAR (file no: 027/2015/A1, 029/2017/ A1, 0101/2018/A3, and 0011/2019/AKP).



### **Events**

### Prof. Wenhua ZHENG Presents Project in the 7th Macau Industrial Products Show

UM took part at the 7<sup>th</sup> Macau Industrial Products Show during 1 to 4 October. Prof. Wenhua ZHENG presented his research work on "Study on the Therapeutic Effect of Artemisinin Drugs on Alzheimer's Disease" with an aim to illustrate its industrialization potential in the show. Participants learnt more about the latest studies and plausible therapies of the Alzheimer's Disease.





#### The 6<sup>th</sup> "Health I Care!" Competition Enhances Students' Health Knowledge

FHS Student Association (FHSSA) organized the 6<sup>th</sup> "Health I Care!" Health Knowledge Competition successfully on 30 September. The competition attracted a hundred students of various faculties to participate and compete for the awards.

In the competition, 36 contestants passed 4 preliminary rounds and the final to win the game. The questions related to the themes of health knowledge, food, medicine and safety, healthy environment, disease, epidemic and prevention, world and Macao health organizations or departments, and the newly added COVID-19 knowledge. Prof. Xuanjun ZHANG, one of the guests, enjoyed this meaningful and interesting competition.

aims The competition to attract the contestants and audiences to learn more about the health-related knowledge, and to broaden the horizons in the field of health by the diversified health questions through taking part in the exciting competition. Miss Aggie Yuzhao FENG, President of FHSSA, believes that the competition is an interesting, lively and open platform for students to explore health knowledge, and is conducive to the cultivation of students' healthy living habits.



### PhD Oral Defence PhD Oral Defence by Ruotong ZHANG of Prof. Hongjie ZHANG's group

Ms. Ruotong ZHANG supervised by Prof. Hongjie ZHANG completed her PhD oral defence on 29 September. Her thesis title is "A Novel Role of RNA Processing in Epithelial Morphogenesis".



Ms. Zhang claimed that the failure of either establishment or maintenance of apical polarity has a profound influence on tubular organ morphogenesis, and can lead to the pathologic diseases, such as intestinal malrotation. Therefore, she has identified several RNA processing genes which affected apical polarity and caused luminal morphological defects, and found that xrn-2(RNAi) and exos-4.2(RNAi) induced a magu-2 transcript accumulation in the cytoplasm and displayed intracellular mislocalization. Moreover, she has investigated the filamin-1 (FLN-1), a protein that partially colocalizes with actin filaments and is required to maintain the actin cytoskeleton in the

spermatheca and the uterus and allows the exit of embryos. She has also performed the RNA-seq on fln-1(RNAi) animals to find out the genes affected by FLN-1 depletion and identify the potential pathways involved in this process.



Zihan LIU

### FHS Community Story

### FHS Student Receives Logo Design Champion

Zihan LIU, a PhD student of FHS, recently won the logo design in the 40<sup>th</sup> Anniversary of University of Macau Logo and Slogan Design Competition. The judging panel reviewed 83 entries of logo design and made a professional selection out of the excellent submitted works. Zihan LIU emerged and was the champion.

Yimin ZHENG, another PhD student of FHS, has made great contribution to Zihan LIU's prizewinning design work. They worked together to sketch ideas, refine the concept and finalize the layout. Afterwards, Yimin ZHENG turned the drawing into a usable digital format. Zihan LIU further polished the layout and prepared the design description in words. They integrated "UM" with "40" by transforming the upper half of "4" into "U" and the upper half of "0" into "M". With the amalgamation of "40" and "UM" and the combination of the brand colours of UM: the classic blue, yellow and red, they showed the joy of 40<sup>th</sup> anniversary in their design.

Being encouraged by her supervisor, Prof. Yutao XIANG, Zihan LIU actively works on soft skills in addition to the acquisition of professional expertise. She always spends her free time in browsing related websites and books, and joining various workshops to ameliorate her design thinking and skill. Yimin ZHENG is good at time management and makes the most out of his leisure time in which he is eager for knowledge other than his professional area. He implements himself through visiting exhibitions, following other designers to take inspirations and recreating design for practice. Moreover, he is also a sports enthusiast.

UM implements a '4-in-1' education model that consists of discipline- specific education, general education, research and internship education, and community and peer education. FHS has been putting lots of effort in fostering students in whole-person development.

Congratulations to both Zihan and Yimin for emerging victorious in this competition!





# UPCOMING

Sep / Oct				
Mon	Tue	Wed	Thu	Fri
5 Holiday - Exemption from work by the Chief Executive	6	<b>BCAT Meeting</b> Speaker: Prof. Yunlu DAI Time: 17:00-18:00 Venue: E12-G004	8 FHS Postdoc/ Student. Seminar Session: Cancer research Host: Prof. Edwin CHEUNG and Prof. Chuxia DENG Time: 17:00-18:00 Venue: N22-G002 and Zoom	9
12	13	14	15	16
19	20 Oral Defence Xinwei WU Supervisor: Prof. Ruiyu XIE Time: 9:30 Venue: N6-2022	21 BCAT Meeting Speaker: Prof. Kathy LUO Time: 17:00-18:00 Venue: E12-G004	22 FHS Postdoc/ Student Seminar Session: Drug development Host: Prof. Chris WONG and Prof. Jun ZHENG Time: 17:00-18:00 Venue: N22-G002 and Zoom <b>Oral Defence</b> Xingshun WANG Supervisor: Prof. Wei GEE Time: 10:00 Venue: N6-2022 <b>Oral Defence</b> Linlin LIU Supervisor: Prof. Wenhua ZHENG Time: 15:00 Venue: N6-2022	23 Oral Defence Jiankang FANG Supervisor: Prof. Wenhua ZHENG Time: 10:00 Venue: N6-2022

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