FACULTY OF HEALTH SCIENCES

2021 WEEKLY NEWSLETTER

Issue 21 | 24 - 28 May

Publication

1. Ding, R. B., Chen, P., Rajendran, B. K., Lyu, X., Wang, H., Bao, J., Zeng, J., Hao, W., **Sun, H.**, Wong, A. H., Valecha, M. V., Yang, E. J., Su, S. M., Choi, T. K., Liu, S., Chan, K. I., Yang, L. L., Wu, J., **Miao, K.**, **Chen, Q.**, **Shim, J. S.**, **Xu, X.**, and **Deng, C. X.** (2021) Molecular Landscape and Subtype-Specific Therapeutic Response of Nasopharyngeal Carcinoma Revealed by Integrative Pharmacogenomics. *Nat Commun* **12** (1), 3046 **[5yr IF = 13.61]**

2. Zhang, Z., Xie, L., Ju, Y., and **Dai, Y.** (2021) Recent Advances in Metal-Phenolic Networks for Cancer Theranostics. *Small*, e2100314 **[2019 IF = 11.459]**

3. Chen, C. Y., Li, Y., Zeng, N., He, L., Zhang, X., Tu, T., Tang, Q., Alba, M., Mir, S., Stiles, E. X., Hong, H., Cadenas, E., Stolz, A. A., **Li, G.**, and Stiles, B. L. (2021) Inhibition of Estrogen-Related Receptor Alpha Blocks Liver Steatosis and Steatohepatitis and Attenuates Triglyceride Biosynthesis. *Am J Pathol* **[5yr IF = 4.227]**

4. Ding, Z., Dou, X., Wang, C., Feng, G., Xie, J., and **Zhang, X.** (2021) Ratiometric pH Sensing by Fluorescence Resonance Energy Transfer-Based Hybrid Semiconducting Polymer Dots in Living Cells. *Nanotechnology* **32** (24) **[2019 IF = 3.551]**

5. Ng, H., Zhang, T., Wang, G., Kan, S., Ma, G., Li, Z., Chen, C., Wang, D., Wong, M., Wong, C., Ni, J., and **Zhang, X. D.** (2021) Epidemiological Characteristics of Influenza A and B in Macau, 2010-2018. *Virol Sin* **[2019 IF = 3.242]**

1 BCAT Meeting

Identification of Rare Driver Mutations and Molecular Classification of Lung Adenocarcinoma for Precision Cancer Medicine

In the BCAT meeting on 26 May, Prof. Terence POON introduced his study on the identification of actionable rare driver mutations. He mentioned that his research team attempted to identify rare driver mutations of lung adenocarcinoma (LUAD) through meta-analysis and mega-analysis of the mutational profiles of 1314 LUAD tumors from 7 whole exome sequencing studies. Two novel approaches were developed (i) to combine 9 bioinformatic tools for cancer driver gene discovery and (ii) to combine 12 bioinformatic tools for identifying of "change-of-function" (COF) mutations. He reported that 155 cancer driver genes were identified and 52 of them (33.5%) are considered as rare driver genes because COF mutations of individual genes were present in <1% of tumours. He introduced that multivariate analyses revealed specific associations between rare driver genes harbouring COF mutations and demographic/clinical features of the patients. His research team used Bayesian Dirichlet processes to

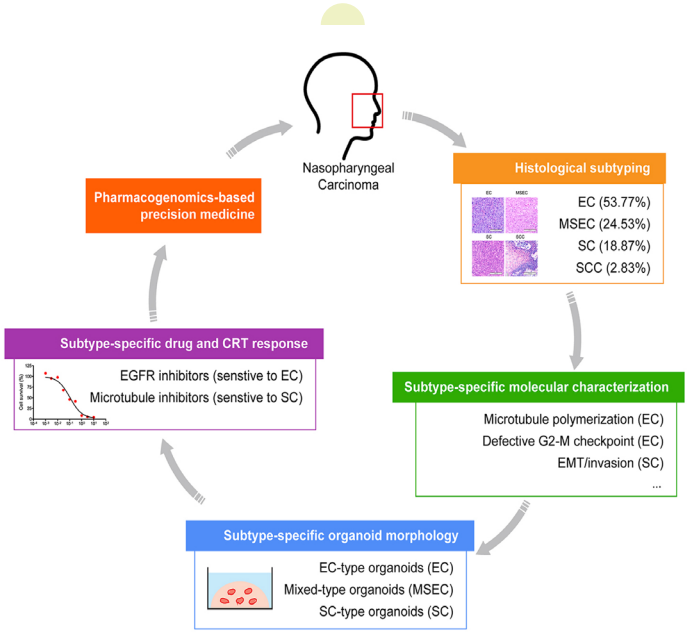
establish classification rules that separated the patients into molecular subgroups and patterns of co-mutation separated the cases into 14 classes. They found that the Bayesian Dirichlet processes were mainly governed by 8 driver genes. A simplified molecular classification of LUAD based the 8 driver genes was proposed. The molecular subgroups had distinct demographic features and survival outcomes. He demonstrated that their findings shed light on the development of precision cancer medicine.

2 Article Sharing

FHS Achieves Major Breakthrough in Nasopharyngeal Carcinoma Treatment

Prof. Chuxia DENG and his research team have successfully developed a novel cancer precision medicine strategy by integrating tumour organoid culture, genome sequencing, and bioinformatic analysis in collaboration with Kiang Wu Hospital. This strategy is a new breakthrough in precision medicine and can provide personalized treatment suggestions for nasopharyngeal carcinoma (NPC) patients of different subtypes. The study has been published in the internationally renowned journal *Nature Communications*.

NPC is a highly prevalent type of cancer in Macao and South China. However, there has been little research on the mechanisms of cancer development and molecular subtyping, which results in a lack of precision medicine strategies in NPC therapy. Prof. Deng's team applied whole-exome genome sequencing to study the molecular subtyping of 106 NPC tumours, and found that each subtype of NPC tumours was driven by different mutational genes and pathways. The team also cultured the mini-tumours derived from individual patients using organotypic culture technology to investigate personalised drug sensitivity. The results revealed sensitive and resistant drugs for mini-tumours/organoids of different NPC subtypes. Based on the above findings, the team proposed a novel pharmacogenomics-based precision medicine approach for the treatment of NPC. The study points to a new direction for precision oncology and has important clinical significance.

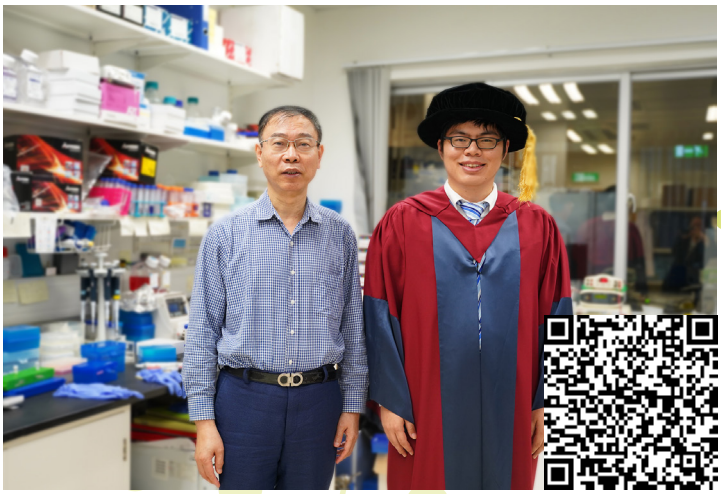


Prof. Deng's team has uncovered the differential driver molecular pathways and drug sensitivities of each NPC subtype.

In the past year, Prof. Deng's research team has achieved multiple major breakthroughs in cancer precision medicine, and has published a series of high-impact research articles in

internationally renowned journals, including *Nature Communications*, *Advanced Science*, and *Theranostics*. In January, the University received approval from the Ministry of Education to officially establish the Frontiers Science Center for Precision Oncology.

The corresponding author of the related paper is Prof. Deng. His PhD student Renbo DING, postdoctoral fellows Ping CHEN and Kumar Rajendran BARANI, as well as research assistant Xueying LYU are the co-first authors. The following individuals have also made important contributions to the study: Prof. Xiaoling XU and Prof. Joong Sup SHIM, postdoctoral fellows Haitao WANG and Jiaolin BAO, Kiang Wu Hospital doctors Shuiming LIU and Kin Iong CHAN, as well as Southwest Medical University Affiliated Hospital doctors Jingbo WU and Linglin YANG. The study was funded by the Science and Technology Development Fund, Macao SAR (file number: 065/2015/A2, 094/2015/A3, 0048/2019/A1 and 0011/2019/AKP) and UM (file number: CPG 2015-00016-FHS, MYRG2016-00139-FHS, MYRG2016-00132-FHS and MYRG2017-00113-FHS). The full version of the related paper can be viewed at: https://www.nature.com/articles/s41467-021-23379-3.



3 Visit

A visit to FHS inspires high school students of Chan Sui Ki Perpetual Help College to consider studies on biomedical sciences College

Around 35 Form 4 students from Chan Sui Ki Perpetual Help College were welcomed to the FHS to learn about the infrastructure, latest development, research accomplishments and academic programmes of FHS. They were warmly received by Prof. William Chong Hang CHAO.

The students toured the aquatic room and the Animal Research Core and also Proteomics,

Metabolomics and Drug Development Core, during which the laboratory technicians of FHS expounded to the students on the facilities and services provided by the cores. The students were amazed by the advanced zebrafish breeding system and the world-class core facilities.

After the lab tour, Prof. Chao oriented the students the academic programmes, research achievements, the cultivation of high-calibre students and the internationalization of FHS. Prof. Chao encouraged the students to pursue their studies in biomedical sciences to benefit the well-being of mankind and the society.

4 FHS Postdoc Student Seminar

Presented by Prof. Yutao XIANG's Group and Prof. Garry WONG's Group

On 27 May, Ms. Hong CAI of Prof. Yutao XIANG's group and Ms. Tianjao ZHANG of Prof. Garry WONG's group presented "Attitudes Toward COVID-19 Vaccines in Chinese Adolescents" and "Role and Function of piRNAs Across Various Tissues and their Potential Impact in Parkinson's Disease" respectively.

The next seminar will be held on 10 June, and presented by the group members of Prof. Chuxia DENG and Prof. Edwin CHEUNG.

UPCOMING EVENTS

May / June

Mon	**31** **Oral Defence** Zhimin LI Supervisor: Prof. Hongjie ZHANG Time: 15:00 Venue: E12-1015	**7** **Qualifying Examination** Speaker: Chi Teng LEI Supervisor: Prof. Leo LEE Time: 14:00 Venue: E12-1016
Tue	**June 1** **Oral Defence** Dejin ZHENG Supervisor: Prof. Ren-he XU Time: 15:00 Venue: E12-1015	**8**
Wed	**2**	**9** **BCAT Meeting** Speaker: Prof. Ruiyu XIE Time: 17:00-18:00 Venue: E12-G004
Thu	**3**	**10** **Qualifying Examination** Speaker: Jie KE Supervisor: Prof. Ruiyu XIE Time: 16:00 Venue: N22-3042 **FHS Postdoc/ Student Seminar** Session: Cancer Research, Precision Medicine Host: Prof. Chuxia DENG and Prof. Edwin CHEUNG Time: 17:00-18:00 Venue: N22-G002 and Zoom
Fri	**4**	**11** **Oral Defence** Renfei WU Supervisor: Prof. Kathy LUO Time: 10:00 Venue: E12-1015 **Qualifying Examination** Speaker: Lixin TAI Supervisor: Prof. Lijun DI Time: 10:00 -12:00 Venue: E12-4044

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