FACULTY OF HEALTH SCIENCES
2021 WEEKLY NEWSLETTER
Issue 27 | 5 - 9 July

Publication

1. Shi, Y., **Shen, H. M.**, Gopalakrishnan, V., and Gordon, N. (2021) Epigenetic Regulation of Autophagy Beyond the Cytoplasm: A Review. *Front Cell Dev Biol* **9**, 675599 **[5yr IF = 7.219]**
2. Chen, Y., Xi, X., Ma, C., Zhou, M., Chen, X., Ye, Z., Ge, L., Wu, Q., Chen, T., Wang, L., and **Kwok, H. F.** (2021) Structure-Activity Relationship and Molecular Docking of a Kunitz-Like Trypsin Inhibitor, Kunitzin-AH, from the Skin Secretion of Amolops Hainanensis. *Pharmaceutics* **13** (7) **[5yr IF = 6.734]**
3. Zuo, W., and **Kwok, H. F.** (2021) Development of Marine-Derived Compounds for Cancer Therapy. *Mar Drugs* **19** (6) **[5yr IF = 5.951]**
4. Zeng, Y., Xue, M., Zhang, T., Sun, S., Lin, R., Li, N., Zheng, P., Zhen, Y., Hu, H., **Zhang, X. D.**, and Sun, B. (2021) Soluble Form of Suppression of Tumorigenicity-2 Predicts Clinical Stability of Inpatients with Community-Acquired Pneumonia. *Exp Biol Med*, 15353702211027116 **[5yr IF = 3.666]**
5. Huang, C., Leng, D., Zheng, P., Deng, M., Li, L., Wu, G., Sun, B., and **Zhang, X. D.** (2021) Comprehensive Transcriptome Analysis of Peripheral Blood Unravels Key lncRNAs Implicated in ABPA and Asthma. *PeerJ* **9**, e11453 **[5yr IF = 3.369]**

1 BCAT Meeting

Prof. Jun ZHENG presented his latest research "Bacterial Persistence to Antibiotics and the Effective Drug Development" in the BCAT meeting on 7 July. Prof. Zheng said that bacterial persistence is one of the major causes of antibiotic treatment failure and the step stone for antibiotic resistance. He also mentioned that maintaining a dormant state to prevent antibiotics from taking effect is believed to be the fundamental mechanistic basis, and persisters normally maintain an intact cellular structure. Prof. Zheng's team has examined the morphologies of persisters in *Acinetobacter baumannii* which survived from the treatment by three major classes of microcopy and foundthat a fraction of enlarged spherical bacteria constituted a major sub-population of bacterial survivors from β-lactam antibiotics treatment whereas survivors from the treatment of aminoglycoside and fluoroquinolone were less changed morphologically. Prof. Zheng further reported that the spherical bacteria had completely lost their cell wall structures but could survive without any osmoprotective reagent. The spherical bacteria were not the viable-but-non-culturable cells and they could revive upon the removal of β-lactam antibiotics. Those non-walled spherical bacteria also persisted during antibiotic therapy *in vivo* using *Galleria mellonella* as the infection model. Furthermore, they found that the combinational treatment on *A. baumannii* by β-lactam and membrane-targeting antibiotic significantly enhanced the killing efficacy. Last but not least, they have identified two potential adjuvants to potentiate kanamycin and colistin to eradicate persisters respectively and have explored the primary mechanism of action of these two adjuvants.

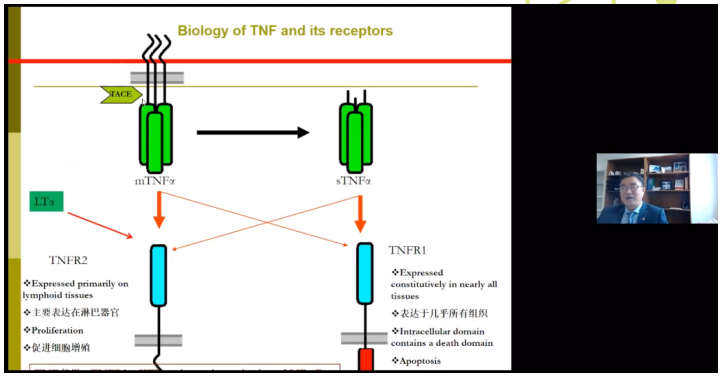
FACULTY OF HEALTH SCIENCES
2021 WEEKLY NEWSLETTER
Issue 27 | 5 - 9 July

2 Seminar Series

TNFR2: Emerging Hot Target for Cancer Immunotherapy – Prof. Xin CHEN

Prof. Xin CHEN, Interim Director and Distinguished Professor of the Institute of Chinese Medical Sciences (ICMS), presented "TNFR2: Emerging Hot Target for Cancer Immunotherapy" in the Ministry of Education (MoE) Frontiers Science Center for Precision Oncology (FSCPO) Seminar Series on 6 July.

Prof. Chen first introduced that TNFR2 is a receptor transduces the biological function of tumor necrosis factor-alpha (TNF). Prof. Joost J OPPENHEIM and he has firstly found and reported that TNFR2 played a decisive role in the activation, expansion, and phenotypical stability of highly immunosuppressive CD4+-Foxp3+ regulatory T cells (Tregs) and the finding has been substantiated and supported by many other groups although it is counterintuitive. He continue introduced that the Treg cells are crucial for immune homeostasis and the prevention of autoimmune responses, while they also represent a major cellular mechanism in cancer immune evasion. Prof. Oppenheim and he for the first time proposed that the blockade of TNFR2 may represent a novel strategy for the cancer immunotherapy. He reported that there is increasing evidence that the targeting of TNFR2 with pharmacological agents, used alone or in combination with other therapeutic agents, can eliminate tumor-infiltrating Treg cells and consequently inhibit the tumor growth or induce the complete regression of tumor. He concluded that he will continue to work on the discovery of TNFR2 and considered that TNFR2 is a target for cancer immunotherapy.



3 PhD Oral Defence

PhD Oral Defence by Ming ZHAO of Prof. Chuxia DENG's Group

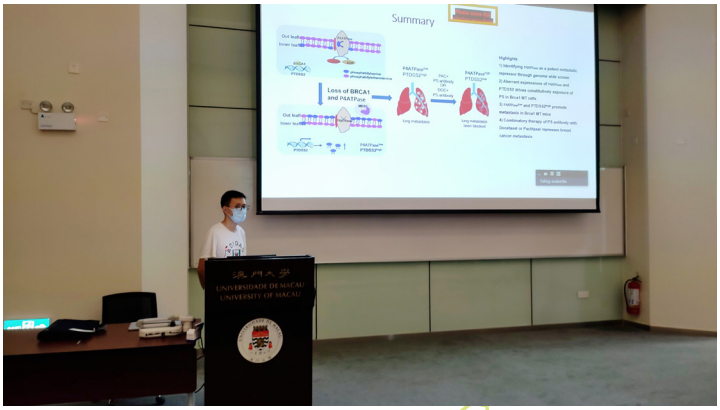
Mr. Ming ZHAO supervised by Prof. Chuxia DENG completed his PhD oral defence on 8 July. His thesis title is "An *In Vivo* Genome-wide Screen Identifies Cullin3 as A Liver Tumor Suppresser by Shaping the Hepatic Microenvironment and Aggravating Cholangiocarcinoma Tumorigenesis at An Early Stage".

Mr. Zhao introduced that cholangiocarcinoma (CC) is the most lethal type of liver cancer and it is very difficult to treat. He has conducted a genome-wide CRISPR-Cas9 screening in mouse liver and identifies Cullin3 (Cul3) as a suppressor of CC. The Cul3 deficiency increased the protein levels of Nrf2 and Cyclin D1 and thus he found that accelerated the cholangiocytes expansion led to the

initiation of CC. He further discovered that the Cul3 deficiency also increased the production of Amphiregulin mediated by Nrf2, which paracrinely induced the inflammation in the liver, and promoted the accumulation of exhausted PD1high CD8 T cells at the expenses of their cytotoxic activity, and finally led to the CC progression. He also reported that the anti-PD1/PD-L1 blockade on the primary tumor inhibited the CC growth, and the effect is enhanced by the combining the the blockade with sorafenib selected from the organoid culture.

4 FHS Postdoc Student Seminar

Presented by Prof. Xiaoling XU's Group



On 8 July, Mr. Jun XU of Prof. Xiaoling XU's group presented "Constitutive Externalization of PS Caused by P4ATPaselow-PTDSS2high Axis Accelerates Metastasis in Breast Cancer" in the FHS Postdoc Student Seminar.

The next seminar will be held on 8 July, and presented by the group members of Prof. Tzu-Ming LIU and Prof. Kathy LUO.

5 Community Story

FHS Science Talks Raise Local High School Students' Aspiration in Biomedical Sciences

Prof. Garry WONG and Prof. Chris WONG delivered two spellbinding science talks, "A love story of Mr. Coding and Ms. Biology" and "Do Your Genes Determine Everything about You?", to 87 Form 5 students of Sacred Heart Canossian College (English Session) and 30 Form 5 students of Colégio Diocesano de São José (5ª) respectively, aiming at arousing their interests in biomedical sciences.

Prof. Garry Wong enthused upon the correlation of computer science and biology and how computational biology is useful in scientific research. He created an engaging environment for the students by incorporating different fun activities with the aid of technology. The students actively answered the questions and made voting via their mobiles, and the answers and final statistics were reflected on the screen. They also got a chance to observe the nematodes. At the end of the talk, all the students agreed on the "marriage" of Mr. Coding and Ms. Biology.

Prof. Chris Wong amused the class by asking them to guess the genetic differences between human beings with chimpanzees, mice, fruit flies, yeast and plants. They were surprised that the chimp-human distinction is only 2% while mice and men share about 98% of their working DNA. Prof. Wong explained that although humans and chimps have many identical genes but a gene's activity can be turned up high in humans while very low in chimps. DNA was more fascinating than the students expected.

The FHS academics believe that it is important for human beings to continue to advance the field of science. They have been keeping up the high school students' enthusiasm of learning science. They showcased the students with amazing scientific innovations, ideas and findings in the science talks for bringing them new perspectives of biomedical sciences.

FACULTY OF HEALTH SCIENCES
2021 WEEKLY NEWSLETTER
Issue 27 | 5 - 9 July

UM iGEM Team Works On Their Project to Reduce Purine in Beer

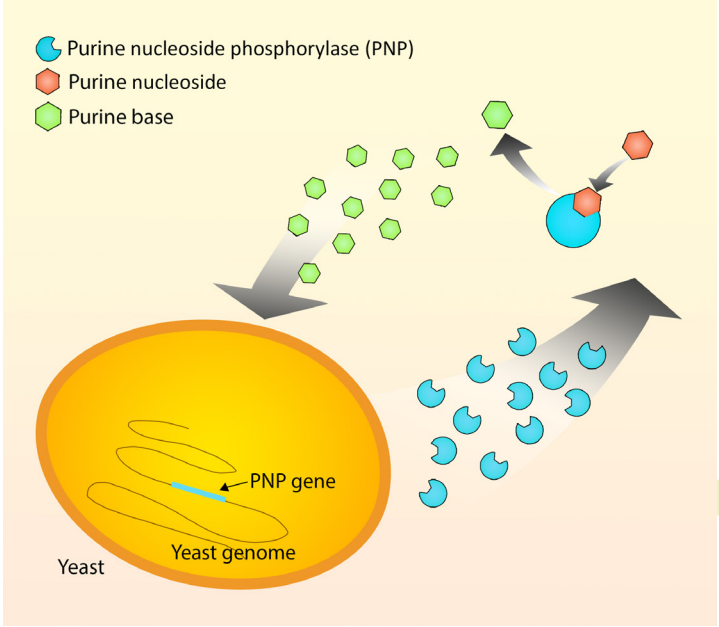
The students from FHS, the Faculty of Business Administration (FBA) and the Faculty of Arts and Humanities (FAH) are now preparing for the 2021 International Genetically Engineered Machine (iGEM) competition. The objective of their iGEM project is to reduce the high purine content of beer, while maintaining the taste and aroma in it.

Purines can be found in food such as certain types of meat, seafood and beer. When we consume these food, our bodies absorb the purines and go through a series of reactions to break down the purines. The end product of the reactions is uric acid which will be excreted out in urine. When there is problem in the balance of the production and excretion of uric acid, this will lead to a high level of uric acid in blood, effectuating the formation of crystals. These tiny, hard and sharp crystals deposit in joints and rub against the soft lining of the joints, eventually causing a lot of pain, swelling and inflammation in joints, which is known as gout.

Consuming beer is associated with a higher risk of gout as beer contains a higher level of purines. The purines, which are mainly composed of purine bases and purine nucleosides, come from the breakdown of malt nucleic acids when the grains are crushed for beer brewing. During beer fermentation, the yeasts are used for giving beer its alcohol content and carbonation. Interestingly, the yeasts also absorb the purine bases in the brew; yet, the yeasts do not absorb the purine nucleosides, leaving a high level of purines in the beer.

In order to reduce the purine nucleosides in the beer, the UM team decided to bio-engineer the yeasts. This involves the insertion of a new gene that encodes an enzyme called purine nucleoside phosphorylase (PNP) in the yeasts so that the yeasts can gain a new function to produce and release PNP to the brew. The released PNP which is safe to consume can then convert the purine nucleosides to purine bases which can be absorbed subsequently by the yeasts. With the insertion of the PNP gene, the bio-engineered yeasts now have ways to remove both the purine bases and purine nucleosides from the brew, and this beer with lower purine content can become a healthier alternative for drinkers, especially for those who are sensitive to the purine content.

The iGEM competition encourages students to design their projects using the standard, interchangeable pieces of DNA called as BioBricks to deal with issues they are now facing. In this competition, teams have to work together to design, build, test and measure a system of their own design using the BioBricks and standard molecular biology techniques.



6 Coming Event

7th Macau Symposium on Biomedical Sciences 2021

FHS is going to hold the "7th Macau Symposium on Biomedical Sciences 2021" on 23 and 24 July 2021 at the University Hall (N2), UM. This symposium is one of the celebrating events of the 40th anniversary of UM.

The theme of the symposium this year is Discovery, with topics on but not limited to cancer precision medicine, cancer immunology, translational medicine research, aging research, infectious disease and therapy, drug discovery and other new technologies in biomedical sciences.

Let's join the annual event together and please visit http://msbs2021.fhs.um.edu.mo for more details.

UPCOMING EVENTS

July		
Mon	**12** **Qualifying Examination** Speaker: Zhiwei ZHOU Supervisor: Prof. Wenhua ZHENG Time: 15:00 Venue: E12-3036	**19**
Tue	**13**	**20** **Qualifying Examination** Speaker: Yang QIAO Supervisor: Prof. Zhen YUAN Time: 14:00 Venue: E12-4044 **Qualifying Examination** Speaker: Dongliang LENG Supervisor: Prof. Douglas ZHANG Time: 15:00 Venue:TBC
Wed	**14**	**21** **BCAT Meeting** Speaker: Prof. Chris WONG Time: 17:00-18:00 Venue: E12-G003
Thu	**15** **The Pursuit of Research in FHS** Visitor: Pui Ching Middle School, Houkong Middle School, Escola Xin Hua, Kwong Tai Middle School Macau Time: 10:30 - 12:00 Venue: E12-1061 & N22-G002	**22** **FHS Postdoc/ Student Seminar** Session: Cancer research, Bioimaging, and Drug Discovery Host: Prof. Tzu-Ming LIU and Prof. Kathy LUO Time: 17:00-18:00 Venue: N22-G002 and Zoom **Qualifying Examination** Speaker: Sen YE Supervisor: Prof. Ren-he XU Time: 10:30 Venue: N22-4028 **Qualifying Examination** Speaker: Sen YE Supervisor: Prof. Ren-he XU Time: 10:30 Venue: N22-4028
Fri	**16**	**23** **7th Macau Symposium on Biomedical Sciences** Time: 09:00 Venue: N2-University Hall
Sat	**17**	**24** **7th Macau Symposium on Biomedical Sciences** Time: 09:00 Venue: N2-University Hall

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