

Department of Biomedical Sciences Presents a seminar

From Cells to Life — On the way to generating functional synthetic embryos

Dr. Man Zhang
Principal Investigator, Guangzhou Lab

Date: 12 May 2023 (Friday)

Time: 2:30pm – 3:30pm (Hong Kong Time)

Zoom Link: <https://cityu.zoom.us/j/98362316380>

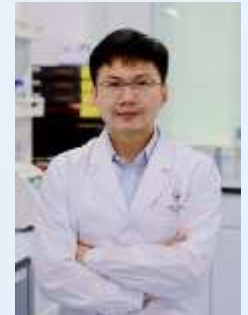
(Meeting ID: 983 6231 6380 & Passcode : 115185)

Abstract: Synthetic embryos can be used as a tractable tool to explore embryogenesis without sacrificing animals. However, none of the reported synthetic embryos (blastoids) can develop to full term. Recently, we compared the mouse synthetic embryos aggregated with different types of totipotent-like cells. The results showed that spliceosomes-repressed totipotent blastomere-like cells (TBLCs) generated blastoids with the highest efficiency. In addition, scRNA-seq of blastoid cells revealed that extra-embryonic lineages of all types of blastoids were not established correctly, which might be the major reason that they cannot develop normally in vivo. Therefore, to figure out the epigenetic barrier between somatic and trophoblast cells, we screened a batch of small molecules targeting the epigenetic regulators and found that treatment of sodium butyrate, an HDAC inhibitor, can directly transdifferentiate embryonic stem cells (ESCs) into trophoblast stem cells (TSCs) without the transition through a 2C-like state. Mechanistically, butyrate inhibits Class I histone deacetylases activities in LSD1-HDAC1/2 corepressor complex, enhancing acetylation levels in the regulatory regions of abundant TSC specific genes and increasing their mRNA expression level. These results indicated HDAC1/2 secure ESC identity from trophoblast cell fate.

About the speaker:

2003.9- 2007.7 B.S. in Biology, Sichuan University, Sichuan Province, China;
2007.9 - 2013.9 PhD in Developmental Biology, SIBCB, Chinese Academy of Sciences, Shanghai, China;
2014.8 - 2019.11 Postdoctoral Research Associate, University of Edinburgh, UK (Prof. Ian Chambers' Lab);
2019.11- Present Principal Investigator, Guangzhou Lab

Focused on germ cell and early embryo development, Dr Man Zhang has published 15 high-quality academic papers until now, including Nature, Cell Reports, Cell Research, Cell Stem Cell etc. Together with his colleagues, he found transcription factor Otx2 plays a critical role in germ cell entry (Nature, 2018). Besides, he elucidated the function of Nanog and Esrrb in germ cell initiation and development (Cell Report, 2018; Stem cell reports, 2022). He was selected in the National Youth Talent Plan (2019).



Enquiries:

Ms Irene Wong (3442-4707, irene.wong@cityu.edu.hk)

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