



ON-SITE BIOLOGY COLLOQUIUM

Friday, 11 Oct 2024 | 4 pm | DBS Conference Room 1, Blk S3 Level 5

Hosted by Assoc Prof Liou Yih-Cherng

Map to Block S3



A novel protein CYTB-187AA with mitochondrial DNA-encoded protein arising from cytosolic translation (mPACT) pattern

By **Xingguo Liu**

Guangzhou Institutes of Biomedicine and Health, Chinese Academy of Sciences



About the Speaker

Professor Xingguo Liu, was honored as "Distinguish Youth Foundation" of National Natural Science Foundation, Chief Scientist of the National Key Research and Development Program of China, 1st finisher of the first prize of the Guangdong Science and Technology Award in Natural Science, The Shulan Medicine Youth Award by the Academician Shusen Lanjuan Talent Foundation, The Ying Ding Science and Technology Award, "2016 Stem cell Young Investigator Award" from Chinese Society for Cell Biology and "Young Bioenergeticist Award" of the International Biophysical Society. He is the Executive Editor of Science Bulletin, the council member of the Asian Society for Mitochondrial Research and Medicine, and the council member of the Biophysical Society of China. Dr. Liu has published more than 80 papers, which have been cited for more than 6000 times. Since 2015, he has published 32 research papers as corresponding author (4 IF>20, 22 IF>9), such as Cell Metabolism (2016,2018, 2024), Nature Metabolism, Nature Structural & Molecular Biology, Nature Communications (2022,2024), Science Advances (2019, 2022), Advanced Science, Hepatology. Among his papers, 3 were recommended by F1000, 9 were chosen as cover, and his findings have been listed in 17 books such as Encyclopedia of Biological Chemistry. He obtained 10 authorized patents (including one PCT). Dr. Liu has been the invited speaker in Keystone Symposia.

The mitochondrial genome transcribes 13 mRNAs coding for well-known proteins essential for oxidative phosphorylation. We demonstrate here that cytochrome b (CYTB), the only mitochondrial-DNA-encoded transcript among complex III, also encodes an unrecognized 187 amino-acid-long protein, CYTB-187AA, using the standard genetic code of cytosolic ribosomes rather than the mitochondrial genetic code. After validating the existence of this mtDNA-encoded protein arising from cytosolic translation (mPACT) using mass spectrometry and antibodies, we show that CYTB-187AA is mainly localized in the mitochondrial matrix and promotes the pluripotent state in primed-to-naïve transition by interacting with SLC25A3 to modulate ATP production. We further generated a transgenic knock-in mouse model of CYTB-187AA silencing and found that reduction of CYTB-187AA impairs females' fertility by decreasing the number of ovarian follicles. For the first time we uncovered novel mPACT pattern of a mitochondrial mRNA and demonstrated the physiological function of this 14th protein encoded by mtDNA.