NUS National University of Singapore | Department of Biological Sciences, Faculty of Science

ON-SITE BIOLOGY COLLOQUIUM

Friday, 15 Mar 2024 |4 pm| DBS Conference Room 1, Blk S3 Level 5

Hosted by Assoc Prof Liou Yih-Cherng

Map to Block S3

Dynamic palmitoylation regulates fatty acid metabolism

By **Tong-Jin Zhao**

Institute of Metabolism and Integrative Biology, Fudan University

Fatty acids are essential nutrients for cellular activities. In addition of being energy sources and precursors for biomembrane synthesis, fatty acids can be used to modify proteins. Protein S-palmitoylation is one of the lipid modifications. It is catalyzed by a family of enzymes that have a Aso-His-His-Cys (DHHC) motif in the active site. Our laboratory is interested in how different metabolic tissues uptake fatty acids in different contexts. CD36 is a palmitoylated protein that plays an essential role in fatty aid uptake of many metabolic tissues. We show that in adipocytes, DHHC4 and DHHC5 palmitoylate CD36 at Golgi and plasma membrane, respectively, to target CD36 to the plasma membrane. Binding of fatty acids to CD36 triggers a signaling pathway to inactivate DHHC5, thereby leading to depalmitoylation of CD36 and endocytic uptake of fatty acids. In muscle stem cells, CD36 is regulated differently. It is usually localized in the cytosol. After muscle damage, a snare protein STX11 is palmitoylated, which triggers the fusion of STX11- and CD36-containing vesicles. CD36 is then translocated to the plasma membrane to facilitate fatty acid uptake and muscle stem cell proliferation. Our studies uncover a regulatory mechanism of dynamic palmitoylation in regulating fatty acid metabolism.

About the Speaker

Dr. Tong-Jin Zhao obtained his Bachelor's degree from Shandong University in 2002, and his PhD from Tsinghua University in 2007. From 2007 to 2014, he joined the Brown&Goldstein laboratory at UT Southwestern as a postdoctoral fellow and research assistant professor. In 2014, Dr. Zhao moved to School of Life Sciences at Xiamen University and worked as a professor. From 2019, he is professor at Institute of Metabolism & Integrative Biology (IMIB) of Fudan University. In 2022, he was supported by the National Science Fund for Distinguished Young Scholars.

His laboratory mainly focuses on dissecting the molecular mechanism of the metabolic diseases. They are currently working on the regulatory mechanism of fatty acid sensing and uptake. Dr. Zhao has published a series of research articles, including Developmental Cell, Cell reports and Nature Communications.