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

BIOLOGY COLLOQUIUM

Friday, 14 July 2023 | 4 pm | DBS Conference Room 1

Hosted by Assoc. Prof Low Boon Chuan

Regulation of erythroid heme synthesis by mitochondrial proteins

By **Yvette Yien**

University of Pittsburgh

About the Speaker

Dr. Yien earned her B.Sc from NUS, where she studied mitochondrial apoptosis in Victor Yu's lab. She earned her PhD from the Mount Sinai School of Medicine in New York City, where she focused on regulation of erythroid transcription. Subsequently, she completed a postdoctoral fellowship at the Brigham and Women's Hospital at Harvard Medical School studying mitochondrial iron metabolism. Her postdoctoral work was funded by NIH/NIDDK F32 and K01 fellowships. She was promoted to Instructor of Medicine at Harvard Medical School, and in 2017, she started her lab at the University of Delaware as an Assistant Professor at the Department of Biological Sciences. There, she started the first zebrafish research facility in the state and continued her work on iron metabolism and its interplay with development. In 2021, she was recruited to the University of Pittsburgh at the rank of Associate Professor. Her work is currently funded by an NIGMS R35. Her independent work has previously been funded by other awards from the NIDDK (K01 and R03, and 2 pilot grants), NHLBI (P01 subproject), NIGMS (P20 subproject), as well as a Cooley's Anemia Foundation award. She has a pending new NIDDK R01 grant which is anticipated to start in September 2023.

The goal of the Yien lab is to identify the mechanisms that regulate govern the interplay between iron metabolism and cell fate. Iron catalyzes both ubiquitous and cell-specific redox reactions in all cells. Although iron metabolism is cell-specific, context-dependent regulation of iron transport or fate remain poorly understood. We show that the mitochondrial protein unfoldase and master regulator of protein quality control, CLPX is a key regulator of heme synthesis. CLPX is best known as part of the mitochondrial CLPXP protease and is required in all cells. CLPX regulates the initial and terminal steps of heme synthesis, and regulates iron fate, showing context-specific roles for proteins that are known to have ubiquitous housekeeping functions. In a second project, we showed that deficiencies in iron transport and heme synthesis cause developmental and cellular defects even under iron-replete conditions. We show that iron transport through MFRN1 is required for terminal erythroid differentiation, and that iron is prioritized in a cell-specific manner when it is limiting.