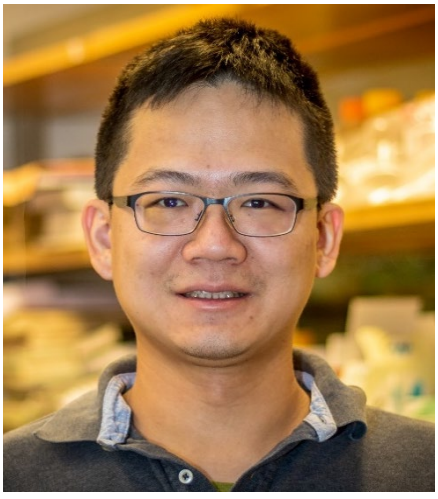
NUS National University of Singapore | Department of Biological Sciences, Faculty of Science

BIOLOGY COLLOQUIUM

Friday, 11 Oct 2019 | 4pm | DBS Conference Room 1

Hosted by A/P Wu Min

Using recombinant human tubulin to dissect the structure and function of the microtubules with different tubulin isotypes



By **Shih-Chieh Ti**

School of Biomedical Sciences,
University of Hong Kong

α/β-tubulin heterodimers polymerize into microtubules that are central to cellular processes, such as cell division, cell migration, and organelle transportation. The human genome encodes at least nine α- and ten β-tubulin gene families (i.e., isotypes). Single point mutations in a specific tubulin isotype have been associated with human diseases, suggesting that tubulin isotypes do not complement each other in functions. However, even with studies for more than five decades, the biological function and properties of human tubulin isotypes are currently not clear. This knowledge gap is mainly due to the challenge facing the field to generate recombinant human tubulin of specific isotypes. To fill this knowledge gap, we developed a long-sought strategy for generating recombinant human tubulin of specific isotypes. We discovered that changes in the primary sequences of nanometer-size tubulin (i.e., disease-related point mutations or tubulin isotypes) could control the polymerization dynamics, the stability, and the tubulin subunit organization of micrometer-scale polymers. Our work on recombinant human tubulin opens a new avenue for answering the biological questions that have puzzled the field for decades.

Dr. Ti received his bachelor degree from the Department of Chemistry at the National Taiwan University. In 2006, Dr. Ti pursued his doctoral degree in Dr. Thomas Pollard's laboratory at Yale University. His thesis research focused on dissecting the mechanism underlying the Arp2/3 complex-mediated formation of actin branches. In 2012, he joined Dr. Tarun Kapoor's laboratory at the Rockefeller University for postdoctoral training. At Rockefeller University, he used biochemical and biophysical methods to study how tubulin isotypes can regulate microtubule properties. In 2019, he joined the School of Biomedical Sciences at the University of Hong Kong as an Assistant Professor.