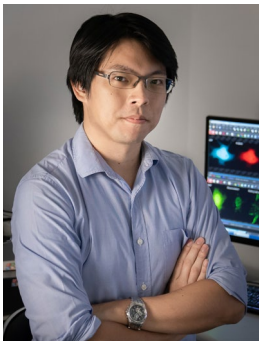
NUS National University of Singapore | Department of Biological Sciences, Faculty of Science

VIRTUAL BIOLOGY COLLOQUIUM

Friday, 25 Mar 2022 | 4 pm | Online Zoom Session

Hosted by Dr Phua Siew Cheng

Precise Control of Microtubule Disassembly in Living Cells



By **Yu-Chun Lin**

Associate Professor, Institute of Molecular Medicine
National Tsing Hua University, Taiwan

Microtubules tightly regulate various cellular activities. Our understanding of microtubules is largely based on microtubule-targeting agents, which, however, are insufficient to dissect the dynamic mechanisms of specific microtubule populations due to their slow effects on the entire pool of microtubules. To address this limitation, we have used chemogenetics and optogenetics to disassemble specific microtubule subtypes including tyrosinated microtubules, primary cilia, mitotic spindles, and intercellular bridges, by rapidly recruiting engineered microtubule-cleaving enzymes onto target microtubules in a reversible manner. Acute microtubule disassembly swiftly halted vesicular trafficking and lysosomal dynamics. It also immediately triggered Golgi and ER reorganization and slowed the fusion/fission of mitochondria without affecting mitochondrial membrane potential. Cell rigidity was increased after microtubule disruption owing to increased contractile stress fibers. Microtubule disruption prevented cell division but did not cause cell death during interphase. These tools enable to uncover new insights of how microtubules precisely regulate cellular architectures and functions.

About the Speaker

Dr. Lin obtained Ph.D. degree at TungHai University in Taiwan (2008). He then did first postdoctoral research at National Taiwan University, Taiwan (2009~2011) and second at Johns Hopkins University School of Medicine, USA (2011~2014). Dr. Lin joined National Tsing Hua University in Taiwan as an assistant professor in 2015 and was promoted associate professor in 2019. He and his team focus mainly on two projects: 1) Spatiotemporally manipulating the microtubule disassembly and post-translational modifications (Hong et al., Nat Commun, 2018; Yang et al., Front Cell Dev Biol, 2021); 2) Sonogenetics: using medical ultrasound to control cellular activities (Fan et al., ACS Synth Biol, 2017; Huang et al., Nano Letters, 2020; Wu et al., Theranostics, 2020; Fan et al., Nano Letters, 2021). These established tools will serve as catalysts to incorporate powerful new methodology and unique concepts to scientific communities as well as offering new strategies for various non-invasive therapeutic applications.

Join Zoom Meeting | LINK
Meeting ID: 810 4678 9165
Password: 881154

Virtual Seminar Etiquette:

- ✓ Please "mute" upon arrival into the meeting room.
- ✓ Questions can be asked after the presentation. You are encouraged to verbally ask questions or submit your questions via chat group.
- ✓ By being present at this meeting, **information presented is a privilege** and you agree that you would **NOT UNDERTAKE** any forms of recording/photo-taking.