

Understanding extracellular vesicles biology through the study of protein dynamics with pSILAC-based quantitative proteomics



Mr Tan Chee Fan
NTU Institute for Health Technologies

11 September 2019, Wednesday
10.00am

BTI Boardroom
Level 6, Centros

Hosted by Dr Bi Xuezhi

Seminar Abstract

Extracellular vesicles (EVs) are membranous vesicles that contain cytosolic materials and are released by the cells into the extracellular milieu and this is an evolutionary conserved process that occurs in both eukaryotic and prokaryotic cells. Depending on the biogenesis pathways and size ranges, EVs are broadly classified into apoptotic bodies (50-5000nm), microvesicles (100-1000nm) and exosomes (30-150nm). EVs, in particular exosomes and microvesicles, have been shown to play major roles in intercellular communication by direct transfer of functionally active biomolecules including proteins and nucleic acids into the cytosol of recipient cells. Proteomics technology has been widely used in the characterization of EVs subpopulation and elucidation of their functional role. However, these studies have mainly focused on the protein content and quantity. Owing to the secretory nature of EVs, we believed that proteins essential for EVs biogenesis or intercellular communication to have a higher protein synthesis rate. Therefore, we have developed a system biology approach driven by pSILAC-based quantitative proteomics to study the protein dynamic in EVs and their role in EVs biogenesis and intercellular communication. In this seminar, I will illustrate the application of pSILAC-based quantitative proteomics in 1) identifying the role of Cathepsin proteins in EV biogenesis in mHypoA 2/28 hypothalamus cells; 2) studying the impact of hypoxia stress on protein synthesis dynamics and EV loading in A549 lung adenocarcinoma cells.

About the Speaker

Chee Fan received his Bachelors of Science degree in Biological Sciences from Nanyang Technological University in 2013. He enrolled into the Interdisciplinary Graduate Programme, NTU in 2015 and is about to complete his PhD studies. His PhD project involves the application of pSILAC-based quantitative proteomics in the study of extracellular vesicles biology.