NUS National University of Singapore

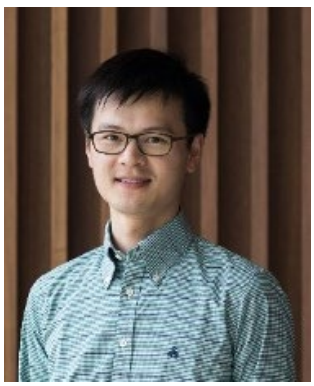
Department of Biological Sciences
Faculty of Science

SEMINAR

Fri, 22 Nov 2024 | 1:30 pm | DBS Conference Room 1

Hosted by Asst Prof Qu Kun & Asst Prof Tan Yong Zi

Molecular Architecture of Coronavirus Double Membrane Vesicle Pore complex



About the Speaker

Dr. Tao Ni received his PhD in 2016 in Oxford University, and completed his postdoctoral training with Professor Peijun Zhang in the University of Oxford. He then joined as an Assistant Professor in Structural Biology in the School of Biomedical Sciences in The University of Hong Kong from 2022. He is a well-trained in structural biologist specialized in X-ray crystallography, cryo-electron microscopy, and cryo-electron tomography. His main focus is to understand the molecular mechanism of host-pathogen interactions and large molecule assembly mechanism, aiming to identify novel interfaces to inhibit virus replication.

By **Tao Ni**

The University of Hong Kong

Positive-stranded RNA viruses substantially remodel intracellular membranes during RNA replication, which is a common feature observed in picornaviruses, flaviviruses, noroviruses and coronaviruses. The replication of coronaviruses, such as MERS-CoV, SARS-CoV-2 and mouse hepatitis virus (MHV), leads to the formation of DMVs in host cells to accommodate viral RNA synthesis and modifications. SARS-CoV-2 non-structural protein (nsp) 3 and 4 are the minimal viral components required to induce DMV formation and to form a double-membrane spanning pore, essential for the transport of newly synthesized viral RNAs. The mechanism of DMV pore complex formation remains unknown. Here we present the molecular architecture of SARS-CoV-2 nsp3-4 pore complex, as resolved locally up to 3.9 Å resolution by cryo-electron tomography and subtomogram averaging within isolated DMVs. Our work establishes a framework for understanding DMV pore formation and RNA translocation, providing a structural basis for the development of new antiviral strategies to combat coronavirus infection. In this seminar, I will present our recent work about coronavirus double membrane vesicle pore complex and discuss the application of cryo-electron tomography in the modern virology research, especially on the intramembrane membrane reorganization and RNA transport machineries.