NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

School of Biological Sciences
College of Science

Seminar Announcement

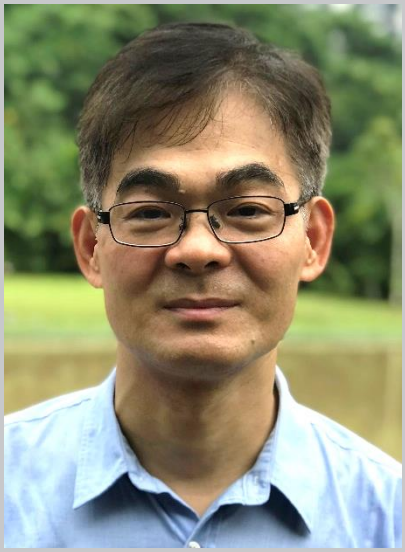
Protein ‘aging’ drives human cardiovascular disease and dementia

Date: **9 October 2020, Friday**

Time: **4pm**

Venue: **Classroom 1, SBS**

Progressive protein damages by spontaneous chemical reactions such as oxidation, deamidation, glycation and many others (degenerative protein modifications - DPMs) have long been recognized as important mediators of human aging and degenerative diseases. However, the underlying mechanisms that drive pathology have remained elusive. My laboratory therefore developed advanced proteomics techniques and animal models of diseases that enable detailed study of global DPMs in tissues from animal models and patients with cardiovascular disease (CVD), diabetes and dementia. The effort has leaded to a striking discovery that key proteins in plasma, vascular walls, and brain undergo age-related structural changes that gain new function to bind to immune cells and platelets, thereby triggering secretion of proinflammatory cytokines and promoting abnormal thrombosis. We then generated a transgenic mouse model that lacks the DPM repair enzyme, and hybridoma cell that produces DPM-specific mAb for functional studies. The transgenic mouse develops arteriosclerosis, aortic/abdominal aneurysms, immune cells infiltration to the vascular beds similar to human CVD. Upon inspection of brain tissues, we observed blood vessel damage, micro-bleeding, and thrombosis similar to the pathology of human vascular dementia. We have also identified a panel of 10 novel DPM plasma proteins that accumulate to high levels in blood from CVD and dementia patients. We are now working closely with clinical investigators to translate our basic research discoveries into clinical use, and hope to radically improve human ‘healthspan’ in the near future.



Speaker:

Sze Siu Kwan
Associate Professor
School of Biological Sciences
Nanyang Technological University