ORGANISED BY:

香港中文大學理學院
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THE CHINESE UNIVERSITY OF HONG KONG

School of Life Sciences
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The 5“A”s: ageing, autophagy, Alzheimer’s, Artificial intelligence, and an “A” molecule” in brain protection and healthy longevity

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SCIENCE CENTRE L4, CUHK

SPEAKER:

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ABSTRACT:

Increased lifespan enables people to live longer, but not necessarily healthier lives. Ageing is arguably the highest risk factor for numerous human diseases, including Alzheimer’s disease (AD); thus understanding the molecular mechanisms of human aging holds the promise of developing interventional and therapeutic strategies for many diseases simultaneously, promoting healthy longevity. Accumulation of damaged mitochondria is a hallmark of aging and age-related AD. However, the molecular mechanisms of impaired mitochondrial homeostasis and their relationship to AD are still elusive. Mitochondrial autophagy (mitophagy) is the cellular self-clearing process that removes damaged and superfluous mitochondria, and therefore plays a fundamental role in maintaining neuronal homeostasis and survival. We hypothesise that age-susceptible defective mitophagy causes accumulation of damaged mitochondria, first in the high energy-demanding and ‘fragile’ entorhinal cortex Layer II region, leading to inflammation, senescence, and finally cellular dysfunction and/or death; this age-related risk combines with genetic and environmental risks causing AD and its progression. Restoration of mitophagy/autophagy, through pharmaceutical (e.g., NAD+, passion fruit components, and urolithin A) and genetic approaches, forestalls pathology and cognitive decline in mouse models of AD and improves neuronal function in AD iPSC-derived neurons. Additionally, artificial intelligence (AI) is now being used to propel drug screening, as well as being used for drug design specifically targeting AD and ageing pathways. The Evandro Fang lab is now leading/involved in several clinical trials looking into the use of NAD+ precursors to treat AD and premature ageing diseases, among others.