Neurobiology/Ageing Programme

# SEMINAR

NUS National University of Singapore

## Neurodegeneration study: From molecules to big animal models.


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**Introduction**

Born in Shanghai, China, **Xiao Zhi-Cheng** holds a Doctor of natural science degree from Swiss Federal Institute of Technology, Zurich. He was also trained in Harbin Medical University, University of Science and Technology of China, and Beijing Medical University as a medical student and a MSc and PhD candidate. He was a postdoctoral fellow of University of California, Irvine, University of Southern California, University of Rochester in USA, McGill University in Canada, and University Hamburg in Germany. He joined Singapore General Hospital in 2000 as a principal investigator, IMCB, Singapore in 2004, and Hong Kong University in 2008 as an Associate Professor. He jointed GSK in 2009 as a Director of Innovative Research. He joined and Monash University in 2010 as a Full Professor.

Appropriate connections or interactions among different neural cell types are essential for the correct and efficient functioning of the nervous system during development and regeneration after trauma or degeneration. The aim of my research is to understand the molecular events that mediate communication among neural cells, in the nervous system during development, myelination, learning and memory, degeneration, and regeneration. These studies have yielded insights into the therapeutic potential of cell signalling molecules to ameliorate or even ablate the detrimental consequences of nervous system injury and neurodegenerative diseases, including stroke, traumatic brain injury, spinal cord injury, Alzheimer Disease (AD), and Multiple Sclerosis (MS).


**Abstract**

Currently an estimated 26.6 million people suffer from Alzheimer Disease (AD) worldwide. Fundamental to defining therapeutic targets for AD is to understand the underlying pathogenic mechanisms. Amyloid precursor protein (APP) is a ubiquitous type I membrane protein. In AD, abnormal processing of APP leads to accumulation of A peptide and subsequent formation of amyloid plaques. APP knockout mice show reduction in brain volume whereas deletion of APP results in developmental lethality and neuroanatomical abnormalities. This suggests a role of APP in neural development. In AD, there is a significant reduction of Musashi1-positive progenitor cells in the SVZ, but an increase in GFAP-negative astrocyte-like cells with progenitor characteristics. APP reduces the neuronal differentiation of stem/progenitor cells. Our recent finding that TAG-1/APP signaling suppresses neurogenesis in mouse neural stem/progenitor cells may shed light on the mechanisms by which APP modulates stem/progenitor cell functions. Recently we identified TAG-1 as a novel APP ligand, increasing APP intracellular domain (AICD) release. Importantly, in embryonic neural stem cells (NSCs) this process negatively regulates neurogenesis. We hypothesize that APP-TAG-1 interactions modulate adult NSCs, and particularly those in the aging population under pathological conditions such as AD. Thus it will be important to explore the mechanisms by which this interaction leads to reduction of neurogenesis from molecules to big animal models, such as pig AD transgenic models.


**Date and time: Monday, 28 November 2011**
**Time: 3 – 4pm**
**Venue: NUS Centre for Life Sciences, Seminar Room 1**
**Host: Associate Professor Gavin Dawe , Department of Pharmacology**
**Neurobiology/Ageing Programme, Life Sciences Institute**