NANYANG TECHNOLOGICAL UNIVERSITY

School of Biological Sciences

Reg. No. 200604393R

Research Theme: Neuroscience

Research Project Title: Molecular mechanisms underlying experience- and activity-dependent regulations of adult neurogenesis

Principal Investigator/Supervisor: Asst/ Prof Ayumu Tashiro

Project Description

a) Background

New neurons are continuously generated in certain regions of adult mammalian brain. One of those regions is the dentate gyrus, a subregion of hippocampus, which is essential for memory formation. These new neurons in the adult dentate gyrus have been suggested to have an important role in learning and memory. The memory functions of new neurons is thought to be mediated through experience- and activity-dependent regulations of adult neurogenesis, which would lead to the formation of new neuronal circuits reflecting animal's experience.

b) Proposed work

In this project, we aim to understand molecular mechanisms underlying these experience- and activity-dependent regulations of adult neurogenesis in the dentate gyrus. One approach is to use retrovirus-mediated single-cell gene manipulation techniques (gene knockout, RNA interference etc) and to examine the roles of candidate genes (such as neurotransmitter receptors and their downstream genes) in neurogenic processes. Another approach is to perform gene expression analysis in new neurons to identify new genes involving the regulations of adult neurogenesis.

Reference:

Eur J Neurosci. 2011, 33:1094-100.
J Neurosci. 2007, 27:3252-9.
Nature. 2006, 442:929-33.

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