

RECRUITMENT VISIT: TEACHING SEMINAR

LEARNING AND MEMORY

The aim of this lecture is to describe the types of learning and memory which occur in the nervous system, and the role of the hippocampus and other nervous system structures in short and long term memory formation. The key concepts that we will discuss are- Distinctions between different kinds of memory, define synapses, long term synaptic potentiation (LTP) and its relationship to memory, explain the concept of synaptic plasticity as the basis of memory, and why the hippocampus may be so important in some new memories, explain the key role of the NMDA receptor and intracellular Ca^{2+} concentration in inducing some forms of LTP, changes in neuronal properties known to contribute to long-term potentiation, and mechanisms that mediate memory loss in disease states like Alzheimer's disease and other dementias.

ABOUT THE SPEAKER

My research has focused on elucidating the fundamental molecular mechanisms of synaptic transmission and a variety of forms of synaptic plasticity in a number of brain regions including the amygdala, hippocampus, and the midbrain. My research incorporates molecular manipulations of defined neuronal populations with the goal of elucidating the functions of synaptic molecules in defined circuits and behaviors. I use molecular manipulations in combination with a variety of cell biological, optogenetic and electrophysiological assays in different in vitro and in vivo preparations. Broadly, the two main areas of my research focus have been: *i. Molecular mechanisms mediating synaptic transmission and synaptic gain, ii. Neural mechanisms of reward and motivation*

My doctoral research work at the University of Queensland addressed how fear memories are inhibited during fear extinction, the process by which an individual learns to 'unlearn' a previously learned, undesired emotion. For my postdoctoral training, I relocated to Stanford University to train with Profs. Rob Malenka and Tom Sudhof in molecular neuroscience and rodent behaviour. Here, I gained expertise in molecular biology and virus design that allowed me to manipulate synaptic molecules and neural circuits in free behaving animals. Using these tools, I studied mechanisms mediating long term plasticity. Over the past 5 years, I began exploring synaptic function and plasticity in key nodes of the circuitry underlying rewarding behaviors with the goal of probing synaptic mechanisms that contribute to the pathological circuit maladaptation that underlie neuropsychiatric disorders.

Wednesday

13 February 2019

10.30 am to 11.30 am

Seminar Room, MD10

Level 2, Anatomy Museum

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