NUS Graduate School for Integrative Sciences and Engineering
Research Project Write-up

Title of Project :	Behavioural and electrophysiological studies of learning, memory and long-term potentiation
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Short Description

Long-term potentiation (LTP) is a form of synaptic plasticity widely assumed to be involved in learning and memory. However, LTP is a phenomenon generated by electrical stimulation of brain pathways and learning and memory result from physiological activation of neurons by sensory stimuli in the environment. Direct investigation of the association between changes in electrically evoked field potentials and learning has so far been limited to correlation of observation of changes in response to sensory stimuli with learning.

Our laboratory has adopted a novel approach to address this long-standing problem in cognitive neurobiology. We are studying olfactory conditioning in rats by training them to associate the pairing of an odour and direct electrical stimulation of the perforant path to the dentate gyrus of the hippocampus with a reward. As one of the stimuli in the learning paradigm is now an electrical stimulus we can directly studying the changes in evoked field potential response in the brain. To allow these experiments to be performed in freely moving animals in an ethologically relevant environment, we are also developing novel mote-base wireless recording technologies.

In addition to students interested in the neurobiology of learning and memory, we are also seeking students interested in working in collaboration with the Department of Electrical and Computer Engineering on developing the novel telemetric recording technologies.