



Department of Biomedical Sciences presents a seminar

Processing objects and space in the hippocampus

by

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Date: 3 June 2014 (Tuesday)
Time: 3:00 pm – 3:30 pm
Venue: Room B4302
4/F Academic 1 (Blue Zone)
City University of Hong Kong
Kowloon Tong

Abstract:

The hippocampus plays a key role in the acquisition of new memories for places and events. In rodents, it is believed to provide a spatial framework within which items and events can be integrated to form a coherent representation of the animal's on-going experience.

Sensory information arrives in the hippocampus through two parallel processing streams: place-related information from medial entorhinal cortex (MEC) and object-related information from lateral entorhinal cortex (LEC). The unique anatomical arrangement of inputs to CA1 suggests that it may receive both integrated and segregated space/object information - from upstream hippocampal subregions and directly from MEC/LEC, respectively.

We carried out large-scale ensemble recordings in area CA1 of mice as they performed novel object-location recognition, a one-trial contextual learning task that occurs in a familiarized environment. We present physiological data that reflects the anatomical segregation of parallel processing streams to the hippocampus, and we find that the formation of new object-place representations requires CA3 input to CA1. Distal CA1 cells, which receive predominantly LEC input, fire selectively at locations relative to objects in both controls and in mice with blocked CA3 transmission. However, only control animals show changes in object-related firing that are specifically associated with object displacement. Our ensemble data support the idea that CA3 inputs provide a more stable representation of the familiarized context to CA1; Meanwhile information on new features in the environment arrives concurrently through the direct entorhinal inputs, where it can be quickly incorporated to reflect the animal's present experience.

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~ All are Welcome ~