

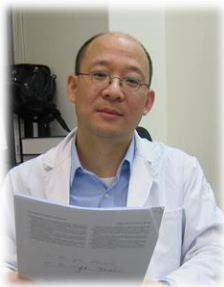
DANDRITE Lecture

Monday 17 September 2018

14:00 - 15:00

The Biomedicine Auditorium 6, building 1170, 3rd floor, room 347

Ole Worms Allé, 8000 Aarhus C



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Circuit specificity in the inhibitory architecture of the dentate gyrus

The hippocampus is a key brain structure for learning and memory. The dentate gyrus (DG) is the first relay station and serves as a primary gate of the hippocampus. Local-circuit GABAergic inhibitory interneurons (INs) in the DG comprise a heterogeneous cell population with distinct molecular, morphological, and electrophysiological properties. Despite representing only ~20% of the total neuron population, their diversity endows them with the ability to provide exquisite spatiotemporal control over granule cell (GC) activity and regulate information transfer from the cortex to other hippocampal areas.

Although multiple classes of GABAergic INs are present in the DG, the excitatory input from the medial entorhinal cortex (MEC), called medial perforant path (MPP), selectively recruits fast-spiking basket cells (BCs), thereby providing strong feedforward inhibition onto GCs. In addition to the MPP, the DG also receives long-range excitatory afferents from other brain regions. One fundamental question in studying IN dynamics in neuronal networks is: how do various classes of INs respond to incoming input and transform their output into postsynaptic responses? In my talk, I will focus on the MPP-DG pathway and the hilar commissural-DG pathway, two major excitatory cortical inputs and the SuM-DG pathway, a major excitatory subcortical input. I will show how various IN types are differentially activated by different afferent pathways. Such extrahippocampal and intrahippocampal input-specific recruitment of certain IN subpopulations may underscore a “division of labor” in cortical circuits, where distinct computational functions are implemented by various types of local inhibitory INs.

Host: Affiliated Researcher Marco Capogna, DANDRITE, Dept. Biomedicine, Aarhus University