DANDRITE
Danish Research Institute of Translational Neuroscience
Nordic EMBL Partnership for Molecular Medicine

AARHUS UNIVERSITY

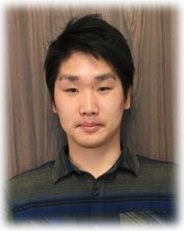
DANDRITE Topical Seminar

Wednesday 12 December 2018

11.00 – 12.00

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

Ole Worms Allé, 8000 Aarhus C



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Role of midbrain cholinergic inputs to the superficial layer of superior colliculus - Anatomical and electrophysiological studies -

The superior colliculus (SC) is a laminated midbrain structure that integrates sensory input and generates motor command to initiate orienting and escape responses. Its superficial layer (sSC) is a prominent visual center for rodents, in which more than 85% of retinal ganglion cells project to the sSC.

We have investigated the visual signal processing in the sSC, and especially focused on its modulatory role by the cholinergic inputs from the parabigeminal nucleus (PBN), which is a small cluster of neurons in midbrain, containing cholinergic neurons. The PBN receives projections from the sSC, and projects back to the sSC. Based on their reciprocal connections, PBN has been designated as a satellite system of SC since 1970s (Graybile, 1978). However, its physiological role is still elusive. Furthermore, the anatomical properties, such as axonal trajectories and terminal distribution, also remain unclear.

As a first step, we investigated the anatomical properties of the cholinergic projection from the PBN to the sSC. Cre-dependent adeno associated virus vector was used to express fluorescent marker in the cholinergic neurons in the PBN of ChAT-Cre mice. We found the cholinergic projections were densely terminated in the specific aspect of the sSC which encode upper and central visual fields.

From ethological viewpoint, these areas in the sSC would be critical to detect the threat such as avian predators coming from above. We hypothesized the cholinergic inputs might improve the predator detection in the sSC. To confirm this hypothesis, we have been carrying out the electrophysiological experiments in anesthetized and awake mice. In this seminar, I will present the results from my anatomical experiments, and recent data of electrophysiological experiments.

Host: DANDRITE Group Leader Keisuke Yonehara, DANDRITE, Dept. Biomedicine, Aarhus University