

The 66th Frontier Brain Science Seminar

Sponsored by Research Center for Idling Brain Science (RCIBS)

Multi - Cellular measurement and manipulation

～多細胞回路の計測と操作～

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場所: 富山大学附属病院 2階 臨床講義室 1

Abstract

The interaction of neuron and glia is essential for functional neuronal circuits. We have been especially focused on microglia, a sole immune cell in CNS. In addition to the pathological function of microglia, recent developments in molecular probes and optical imaging *in vivo* have revealed that microglia are highly motile cell in the healthy brain, extending and retracting their process that extend from a largely stationary cell soma. We reveal their physiological and pathological function on synapse and vessels. In this session, we will show microglial role for cross modal plasticity and show how they can contribute on sensory discrimination by their effect on neural circuit function. In addition, we will introduce our recent developed holographic microscope that can precisely measure and manipulate neuron and glial cell activities in a spatiotemporal manner in living mice to ultimately affect on behavior output. Furthermore, we will show our successful biological evaluation method to analyze the functional neuronal connectivity to integrate the transcriptome information using holographic microscope.

References

1. Hashimoto A, Kawamura N, Tarusawa E, Takeda I, Aoyama Y, Ohno N, Inoue M, Kagamiuchi M, Kato D, Matsumoto M, Hasegawa Y, Nabekura J, Schaefer A, Moorhouse AJ, Yagi T, **Wake H***. Microglia enable cross-modal plasticity by removing inhibitory synapse. *Cell Rep*. 2023 May 30;42(5):112383. doi: 10.1016/j.celrep.2023.112383. Epub 2023 Apr 21.
2. Okada T, Kato D, Nomura Y, Obata N, Quan X, Morinaga A, Yano H, Guo Z, Aoyama Y, Tachibana Y, Moorhouse AJ, Matoba O, Takiguchi T, Mizobuchi S and **Wake H***. Pain induces stable, active microcircuits in the somatosensory cortex that provide a new therapeutic target. *Sci Adv*, 2021 Mar 19;7(12):eabd8261. Doi: 10.1126/sciadv.abd8261.
3. Haruwaka K, Ikegami A, Tachibana Y, Ohno N, Konishi H, Hashimoto A, Matsumoto M, Kato D, Ono R, Kiyama H, Moorhouse AJ, Nabekura J and **Wake H***. Dual Microglia Effects on Blood Brain Barrier Permeability Induced by Systemic Inflammation, *Nature Commun*. 2019, Dec 20;10(1):5816. Doi: 10.1038/s41467-019-13812-z.

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