



# OIST SEMINAR

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**DATE: Wednesday, April 24, 2019**

**TIME: 16:00 – 17:00**

**VENUE: D015 Seminar Room, Level D, Lab 1**

## **Dynamics in astrocytic shape by in vivo imaging and voltage imaging with a random-scan 2-photon microscope**

### *Abstract:*

"Dynamics in astrocytic shape by in vivo imaging": Astrocytes have the endfoot structure which covers blood vessels in the brain. The endfoot is thought to play some roles in the maintenance of the BBB function, but the detail is not known. We tested the endfoot function by removing it from astrocytes by laser ablation in in vivo condition. Without the astrocytic cover, there was no blood leak from the blood vessels, meaning that the endfoot is not involved in the immediate BBB barrier function. But the stripped vascular walls were recovered by elongation of endfeet from nearby astrocytes, which may suggest a physiological importance of the endfoot cover over the blood vessels.

"Voltage imaging with a random-scan 2-photon microscopy": We have been trying spike detection from multiple neurons with a custom-made 2-photon microscope. With chemical voltage sensor, DiO/DPA, action potentials of cultured neurons were monitored for 30-90 minutes, and synaptic connections among neurons were determined with the direction. We are now trying to reveal local circuit nature in more realistic neural circuits using brain slice preparation. I will show some preliminary results of action potential recordings in brain slice and would like to discuss with the audience.

### References:

Shafeghat N, Heidarinejad M, Murata N, Nakamura H, Inoue T, "Optical detection of neuron connectivity by random access two-photon microscopy", J Neurosci Methods, 263:48-56 (2016)

Kubotera H, Ikeshima-Kataoka H, Hatashita Y, Allegra Mascaro AL, Pavone F, Inoue T, "Astrocytic endfeet recover blood vessels after removal by laser ablation", Scientific Reports, 9:1263 (2019)