

[1P]Blood-Brain Barrier

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***Videos are available throughout the meeting period.**

[1P-054]Functional implication of astrocytic endfoot in capillary damage

*Hideaki Kubotera¹, Osamu Kutomi², Sen Takeda², Hiroko Ikeshima-Kataoka¹, Takafumi Inoue¹ (1.Dept of Life Science and Medical Bioscience, Waseda Univ, Tokyo, Japan, 2.Dept Anat and Cell Biol, Univ of Yamanashi, Yamanashi, Japan)

The astrocyte, one of the glial cells, plays many roles, such as provision of nutrients from blood vessels to neurons, control of extracellular pH and uptake of neurotransmitters. In addition, astrocytic endfeet cover almost entire surface of the blood vessels and contribute to maintenance of blood-brain barrier (BBB) integrity. Previously, we ablated astrocytic endfeet covering blood vessel using two photon laser scanning microscopes (2P-LSM) to know its functional role at BBB and confirmed that it does not contribute to the immediate BBB function under a normal condition in the mouse brain. In this study, we introduced a pathological state to blood vessels to investigate the astrocytic endfoot function in a pathological state: local ischemia was introduced by laser irradiation to blood vessels and astrocytic endfeet were observed in living mouse brain. Blood vessels were labeled with Evans Blue (EB) dye and astrocytes were labeled with Sulforhodamine 101 (SR101) or EGFP. Laser irradiation to blood vessels caused leakage of EB from blood vessels. In some cases, the EB leakage was confined to a small area with solid boundaries, some of which were covered with astrocytic endfeet. These results indicate a possibility that astrocytic endfeet sometimes play a physical barrier of BBB under pathological conditions. Furthermore, we investigate involvement of other cell types with the confined plasma leak. Pericytes labeled with NeuroTrace 500/525 did not cover it. Investigations are under way to investigate involvement of microglia with the confined plasma leak, the precise nature of the confined plasma leak in the ischemic condition: fluorescent labeled fibrinogen injection to the blood stream, which marks blood coagulation with high fluorescence, to see if the confinement of the plasma leak was due to coagulation or by other mechanisms and an electron microscopic analysis.