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Discovering Fine Neurovascular Structures in Tibial Epiphysis Using the FV3000 Microscope

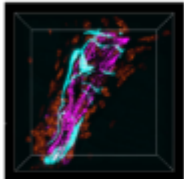
Understanding the vascular and neural projections to the knee joint is important for treating pain associated with knee arthropathy. With the FV3000 microscope, researchers at the Keio University School of Medicine were able to successfully image a complex 3D structure of sensory nerves and their surrounding vasculature in the tibial epiphysis for the first time. They discovered that sensory nerves in the knee joint exist not only in the meniscus but also in the tibial epiphysis.

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Discovering Fine Neurovascular Structures in Tibial Epiphysis Using the FV3000 Microscope

Imaging of Fine and Complex Tissue Structures while Reducing Bleaching



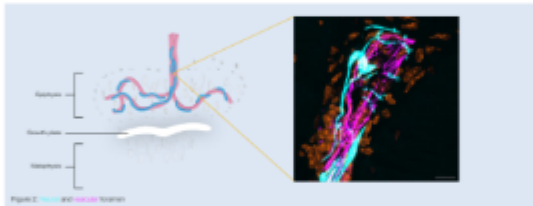
Imaging blood vessels and sensory nerves in the epiphysis of a knee joint is difficult because the nerves and vessels form a complex structure within a narrow area. Owing to its high transmission efficiency, the FLUOROPH FV3000 confocal laser scanning microscope enables bright, high-resolution imaging of fine structures while using low laser power, which helps minimize photobleaching in the sample. Using this capability of the FV3000 microscope, we were able to successfully image a complex 3D structure of sensory nerves and their surrounding vasculature penetrating a foramen in the tibial epiphysis.

Figure 1
Sensory nerves and surrounding vasculature penetrate a foramen in the tibial epiphysis (200 μm). Sensory nerves (DPI) (red), blood vessels (fluorophor 394) (cyan), and (DPI) (orange).

Imaging equipment:
FV3000 microscope
SP-APC10000 system

Discovery of Neurovascular Structures in Tibial Epiphysis

Understanding the vascular and neural projections to the knee joint is important for relieving pain in knee arthropathy. However, until now, researchers have been unable to fully observe the fine structures formed by sensory nerves and blood vessels throughout the knee joint. With the FV3000 microscope, these structures are clearly visible for the first time. We observed that sensory nerves in the knee joint exist not only in the meniscus, but also in the tibial epiphysis. These sensory nerves are entangled with surrounding blood vessels, and together the neurovascular structure penetrates a foramen in the tibial epiphysis.



Reference: Koichi Nakano, et al. "Penetration of the Tibial Epiphysis through the Meniscus by Nerves." *Sci Rep* 2019, 9:1-10

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