LECTURE ABSTRACT

"Mesoscopy and Epoxy Sheet Plastination"

Ming Zhang

Department of Anatomy, University of Otago, New Zealand.

Despite a wealth of macro-/microscopic anatomical data, mesoscopic anatomy has remained a blind spot of teaching and research. Mesoscopic examination involves details of biological systems in the context centered at tissues, and covered more than a whole organ or a set of cells. The aim of this lecture is to demonstrate how to use epoxy sheet plastination for mesoscopic research.

Rat heads and human cadavers were prepared as epoxy sheet plastinated slices which were examined under a stereoscope and/or confocal microscope. All the studies presented were approved by the Human Research Ethics Committee in University of Otago.

Two examples of the application of epoxy sheet plastination in neuroscience and clinical anatomy research will be presented. One is to investigate the precise anatomical connection between the peripheral and central auditory neural networks ("connectomes") for the advancement of knowledge in auditory research and for technology translation in tinnitus treatment. Another is the establishment of a 3-dimensional somatotopic map of the trigeminal ganglion, which is essential for neurosurgeons to guide the precise positioning of the needle tip during percutaneous trigeminal rhizotomy for the patients with trigeminal neuralgia.

Epoxy sheet plastination provides a powerful tool for mesoscopic examination as the size of a plastinated specimen can be up to the whole body but its structures can be visualized at a cellular or even subcellular level. Of morphological research techniques, epoxy sheet plastination technology has two unique features: (1) examination of the interface in situ between hard and soft tissues without decalcification and dissection, and (2) mesoscopic examination on the same slice. It can also combine with various pre-treatments (e.g. coloured vascular casting) and post-treatments (e.g. various histochemistry staining, confocal microscopy).

Epoxy sheet plastination is a revolutionary mesoscopic research tool.

Wednesday, July 19, 2022, 7:40 a.m. (Chile time)