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Micro-CT imaging of mouse brain fixated in ethanol

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Current basic neuroscience research in animal models uses all available imaging techniques for brain visualization. Micro-CT offers 3D reconstruction of inner structures of brain without its destruction. On the other hand from all soft tissues, imaging of brain is the biggest challenge due to its composition and homogenous structure. The goal of our study was to create a fixation protocol for mouse brain imaging in micro-CT MARS (Medipix All Resolution System) in order to display its inner structures. In our study mouse brains from 12 mice were used and 9 brains were fixated in ascending ethanol concentration (25%, 50%, 75%, 97% each for 12 hours) and 3 brains were put only into Phosphate-Buffered Saline (PBS solution). Fixated brains were scanned after 72, 168 and 336 hours period of fixation, native specimens were scanned after 2 hours of cleaning in PBS, after they were processed histologically and stained with Nissl stain. Ethanol fixation provided sufficient contrast among brain inner structure, on the other hand scanning of native specimens provided displaying of outer contour of brain only. With ethanol fixation protocol hippocampus, basal ganglia, ventricles, corpus callosum were visualized. Ethanol fixation protocol is a great option for brain fixation as well as the method for enhancing contrast among its inner structures. After the scanning, tissues are available for further staining, for example in phosphotungstic acid or available for other methods, like histochemical procedures. Ethanol fixation method is a powerfull tool for research of inner structures of mouse brain.

Biography

Petr Zach is an Associate Professor of Anatomy and Head of the Institute of Anatomy at the Third Faculty of Medicine, Charles University, Prague, Czech Republic. His research activities cover field of neuroanatomy, psychiatry, micro-CT of soft tissues and neuroscience.

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