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New Ethanol Method for Soft Tissue Imaging in Micro-CT

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Abstract : Introduction: Micro-CT is well used for examination of bone structures and teeth. On the other hand visualization of the soft tissues is still limited. The goal of our study was to create a new fixation method for soft tissue imaging in micro-CT. Methodology: We used organs of 18 mice - heart, lungs, kidneys, liver and brain, which we fixated in ethanol after meticulous preparation. We fixated organs in different concentrations of ethanol and for different period of time. We used three types of ethanol concentration - 97%, 50% and ascending ethanol concentration (25%, 50%, 75%, 97% each for 12 hours). Fixated organs were scanned after 72 hours, 168 hours and 336 hours period of fixation. We scanned all specimens in micro-CT MARS (Medipix All Resolution System). Results: Ethanol method provided contrast enhancement in all studied organs in all used types of fixation. Fixation in 97% ethanol provided very fast fixation and the contrast among the tissues was visible already after 72 hours of fixation. Fixation for the period of 168 and 336 hours gave better details, especially in lung tissue, where alveoli were visualized. On the other hand, this type of fixation caused organs to petrify. Fixation in 50% ethanol provided best results in 336 hours fixation, details were visualized better than in 97% ethanol and samples were not as hard as in fixation in 97% ethanol. Best results were obtained in fixation in ascending ethanol concentration. All organs were visualized in great details, best-visualized organ was heart, where trabeculae and valves were visible. In this type of fixation, organs stayed soft for whole time. Conclusion: New ethanol method is a great option for soft tissue fixation as well as the method for enhancing contrast among tissues in organs. The best results were obtained with fixation of the organs in ascending ethanol concentration, the best visualized organ was the heart.

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