

Abstract Submitted
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Quantitative MRI and PLM Study of Rabbit Cartilage at Microscopic Resolutions¹ SYEDA BATOOL, YANG XIA, Oakland University — The gradual degradation of cartilage leads to osteoarthritis, a major musculoskeletal disease affecting millions of adults. This study aimed on the quantification of T2, T1 ρ and T1 relaxation times in humeral and femoral cartilage of rabbit using MRI, and complementing the results with Polarized microscopy (PLM) at highest possible resolution. We plan in the future to study cartilage from the rabbit model of osteoarthritis. Multiple (1.822.5mm) cartilage-bone specimens were harvested from humeral and femoral heads and imaged in MRI at 9.75m resolution. After MRI, 6.0m thick sections were cut from each sample to generate quantitative PLM images at 1m resolution. Quantitative MRI relaxation data and PLM fibril structural data showed distinct features in tissue properties at different depths of cartilage, different in individual histological zones. The thicknesses of the histological zones in MRI and PLM were successfully obtained. This is the first correlated and quantitative MRI and PLM study of rabbit cartilage at sub-10m resolutions. The establishment of the characteristic features of rabbit cartilage based on multidisciplinary imaging techniques would provide a solid foundation for future utilization of the rabbit model in the OA investigation.

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