Development of the Human *Ex Vivo* Split Tissue Osteoarthritis Model

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ABSTRACT

Osteoarthritis (OA) is a disease characterized by loss of functional articular cartilage with associated whole-joint pathology and resultant pain and disability. As such, our laboratory has set out to develop valid and clinically applicable models to unravel disease mechanisms and evaluate potential treatments for OA utilizing cartilage explants obtained from tissues discarded after standard-of-care joint surgeries. Due to significant patient to patient and intra-joint variability in OA development, there is a need for more standardized sampling and culturing strategies for spontaneous OA *ex vivo* modeling. Therefore, osteoarthritic articular cartilage was obtained from total knee arthroplasty and osteochondral allograft transplantation patients. Cartilage explants were then cut into halves and cultured individually. The objectives of this study were to validate consistency of relevant biomarker production between halves of osteoarthritic cartilage explants, and to determine if candidate biomarkers can be detected in human osteoarthritic cartilage explant cultures for subsequent therapeutic screening studies. A secondary focus of this study was to apply clinically used therapeutics to this split tissue model and evaluate their abilities to modify the disease progression of OA. By using this split tissue approach, we will control for variation in OA development and progression.