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F20-009

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Funding Source:
Thompson Laboratory for Regenerative Orthopaedics

Relationships among Degradation-Related Biomarkers Released by Subchondral Bone from Osteoarthritic Knees

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INTRODUCTION: Osteoarthritis (OA) is a multifactorial whole-joint disease progressing from thinning of the cartilage to complete loss of cartilage. OA progression can be variable, resulting in regional variation in architecture and metabolic responses of affected tissues. This study was designed to determine relationships in the production of degradation-related biomarkers by subchondral bone of patients undergoing total knee arthroplasty (TKA). It was hypothesized that patterns could be identified that indicate non-linear co-expression patterns between biomarkers.

METHODS: With IRB approval (#1208392), tissues were obtained from OA patients undergoing TKA surgery. Explants (6mm) were samples across the joint. The cartilage was separated from the bone, and the bone was cultured for 3 days. Day 3 media was assessed for relevant OA biomarkers. Data was ranked and Kruskal-Wallis test with a Bonferroni correction was performed to identify production patterns.

RESULTS: The data analysis from this study identified novel positive, negative, and complex associations between degradation related biomarkers produced by subchondral bone from OA patients not observed with linear correlation analysis.

CONCLUSION: Data from this study indicates that there are several relationships between degradation related biomarkers produced by osteoarthritic subchondral bone. This suggests that key degradative mechanisms of disease in knee OA may share common regulatory pathways and signaling cues.