Correlations among Pro-Inflammatory, Degradation-Related, and Bone Metabolism Biomarkers Released by Bone obtained from Patients with Knee Osteoarthritis

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INTRODUCTION: Osteoarthritis (OA) is a multifactorial disease often progressing from an initial insult or injury to whole-joint inflammation and degeneration causing pain and dysfunction. The development and progression of OA is highly variable among patients, resulting in significant regional variation in architecture and metabolic responses of affected tissues. This study was designed to determine strength of correlations between the production of pro-inflammatory, degradation-related, and bone metabolism biomarkers of the underlying bone from OA patients undergoing total knee arthroplasty. It was hypothesized that there would be important (moderate ($r=0.4$-0.69) to strong ($r\geq0.7$) and significant ($p<0.05$)) correlations among these assessments of subchondral bone from osteoarthritic knees.

METHODS: With IRB approval, tissues normally discarded during surgery were obtained from OA patients undergoing TKA surgery. Explants (6mm) were created and cultured for 3 days. Day 3 media was assessed for relevant OA biomarkers. Spearman's correlation analyses of the rankings of each biomarker was performed to identify production patterns.

RESULTS: There were numerous strong to moderate correlations within and between biomarkers associated with bone metabolism, degradative metabolism, and inflammatory metabolism.

CONCLUSION: The results of this study suggest that the relationships among the underlying bone metabolic processes in end-stage knee OA are complex and multifaceted.