GLYCOSAMINOGLYCAN PRODUCTION IN RABBIT MENISCAL CELLS DUE TO FLUID FLOW

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Introduction:
During normal joint loading, such as walking, the fluid contained in biphasic materials, including cartilage and the meniscus, moves through the tissue matrix causing fluid flow. Similar to bone and cartilage this fluid flow induces a shear stress on the cells that may be responsible for the maintenance and synthesis of biochemically and biomechanically healthy meniscal tissue. One of the primary constituents of meniscal tissue, enabling it to withstand the large loads seen in the knee joint, is proteoglycans. Additionally, calcium may be a second messenger necessary for the biochemical pathway responsible for matrix protein production. Preliminary work has shown that intracellular calcium oscillations are an immediate response to fluid flow in meniscal cells. The focus of this research is to determine if mechanical loading in the form of fluid flow induced shear stress alters proteoglycan production levels.