Recapitulating The Effects Of The Osteoarthritis Inflammatory Environment On Mesenchymal Stem Cell Chondrogenesis

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Introduction

- Osteoarthritis (OA) is a degenerative disease involving damage to articular cartilage in the knee joint with risk factors such as age, sex, and obesity.
- Extracellular matrix (ECM) degradation leads to inflammation which can be regulated by pro-inflammatory M1 macrophages.
- In order to treat OA with anti-inflammatory therapies, we must develop a robust model of inflammation for our in vitro studies.
- The objective of this study is to explore how inflammation affects human mesenchymal stem cell (hMSC) chondrogenesis by incorporating cell pellets in macrophage conditioned media (MCM).

Experimental Design

A) Chondrogenic media (baseline) B) RPMI, RPMI+LPS (negative controls)
C) Macrophage conditioned media (MCM) experimental group

D) Timeline and layout.

Results

- The data suggests that macrophage conditioned media (MCM) is stalling chondrogenesis and mimicking an osteoarthritic environment.
- MCM attempts to degrade the extracellular matrix in pellet culture. However, this effect is counterbalanced by chondrogenically differentiated hMSCs, resulting in no observable levels of degeneration or chondrogenesis.
- The current study used conditioned media from a murine cell line, but future studies will use a murine primary cell line with a greater potential for pro-inflammatory phenotype.

Discussion/Conclusion

References


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