Comparison between Chondrogenic Markers of Differentiated Chondrocytes from Adipose Derived Stem Cells and Articular Chondrocytes In Vitro.

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Abstract

Objective(s): Osteoarthritis is one of the most common diseases in middle-aged population in the world. Cartilage tissue engineering (TE) has been presented as an effort to introduce the best combination of cells, biomaterial scaffolds and stimulating growth factors to produce a cartilage tissue similar to the natural articular cartilage. In this study, the chondrogenic potential of adipose derived stem cells (ADSCs) was compared with natural articular chondrocytes cultured in alginate scaffold. Materials and Methods: Human ADSCs were obtained from subcutaneous adipose tissue and human articular chondrocytes from non-weight bearing areas of knee joints. Cells were seeded in 1.5% alginate and cultured in chondrogenic media for three weeks with and without TGFβ3. The genes expression of types II and X collagens was assessed by Real Time PCR and the amount of aggrecan (AGC) and type I collagen measured by ELISA and the content of glycosaminoglycan evaluated by GAG assay. Results: Our findings showed that type II collagen, GAG and AGC were expressed, in differentiated ADSCs. Meanwhile, they produced a lesser amount of types II and X collagens but more AGC, GAG and type I collagen in comparison with natural chondrocytes (NCs). Conclusion: Further attempt should be carried out to optimize achieving type II collagen in DCs, as much as, natural articular chondrocytes and decline of the production of type I collagen in order to provide efficient hyaline cartilage after chondrogenic induction, prior to the usage of harvested tissues in clinical trials.

KEYWORDS:

Alginate; Chondrocyte; Stem cell; TGFbeta

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