

عنوان مقاله:

Induction of Chondrogenic Differentiation of Human Adipose-Derived Stem Cells with TGF- β_3 in Pellet Culture System

محل انتشار:

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خلاصه مقاله:

Objective Adult stem cells which are derived from different tissues, with their unique abilities to self-renew and differentiate into various phenotypes have the potential for cell therapy and tissue engineering. Human adipose tissue is an appropriate source of mesenchymal stem cells with wide differentiation potential for tissue engineering research. In this study isolated stem cells from human subcutaneous adipose tissue were investigated for chondrogenic potential of adipose-derived stem cells (ADSCs) in pellet culture system treated with transforming growth factor- β_3 (TGF- β_3). Materials and Methods Human ADSCs were isolated from subcutaneous adipose tissue and digested with collagenase type I. Immunocytochemical method for cell surface antigens was done in order to characterize the cells. The isolated cells were treated with chondrogenic medium, supplemented with TGF- β_3 in pellet culture system and harvested after 21 days. Histological staining was used to evaluate the presence of proteoglycan, with alcian blue. Immunohistochemical method performed for the assessment of cartilage-specific type II collagen and aggrecan. Also, in order to confirm our results, we managed RT-PCR technique. Results Chondrogenesis of ADSCs in pellet culture, induced by TGF- β_3 growth factor. Histological and immunohistochemical methods showed deposition of typical cartilage extracellular matrix components in pellets. RT-PCR analysis of cartilage matrix genes, such as type II collagen and aggrecan, also, confirmed the induction of the chondrocytic phenotype in high-density culture upon stimulation with TGF- β_3 . Conclusion TGF- β_3 promoted chondrogenesis of ADSC in pellet culture system. We suggest that human subcutaneous adipose stem cells could be excellent candidates for the cartilage tissue engineering.

کلمات کلیدی:

Adipose, Chondrogenesis, Stem cell, Tissue engineering, TGF- β_3

