عنوان مقاله:

in vitro Study of Primary Isolation and Culture of Adipose-Derived Stem Cells and Induction of Chondrogenic Differentiation

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خلاصه مقاله:

Articular cartilage has constrained potential to restore. The mesenchymal stem cellular remedy has presented new treatment possibilities for this circumstance. The experiment aimed to verify the chondrogenic differentiation capacity of rat adipose tissue-derived mesenchymal stem cells (AD-MSCs) in vitro inside the presence or absence of transforming growth factor-beta (TGF-β۱). Rat's subcutaneous adipose tissue minced into a small piece (۲-۳ mm۳) was aseptically collected from the subcutaneous fat under anaesthesia and then digested with collagenase type I (۱ mg/mL). Spontaneous chondrogenesis occurred in both AD-MSCs pellet cultures and was similar in both TGF-β۱ treated. The untreated pellet cultures were collected after ۲۱ days. Histological assessment for evaluating the level of proteoglycan by alcin blue staining and immunohistochemistry for detecting the presence of collagen type II. A monoclonal antibody directed against collagen type II. Adipose-derived stem cells (AD-MSCs) isolated from rats were immunophenotyped for the expression of MSCs cell surface markers and was performed by Flow cytometer, which demonstrated AD-MSCs highly expressed CD۷۳ (۹۹.۶۹±۲.۶%), CD۹۰ (۹۸.۱۱±۰.۳%), and week expression CD۴۴ (۱۷.۱۵±۰.۳%). The result of histological staining showed the presence of extracellular matrix (ECM) in the hyaline cartilage. This staining indicated a deposit of "acid mucopolysaccharides" in the proximity of the cells. Additionally, most cells are rounded cells stained positive for the presence of the cells encompassed by extracellular matrix (ECM), which were like chondrocytes as seen from the magnified view, lightly pink stained nuclei, and nuclear fast red stain. However, the immunohistochemistry method demonstrated that the presence of TGF-β۱ decreased the levels of collagen type I and increased the levels of collagen type II. In conclusion, subcutaneous adipose tissue-derived stem cells can be used in cartilage tissue engineering.

کلمات کلیدی:

rat, Adipose tissue, Chondrogenic, Mesenchymal stem cells