

Chondrogenic differentiation of adipose tissue-derived mesenchymal stem cells at different time points

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The aim of this study was to identify the most appropriate time point for the successful chondrogenic differentiation of adipose tissue-derived mesenchymal stem cells (AMSCs). For this purpose, the expression of some chondrogenesis markers, such as collagen type I, collagen type II, lubricin and RUNX2 have been investigated by immunohistochemical and Western blot analysis at different time points (7, 14, 21 and 28 days). The AMSCs chondrogenic differentiation in the natural self-assembling constructs, called 'cell pellets' has been also assessed by the histological (hematoxylin and eosin) and histochemical (alcian blue staining) methods. The results showed that the differentiated chondrocytes, after 21 days of differentiation process, were able to produce increased quantities of collagen type I, collagen type II, and lubricin, suggesting the hyaline cartilage formation, and reduced expression of RUNX2, a protein expressed by the hypertrophic chondrocytes in the late stages of differentiation and normally expressed by osteoblasts. Our study demonstrates that 21 days represents the optimum period for the potential implantation of AMSCs derived chondrocytes for the cartilage defects. This information could be useful for the future development of cell-based therapies for the articular cartilage degenerative diseases.

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References

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Keywords

Adipose tissue; mesenchymal stem cells; chondrogenesis; lubricin; collagen; Runx2; cell pellets.