عنوان مقاله:

Matrigel Enhances in vitro Bone Differentiation of Human Marrow-derived Mesenchymal Stem Cells

محل انتشار:

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خلاصه مقاله:

Objective(s) The use of co-culture cells as well as extra cellular matrix are among those strategies that have been employed to direct mesenchymal stem cell (MSC) bone differentiation in culture. In this regard, there is no study considering the effects of Matrigel on mesenchymal stem cell (MSC) in vitro bone differentiation. This was the subject of the present study. Materials and Methods Human passaged-۳ MSCs isolated from the marrow aspirates were seeded on either Matrigel or conventional polystyrene plastic surfaces (as control) for ۱۰ days. To compare the cell proliferation in two cultures, the cell numbers were determined during the cultivation period. For bone differentiation, the confluent cultures from either group were provided with osteogenic medium and incubated for ۲۱ days during which the alkaline phosphates (ALP) activity, culture mineralization and the expression of some bone-related genes were quantified and statistically compared. Results MTT assay indicated that Matrigel-cultivated cells underwent statistically less proliferation than polystyrenecultivated cells (P<۰.۰۵). Regarding the osteogenic differentiation, ALP activity was significantly high in Matrigel versus plastic cultures. Calcium deposition in Matrigel cultures tended to be significantly extensive compared with that of control cultures (۲.۵۳۳±۰.۰۱۷ versus ۰.۶۰۷±۰.۰۹ mM). Furthermore, according to the semi-quantitative RT-PCR analysis, compared with polystyrene plastic surface, Matrigel seemed to provide a microenvironment in which human MSC expressed osteocalcin and collagen I genes in a significantly higher level. Conclusion Collectively it seems that Matrigel could be considered as an appropriate matrix for MSC osteogenic differentiation.

کلمات کلیدی:

Cell Proliferation, Matrigel, Mesenchymal progenitor cells, Osteogenesis