عنوان مقاله:

Laminin matrix promotes hepatogenic terminal differentiation of human bone marrow mesenchymal stem cells

محل انتشار:

مجله علوم پایه پزشکی ایران, دوره 19, شماره 1 (سال: 1395)

تعداد صفحات اصل مقاله: 9

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خلاصه مقاله:

Objective(s):The application of stem cells holds great promises in cell transplants. Considering the lack of optimal in vitro model for hepatogenic differentiation, this study was designed to examine the effects of laminin matrix on the improvement of in vitro differentiation of human bone marrow mesenchymal stem cells (hBM-MSC) into the more functional hepatocyte-like cells. Materials and Methods:Characterization of the hBM-MSCs was performed by immunophenotyping and their differentiation into the mesenchymal-derived lineage. Then, cells were seeded on the laminin-coated or tissue culture polystyrene (TCPS). The differentiation was carried out during two steps. Afterward, the expression of hepatocyte markers such as AFP, ALB, CK-۱۸, and CK-۱۹ as well as the expression of C-MET, the secretion of urea, and the activity of CYP۳A۴ enzyme were determined. Moreover, the cytoplasmic glycogen storage was examined by periodic acid–Schiff (PAS) staining. Results:The results demonstrated that the culture of hBM-MSC on laminin considerably improved hepatogenic differentiation compared to TCP group. A significant elevated level of urea biosynthesis and CYP۳A۴ enzyme activity was observed in the media of the laminin-coated differentiated cells (P<۰.۰۵). Furthermore higher expressions of both AFP and ALB were determined in cells differentiated on laminin matrix. Glycogen accumulation was not detected in the undifferentiated hBM-MSCs, however, both differentiated cells in laminin and TCPS groups demonstrated the intracellular glycogen accumulation on day ۲۱ of hepatogenic differentiation. Conclusion:Taken together, these findings may indicate that laminin matrix can improve terminal differentiation of hepatocyte-like cells from hBM-MSCs. Thus, laminin might be considered as a suitable coating in hepatic tissue engineering designs.

کلمات کلیدی:

bone marrow, Differentiation, Hepatocyte, Laminin, Mesenchymal stem cell