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In vitro differentiation of human amniotic membrane-derived mesenchymal stem cells into hepatocyte-like cells

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Introduction

Many types of liver diseases can damage regenerative potential of mature hepatocytes, hepatic progenitor cells or oval cells. In such cases, a stem cell-based therapy can be an alternative therapeutic option. Hematopoietic stem cells or bone-marrow-derived mesenchymal stem cells have been examined for the potential. However, these cells are not easily obtained or applied. In this study, whether human amniotic membrane-derived mesenchymal stem cells (HAM) could be used a new source for the cell-based therapeutics such as in liver diseases.

Materials and Methods

HAM were isolated from the amnion tissue during natural delivery. They were cultured on non-coated or 10 g/ml fibronectin-coated plates in DMEM-LG supplemented with 10% FBS, 20ng/ml hepatocyte growth factor (HGF), 20ng/ml oncostatin M (OSM) and 10^{-6}M dexamethasone (Dex). Effects of 20ng/ml FGF (fibroblast growth factor)-1, 20ng/ml FGF-2, 20ng/ml FGF-4, 10^{-4}M L-ascorbic acid 2-phosphate and/or ITS were examined on the hepatic differentiation. After culture for 3 weeks, cells were analyzed by immunocytochemistry, western blotting and periodic acid-schiff (PAS) staining.

Results and Conclusion

Initial fibroblast-like appearance of HAM was changed to round shape

during culture in the hepatogenic medium. Results of immunocytochemistry and western blotting demonstrated that these HAM produced albumin. They also showed to store glycogen by the strong PAS stainability. However, HAM cultured in the non-inducing medium did not express albumin. In conclusion, human amniotic membrane contain multipotent mesenchymal stem-like cells that could differentiate into hepatocytes in an appropriate condition.