Hepatic differentiation of mesenchymal milk pulp cells

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Objectives: Stromal stem cells display extensive proliferative capacity of multilineage differentiation and offer a large therapeutic potential in the field of regenerative medicine. The stromal compartment of mesenchymal tissues is considered to harbor stem cells. The present study is a comparison of differentiation towards endodermal lineage properties of mesenchymal cell cultures from milk tooth pulp.

Material and Methods: Cell cultures were isolated from milk tooth and third molar pulp and were grown in DMEM supplemented with 10 % FBS. Cells were characterized for expressing stem cell markers CD117, CD44H, Oct3/4 by immunofluorescence and flow-cytometry. After 3 to 5 passages we added to the media 20 ng/ml hepatocyte growth factor (HGF) for 5 days for hepatic commitment. For hepatic differentiation the cells were cultured in DMEM, 20 ng/ml HGF, 10 μM dexamethasone, insulin-transferrin-selenium X, 10 ng/ml oncostatin and 2% FBS for 15 days.

Results and Discussion: Mesenchymal cells were expanded in vitro and maintained in an undifferentiated state for more than 50 population doublings. The cell cultures were proven to be positive for pluripotent cell markers CD117, CD44H, Oct3/4. After hepatic induction cell morphology changed from spindle shaped, fibroblast-like to polygonal, parenchymal-like morphology. The alpha feto-protein and albumin expression were found during the differentiating process by immunofluorescence and ELISA. The present results demonstrated the ability of milk tooth pulp mesenchymal cell cultures to differentiate to endodermal type of cells, normally not presented in tooth’s pulp. These cells also acquired functional characteristics of hepatocytes: they secreted alpha feto-protein. Dental pulp mesenchymal cells obtained from each patient, requiring liver transplantation may therefore be ideal for in vivo therapies for these patients.