1st AMDI INTERNATIONAL BIOHEALTH SCIENCE CONFERENCE (IBSC) 2010

Infectious Diseases - Current Challenges

IBSC-2010 ORAL

MB011.O

In vitro differentiation of stem cell cultures from mouse dental pulp to chondrocyte

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Background/Aim*:* Dental pulp is a loose connective tissue that can support teeth as nutrition tissue. Dental pulp is rich site for stem cell collection. These cells are important source because they can able to give rise to another cell. These stem cells are called dental pulp stem cells. Nowadays a major goal of dental research is regeneration of odontoblast cells, but our research indicate that we can use dental pulp cells for provide another cells like chondrocyte. The aim of this study was to isolate dental pulp Stem cells and survey differentiation ability to chondrocyte. In the future these cells can be used in Regenerative Medicine.

Methodology*:* The pulp tissue gently separated from the crown and root, and then digested in a solution of 4mg/ml collagenase type I for 1 h at 37°C. To induce the cartilage differentiation, we used $1X10^5$ cells for each 24-well. The cells were cultured in alpha-modified Eagle's medium supplemented by 10ng/ml TGF- ß1 (transforming growth factor-ß1), 50µg/ml ITS+, 50µg/ml ascorbate-2-phosphate, 100nM dexamethasone. Three weeks after initiation of the culture, the cells stained with toluidine blue. The DPSCs were seeded at a density of $1X10^2$ cells/well in 96-well plates. After 1, 3, 5, 7, 10, and 14 days of culture, the ALP activity of DPSCs was detected using an ALP assay.

Results*:* We demonstrate the characterization of the dental pulp. Three weeks after induction, these cells differentiate to chondrocyte. These cells were stained with toluidine blue and the level of ALP activity was high at 14 days after induction.

Discussion and Conclusion*:* In the previous study, chondrogenic differentiation achieved from bone marrow mesenchymal stem cells but in this study, we used dental pulp stem cells. Dental pulp stem cells, like embryonic stem cells can be converted into different kinds of cells.