

Characterization of stem cells from pulp of unerupted human wisdom teeth

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Introduction: Dental pulp stem cells (DPSCs) are most diagnosed type of stem cells isolated from dental tissues. Previous studies demonstrate that tissues in earlier stages of development could be better stem cell resources for tissue engineering. In this study, with the aim of finding younger stem cell resources, we chose the pulp of human unerupted wisdom teeth when the crown was completely formed and the roots had not begun their development, Nolla's 6th developmental stage (N6th).

Methods and Materials: Surgical removal of the third molar was performed by aseptic technique with minimal trauma. The tissues were digested by collagenase and dispase. The obtained single cells were harvested and cultured. Immunophenotypic characterization of cells was done via immunocytochemistry, immunofluorescent, and flowcytometry assays. Moreover, adipogenic and osteogenic differentiation potential of these postnatal stem cells were examined and confirmed by histochemical staining and reverse transcription-polymerase chain reaction (RT-PCR) analysis.

Results: N_{6th}-DPSCs displayed similar features as other MSCs do, albeit with incredible proliferation capability and even after multi-passaging and cryopreservation. These undifferentiated preodontogenic cells (dentin sialoprotein (DSP) negative) expressed MSC markers: Vimentin, CD73, CD90, CD105, CD166, CD44, CD146, and STRO-1, but did not express hematopoietic cell markers: CD14, CD34, CD45, and HLA-DR. Adipocytes differentiated from N_{6th}-DPSCs were positively stained with Oil-Red-O, formed typical lipid clusters, and expressed both early and late adipocyte specific genes. Formation of Alizarin-red positive condensed calcium-phosphate nodules and strong expression of two osteogenic mRNAs, exhibited N_{6th}-DPSCs' osteogenic differentiation ability.

Conclusion: In view of this study, we suggest that N_{6th}-DPSCs are a viable choice for cryo-banking and future usage in regenerative therapies; however, more investigations are necessary before clinical application can commence.

Keywords: Dental pulp stem cells, human third molar tooth, Nolla's 6th developmental stage, cryopreservation.

Biography

Yasamin Hadaegh has completed her D.M.D. (Doctor of Medical Dentistry) at the age of 24 years from Shiraz University of Medical Science (Shiraz, Iran) and currently she is accomplishing MSc in Medical Sciences-Dentistry at University of Alberta (Edmonton, Canada). She has been one of the main members of student's research committee affiliated to Shiraz University of Medical Sciences for around 6 years. About 10 national and international congress presentations, and one original article in press, all related to stem cell research in Dentistry, was part of her research activities to date.

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