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## Overexpression of lentiviral vector-mediated human BMP2 gene in the mesenchymal dental pulp stem cells (DPSCs)

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Human bone morphogenetic protein 2 (hBMP2) through the other BMPs group family has been shown to have a significant role in regulating the odontogenic differentiation of dental tissue-derived stem cells. However, there are few study on the effects of the BMP2 gene on the proliferation and odontogenic differentiation of human dental pulp stem cells (hDPSCs). DPSCs have many advantages in comparison to other types of dental stem cells including easy to access for isolation, high proliferation capacity, extensive capability to produce mineralized matrix and similarity to bone marrow MSCs phenotype. This study evaluated in vitro odontogenic differentiation potential of lentiviral-mediated BMP2 gene-transfected human DPSCs. DPSCs were isolated by enzymatic dissociation of Primary and Permanent Teeth. The characteristics of DPSCs was evaluated by flow cytometry (FCM) then transduced with lentiviral vector to secretion of BMP2 along with expression level of green fluorescent protein (GFP). Transduced cells were analyzed for BMP2 secretion with RT PCR. Almost 70% of human dental pulp stem cells could express GFP marker following transduction. Graphical analysis and GFP assay confirmed BMP2 expression level in DPSCs transduced by recombinant lentiviral vectors was 6 times more than the native DPSCs. This result showed the induction odontogenic potential in DPSCs. In conclusion, DPSCs could be considered as one of the promising sources for tissue engineering including potential application for dental tissue, nerve and bone regeneration after tooth extraction or diseases and maxillofacial treatment failure. However, further studies should be performed to confirm this hypothesis. Also, lentiviral-mediated BMP2 gene transfection could enhance the in vitro odontogenic differentiation capacity of human DPSCs.

### Biography

Elham Poonaki completed BSc in Microbiology at the age of 22 years from I.A.U of Karaj. She has completed MSc in Biotechnology from I.A.U of Damghan. During these years she involved in team of her professor, Dr Marziyeh Aghazadeh. In her team, she gained experience of isolation and characterization of dental pulp stem cells, culturing and differentiating, seeding them on different type of scaffolds and facing these cells to different stimulators. Her thesis in university for MSc was in gene therapy area and working with Lentiviral vectors. She enthusiastic about Virotherapy, epigenetic, IPs and utilizing these methods to cure diseases especially CF and lung diseases. She is so motivated and she would like to continue her education in PhD and get involved in research projects in gene therapy field.

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