Effect of basic fibroblast growth factor on pluripotent marker expression and colony forming unit capacity of stem cells isolated from human exfoliated deciduous teeth

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Abstrak

Human dental pulp of exfoliated deciduous teeth contains the population of cells that exhibited mesenchymal stem cell (MSC) characters. Though, a cell amplification process is indeed required to secure and adequate cell number for such a potential employment. Several publications suggested the alteration of MSCs upon in vitro culture, for example, the decrease in proliferation and the loss of stem cell characters. Here, we investigated an influence of basic fibroblast growth factor (bFGF) on stem cells isolated from human exfoliated deciduous teeth (SHEDs) with respect to cell proliferation, colony forming unit efficiency and stem cell marker expression in both short- and long-term cultures. For short-term bFGF treatment, SHEDs were treated with bFGF for 48h. While, in long-term bFGF supplementation, SHEDs were maintained in culture and continuous passage upon confluence in medium supplemented witg bFGF. Cells at passage (P) 5 and 10 were employed for characterization. Our result showed that short-term bFGF treatment enhanced OCT4, REX1, and NANOG mRNA expression as well as colony forming unit ability. The FGFR inhibitor pretreatment was able to attenuate the influence of bFGF on pluripotent stem cell marker expression, confirming bFGF function. In addition, cells cultured in high passage number had decreased in cell proliferation, colony forming unit capacity, and pluripotent stem cell marker mRNA expression. However, bFGF supplementation in culture medium enhanced both pluripotent stem cell marker expression and colony forming unit capacity in later passage, though the effect was not robust. Together, these results indicate that high passage number may attenuate pluripotent properties of SHEDs and bFGF supplementation could be the beneficial approach to maintain SHEDs' stemness properties.