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INTERLEUKIN-17A REGULATES OSTEOGENIC DIFFERENTIATION, OPG/RANKL RATIO AND MAP KINASE SIGNALING PATHWAY IN STEM CELLS FROM HUMAN EXFOLIATED DECIDUOUS TEETH

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SUMMARY

Stem cells derived from human exfoliated deciduous teeth (SHED) represent a promising cell source for bone tissue regeneration. This study evaluated the effects of interleukin-17A (IL-17A) on the osteogenic differentiation of SHED. SHED were cultured in complete alpha minimum essential medium supplemented with osteoinducing reagents and treated with recombinant IL-17A. For osteogenic differentiation, alkaline phosphatase (ALP) activity was quantified; mineralization assays were carried out using von Kossa and Alizarin red stainings, and expression of osteogenic markers were analysed by real-time polymerase chain reaction and Western blot. The effect of IL-17A on MAP kinase signaling pathway was quantitatively assessed by RT2 profiler PCR array, which profiles the expression of 42 genes related to the pathway. The results showed that IL-17A induced osteogenic differentiation in SHED as evidenced by high ALP activity, increased matrix mineralization, and upregulation of the osteogenic markers expressions ALP, alpha 1 type 1 collagen (Col1A1), runt-related transcription factor 2 (RUNX2), osteopontin (OPN), osteocalcin (OCN), and osteoprotegerin (OPG) but downregulation of receptor activator of nuclear factor κB ligand (RANKL) as well as altering the OPG/RANKL ratio. In addition, IL-17A activated MAPK signaling pathway by significant up-regulation of all upstream activators and downstream targets of ERK, P38 and JNK pathway. Findings from our study indicate that IL-17A enhances proliferation and osteogenic differentiation of SHED by regulating OPG/RANKL mechanism as well as activates MAPK signalling pathway; thus suggests therapeutic potential of IL-17A in bone regeneration.