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<AT>The role of TGFβ receptor 1-smad3 signaling in regulating the osteoclastic mode caused by fluoride

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<ABS-HEAD>Highlights► Fluoride upregulated 303 miRNAs expression and downregulated 61 miRNAs. ► Fluoride exhibited biphasic effect on osteoclast viability, formation and function. ► Fluoride indicated little effect on expression of RANK protein. ► SB431542 inhibited or aggravated fluoride-regulating osteoclast mode. ► Stimulation of fluoride on Smad3 expression exhibited dose-dependent manner.

<ABS-HEAD>Abstract

<ABS-P>Studies that have focused on the role TGFβ signaling plays in osteoclast activity are gradually increasing; however, literature is rare in terms of fluorosis. The aim of this study is to observe the role the TβR1/Smad3 pathway plays in fluoride regulating cellsosteoclast-like cells that are under the treatment of TGFβ receptor 1 kinase. The RANKL-mediated osteoclast-like cells from RAW264.7 cells were used as osteoclast precursor model. The profile of miRNA expression in fluoride-treated osteoclast-like cells exhibited 303 upregulated miRNAs, 61 downregulated miRNAs, and further drew 37 signaling pathway maps by KEGG and Biocarta pathway enrichment analysis. TGFβ and its downstream effectors were included among them. Osteoclast viability, formation and function were detected via MTT method, bone resorption pit and tartrate-resistant acid phosphatase (TRACP) staining, respectively.
<ABS-P><ST>Results</ST> demonstrated that different doses of fluoride exhibited a biphasic effect on osteoclast cell viability, differentiation, formation and function. It indicated that a low dose of fluoride treatment stimulated them, but high dose inhibited them. SB431542 acted as TβR1 kinase inhibitor and blocked viability, formation and function of osteoclast-like cells