Effect of L-quebrachitol on osteoclastogenesis

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Abstract: Osteoporosis is generally recognized as a major health problem resulting from an imbalance of bone resorption and bone formation. Previously, we showed that L-quebrachitol, is an optically active methoxy analog of inositol, promotes bone formation by enhancing osteoblastogenesis of pre-osteoblastic MT3C3-E1 cells line through an involvement of the BMP-2/Runx2/MAPK/Wnt/β-Catenin signaling pathway. However, the effect on bone resorption of L-quebrachitol has not yet been reported. Therefore, the purpose of this study was to investigate the effect and underlying mechanism of L-quebrachitol on osteoclastogenesis of pre-osteoclast RAW 264.7 cells. In this study, it was shown that low concentration of L-quebrachitol was significantly suppresses cell differentiation, which led to decrease bone resorption. Result of TRAP staining indicated that L-quebrachitol suppressed the RANKL-induced osteoclast differentiation by significantly decrease the number of TRAP positive. In addition, it also down regulated mRNA expression of osteoclast marker genes including, NFATc1, cFOS, NFKB-P65, TRAP, MMP9, and cathepsin K. Moreover, L-quebrachitol could inhibit bone resorption ability of osteoclast by significantly decrease the pit formation area in a dose dependent manner.

Keywords: L-quebrachitol, Osteoclastogenesis, Osteoporosis

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