mineralisation ability was conducted to identify whether STIM1 is involved in osteogenesis. We next investigated the effects of 17β-estradiol on STIM1. MC3T3-E1 were cultured in the presence of 17β-estradiol and 17β-estradiol inhibitor (ICI) while osteogenic induction was conducted. RT-PCR and Western Blot was used to detect the expression and mRNA transcript levels. To elucidate the underlying mechanism of oestrogen on STIM1, we added an inhibitor of PI3K and mTOR to determine whether this signalling pathway was involved. To investigate the role of STIM1 in osteoblast differentiation and osteogenesis regulated by 17β-estradiol, we compared the osteogenic gene markers, ALP activity, and mineralization ability between STIM1 knockdown and control group in the presence of 17β-estradiol. Results: The function of the CRAC channel and osteogenic differentiation of BMSCs is decreased in postmenopausal osteoporosis patients. Knockdown of STIM1 weakened the osteogenic differentiation and mineralisation of osteoblasts derived from MC3T3-E1 dramatically. We found that 17β-E2 can promote the expression and transcription of STIM1 via the PI3K-mTOR signalling pathway. STIM1 also plays an essential role in osteogenic differentiation of osteoblasts regulated by oestrogen. Discussion and Conclusion: In summary, we found that the expression of STIM1 is decreased due to low activity of PI3K-mTOR signalling pathway, because of the low level of oestrogen after menopause. The decreased expression of STIM1 affects the differentiation and bone formation. Our study preliminarily clarified the underlying mechanism of the role of STIM1 on osteogenesis and bone formation, further studies are needed to clarify potential mechanisms and provide new strategies for treatment.

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CHEMOKINES: A POTENTIAL MOLECULAR LINK BETWEEN CHONDROCYTE APOPTOSIS AND OSTEOCLAST MIGRATION AND FORMATION FOLLOWING DEXAMETHASONE THERAPY
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Introduction: Glucocorticoid therapy is known to cause growth plate chondrocyte damage, bone growth arrest, bone resorption, and bone loss, for which the mechanisms remain unclear. The current study aims to identify whether apoptotic chondrocytes secrete factors that may stimulate osteoclast differentiation. It was hypothesised that dexamethasone (Dex) will induce chondrocyte apoptosis, causing increased secretion of chemokines with the capacity to promote osteoclast recruitment and formation.

Subjects and Methods: The current study utilized an in vitro Dex treatment model in ATDC5 chondrogenic cells and examined treatment effects on molecular marker expression, induction of apoptosis, and expression of chemokines and receptors in differentiated Dex-treated chondrocytes. In addition, ability of promoting osteoclast differentiation in RAW264.7 osteoclast precursor cells was assessed for conditioned media taken from Dex-treated or -untreated chondrocytes.

Results: In a time course of chondrogenic culture, the increased type II and X collagen expression suggests the dynamic chondrocyte differentiation. The significantly enhanced increased density of apoptotic cells as observed by Hoechst dye staining as well as markedly increased expression level of Fas-L as examined by real-time quantitative RT-PCR suggests increased chondrocyte apoptosis following Dex treatment. Meanwhile, chemokine PCR array analysis of Dex-treated or -untreated chondrocytes identified up-regulation of various chemokines in treated chondrocytes. Chemokine SDF-1 was demonstrated to be the chemokine with the highest induction following treatment, and its induction was also supported by conformational RT-PCR. Furthermore, the SDF-1 protein level was also increased as assayed by ELISA in the conditioned medium of Dex-treated chondrocytes. Moreover, it was found that conditioned medium from Dex-treated chondrocytes was able to stimulate migration of RAW264.7 cells as well as enhance formation of TRAP-positively stained RAW264.7 cells. In particular, inhibition of these promoting effects of the conditioned medium by a neutralising antibody for SDF-1 was also observed.

Discussion and Conclusion: These findings suggest that Dex treatment can cause apoptosis of chondrocytes and elevated expression of chemokines by apoptotic chondrocytes, which may be responsible for enhanced osteoclast migration and formation, serving as a potential molecular link between chondrocyte apoptosis and osteoclast differentiation.

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