عنوان مقاله:

Gene co-expression network analysis identifies BRCC3 as a key regulator in osteogenic differentiation of osteoblasts through a β-catenin signaling dependent pathway

محل انتشار:

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خلاصه مقاله:

Objective(s): The prognosis of osteoporosis is very poor, and it is very important to identify a biomarker for prevention of osteoporosis. In this study, we aimed to identify candidate markers in osteoporosis and to investigate the role of candidate markers in osteogenic differentiation. Materials and Methods: Using Weighted Gene Co-Expression Network analysis, we identified three hub genes might associate with osteoporosis. The mRNA expression of hub genes in osteoblasts from osteoporosis patients or healthy donor was detected by qRT-PCR. Using siRNA and overexpression, we investigated the role of hub gene BRCC3 in osteogenic differentiation by alkaline phosphatase staining and Alizarin red staining. Moreover, the role of β-catenin signaling in the osteogenic differentiation was detected by using β-catenin signaling inhibitor XAV939.Results: We identified three hub genes that might associate with osteoporosis including BRCC3, UBE2N, and UBE2K. UBE2N mRNA and UBE2K mRNA were not changed in osteoblasts isolated from osteoporosis patients, compared with healthy donors, whereas BRCC3 mRNA was significantly increased. Depletion of BRCC3 promoted the activation of alkaline phosphatase and formation of calcified nodules in osteoblasts isolated from osteoporosis patients and up-regulated β-catenin expression. XAV939 reversed the BRCC3 siRNA-induced osteogenic differentiation. Additionally, inhibited osteogenic differentiation was also observed after BACC3 overexpression, and this was accompanied by decreased β-catenin expression.Conclusion: BRCC3 is an important regulator for osteogenic differentiation of osteoblasts through β-catenin signaling, and it might be a promising target for osteoporosis treatment.

کلمات کلیدی:

BRCC3, β-catenin, Osteoblasts, Osteogenic differentiation, Osteoporosis