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Diphlorethohydroxycamalol isolated from *Ishige sinicola* stimulates osteoblast proliferation and differentiation via the bone morphogenetic protein-2 signaling pathway

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Osteoporosis is one of the most common bone diseases, occurring due to an imbalance between bone formation and bone resorption. The aim of this study was to investigate the effects of Diphlorethohydroxycamalol (DPHC) isolated from *Ishige sinicola* on osteoblast differentiation through the activation of the Bone Morphogenetic Protein-2 (BMP-2) signaling pathway in MC3T3-E1 cells. A cell proliferation assay, alkaline phosphatase (ALP) activity assay, Alizarin red staining, and expression analysis of osteoblastic genes were carried out to assess MC3T3-E1 cell proliferation and osteoblastic differentiation. We found that DPHC increased cell proliferation in a dose-dependent manner. DPHC markedly promoted ALP activity and mineralization. Alizarin red S staining demonstrated that DPHC treatment tended to increase extracellular matrix calcium accumulation. Moreover, DPHC upregulated the osteoprotegerin/receptor activator of nuclear factor-κ B ligand ratio. DPHC also increased the protein expression levels of ALP, Ras, p-Smad 1/5, Smad 1/5, Erk, and BMP-2. Therefore, DPHC showed potential in stimulating osteoblastic bone formation, and it might be useful for the prevention and treatment of osteoporosis.

Biography

Jeonghyeon Kang completed her PhD from Pusan National University (Busan, South Korea) and is Professor in the Department of Food and Nutrition at Silla University in South Korea. She is investigating the effects of nutrients and phytochemicals on chronic degenerative diseases and their molecular mechanisms through human metabolism studies, clinical studies, animal studies, biochemical analyses, and cell research.

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