International Journal of Nutrition and Food Engineering
Vol:8, No:7, 2014

Egg Yolk Peptide Stimulated Osteogenic Gene Expression

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Abstract : Postmenopausal osteoporosis is characterized by low bone density which leads to increased bone fragility and greater susceptibility to fracture. Current treatments for osteoporosis are dominated by drugs that inhibit bone resorption although they also suppress bone formation that may contribute to pathogenesis of osteonecrosis. To restore the extensive bone loss, there is a great need for anabolic treatments that induce osteoblasts to build new bone. Pre-osteoblastic cells produce proteins of the extra-cellular matrix, including type I collagen at first, and then to successively produce alkaline phosphatase (ALP) and osteocalcin during differentiation to osteoblasts. Finally, osteoblasts deposit calcium. Present study investigated the effects of egg yolk peptide (EYP) on osteogenic activities and bone matrix gene expressions in human osteoblastic MG-63 cells. The effects of EYP on cell proliferation, alkaline phosphatase (ALP) activity, collagen synthesis, and mineralization were measured. The expression of osteogenic genes including COL1A1 (collagen, type I, alpha 1), ALP, BGLAP (osteocalcin), and SPP1 (secreted phosphoprotein 1, osteopontin) were measured by quantitative realtime PCR. EYP dose-dependently increased MG-63 cell proliferation, ALP activity, collagen synthesis, and calcium deposition. Furthermore, COL1A1, ALP, and SPP1 gene expressions were increased by EYP treatment. Present study suggested that EYP treatment enhanced osteogenic activities and increased bone matrix osteogenicgenes. These results could provide a mechanistic explanation for the bone-strengthening effects of EYP.

Keywords : egg yolk peptide, osteoblastic MG-63 cells, alkaline phosphatase, collagen synthesis, osteogenic genes, COL1A1, osteocalcin, osteopontin
Conference Title : ICNFS 2014 : International Conference on Nutrition and Food Sciences
Conference Location : Zurich, Switzerland
Conference Dates : July 30-31, 2014