Abstracts *(Poster Presentation)*

Andrographolide Promotes Osteoblastic Differentiation in MC3T3-E1 Cells and Protects Bone Loss in Estrogen Deficiency Rats

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Abstract

Introduction: A decline of estrogen in menopause women is accompanied with increases in many pro-inflammatory cytokines and osteoporosis. Andrographolide (AP), from *Andrographis paniculata*, which has an anti-inflammatory activity, may have potential to alleviate osteoporosis during estrogen deficiency.

Objectives: This study aimed to investigate the osteogenic potential of AP on mouse pre-osteoblastic (MC3T3-E1) cells and the protective effect of AP on bone loss in estrogen-deficient rats.

Methods: The study was conducted into two parts. Firstly, in mouse pre-osteoblastic (MC3T3-E1) cells, the osteogenic effect of AP was determined by ALP expression, alizarin red staining, and osteoblast-specific gene expressions. Secondly, the protective effect of AP on bone loss was evaluated in estrogen-deficient animal model using ovariectomized induced osteopenia rats. The prevention effect was evaluated from bone mineral density (BMD) and bone microarchitural indices, by peripheral quantitative computed tomography (pQCT) and bone histomorphometry, respectively.

Results: AP promoted the differentiation of MC3T3-E1 cells into osteoblast by increasing the expression and activity of alkaline phosphatase (ALP), an osteoblastic gene-specific marker. AP also accelerated bone formation and increased bone structural gene production including collagen and osteocalcin. AP also protected bone loss in the estrogen-deficient (ovariectomized, OVX) rats after 12 weeks of treatment. It protected the loss of bone mineral density, and bone microarchitecture deterioration in OVX rats.

Conclusions: This study provides essential evidence for clinical applications and development of AP towards treating osteoporosis in post-menopausal women.

Keywords: Andrographolide, Bone formation, OVX rats, Osteoblast, Osteoporosis
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