

Relationship of osteoblast and osteoclast-related mRNA expression with the use of piper sarmentosum water extract in the treatment of glucocorticoid-induced osteoporosis

ABSTRACT

Glucocorticoid-induced osteoporosis is the most common cause of secondary osteoporosis. Expression of bone-related genes may correspond to alteration in bone metabolism with glucocorticoid exposure. Piper sarmentosum (Ps) extract is known to possess antioxidant and anti-inflammatory activities. In this study, we determined the correlation between the effects of Ps leaf extract with mRNA expression of osteoblast and osteoclast related genes in glucocorticoid-induced osteoporotic rats. Sprague-Dawley rats were adrenalectomized and divided into four groups: G1: sham-operated control; G2: adrenalectomized (adx) control; G3: adrx and given Ps 125 mg/kg/day; and G4: adrx and given GCA 120 mg/kg/day. These rats were given dexamethasone replacement 120µg/kg body weight/day intramuscularly. Treatment with water-based Ps leaf extract 125mg/kg/day and GCA 120 mg/kg/day were given for 2 months. The left femur was dissected out for gene expression analysis. The results showed that Ps leaf extract had increased the osteoprotegerin mRNA expression ($p < 0.05$), whereas GCA increased the osteoprotegerin and osteocalcin mRNA expression ($p < 0.05$). This suggests that Ps leaf extract was able to prevent bone loss due to long-term glucocorticoid therapy by increasing the expression of bone formation related genes. Thus Ps may have the potential to be used as prophylaxis against osteoporosis and osteoporotic fracture in patients on long-term glucocorticoid treatment.

Keyword: Gene expression; Glucocorticoid; Osteoblast; Osteoclast; Osteoporosis; Piper sarmentosum