

R-21. Ginseng saponin inhibits collagenase-3 in osteoblasts

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Background

There is a potential role of collagenase-3 in alveolar bone loss and periodontal disease progression, we need to develop or find chemotherapeutic drugs or herbal agents which may regulate the expression of MMP-13. Ginseng saponin, one of the major components of Korea ginseng (panax ginseng) root, has many various biologic effects, such as cytotoxic effect, tumoricidal effects, cytokine regulations, and protein biosynthesis effect. The purpose of this study was to determine the effects of Korea red ginseng saponin on MMP-13 gene expression in osteoblasts.

Materials and Methods

The cells were cultured with ginseng saponin in concentration of 1.0, 10, 25, 50, 100, 250 and 500 $\mu\text{g}/\text{ml}$ for MTT assay. Primary rat calvarial cells were pre-treated for 1 hour with ginseng saponin (100 $\mu\text{g}/\text{ml}$) and then stimulated with IL-1 β (1.0 ng/ml) and PTH (10 nM). MMP-13 gene expression was evaluated by RT-PCR.

Results

Ginseng saponin was cytotoxic to osteoblast at concentration exceeding 250 $\mu\text{g}/\text{ml}$ for longer than 24 hours in tissue culture ($p < 0.01$). In RT-PCR analysis, PTH and IL-1 β were induced MMP-13 expression in primary rat calvarial cells. Steady state RNA levels were increased approximately 350% by IL-1 β , and 400% by PTH when normalized to untreated control. IL-1 β induced MMP-13 mRNA expression was reduced 54% by treatment with ginseng saponin. But ginseng saponin didn't inhibit MMP-13 expression from PTH stimulated cells.

Conclusions

These results suggest that ginseng saponin may differently affect cell signalling pathway in osteoblastic cells that mediate MMP-13 expression.