

Bone Strengthening Effects of Deer Antler Extract

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Abstract : It has been reported that deer antler extract has bone-strengthening activity and effectively used in bone diseases therapy. However, little is known about the cellular and molecular mechanism of this effect. The upper section, mid section, and base of the antler has been known to exhibit different biological properties. Present study investigated the effects of these three parts of deer antler extracts on bone formation and resorption. The effects of deer antler extracts (DH) on bone formation were determined by cell proliferation, alkaline phosphatase (ALP) activity, collagen synthesis, and mineralization in human osteoblastic MG-63 cells. The effect on bone resorption was determined by osteoclastogenesis from bone marrow-derived precursor cells driven by RANKL. Ethanol extracts of DH (50 ~ 100 µg/ml) dose-dependently increased cell proliferation, and upper part increased the cell proliferation by 118.4% while mid and base parts increased proliferation by 107.8% and 102.3%, respectively. ALP activity was significantly increased by upper part of the DH treatment. After enhancement of ALP activity, significant augmentation of collagen synthesis and calcification assessed by Sirius red and Alzarin red staining, respectively, was observed in upper part of the DH treatment. The effect of DH on bone resorption was not observed in all three parts of the DH. These results could provide a mechanistic explanation for the bone-strengthening effects of DH.

Keywords : alkaline phosphatase, collagen synthesis, deer antler, osteoblastic MG-63 cells

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