Influence of Osteoporosis on Bone Formation by Bone Morphogenetic Protein-2

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Abstract: Recombinant human bone morphogenetic protein (BMP)-2 is known to induce significant regeneration of bone, but the influence of osteoporosis on bone formation is not understood. The aim of this study was to investigate the influence of osteoporosis on bone formation by histopathological and histometrical evaluations.

Five-week-old KO OCIF/Jcl (homo) mice (osteoporosis group) and C57BL/6NJcl mice (normal group) were used. Atelocollagen gel with 0, 1, 5, 10 and 15 μg/ml BMP-2 were prepared and injected into the periosteum of the mice’s cranial bone. Histopathological observation and histometric measurement of new bone and bone density were performed. The Mann Whitney U test was used for statistical significance.

Both groups increased new bone in a concentration-dependent manner. At BMP concentrations of 0 and 1 μg/ml, neither group showed new bone, and at BMP of 5 and 15 μg/ml, the osteoporosis group showed significantly more bone than the normal group (p<0.05). Bone density was significantly lower in the osteoporosis group than in the normal group at BMP 5, 10 and 15 μg/ml separately (p<0.05).

As a result, it was concluded that the amount of new bone induced by BMP-2 increases and the bone density decreases in osteoporosis.

Key words: Osteoporosis, OCIF KO mouse, BMP-2