

R-23. Effect of BMP-7 on bone matrix expression and mineralization in rat periodontal ligament cell

이호재, 정현주, 김영준, 김옥수

전남대학교 치과대학 치주과학교실

Background

Periodontal therapy has dealt primarily with attempts at arresting progression of disease, and, more recent techniques have focused on regenerating the periodontal ligament having the capacity to regenerate the periodontium. Recombinant human bone morphogenic protein-7 (rh BMP-7) can differentiate the osteoprogenitor cells and induce bone formation. The purpose of this study was to evaluate the effect of rh BMP-7 on the expression of extracellular matrix proteins in rat periodontal ligament cells in vitro.

Materials and Methods

In the control group, cells was cultured with DMEM media. In the experimental groups, cells were cultured with rh BMP-7 in concentration of 10, 25, 50 and 100 ng/ml. Then each group was characterized by examining alkaline phosphatase activity at 3 and 5 days and the ability to produce mineralized nodules of rat calvarial cells at 14 days. Synthesis of type I collagen (COL-I), osteocalcin (OCN), bone sialoprotein (BSP) was evaluated by RT-PCR at 7 days. Activation of Smad proteins was determined by western blot analysis.

Results

1. Alkaline phosphatase activity was significantly greater in rh BMP-7 50 ng/ml and 100 ng/ml compared to control ($p < 0.05$).
2. The percentage of mineralized bone nodule was more greater in rh BMP-7 50 ng/ml and 100 ng/ml than the control.
3. At 7 day culture, the expressions of BSP and OCN were greater by rh BMP-7 in concentration of 50 ng/ml and 100 ng/ml.
4. In western blot analysis, Smad 1,5 and 8 expression was shown by dose-dependent manner.

Conclusions

These results suggested that rh BMP-7 in concentration of 50 ng/ml and 100 ng/ml stimulate the secretion of extracellular matrix of rat periodontal ligament cells and may facilitate bone formation.