R-23. The Effect of varying the Particle Size of β-Tricalcium Phosphate carrier of Recombinant Human Bone Morpho-genetic Protein-4 on Bone Formation in Rat Calvarial Defects

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Background

The carriers used in Bone Morphogenetic Protein(BMP)delivery systems play an important role in supporting the osteoinductive activity of BMPs. Beta tricalcium phosphate(β-TCP) has been developed as one of the carriers of rhBMP. However, it is not known whether the particle size of β-TCP is related to the bone formation. The purpose of this study was to evaluate the effect of using β-TCP with different particle sizes on the ability of rhBMP-4 to enhance bone formation in the rat calvarial defect model.

Methods

Calvarial, 8-mm diameter, critical-size defects were created in 100 male Sprague-Dawley rats. Five groups of 20 animals each received either rhBMP-4(2.5 g) using β-TCP with a particle size of 50-150 m, rhBMP-4(2.5 g) using β-TCP with a particle size of 150-500 m, a β-TCP control with a particle size of 50-150 m, a β-TCP control with a particle size of 150-500 m, or a sham-surgery control, respectively, and were evaluated by measuring their histometric parameters following a 2- and 8-week healing interval(10 animals/group/healing interval).

Results

Surgical implantation of rhBMP-4/β-TCP resulted in enhanced local bone formationat both 2 and 8 weeks. There were no significant differences in the defect closure, new bone area or augmented area between either the two rhBMP-4/βTCP groups or between the two β-TCP control groups at 2 and 8 weeks.

Conclusion

Within the parameters of this study, varying the particle size of β-TCP does not seem to have a significant effect on bone formation.

* **key words** : Bone formation; recombinant human bone morphogenetic protein-4; particle sizes; carrier; β-tricalcium phosphate; rat calvarial defect model

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