

# Comprehensive Study to Realize Clinical Use of Bone Morphogenetic Protein for Regeneration of Skeletal Defects

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## **【 Outline of survey 】**

Bone morphogenetic proteins (BMP) are family of proteins and thought to be responsible for regenerative potential of bone as commonly seen in fracture repair. However, the regenerative potential is limited in humans and bone defects of significant sizes are not repaired. This study focus on enhance the regenerative potential intensively with use of BMP molecules produced by DNA recombination and its delivery system. In order to control the bone size and shape to be formed by the BMP delivering system, bio-compatible materials was used as scaffold for the BMP-induced new bone. .In order to manufacture the scaffold that perfectly fit the defect, 3-D CT image data of the specific bone defect will be obtained. And computer-controlled cutting machine will fabricate the scaffold based on the CT data. The surface of the scaffold will be coated with the BMP-delivering composite and implanted to the bone defect. The efficacy of this bone defect regenerating system will be examined in dog models as pre clinical trials.

## **【 Expected results 】**

We expect to produce a new bone regenerating system applicable to repair bone defects at any part or any shape of the skeletal defect with synthetic materials (rhBMP-2, new carrier polymers and synthetic biomaterials like ceramics or titanium alloys). With use of this system, autogenous bone grafting will be avoided, which is currently used to enhance bone healing process in spite of various disadvantages including additional surgery and physical and cosmetic morbidities associated with the procurement of the bone graft.

## **【 References by the principal researcher 】**

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**【 Term of project 】** FY 2004 - 2008

**【 Budget allocation 】** 75,400,000 yen

**【 Homepage address 】** <http://www.med.osaka-cu.ac.jp/orthoped>