

Symposium I - 3

BMP, myth or fact (reality)

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The bone morphogenetic proteins (BMPs) are multi-functional growth factors belonging to the TGF- β superfamily. To date, about 15 BMP family members have been identified and characterized. Some BMPs, especially BMP-2 and BMP-7, are shown to induce differentiation of mesenchymal stem cells into osteoblast and chondroblast cells. Biologic responses of BMPs come from BMP (IA, IB and II) receptor signal transduction with activation of transcriptional factors(e.g., Smad, Runx2). When delivered locally to animals with proper carriers, recombinant human BMP (rhBMP) peptide and gene reproduced the activity of ectopic or orthotopic bone formation. As biocompatible and non-immunogenic carriers for BMPs delivery, hydroxyapatite and polymeric scaffolds such as poly(lactic acid)(PLA) and poly(glycolic acid)(PGA) have been introduced. Some preclinical studies with combination of rhBMPs and proper carriers successfully showed that rhBMP-induced bone behaved as morphologically and mechanically normal. Simultaneous or temporal combination between rhBMP-2 and other BMP subtypes(e.g., rhBMP4, rhBMP7) or other growth factors(e.g., VEGF, FGF2) synergistically enhanced the bone forming activity of rhBMP-2. For the strong induction of bone formation, these combination strategies are considered. In recent, use of BMPs peptides and genes for regeneration of dental and craniofacial tissue are studied. rhBMP-2, rhBMP-4 and rhBMP-7 are shown to induce dentinogenesis, periodontal and jaw bone regeneration, and osseointegration between implant and bone, although the results are variable depend on carriers used. To improve success of dental implant, rhBMPs coating methods on titanium surfaces are extendedly explored with development of coating materials and surface modification. This presentation will also discuss usefulness and limitations of BMPs in oral/maxillofacial fields.

주요 학력 및 경력:

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