

강연 III

BMP-7 peptides support osteoblast differentiation on titanium surfaces

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Understanding the factors that control osteoblastic behavior is centrally important in establishment of successful osseointegration. Pharmacogenetic control of the osteoblast to increase the mineral content around dental implant may offer a unique advantage to clinicians in improving osseointegration success and decreasing time before mechanical loading. This in vitro pilot study has screened for bioactive peptides derived from bone morphogenic protein 7 (BMP-7) (also called osteogenic protein 1 (OP-1)). Thirteen overlapping peptides of BMP-7 were synthesized and covalently coupled to glass cover slip. The rate and relative amount of mineralization were compared by von Kossa analysis using primary rat calvarial osteoblastic cell population during a 7 - to 21-day period. In addition bone sialoprotein (BSP) and osteocalcin (OCN) gene expression was measured from osteoblastic cells grown on peptide-immobilized glass coverslips by RT-PCR. Initial results from mineralization studies suggest the BMP-7-derived peptides were able to support mineralization to varying degrees with enhanced peptide-induced mineralization from the C- and N-terminal of the BMP-7 molecule. Analysis of these peptide regions indicated that these peptides comprised the finger 1 and 2 domains of OP-1, which contribute toward ligand-receptor interaction. These studies indicated that BMP-7 peptides covalently bound to solid substrates may provide the biological basis to immobilized peptides to titanium implants to induce osteoblastic differentiation and mineralization in more predictable fashion.

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