

R-12. Osteopromotive domain (OPD-15) peptide on the surface of biomedical device for early guided bone regeneration

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연구배경

To improve osteoblastic cell adhesion and bone regeneration, surface modification of chitosan was studied. Chitosan, deacetylated derivative of chitin, has been suggested in recent years to be a tissue engineering scaffold material, for cartilage, skin, bone and hepatic application. Here in, synthetic bioactive peptide named as osteopromotive domain (OPD-15) was bound onto the biomedical devices including nanofibrous chitosan membranes and hydroxyapatite powder to increase initial osteoblastic adhesion for thereby enhancing bone regeneration efficacy.

연구방법 및 재료

The OPD-15 bound chitosan membrane or hydroxyapatite powder was examined its cell adhesion ability, proliferation, and differentiation by confocal microscopy observation, flow cytometric analysis, and Western-blot analysis as well as mineralization assay. The OPD-15 bound biomedical devices were further evaluated their capacity of bone regeneration using rat/rabbit calvarial defect model.

결과

The OPD-15 bound biomedical devices had selectivity for osteoblast and exhibited an increased calcium level in comparison with control surface. The modified surface can either enhance specific cell adhesion, cell differentiation such as bone cell calcification. The modified biomedical devices were shown to improve their ability to osteogenesis more efficiently in bone defect while reducing foreign body reaction.

결론

These results suggested that the surface of biomedical device can be modified by stably binding OPD-15 so that it can provide cell with favorable environment for cell adhesion, proliferation and differentiation, thereby ultimately enhancing tissue regenerative capacity.

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