

PR-II-5. Comparative study on the osteopromotive capacity of different type scaffold immobilized with synthetic oligopeptide

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Background

Osteopontin (OPN) is reported to play an essential role in adhesion, remodeling and osseointegration at the interface between biomaterial and bone. These proteins are difficult to use because of their high molecular weights, immunological responses, cost, coupling to scaffolds, and problems in targeting to remote organs. Synthetic peptides have been suggested to overcome these shortcomings. The aim of this study was to evaluate the osteopromotive capacity of different type scaffold immobilized with synthetic oligopeptide using rabbit calvarial defect model.

Materials and methods

The peptide coated bone mineral were achieved. Either peptide-coated bone minerals (test group) or uncoated ones (control group) were implanted into 10-mm calvarial defects in the rabbits. Preparation of peptide-immobilized gel was done. The peptide-immobilized gel was applied into the defects. In one group the amount of immobilized peptide was 4 mg and in the other group the amount was 6 mg. The peptide-unloaded gel was placed as the control group and non-grafted area was

served as negative control.

Results

The ratio of new bone formation was significantly greater in the peptide-coated group compared to that in peptide-uncoated bone mineral group ($P < 0.05$). The amount of new bone formation and defect closure were significantly greater in the peptide-immobilized gel group relative to the peptide-unloaded gel and non-graft control ($P < 0.05$).

The mean of absolute value of regenerated bone in peptide-coated deproteinized bovine bone at two weeks was 2.85 mm^2 and the mean of absolute value of regenerated bone in peptide-immobilized alginate gel was 2.93 mm^2 .

Conclusion

The use of collagen binding motif from OPN as a peptide-coated bone reveals faster regeneration of new bone and peptide-immobilized gel is a promising material for easier application for enhancing osteopromotion.