B 8 0 6 In Vivo Osteogenic Potential of a Novel Porous Hydroxyapatite

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A novel porous hydroxyapatite (HA) was developed as implantable cell carriers. Polyethyleneimine (PEI) was used as a dispersion agent of HA powder. The slurry was foamed by adding of polyoxyethylenelaurylether and mixing. The slurry was poured into a resin mold and placed in a closed vessel to cross-link PEI with diepoxy compound. HA porous body was obtained by a sintering of the HA/PEI porous body. The material was highly porous (77%) and completely interconnected. Pore average was 500μm in diameter. Interconnection pass was 200μm in diameter. The compress intensity (17.4MPa) and three-point bending (7.2Mpa) strength of the porous HA were much high. For *in vivo* testing, firstly BMOs were cultured in a standard medium for 10 days, then trypsinized to make composites of HA and the cells. The 2-week subcultured composites were implanted into subcutaneous sites of syngeneic rats. These implants were harvested at different time points and prepared for the biochemical analysis of alkaline phosphatase activity (ALP) and bone osteocalcin content (OCN), and histological analysis. High ALP could be detected 1 week after implantation and had a maximum at 3 weeks, after which it gradually decreased until 8 weeks after implantation. OCN could be detected at 1 week and increased steadily with time until 8 weeks after implantation. Light microscopy revealed active bone formation at 2 weeks after implantation. In the SEM study, mineralized collagenous extracellular matrix was noted at 2 weeks after implantation with numbers of active osteoblasts. These results indicate that the composite of the novel HA and cultured BMOs have osteogenic ability *in vivo*, suggesting the novel HA to be clinically applicable.