Osteogenicity of biphasic calcium phosphate ceramics and bone autograft in a goat model

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Mots-clés	Autologous bone [6], Bone ingrowth [7], Calcium phosphate ceramics [8], Osteoconduction [9], Osteogenesis [10], Osteoinduction [11]
Résumé en anglais	The aim of this work was to compare the osteogenicity of calcium phosphate ceramic granules with autologous bone graft in ectopic and orthotopic sites. Biphasic calcium phosphate (BCP) granules composed of hydroxyapatite (HA) and β-tricalcium phosphate (β-TCP) in a 60/40 ratio were sintered at 1050, 1125 and 1200 °C, producing different microporosities. Either BCP ceramic granules or autologous bone chips (n = 7) were implanted into paraspinal muscles. Osteoinduction was not observed in either the BCP implants or autologous bone chips after 6 or 12 weeks in the ectopic sites. Hollow and bored polytetrafluoroethylene (PTFE) cylinders were filled with autologous bone, BCP granules or left empty, then implanted into critical-sized defects in femoral epiphyses. The PTFE cylinders left empty contained marrow and blood vessels but not mineralized bone, indicating that this model prevented bone ingrowth (0.56 ± 0.43% at 12 weeks). Bone formation was observed in contact with the BCP1050 and BCP1125 granules in the femoral sites after 6 weeks. The amount of bone after 12 weeks was 5.6 ± 7.3 and 9.6 ± 6.6% for BCP1050 and BCP1125, respectively. Very little bone formation was observed with the BCP1200 implants (1.5 ± 1.3% at 12 weeks). In both the ectopic and orthotopic sites, autologous bone chips were drastically resorbed (from 19.4 ± 3.7% initially to 1.7 ± 1.2% at 12 weeks). This study shows that synthetic bone substitutes may have superior stability and osteogenic properties than autologous bone grafts in critical-sized bone defects.
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Liens

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