Proliferation and osteogenic differentiation of mesenchymal stromal cells in a novel porous hydroxyapatite scaffold

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Aim: To compare the effect of bovine bone derived porous hydroxyapatite (BDHA) scaffold on proliferation and osteogenic differentiation of human bone marrow-derived mesenchymal stromal cells (hMSCs) compared with commercial hydroxyapatite (CHA) scaffold. Materials and methods: The porosity and pore size were analyzed using micro-CT. The biocompatibility was demonstrated by alamar blue assay, and cell attachment through SEM and Hoechst staining. The osteogenic differentiation was demonstrated using biochemical assay and osteogenic gene expression. Results: BDHA and CHA scaffolds showed porosity of 76.6 ± 0.6 and 64.3 ± 0.3% and pore size diameter of 0.04–0.25 and 0.1–2.6 mm, respectively. hMSCs proliferation, ALP activity, osteocalcin secretion and osteogenic gene expression are comparable in both the scaffolds. Conclusion: These results demonstrated that BDHA is biocompatible, supports cell adhesion and promotes proliferation and osteogenic differentiation.

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