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The effect of strontium doped β-TCP on bioactivity of collagen scaffold for bone tissue engineering

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Sufficient bioactivity in three-dimensional porous collagen scaffolds is critical for bone tissue engineering. In this study, a composition of beta tricalcium phosphate (β-TCP) was synthesized by doping with strontium oxide (SrO). The sample was prepared by mixing β-TCP and an appropriate amount of SrO in anhydrous ethanol as a solvent and zirconia milling media. The mixture was then milled for 6 h at 70 rpm and then, dried in an oven at 60°C for 7 h. The particle size was determined by Dynamic Light Scattering (DLS). The surface of doped β-TCP was observed by scanning electron microscopy (SEM), and the amount of Ca, P, O and Sr was measured via energy dispersive X-ray (EDX) analysis. The synthesized powder was added as an inorganic component to collagen for scaffold fabrication by freeze drying technique. Surface morphology of the scaffolds was also observed using SEM. Bioactivity study of the scaffolds was carried out in simulated body fluid (SBF) to determine the ability of calcium and phosphate deposition. Samples were investigated by EDX after 3 days. And a high level of calcium and phosphorus element in a molar ratio of Ca/P at 1.63 (this is approximately equal to that of natural material hydroxyapatite which has a Ca/P ratio of 1.67) was observed. In summary, this study examined the effect of SrO as a dopant material to improve the bioactivity. Addition of SrO to the scaffold facilitated more bioactivity compared to that without dopant.

Biography

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