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Strontium- and zinc- containing bioactive glass and alginates scaffolds

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Abstract

With an increasingly elderly population, there is a proportionate increase in bone injuries requiring hospitalization. Clinicians are increasingly adopting tissue-engineering methods for treatmentduetolimitationsintheuseofautogenousandautologousgrafts. The aim of this study was to synthesize a novel, bioactive, porous, mechanically stable bone graft substitute/scaffold. Strontium and zinc-containing bioactive glasses were synthesized and used with varying amounts of alginate to form scaffolds. Differential scanning calorimetric analysis (DSC), FTIR, XRD, and NMR techniques were used for the characterization of scaffolds. SEM confirmed the adequate porous structure of the scaffolds required for osteo conductivity. The incorporation of the bioactive glass with alginate has improved the compressive strength of the scaffolds. The bioactivity of the scaffolds was demonstrated by an increase in the pH of the medium after the immersion of the scaffolds in a Tris/HCl buffer and by the formation of orthophosphate precipitate on scaffolds. The scaffolds were able to release calcium, strontium and zinc ions in the Tris/HCl buffer, which would have a positive impact on osteogenesis if tested in vivo.

Biography

Asfia Haider completed her master's degree in Oral Biology and Maxillofacial Pathology at Queen Marry University of London, UK. Currently she is working as a dentist at NHS, UK.

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