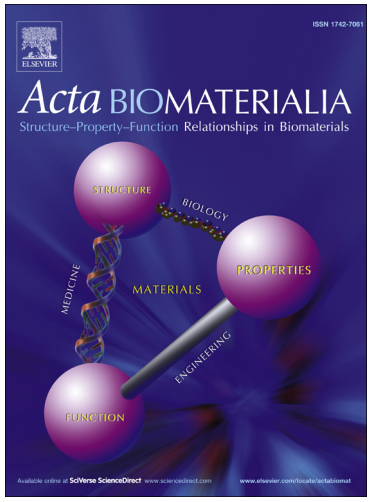

Significance of calcium phosphate coatings for the enhancement of new bone osteogenesis – A review

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SIGNIFICANCE OF CALCIUM PHOSPHATE COATINGS FOR THE ENHANCEMENT OF NEW BONE OSTEOGENESIS – A REVIEW

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Dedicated to Professor Marina V. Chaikina on the occasion of her anniversary

Abstract

A systematic analysis of results available from *in vitro, in vivo,* and clinical trials on the effects of biocompatible CaP coatings is presented. An overview of the most frequently used methods to prepare CaP-based coatings was conducted. Dense, homogeneous, highly adherent, and biocompatible CaP or hybrid organic/inorganic CaP coatings with tailored properties can be deposited. It has been demonstrated that CaP coatings have a significant effect on the bone regeneration process. In vitro experiments using different cells (e.g. SaOs2, hMSCs, and osteoblast-like cells) have revealed that CaP coatings enhance cellular adhesion, proliferation, and differentiation to promote bone regeneration. However, in vivo, the exact mechanism of osteogenesis in response to CaP coatings is unclear, indeed there are conflicting reports of the effectiveness of CaP coatings with results ranging from highly effective to no significant or even negative effects. This review will therefore highlight progress in CaP coatings for orthopaedic implants and discuss the future research and use of these devices. Currently, an exciting area of research is in bioactive hybrid composite CaP-based coatings containing both inorganic (CaP coating) and organic (col-