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Nanostructured Calcium Phosphates for Drug, Gene, DNA and Protein Delivery and as Anticancer Chemotherapeutic Devices

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Abstract

During the past two decades, a number of materials and devices have been utilised in drug delivery applications. A range of biomaterials with different morphologies and pore sizes are currently utilised. For any given biomaterial or bioceramic, having an adequate control of the chemical composition as well as the critical pore sizes is important in terms of controlling the effectiveness when used to deliver drugs locally. In comparison to all currently known and used biomaterials, given the fact that it possesses chemical similarity to human bone, and most importantly its dissolution characteristics which allow for bone regeneration and growth, calcium phosphate holds a special consideration. Moreover, due to their interconnected pore structure, marine materials such as shells and coral exoskeletons show potential for applications in drug delivery due to their easy conversion to calcium phosphates with controllable dissolution rates. This chapter covers a range of current methods used specifically for natural materials that can be converted to calcium phosphates and mixed with polymeric materials as thin film or nanostructured drug, genes, protein and range of delivery and as anticancer chemotherapeutic devices.

Keywords

Hydroxyapatite Foraminifera Marine material Coral skeleton Liposomes Surface modifications Biomimetics

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