

عنوان مقاله:

In-vitro and in-vivo examination for bioceramics degradation

محل انتشار:

فصلنامه کامپوزیت ها و ترکیبات, دوره 4, شماره 12 (سال: 1401)

تعداد صفحات اصل مقاله: 9

نویسندگان:

Shadi Askari - Department of Biomedical Engineering, Amirkabir University of Technology, Tehran, Iran

Erfan Yazdani - School of Medicine, North Khorasan University of Medical Sciences, Bojnord, Iran

Lili Arabuli - School of Science and Technology, University of Georgia, Tbilisi, Georgia

Hamed Goldadi - Department of medical science, University of Bojnord, Bojnord, Iran

Seyed AmirAbbas Shahidi Marnani - Faculty of Medical Sciences, University of Isfahan, Isfahan, Iran

Mohammad Emami - General Physician, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

خلاصه مقاله:

Bone is a composite of collagen fibers that are organized by calcium phosphates nanocrystals. Bone tissue engineering has been continuously developing since the concept of "tissue engineering" has been proposed. Biomaterials that are used as the basic material for the fabrication of scaffolds play a vital role in bone tissue engineering. Calcium phosphates and bioactive glasses were the first bioceramics that were specifically developed for bone repair. Biological responses such as bone bonding and the biodegradation properties of these materials are very important in clinical applications. This paper aims to introduce a strategy to review the difference between the in-vivo and in-vitro investigation of such bioceramics since there are several differences between mechanisms of in-vitro and in-vitro investigations. In this regard, various biological degradation mechanisms are discussed and the effects of additives such as ions and metals on the performance of the degradation behavior of bioceramics scaffolds are reviewed. It was found that additives can enhance the performance of the bioceramics scaffolds by affecting their biodegradation performance. We can change the bioceramics composition indefinitely and in a controlled fashion to tailor their dissolution rate. The presence of some additives of mineral origins within the calcium phosphate structure can affect the crystal lattice, and therefore can accelerate their dissolution as well as their biodegradability. Bone is a composite of collagen fibers that are organized by calcium phosphates nanocrystals. Bone tissue engineering has been continuously developing since the concept of "tissue engineering" has been proposed. Biomaterials that are used as the basic material for the fabrication of scaffolds play a vital role in bone tissue engineering. Calcium phosphates and bioactive glasses were the first bioceramics that were specifically developed for bone repair. Biological responses such as bone bonding and the biodegradation properties of these materials are very important in clinical applications. This paper aims to introduce a strategy to review the difference between the in-vivo and in-vitro investigation of such bioceramics since there are several differences between mechanisms of in-vitro and in-vitro investigations. In this regard, various biological degradation mechanisms are discussed and the effects of additives such as ions and metals on the performance of the degradation ... behavior of bioceramics scaffolds are reviewed. It was found that additives can enhance the performance of the bioceramics

کلمات کلیدی:

Degradation, in vitro, in vivo, bioceramics

لینک ثابت مقاله در پایگاه سیویلیکا:

