

REVIEW

Biomaterials with Enhanced Biological Functions for Medical Applications

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Abstract

Biomaterials and their use as implant coatings have been evaluated focusing on biocompatibility, biodegradability and constructive responses in terms of osseointegration, cell proliferation and cell adhesion. Biomaterials from natural (protein and polysaccharide) and synthetic (metallic, polymeric, ceramic and composite) sources have been identified. The role of biomaterials and implant coatings in the body through in vivo and in vitro experiments has been highlighted. In addition, methods for activating the surface of implants such as mechanical, chemical and physical ones are presented, as well as the classification of the deposition procedures but also of the interactions with the living system. This review addresses a topic with future challenges and perspectives in the biomedical field with the well-defined goal of maintaining and enhancing tissue elasticity, facilitating the healing of diseases suffered by patients and developing innovative materials capable of replacing or regenerating affected tissues.

Keywords: biomaterials, implants, nanoparticles, cell membrane, cellular behavior, regenerative medicine, tissue engineering

Introduction

Bone replacement is one of the most controversial methods of bone regeneration in orthopedic surgery. In the medical field it is necessary to develop materials as closest as possible to chemical composition and structure of natural bone that favors faster healing with minimal side effects. The bone makes up the entire skeleton of the human body and is one of the largest organs that perform the functions of movement, support, mineral intake and protection. It also has the ability to reshape and self healing [1-7] that means absorption of old or damaged