

Bioszklą i organiczno-nieorganiczne kompozyty dla inżynierii tkankowej kości=Bioglasses and organic-inorganic composites for bone tissue engineering.

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Rok wydania

2012

Czasopismo

Wiadomości Chemiczne

Numer woluminu

66

Strony

21-39

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

Wykaz stosowanych skrótówWprowadzenie1. Morfologia i skład materiałów bioaktywnych2. krótki przegląd wybranych biomateriałów3. Synteza biomateriałów4. biomineralizacja5. Modyfikowanie powierzchni biomateriałówPodziękowaniePiśmiennictwo cytowane

The most demanded biomaterials for bone tissue engineering could be classified in two main sol-gel derived groups: bioglasses and organic-inorganic composites. The first of these include bioactive ceramics such as calcium phosphates (Tab. 2) [1], glasses and glass ceramics [2], and so-called inert ceramics (Tab. 1) such as Al₂O₃, zirconium and titanium dioxide, and carbon-based materials [3, 4]. Second-group of compounds constitute bioactive organic-inorganic hybrids, generally based on organic matrix and various inorganic dopants. Biomaterials in contact with human plasma and bone stem cells form, on their surface, hydroxyapatite Ca₁₀(PO₄)₆(OH)₂ (HAp) and its derivatives (Tab. 2). HAp-layer initiates bone growth and reconstruction of treated fragment (Fig. 2). These materials, due to the high degree of biocompatibility are considered as the most valuable compounds for bone surgery [5]. Extremely rapid development of biomaterials used in medicine caused the production of implants with different properties (Scheme 1). The real revolution and technological progress have brought biomimetic composites that mimic naturally occurring solutions in living organisms. The role of such implants is not only replacing the damaged parts of body, but – due to the appropriate morphology and composition – stimulating the growth of living cells (Fig. 3) and final bone regeneration. This article is devoted to this type of biomaterials proposed for bone tissue engineering.

Słowa kluczowe

biomaterials, bioglasses, organic-inorganic hybrid, hydroxyapatite, bone implants, scaffolds, in vitro

biomateriały, bioszklą, organiczno-nieorganiczne hybrydy, hydroksyapatyt, implanty kości, rusztowania, in vitro

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