Strontium-doped organic-inorganic hybrids towards three-dimensional scaffolds for osteogenic cells.

Autorzy

Łukasz John

Marta Podgórska

Jean-Marie Nedelec

Łucja Cwynar-Zając

Piotr Dzięgiel

Rok wydania

2016

Czasopismo

Materials Science and Engineering C-Materials for Biological Applications

Numer woluminu

68

Strony

117-127

DOI

10.1016/j.msec.2016.05.105

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

Biomimetic organic-inorganic hybrid bioscaffolds are developed to complement or replace damaged fragments in bone tissue surgery. The aim of this work was to develop a simple and fast method to prepare composite material for bone engineering, avoiding time consuming and complex methodologies. The resulting materials (also called in this work as hybrid composites or hybrid scaffolds) have a three-dimensional macroporous polymer-like network derived from triethoxyvinylsilane (TEVS) and 2-hydroxyethylmethacrylate (HEMA) monomers, with incorporated calcium, strontium, and phosphate ions. The materials were fully characterized using FT-IR, biomineralization studies, scanning electron microscopy (SEM), energy dispersive X-ray spectroscopy, scratch tests, Young's modulus and compressive strength tests, and gas physisorption. We report a comprehensive study on the *in vitro* effect of novel strontium doped materials on human bone cells. *In vitro* investigations were conducted using a normal human osteoblast cell line that mimics the cellular events of the *in vivo* intramembranous bone formation process. The materials do not have a negative impact on the survival of the normal human osteoblasts; moreover, materials doped with strontium show that not only are cells able to survive, but they also attach to and grow on a bioscaffolds surface. For this reason, they may be used in future *in vivo* experiments.

Słowa kluczowe

bone, organic–inorganic hybrids, Osteoblasts, scaffolds, Osteoporosis, strontium

Adres publiczny

http://dx.doi.org/10.1016/j.msec.2016.05.105

Strona internetowa wydawcy

http://www.elsevier.com