

Abstract

This work summarizes information about the interactions between osteoblasts and nanostructured materials, which are of growing importance and are highly promising in regard to their application in medicine and in tissue engineering. The number of people with artificial replacements of tissues, such as bones, joints, teeth, cartilage, and tendons increases every year. Titanium and his alloys are extensively used for artificial tissue replacements. Titanium is favourable for its mechanical properties that allow the implant to remain in the place of implantation more than thirty years. For better osseointegration the surface of titanium can be modified with hydroxyapatite, coating with diamond-like carbon or plasma spray coating. Another option is to prepare a layer of nanotubes, which forms nanoroughness on material surface. The nanoroughness in turn improves physical and chemical properties of the material surface. Nanostructured materials mimic the natural bone tissue, support adsorption of specific proteins, improve the biocompatibility of the implants and positively influence cell behaviour, e.g. stimulate the synthesis and suitable conformation of specific molecules for cell adhesion and differentiation.