Authors: Maria Savelieva, Saratov State University, Postgraduate student

Abstract: Biocompatible polymer matrices modified with inorganic materials including hydroxyapatite, calcium carbonate CaCO3 and calcium phosphate CaP have promising applications for designing of materials for bone tissue regeneration. In this study we fabricated and described the nanostructured composite based on electrospun polycaprolactone (PCL) fibers coated with porous CaCO3. Such modification of fibers allows the functional properties of nanofibrous material to be achieved. In regard to bone tissue formation, the CaCO3 is bioactive material due to its ability to form strong biomaterial-bone interface [1]. The presence of calcium carbonate provides osteoconductive properties of PCL/CaCO3 scaffold which are beneficial for bone reconstruction materials designing. Moreover, the porous structure of vaterite is suitable for loading of various substances (medicaments, growth factors, dyes, nanoparticles). Vaterite coatings on PCL electrospun fibers provide capabilities of functional substance storage and release in scaffold interior and environment. In such way PCL/CaCO3 materials can be promising candidate for designing scaffolds provided with the function of cell growth control by incapsulated agent. In this research we present the simple but efficient technique of polymeric fibrous matrix mineralization by porous CaCO3 and an ability to control the coating homogeneity, CaCO3 mass and polymorph during mineralization process. Cytotoxicity tests showed that PCL/CaCO3 scaffold did not release toxic substances and are suitable for cell cultivation.