

Nanocomposites and nanomaterials

Peculiarities of reconstruction of biomaterials based on alginate-orthophosphate ceramics in bone tissue

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Advances in the field of medical materials science have made it possible to expand the sphere of biomaterials, which are now widely used in reconstructive reconstruction operations on the skeleton. Along with metal fixing devices based on titanium and its alloys, cobalt-chromium alloys, tantalum and other alloys, various ceramic materials are widely used. The purpose of this study was a morphological evaluation of bone regeneration and rearrangement of composites based on alginate-orthophosphate ceramics implanted in bone defects. For the formation of composite materials calcium nitrate tetrahydrate, diammonium dihydrophosphate and alginate polymer were used as reported elsewhere [1].

On the 30th day of implantation, it was revealed that all the studied biomaterials possess osteoconductivity, as evidenced by the location of the osteoblast cells directly on the biomaterial. Biomaterials do not interfere with the regeneration of the bone, from the bone marrow the wall of the implantation cavity is separated by a thin band of bone tissue consisting of mature bone substance. Bone trabeculae adjacent to the implantation material contain osteocytes and are covered with osteoblasts

Biomaterials do not have toxic properties, as evidenced by the absence of destruction of bone tissue around the implantation material. The results of animal studies showed that the created biomaterials can be recommended for testing in clinical settings.

1. V.M. Kuznetsov, L.B. Sukhodub, L.F. Sukhodub, Structural and Substructural Features of Apatite-biopolymer Composites: the Comparison of Data Obtained Using X-Ray Diffraction and Scanning Electron Microscopy with Electron Diffraction, **JOURNAL OF NANO- AND ELECTRONIC PHYSICS**, Vol. 6 No 4, 04039(6pp) (2014).