

Nanocomposites and nanomaterials

Composition materials with silver nanoparticles for medicine

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Decision effective filling of tissue defects in plastic and reconstructive surgery is an actual task. Modern polymer chemistry has a limited number of biocompatible materials that accord to all the necessary requirements for the materials of medical application and can be used as the basis for creation of implants. The introduction of the polymeric material of nanosized bioactive substances can drastically change the physical, chemical and biological properties of the implant and affect its biocompatibility. Multifactorial influence of polymer systems with biologically active substances when implanted in a living organism requires researchers a comprehensive approach in assessing the effectiveness and safety of such materials.

The aim of the research development, research of biocompatibility and efficiency of composite materials based on polyurethane with silver nanoparticles, as implants for filling tissue defects in the experiment.

The results of sanitary-chemical researches have shown that composite materials with silver nanoparticles are non-toxic.

The porous structure and the presence of biologically active substances in the composition of the implanted samples create structural and functional conditions for the gradual penetration into the implant connective tissue that leads to the improvement of regenerative processes in tissues.

It is shown that composite materials based on polyurethane are characterized by biocompatibility with the tissues of experimental animals and do not cause rejection reaction when implanted. Composite materials with silver nanoparticles compared with the control, when implanted in the tissue defects in experimental animals, reduce the intensity of the inflammatory response and accelerate the onset of the proliferative phase of the inflammatory process.