

# **Comparative assessment of biological compatibility with tissues of a mesh implant made of modified polypropylene with carbon nanotubes and silver nanoparticles**

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A large number of complications after abdominal hernia surgery requires the development of new types of implants for performing hernioplasty.

The aim of the study was to evaluate the tissue response after implantation of the developed mesh implant made of polypropylene (PP) modified with carbon nanotubes (CNTs) and silver nanoparticles (SNPs).

The study conducted on 90 laboratory rats in three experiment series (30 rats in each). In the first series, PP mesh implants implanted into the tissues of the anterior abdominal wall, the second - PP implants coated with antiseptic, and the third - developed PP implants modified with CNTs and SPS. After preliminary anesthesia, the animals taken out of the experiment 3, 7, 14, 21, 30 and 90 days after surgery Anterior abdominal wall tissues removed together with the implants. Histological slides made to study the composition of cellular infiltration elements around the implant, assess the density of the cellular infiltrate and the timing of the formation of the connective tissue capsule. The data obtained in different series for experiments subjected to statistical processing with their subsequent comparison.

The obtained data showed that during the implantation of mesh endoprotheses on the 3rd day after surgery, changes in the tissues was connected to the body's reaction to a foreign body. The maximum manifestations of these processes observed during implantation of classical PP mesh and PP mesh coated with antiseptic and minimal during implantation of modified CNT and SPS-mesh, where a less pronounced exudative phase of inflammation and earlier onset of the repair phase observed. Implantation of nano-modified implants started the formation of a thin connective tissue capsule from day 7 of the experiment, the development of which was completed by day 21 of observation, instead of a classic mesh of PP and PP with antimicrobial coating lasted up to 30 days of examination.

The data obtained indicate bioinertness and high biocompatibility with tissues of the developed nano-modified mesh implants.