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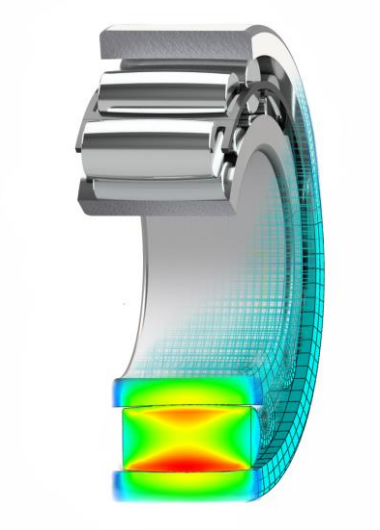
BOOK OF ABSTRACTS



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Contents

Influence Chemical Parameters and Composition on Dependence of Nerve Conduits Structure

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Peripheral nerves can be injured due to loss of structure because of an accident, injury and other causes, leading to partial or complete loss of sensory, motor and autonomic functions and neuropathic pain. Restoration of peripheral nerves by replacing damaged areas of nerve fibers with biopolymer grafts is a common but complex method of surgical treatment. Many artificial nerve grafts have been developed, including nerve tubes – conduits with biocompatibility, appropriate mechanical properties and porosity to control axon growth. Such leading biomaterials are able to stimulate specific cellular and molecular functions. However, there is a need to promote nerve regeneration and accelerate functional recovery, in particular the conduction of nerve impulses. A number of samples based on natural polymer - alginate, with the addition of carbon nanoparticles of different structures (fullerene, graphene, single-walled and multi-walled nanotubes) were created in the laboratory. Different degrees of porosity and swelling are achieved (540 % for samples containing fullerene, compared to 800 % for control one without additives). Also, an important factor influencing the structure of the samples is the chemical crosslinking in chitosan solution. So for samples without chemical crosslinking the degree of swelling is 500–800 % depending on the composition, while crosslinked samples show 200–312 % swelling. Microscopic studies confirm the formation of the microporous tube-shaped structures with an inner diameter of about 2 mm and a wall thickness of 0.5–1 mm and uniformly distributed inorganic particles. Acknowledgement: authors thanks for supporting the Ministry of Science of Ukraine in the frame of a research topic 0122U000775 and the Cultural and Educational Grant Agency of the Slovak Republic (KEGA), project No. 003TnUAD-4/2022.