Doctoral School of Information and Biomedical Technologies
Polish Academy of Sciences (TIB PAN)

SUBJECT:

NANOSCAFFOLDS FOR BIOSYSTEMS SUPPORTING BIOLOGICAL PROCESSES FOR BIOMEDICAL PURPOSES

SUPERVISOR:

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DESCRIPTION:

The aim of the work is to develop a membrane nanoscaffold for the immobilization of biologically active material and its evaluation in a system with this material.

Immobilization of biologically active material within the membrane can be a way of regulating or modifying biological processes for therapeutic purposes.

Work is currently underway in the world on the immobilization of various types of biologically active material within scaffolds. For example, human umbilical vein endothelial cells within polielectrolyte multilayers for maintaining their function [1], dental pulp cells [2] in a hydrogel scaffold to induce differentiation into fat and bone cells. Further reports on the immobilization of biological material include work on multilayer scaffolds based on polyelectrolytes, supporting the function of neuronal cells [3], as well as on the hydrogel scaffolds for the delivery of brain neutrophic factor to support regeneration after spinal cord injury [4]. An important aspect is scaffold for skin repair and bandages [5, 6].

The implementation of the work envisages the development of multilayer nano-thin and / or nanocomposite membrane scaffolds and their possible modification; developing a method for immobilizing biologically active material; methodology for system assessment, its functioning and properties, as well as possible effects on target cells. Research will be carried out on the cells of selected cell lines, e.g. human fibroblasts, osteoblasts or neuronal cells.

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