LONGDOM CONFERENCES

5th International conference on
Stem Cell, Tissue Engineering and Regenerative Medicine
14th International Conference on Dental and Oral Health
24th World Congress on Nursing Care and Healthcare
May 18-19, 2023 | Rome, Italy

Poster Presntation

Tissue equivalents based on sodium alginate for the treatment of trophic and diabetic skin lesions

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The treatment of extensive skin defects requires the use of skin or its artificial analogues, and in recent years there have been numerous studies and developments on their application. But a universal carrier of cellular structures has not been created that would have biocompatibility, absorption capacity for wound exudate, prevent infection, create an optimal microenvironment for wound regeneration, be permeable to water and air, but not dry out the bottom of the wound, be elastic, model a surface with a complex relief . In accordance with modern scientific developments in this area, it is obvious that a promising direction is the use of natural polymers capable of controlling the synthesis and orientation of fibrous structures. The study was aimed at solving a fundamental scientific problem related to the creation of biodegradable tissue equivalents based on biopolymers with an antibacterial effect for the manufacture of new personalized biomedical products. In the course of implementation, a technology was developed for obtaining new materials based on sodium alginate with a controlled composition, microstructure and properties to replace skin defects. Results have been obtained in the field of creating tissue equivalents for replacing the skin for the treatment of diabetic and trophic lesions, which combine high biocompatibility and have proangiogenic properties, that is, the ability to provide active vascular germination of the recipient tissue and the formation of a de novo vascular bed. The novelty of the approach lies in the development of methods for efficient saturation and subsequently prolonged release of drugs from the polymer matrix. The technology for obtaining a wide range of composite two-layer matrices, having one side porous surface, with the possibility of providing vascularization and the formation of a dermal layer by fibroblasts and MSCs, and a film coating on the second side to provide a suitable surface for keratinocytes, capable of forming a multi-layered epidermis. The approach of long-term prolonged release of drugs to provide antibacterial protection of wound or burn lesions of the skin was implemented. The features of the interaction of components in these systems were revealed, the processes of formation of framework structures during their functionalization with antibacterial agents were established. The mechanical, chemical, structural and biological characteristics were studied depending on the nature and concentration of the antibacterial drug. Computed tomography and scanning electron microscopy of the two-layer tissue equivalent and the porous layer are shown in the image.

Biography: Teterina Anastasia, PhD of technical sciences, 2017. The main scientific results are in the field of creating biocompatible materials for use in various fields of medicine (replacement and plasty of bone defects; means of localized and prolonged delivery of drugs into the body; regenerative medicine; coatings on metal implants). In addition to scientific work and research, he manages grants and projects, teaches, reads courses of lectures and tutoring by students and graduate students in the performance of scientific and practical activities.

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Received: 28-Oct-2022 , Accepted : 30-Oct-2022 Published: 06-Jun-2023