

Title: Modification of Biomaterial Structure in Order to Create an Ideal Matrix For Spinal Cord Regeneration

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Abstract

One of the most difficult fields to treat in regenerative medicine is central nervous system (CNS) injury. The brain and spinal cord are the main organs responsible for normal functioning of the whole body. The CNS sends, receives, and interprets information from the peripheral nervous system (PNS). Therefore, its damage leads to concomitant malfunction of other important parts of the body that can result in loss of motor (ambulation, coordination, balance, etc.) and cognitive (communication, information processing, memory, etc.) skills.

Over the last few years, increasing attention has been focused on the development of strategies for regeneration and repair of damage to the central nervous system. Especially biomaterials in the form of hydrogel are being actively investigated due to their intrinsic properties to stimulate cellular regeneration after spinal cord injuries. The main advantage of this type of biomaterials is the fact that their mechanical properties and structural architecture can be easily modulated. They exhibit excellent biological properties that allow on good cell-adhesion. Moreover, they provide a proper biocompatibility and biodegradability.

The purpose of our study is to create a matrix with properties that will mimic the ones of the extracellular matrix of the central nervous system. Our focus is put on natural polymers, especially chitosan. In addition, we use additions which exhibit properties beneficial in regeneration of the central nervous tissue.

Biography

Katarzyna Nawrotek, female, biomaterial engineer, obtained her PhD degree in Chemical engineering from the Lodz University of Technology in 2014. In 2011 she was a trainee at Ghent University, Polymer Chemistry and Biomaterials Research Group, Faculty of Chemistry, Department of Organic Chemistry in Belgium, where she gained experience with working on biomaterials. In 2012 she took part in the project 'Experimental approach of polymers graft in spinal cord injury repair' at Aix-Marseille University in France. In 2013 she lead project 'Chitosan-based guidance conduits for peripheral nervous system regeneration', which results were awarded with the World Intellectual Property Organization award in the category: the best female inventor. Currently, she works as a lecturer at the Lodz University of Technology.