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Electronic tissue technology for spinal cord repair

Initiative: Freigeist-Fellowships

Bewilligung: 28.06.2016

Laufzeit: 5 Jahre

Projekt-Website: https://www.sheffield.ac.uk/acse/department/people/academic/ivan-minev

Electronic tissue technology may soon enable the replacement or repair of damaged human organs. It is envisioned to build a bioelectronic device that, placed inside the patient's body, will blend with host tissues and execute a therapeutic program. The implant may deliver a sequence of physical and pharmacological stimuli and replacement cells designed to assist the body in its efforts to heal. Boosting regenerative capacity will have high impact in the injured central nervous system, where failure to self-repair (following for example trauma or stroke) can have profound and permanent consequences on the patient's quality of life. Towards realizing this vision, the project will explore technologies for building tissue-like electronic implants using 3D printing of soft materials. The implants will be engineered to deliver small doses of drugs and replacement cells precisely where they are needed and generate electrical pulses to direct repair cells to the injured area. Following completion of the therapeutic program, implants will degrade. The project aims to demonstrate the effectiveness of the proposed bioelectronics approach in-vivo, in laboratory models of spinal cord injury.

Projektbeteiligte

Dr. Ivan Minev
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Open Access-Publikationen

Rapid prototyping of soft bioelectronic implants for use as neuromuscular interfaces
Printed elastic membranes for multimodal pacing and recording of human stem-cell-derived cardiomyocytes
Direct Writing of Elastic Fibers with Optical, Electrical, and Microfluidic Functionality
Highly Conductive, Stretchable, and Cell-Adhesive Hydrogel by Nanoclay Doping
Conductive Hydrogels for Bioelectronic Interfaces