Biodegradable, Drug-Releasing Tubes For Tissue Engineering And Regeneration

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Technology description

#materials #biomedical #therapeutics #cns #drugdelivery
Investigators at Northwestern have designed biodegradable nerve guidance conduits or bridges possessing multiple features for promoting nerve regeneration including the ability to deliver DNA, protein, and/or small molecules. These conduits serve as a mechanical support to promote and direct tissue regeneration by creating a path for neurite outgrowth and exclude invading tissue from the injured space. The conduits may be structured as either a single, large channel or multiple small channels. Moreover, the fabrication method allows for a time-controlled release of therapeutic agents that aid tissue regeneration. The fabrication process avoids the use of organic solvents, aqueous/ organic emulsions and elevated temperatures required by alternative methods, allowing a wide range of therapeutics to be incorporated: DNA, proteins, as well as small molecules. These combinations can be tailored to encourage tissue formation. An additional advantage is the potential to spatially regulate the incorporation of therapeutic agents and regulate the concentration of different growth factors throughout the conduit.

Application area

Biodegradable drug-releasing conduits for applications in tissue engineering and neuronal regeneration. These conduits are capable of delivering DNA, protein, and/or small molecules.
Tissue engineering
Neuronal regeneration

Advantages

Biodegradability
Capability of delivering wide range of materials (DNA, protein and/or small molecules)
Success in in vitro and in vivo models
Time-controlled release of agents
Spatial regulation of therapeutic agents and their respective concentrations

Institution

Northwestern University

Inventors

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