Bulletin of Experimental Biology and Medicine 2014 vol.157 N1, pages 155-158

Poly(ε-Caprolactone) nerve conduit and local delivery of vegf and fgf2 genes stimulate neuroregeneration

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Abstract

We studied regeneration of rat sciatic nerve while overcoming of a 5-mm diastasis with the aid of nanostructured conduit made of biocompatible and biodegradable poly(ε-caprolactone) and filled with fibrin hydrogel matrix. Implantation of the conduit into the nerve in combination with local delivery of the expression plasmid carrying genes encoding vascular endothelial growth factor (vegf) and fibroblast growth factor 2 (fgf2) leads to an increase in number of myelinated fibers and S-100+ cells in the peripheral nerve stump and improved recovery of the nerve function. Under conditions of direct gene therapy, an advantage of electrospun poly(ε-caprolactone) conduit with high-porosity was revealed on the basis of these criteria in comparison with biocompatible silicon conduit.

http://dx.doi.org/10.1007/s10517-014-2513-1

Keywords

Fgf2, Nerve regeneration, Vegf