

A Nanofibrous PHBV Tube with Schwann Cell as Artificial Nerve Graft Contributing to Rat Sciatic Nerve Regeneration across a 30-Mm Defect Bridge

Authors : Esmaeil Biazar

Abstract : A nanofibrous PHBV nerve conduit has been used to evaluate its efficiency based on the promotion of nerve regeneration in rats. The designed conduits were investigated by physical, mechanical and microscopic analyses. The conduits were implanted into a 30-mm gap in the sciatic nerves of the rats. Four months after surgery, the regenerated nerves were evaluated by macroscopic assessments and histology. This polymeric conduit had sufficiently high mechanical properties to serve as a nerve guide. The results demonstrated that in the nanofibrous graft with cells, the sciatic nerve trunk had been reconstructed with restoration of nerve continuity and formatted nerve fibers with myelination. For the grafts especially the nanofibrous conduits with cells, muscle cells of gastrocnemius on the operated side were uniform in their size and structures. This study proves the feasibility of artificial conduit with Schwann cells for nerve regeneration by bridging a longer defect in a rat model.

Keywords : sciatic regeneration, Schwann cell, artificial conduit, nanofibrous PHBV, histological assessments

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