Title: **The Native Epineurium Greatly Enhances the Neuro-induction Activity of the Polymeric Material Nerve Conduit**

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Abstract:

The regeneration and repair of peripheral nerve defects have always been an important area for clinical research workers. Due to the structural particularity and complexity of natural peripheral nerves, it is still an important issue to develop a fully functional nerve repair catheter to replace autologous nerve transplantation, also a more significant challenge. In this study, a double-layer repair catheter prepared by decellularized epineurium combined with polymer materials is used to bridge nerve defects and achieve the purpose of nerve regeneration and repair. Studies have shown that the decellularized epineurium can eliminate cellular components to the greatest extent while retaining most of the extramural matrix and biologically active molecules, such as collagen and glycosaminoglycans laminin fibronectin, and some nerve growth factor, etc. We carried out the determination through histochemistry, immunochemistry, and enzyme-linked immunosorbent experiments. And cytotoxicity experiment, cytocompatibility experiment, and blood compatibility experiment tested the material's biological safety; the double-layer catheter's physical properties were pushed through the mechanical tensile experiment. Besides, in the rat sciatic nerve amputation model, the sciatic nerve function index, nerve conduction velocity, and the number of regenerated nerve fibers are detected to evaluate the effect of nerve function repair. The results show that the nerve repair catheter used in this study can better guide nerve regeneration to achieve better nerve regeneration and repair effects than autologous nerve grafts. Therefore, the double-layer nerve repair catheter has good clinical application potential and can provide new prospects for peripheral nerve regeneration and repair.