



ORIGINAL ARTICLE

Epothilone B loaded in acellular nerve allograft enhanced sciatic nerve regeneration in rats

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[Correction added on 6 February 2024, after first online publication: Affiliations 1 and 2 have been updated in this version.]

 References  Related  Information

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Abstract

Background

Epothilone B (EpoB) is a microtubule-stabilizing agent with neuroprotective properties.

Objectives

This study examines the regenerative properties of ANA supplemented with EpoB on a sciatic nerve deficit in male Wistar rats.

Methods

For this purpose, the 10 mm nerve gap was filled with acellular nerve allografts (ANAs) containing EpoB at 0.1, 1, and 10 nM concentrations. The sensorimotor recovery was evaluated up to 16 weeks after the operation. Real-time PCR, histomorphometry analysis, and electrophysiological evaluation were also used to evaluate the process of nerve regeneration.

Results

ANA/EpoB (0.1 nM) significantly improved sensorimotor recovery in rats compared to ANA, ANA/EpoB (1 nM), and ANA/EpoB (10 nM) groups. This led to reduced muscle atrophy, improved sciatic functional index, and thermal paw withdrawal reflex latency, indicating nerve regeneration and target organ reinnervation. The electrophysiological and histomorphometry findings also confirmed the ANA/EpoB regenerative properties (0.1 nM). EpoB only enhanced ANA regenerative properties at 0.1 nM, with no therapeutic effects at higher concentrations.

Conclusion

Totally, we concluded that ANA loaded with 0.1 nM EpoB can effectively reconstruct the transected sciatic nerve in rats, likely by enhancing axonal sprouting and extension.