

2023-03-24

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Elsevier

<https://doi.org/10.1016/j.jchemneu.2023.102260>

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The effects of curcumin and blueberry on axonal regeneration after peripheral nerve injury

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Abstract

The purpose of this study was to analyze the axonal regeneration and therapeutic effects of curcumin and blueberry administration following peripheral nerve injury using stereological, electron microscopic and electrophysiological methods. Animals in were assigned into one of four groups - control (Cont), injury (Inj), injury+curcumin (Cur) and injury+blueberry (Blue). Following the induction of sciatic nerve crush injury (75 Newtons for 5 s) in the Inj, Cur, and Blue groups, the rats in the Cur group received intraperitoneal injection of 30 mg/kg curcumin (Sigma C1386) and the rats in the Blue group received 4 g/kg blueberry by gavage over a four-week period. The rats in the Cont and Inj groups were not exposed to any substance. All animals were given standard chow. Sciatic functional index analyses were performed on the 14th and 28th days after injury, and electromyography (EMG) results were recorded. Stereological analysis of the nerve was performed under light microscopy. Light and electron microscopies were used for the histopathological evaluation of the sciatic nerve. Analysis of myelinated axon numbers revealed no significant differences between the Inj group and the Cur and Blue groups. However, a significant difference was observed between the Blue and Inj groups in terms of axonal areas. EMG test results differed between the Blue and the Inj groups ($p < 0.05$), but no significant difference was observed between the Inj and Cur groups. Electron microscopic analysis revealed protective effects of curcumin and blueberry treatment after injury. The use of the curcumin and blueberry may represent a supportive approach to the protection of nerve fibers after peripheral nerve crush injury.

Keywords

Axonal regeneration; Blueberry; Curcumin; Peripheral nerve; Regeneration