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## Berberine enhanced survival and axonal regeneration of motoneurons following spinal root avulsion and reimplantation in rats

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Brachial plexus avulsion (BPA) refers to tearing off of the root from the surface of the spinal cord, which could induce the death of most motoneurons and degeneration of axons in the corresponding spinal segment, thus resulting in permanent paralysis of motor functions in the upper limb. Avulsion injury would induce an increase in oxidative stress level and intense local neuro-inflammation at the lesioned site, leading to apoptotic death of motoneurons. Berberine (BBR), an isoquinoline alkaloid, is the major active compound found in *Coptis chinensis* Franch. Growing evidence suggests that BBR has neuro-protective, anti-inflammatory and anti-oxidative properties in various animal models of central nervous system (CNS)-related disorders. In this study, we investigated whether BBR could promote motoneuron survival and axonal regeneration in a rat model of BPA. Moreover, BBR accelerated the recovery of motor function in the forelimb by increasing the Terzis grooming test score and the number of Fluoro-Gold-labeled and P75+ regenerative motoneurons. The survival of motoneurons was notably promoted with BBR administration through elevating the ChAT-positive and C1SD2-positive cells and decreasing nNOS-positive cells. Meanwhile, reduced muscle atrophy, increased functional endplates and motor axons in biceps and musculocutaneous nerve were observed in BBR-treated rats. Besides, BBR markedly reduced microglia and astrocyte activation, up-regulated the expressions of Cu/Zn SOD and Akt and down-regulated the expression of NF- $\kappa$ B. Collectively, berberine could be used to assist reimplantation surgery in repairing BPA injuries in clinical treatment, may be through Akt signaling activation and downregulation of NF- $\kappa$ B nuclear transposition.

### Biography

Zhang Xie is currently a PhD student at the Chinese University of Hong Kong, P R China. She has published more than 10 papers in journals.

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