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Melatonin leads to axonal regeneration, reduction in oxidative stress, and improved functional recovery following sciatic nerve injury.

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Abstract

Despite recent advances in microsurgical techniques and equipments, recovery of function following repair of transected nerves often remains suboptimal. Contrary to traumatic injuries vascular damage that causes peripheral nerve injury has not been well-documented in the literature. In the present study a total of 40 female rats were randomly divided into four groups: Group 1: intact controls (n: 10), Group 2: sham-operated (n: 10), Group 3: vehicle-treated (n: 10), Group 4: melatonin-treated (n: 10). Sciatic nerve damage was created by stripping of the epineurial vessels around the nerve. 50 mg/kg Melatonin was injected intraperitoneally immediately after epineurial stripping in Group 4 in the course of 4 postoperative weeks. We found that melatonin administration after stripping of the epineurial vessels exerted a beneficial effect on axonal regeneration and functional recovery was confirmed by functional (sensory-motor, biochemical, and electrophysiological analyses) and morphological (light microscopic and ultrastructural analyses) data. In the light of these results we concluded that melatonin in a model of sciatic nerve injury leads to axonal regeneration, reducing in oxidative stress, and improved functional recovery.

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