

## Effect of melatonin on SOD expression in Spinal Cord injury

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The pathophysiology of Spinal Cord Injuries (SCI) is characterized by an initial primary injury followed by secondary tissue damage. This involves the production of highly reactive species, such as reactive oxygen species (ROS), reactive nitrogen species (RNS) or free radicals, which cause damage to cell components and lead to oxidative stress. Oxidative stress plays a key role in the pathophysiology of SCI and it can be considered an hallmark for it (1); consequently alleviating oxidative stress could be an effective strategy for the therapeutic intervention of SCI.

Melatonin is the major secretory product of the pineal gland and it is recognized as a potent antioxidant and immunomodulator (2). So, the aim of this study was to test the effects of melatonin administration in an organotypic slice culture model of adult Sprague Dawley rat spinal cord. Spinal cord slices were cultured for 7 days *in vitro*; than they were subjected to mechanical injury by cutter blade for the evaluation of melatonin effects on oxidative stress caused by damage.

Four experimental group were used in this study: A) Control Group (CTR) – Organotypic spinal cord slice culture; B) Injury Group (INJURY) – Organotypic spinal cord slice culture mechanically injured by cutter blade; C) Treatment Group (INJURY+MEL) – Organotypic spinal cord slice culture mechanically injured by cutter blade and treated after 24 hours with melatonin for other 24 hours; E) Control Group with melatonin (CTR+MEL) – Organotypic spinal cord slice culture treated with melatonin for 24 hours. After the treatment, adeguated immunohistochemical analysis were performed for superoxide dismutase (SOD). The results obtained show that melatonin administration has a favorable influence on antioxidative processes enhancing SOD immunopositivity in organotypic spinal cord slice cultures. So, these preliminary results indicate a potential therapeutical role for melatonin in preventing secondary tissue damage of SCI.

### References

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### Keywords

Spinal Cord Injury; melatonin; organotypic culture; superoxide dismutase.