IJAE
Vol. 118, n. 2 (Supplement): 32, 2013
ITALIAN JOURNAL OF ANATOMY AND EMBRYOLOGY

Pineal gland and neuropathic pain

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The pineal gland is a small neuroendocrine organ involved primarily in the circadian rhythm by the secretion of melatonin [1]. In addition, the pain modulatory properties of melatonin are generally recognized but its involvement in neuropathic pain regulation is not fully understood. In fact, it is known that the activation of the endogenous melatonin system in the spinal cord can reduce the generation, development and maintenance of central sensitization [2]. Moreover, melatonin showed an analgesic effect, in fact several works in animals [2] and in humans [3] underline its ability to inhibit hyperalgesia. In particular, intracerebroventricular and intraperitoneal melatonin, with its higher doses, produces a blockade of thermal hyperalgesia in mice with partial tight ligation of the sciatic nerve. The aim of our work is to characterize the morphological changes in peripheral structures, such as plantar skin and dorsal root ganglia (DRG) of rats in a neuropathic pain model (chronic constriction injury) after a single melatonin treatment monitoring the behaviour and the changes in NO-system using immunohistochemical techniques. The behavioural results show an increase of withdrawal latency during plantar test already after 30 min from melatonin administration. The immunohistochemical results suggest that melatonin plays a crucial role in keratinocytes-mediated neuropathic pain transmission through the modulation of nitroxidergic system, which could have also a protective role at this site. In addition, at DRG level the NO-system is maintained at low level. These results suggest that melatonin administration or modulation of pineal gland activity may have clinical utility in neuropathic pain therapy in the future.

References

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Key words
Neuropathic pain, melatonin, nitroxidergic system, skin, dorsal root ganglia.