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Repeated methylene blue administration produces analgesia in experimental pain

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Introduction

Methylene blue (MB), a widely used inhibitor of NO activity/production, is also a reduction-oxidation agent that can act both as a powerful antioxidant and as an enhancer of the electron transport chain. Furthermore, it prevents formation of mitochondrial oxygen free radicals and promotes oxygen consumption (Atamna et al. 2010,,Rojas et al. 2012).

Purpose

The aim of the study was to investigate the effects of chronic (14 days) MB administration on experimental pain in mice.

Methods

Sixteen Swiss male mice were divided into 2 groups: control group (n=8) and MB group (n=8); both groups received daily injections, for 14 days, either with saline 20 Î¼l i.p. (control group) or with MB 5 mg/kg b.w. i.p (MB group). Nociceptive tests (tail flick and hot plate) as well as mechanical and thermal withdrawal thresholds were measured every two days before MB/ saline administration. Before and two hours after the last dose was administered (day 14), each group was evaluated for the nociceptive tests and heat/mechanical hyperalgesia; results were compared with paired Student's t test. After nociceptive tests, the mice received 20 Î¼l of 5% formalin into the upper right lip and the intensity of the orofacial pain was assessed. The results were compared with those from saline group using unpaired Student's t test.

Results

Chronic administration of MB increased tail flick and hot plate latencies (p=0.03, p=0.02). We also noted an increase in the reaction time for thermal hyperalgesia assessed by Hargreaves method (p=0.04). As for the formalin-induced orofacial pain, MB produced a significant analgesic effect on both phases (p=0.03).

Conclusion

Our study demonstrates that chronic administration of MB has analgesic effects on acute nociception as well as on the orofacial inflammatory pain; further studies must be conducted in order to elucidate the mechanism by which the methylene blue exerts its antinociceptive effect.

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