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Menthol: a natural analgesic compound

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Abstract

Menthol, after topical application, causes a feeling of coolness due to stimulation of 'cold' receptors by inhibiting Ca++ currents of neuronal membranes. Since Ca++ channel blockers are endowed with analgesic properties, the aim of the present study was to investigate the potential antinociceptive effect of menthol. (-)-Menthol produced a dose-dependent increase in the pain threshold in the mouse hot-plate (3-10 mg kg(-1) p.o.) and abdominal constriction (3-10 mg kg(-1) p.o.; 10 microg per mouse intracerebroventricularly (i.c.v.)) tests. The antinociceptive effect of (-)-menthol was antagonised by the unselective opioid antagonist naloxone and by the selective kappa-antagonist nor-NBI. Conversely, CTOP (mu-antagonist), 7-benzylidenenal-trexone (delta(1) antagonist) and naltriben (delta(2) antagonist) did not prevent (-)-menthol antinociception. In both tests, (+)-menthol (10-50 mg kg(-1) p.o.; 10-30 microg per mouse i.c.v.) was unable to modify the pain threshold. These results indicate that (-)-menthol is endowed with analgesic properties mediated through a selective activation of kappa-opioid receptors.

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