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Peripherally injected linalool and bergamot essential oil attenuate mechanical allodynia via inhibiting spinal ERK phosphorylation

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Abstract

Bergamot essential oil (BEO) is one of the most common essential oil containing linalool and linalyl acetate as major volatile components. This study investigated the effect of intraplantar (i.pl.) bergamot essential oil (BEO) or linalool on neuropathic hypersensitivity induced by partial sciatic nerve ligation (PSNL) in mice. The i.pl. injection of BEO or linalool into the ipsilateral hindpaw to PSNL reduced PSNL-induced mechanical allodynia in a dose-dependent manner. Peripheral (i.pl.) injection of BEO or linalool into the contralateral hindpaw did not yield anti-allodynic effects, suggesting a local anti-mechanical allodynic effect of BEO or linalool in PSNL mice. Anti-mechanical hypersensitivity of morphine was enhanced by the combined injection of BEO or linalool at an ineffective dose when injected alone. We also examined the possible involvement of spinal extracellular signal-regulated protein kinase (ERK) in BEO or linalool-induced anti-mechanical allodynia. In western blotting analysis, i.pl. injection of BEO or linalool resulted in a significant blockade of spinal ERK activation induced by PSNL. These results suggest that i.pl. injection of BEO or linalool may reduce PSNL-induced mechanical allodynia followed by decreasing spinal ERK activation.

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