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Douleurs musculaires et articulaires
Traumatismes et ecchymoses

POSSIBLE INVOLVEMENT OF THE PERIPHERAL MU-OPIOID SYSTEM IN ANTINOCICEPTION INDUCED BY BERGAMOT ESSENTIAL OIL TO ALLODYNIA AFTER PERIPHERAL NERVE INJURY.

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Author information

Abstract

The essential oil of bergamot (BEO) is one of the most common essential oils and is most familiar to the general public. The aims of this study were to investigate the effect of intraplantar (i.pl.) BEO on neuropathic allodynia induced by partial sciatic nerve ligation (PSNL) in mice and the opioid receptor subtypes involved in the antiallodynic effects of BEO. Our findings showed that a single dose of i.pl. administration of BEO significantly inhibited the PSNL-induced neuropathic pain using the von Frey test. The i.pl. pretreatment with naloxone methiodide, a peripherally acting μ -opioid receptor preferring antagonist, β -funaltrexamine hydrochloride (β -FNA), a selective μ -opioid receptor antagonist, and β -endorphin antiserum significantly reversed the antiallodynic effect of BEO in the von Frey test, but not by naltrindole, the nonselective δ -opioid receptor antagonist and nor-binaltorphimine, the selective κ -opioid receptor antagonist. Furthermore, in the western blotting analysis, i.pl. administration of BEO resulted in a significant blockage of spinal extracellular signal-regulated protein kinase (ERK) activation induced by PSNL. Naloxone methiodide and β -FNA significantly reversed the blockage of spinal ERK activation induced by BEO. These results suggest that i.pl. injection of BEO-induced antiallodynic effect and blockage of spinal ERK activation may be triggered by activation of peripheral μ -opioid receptors.

ANTINOCICEPTIVE EFFECT OF INHALATION OF THE ESSENTIAL OIL OF BERGAMOT IN MICE.

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Author information

Abstract

Bergamot essential oil (BEO) has proven wide evidence of pharmacological antinociceptive effectiveness both in nociceptive and in neuropathic pain models. The antinociceptive properties of BEO for inhalation have not been investigated. The purpose of this study is to evaluate the effects of the inhalation of BEO on formalin-induced nociceptive response in mice. Male ddY-strain mice (Japan SLC, Hamamatsu, Japan) of 23-25g of weight at the time the experiments underwent the formalin test. Twenty μ l of formalin (2% in saline) were administered into the plantar surface of the mice hindpaw and the time of licking/biting was observed and recorded at intervals of 5min. The device for BEO inhalatory delivery consisted in a filter paper disc soaked with known volume of BEO placed on the edge of the cage. Inhalation of BEO exerted antinociceptive activity. In particular, it reduced the formalin-induced licking/biting behaviour in a manner that was dependent on the volume of BEO used in the device for its release and on the time of exposure to the phytocomplex. The results support the use of BEO in aromatherapy for complementary management of chronic pain relief in a stepwise therapeutic programme.

NEUROPHARMACOLOGICAL PROPERTIES OF THE ESSENTIAL OIL OF BERGAMOT FOR THE CLINICAL MANAGEMENT OF PAIN-RELATED BPSDs.

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Author information

Abstract

1.1.

BACKGROUND:

Alzheimer's Disease (AD) accounts for approximately 50% of all cases of dementia and, in spite of the great effort for the development of disease-modifying drugs, a definitive treatment of cognitive impairment is not available yet. A perfect adherence to the current therapy of cognitive decline is needed for a better control of the disease and this is proven to reduce, though not completely abolish, the associated Behavioural and Psychological Symptoms of Dementia (BPSDs) from occurring. This cluster of symptoms, remarkably affecting patients' health-related quality of life (HRQL), is tightly associated to pain states. Antipsychotics are the only treatment for BPSDs. However, these drugs are more effective and safer in the short-term (6-12 weeks), they are able to manage aggression but not agitation and they cannot control pain. Aromatherapy with Melissa officinalis and Lavandula officinalis has been employed to handle BPSDs, but it has not provided strong evidence to offer relief from pain. 1.2.

OBJECTIVE:

Bergamot Essential Oil (BEO) exerts antinociceptive activity through several pharmacological mechanisms: in particular, it is able to enhance autophagy, a process undergoing derangement in chronic pain. Thus, the sound pharmacological basis for clinical translation of aromatherapy with BEO in the treatment of BPSDs has been pointed out. 1.3.

CONCLUSION:

The antinociceptive effects elicited by BEO in experimental pain models make of it a possible candidate for the pharmacological management of pain-related BPSDs.

RATIONAL BASIS FOR THE USE OF BERGAMOT ESSENTIAL OIL IN COMPLEMENTARY MEDICINE TO TREAT CHRONIC PAIN.

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Author information

Abstract

In complementary medicine, aromatherapy uses essential oils to improve agitation and aggression observed in dementia, mood, depression, anxiety and chronic pain. Preclinical research studies have reported that the essential oil obtained from bergamot (BEO) fruit (Citrus bergamia, Risso) modifies normal and pathological synaptic plasticity implicated, for instance, in nociceptive and neuropathic pain. Interestingly, recent results indicated that BEO modulates sensitive perception of pain in different models of nociceptive, inflammatory and neuropathic pain modulating endogenous systems. Thus, local administration of BEO inhibited the nociceptive behavioral effect induced by intraplantar injection of capsaicin or formalin in mice. Similar effects were observed with linalool and linalyl acetate, major volatile components of the phytocomplex. Pharmacological studies showed that the latter effects are reversed by local or systemic pretreatment with the opioid antagonist naloxone hydrochloride alike with naloxone methiodide, high affinity peripheral μ -opioid receptor antagonist. These results and the synergistic effect observed following systemic or intrathecal injection of an inactive dose of morphine with BEO or linalool indicated an activation of peripheral opioid system. Recently, in neuropathic pain models systemic or local administration of BEO or linalool induced antiallodynic effects. In particular, in partial sciatic nerve ligation (PSNL) model, intraplantar injection of the phytocomplex or linalool in the ipsilateral hindpaw, but not in the contralateral, reduced PSNL-induced extracellular signal-regulated kinase (ERK) activation and mechanical allodynia. In neuropathic pain high doses of morphine are needed to reduce pain. Interestingly, combination of inactive doses of BEO or linalool with a low dose of morphine induced antiallodynic effects in mice. Peripheral cannabinoid and opioid systems appear to be involved in the antinociception produced by intraplantar injection of β -caryophyllene, present in different essential oils including BEO. The data gathered so far indicate that the essential oil of bergamot is endowed with antinociceptive and antiallodynic effects and contribute to form the rational basis for rigorous testing of its efficacy in complementary medicine.



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