



> *Neurosci Lett.* 2018 Nov 1;686:127-132. doi: 10.1016/j.neulet.2018.08.053. Epub 2018 Sep 7.

## Possible involvement of the peripheral Mu-opioid system in antinociception induced by bergamot essential oil to allodynia after peripheral nerve injury

Takaaki Komatsu <sup>1</sup>, Soh Katsuyama <sup>2</sup>, Yasuhito Uezono <sup>3</sup>, Chikai Sakurada <sup>4</sup>, Minoru Tsuzuki <sup>4</sup>, Kengo Hamamura <sup>1</sup>, Giacinto Bagetta <sup>5</sup>, Shinobu Sakurada <sup>6</sup>, Tsukasa Sakurada <sup>7</sup>

Affiliations

PMID: 30201308 DOI: 10.1016/j.neulet.2018.08.053

### 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  $\mu$ -opioid receptor preferring antagonist,  $\beta$ -funaltrexamine hydrochloride ( $\beta$ -FNA), a selective  $\mu$ -opioid receptor antagonist, and  $\beta$ -endorphin antiserum significantly reversed the antiallodynic effect of BEO in the von Frey test, but not by naltrindole, the nonselective  $\delta$ -opioid receptor antagonist and nor-binaltorphimine, the selective  $\kappa$ -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  $\beta$ -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  $\mu$ -opioid receptors.

..... Bergamot essential oil; PSNL-induced allodynia; Peripheral antinociception; Spinal ERK phosphorylation;  $\mu$ -opioid receptor.

Copyright © 2018 Elsevier B.V. All rights reserved.

### Related information

[MedGen](#)

### LinkOut - more resources

[Full Text Sources](#)

[Elsevier Science](#)

**Other Literature Sources**

[scite Smart Citations](#)

**Medical**

[MedlinePlus Health Information](#)

**Research Materials**

[NCI CPTC Antibody Characterization Program](#)

**Miscellaneous**

[NCI CPTAC Assay Portal](#)