

Antiallodynic and antihyperalgesic activities of zerumbone via the suppression of IL-1 β , IL-6 and TNF- α in a mice model of neuropathic pain

ABSTRACT

Background: Neuropathic pain is a debilitating condition that severely affects the quality of life for those with this pain condition, and treatment for pain relief is greatly sought-after. Zerumbone (Zer), a sesquiterpene compound isolated from the rhizomes of a Southeast Asian ginger plant, *Zingiber zerumbet* (L.) Roscoe ex Smith. (Zingiberaceae), showed antinociceptive and antiinflammatory properties when previously tested on models of nociception and inflammation. Objective: This study investigated the effects of prophylactic administration of zerumbone on allodynia and hyperalgesia in a mouse model of chronic constriction injury (CCI)-induced neuropathic pain. Methods: Intraperitoneal administration of Zer (5–50 mg/kg) from day 1 post-surgery was carried out to identify the onset and progression of the pain condition. Responses toward mechanical and cold allodynia, and mechanical and thermal hyperalgesia were assessed on days 3, 5, 7, 9, 11, and 14 post-surgery. Blood plasma and spinal cord levels of interleukin (IL)-1 β , IL-6, tumor necrosis factor- α , and IL-10 were screened using enzyme-linked immunosorbent assay on day 15. Results: Zer (10 and 50 mg/kg) attenuated pain symptoms on all days of behavioral testing without any signs of sedation in the rotarod test. ED₅₀ values for mechanical allodynia, cold allodynia, thermal hyperalgesia, and mechanical hyperalgesia were 9.25, 9.507, 8.289, and 9.801 mg/kg, respectively. Blood plasma and spinal levels of IL-1 β , IL-6, and tumor necrosis factor- α but not IL-10 were significantly ($p < 0.05$) suppressed by zer treatment. Discussion and conclusion: Zer exhibits its antiallodynic and antihyperalgesic properties via reduced sensitization at nociceptor neurons possibly through the suppression of inflammatory mediators. Zer may prove to be a novel and beneficial alternative for the management of neuropathic pain.

Keyword: Zerumbone; Allodynia; Hyperalgesia; Interleukin-1 β ; Interleukin 6; Tumor necrosis factor- α