Antihyperalgesic and antiallodynic effects of alpha-terpineol in neuropathic pain induced by chronic constriction injury in rat sciatic nerve

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Background:
Neuropathic pain is a neurological disorder which originates from nerve injury or inflammatory neuropathy in the central or peripheral nervous system. The main concern regarding neuropathic pain is inappropriate therapeutic effect of major classes of analgesic drugs in its treatment.

Alpha-terpineol is a cyclic monoterpene alcohol which is extracted from various medicinal plants. Several pharmacological effects including anti-inflammatory and neuroprotective effects have been reported for alpha-terpineol. The main purpose of this study was to evaluate the effect of alpha-terpineol on neuropathic pain induced by chronic constriction injury (CCI) in rats.

Methods:
In order to induce neuropathic pain, the CCI of sciatic nerve model was used. Male Wistar rats were randomly divided into 5 groups (n=6) as follows: control, sham, and three alpha-terpineol-treated groups (25, 50, 100 mg/kg, i.p., once daily for 14 days). To evaluate neuropathic pain, behavioral tests including mechanical allodynia, acetone-induced cold allodynia, and thermal hyperalgesia were carried out on day 0 (before the surgery) and days 3, 5, 7, 10, and 14 after CCI. At the end of behavioral tests (day 14), the rats were sacrificed under deep anesthesia and lumbar spinal cords were dissected and prepared for the measurement of inflammatory cytokines (TNF-α and IL-1β) using ELISA test.

Results:
Treatment with alpha-terpineol (25, 50, 100 mg/kg) dose-dependently caused an apparent relief on mechanical and cold allodynia in rats subjected to neuropathic pain. In addition, alpha-terpineol (50, 100 mg/kg) significantly attenuated hyperalgesia in rats. The analgesic effect of alpha-terpineol started from 3rd day following CCI and persisted up to the 14th day. Moreover, ELISA test results showed a significant decrease in the concentration of TNF-α and IL-1β in the lumbar spinal cords of rats underwent sciatic nerve CCI after a 14-day course of alpha-terpineol therapy.

Conclusion:
The results of this study demonstrate that alpha-terpineol represents analgesic effect in the CCI model of neuropathic pain in rats. Our findings showed that the suppression of inflammatory cytokines by alpha-terpineol underlies its antihyperalgesic and antiallodynic effects.