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Palmitoylethanolamide and hemp oil extract exert synergistic anti-nociceptive effects in mouse models of acute and chronic pain

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Abstract

The use of products derived from hemp - i.e., cannabis varieties with low Δ^9-tetrahydrocannabinol (Δ^9-THC) content - as self-medication for pain and other health conditions is gaining in popularity but preclinical and clinical evidence for their effectiveness remains very limited. In the present study, we assessed the efficacy of a full-spectrum hemp oil extract (HOE; 10, 50 and 100 mg-kg^{-1}; oral route), alone or in combination with the anti-inflammatory and analgesic agent palmitoylethanolamide (PEA; 10, 30, 100 and 300 mg-kg^{-1}; oral route), in the formalin and chronic constriction injury (CCI) tests. We found that HOE exerts modest antinociceptive effects when administered alone, whereas the combination of sub-effective oral doses of HOE and PEA produces a substantial greater-than-additive alleviation of pain-related behaviors. Transcription of interleukin (IL)-6 and IL-10 increased significantly in lumbar spinal cord tissue on day 7 after CCI surgery, an effect that was attenuated to the same extent by HOE alone or by the HOE/PEA combination. Pharmacokinetic experiments show that co-administration of HOE enhances and prolongs systemic exposure to PEA. Collectively, our studies lend support to possible beneficial effects of using HOE in combination with PEA to treat acute and chronic pain.

Keywords: Acute pain; Chronic pain; Hemp; Palmitoylethanolamide.

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