

Limonene Inhibits Methamphetamine-Induced Sensitizations via the Regulation of Dopamine Receptor Supersensitivity

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Received: November 4, 2018; Revised: December 24, 2018; Accepted: January 14, 2019; Published online: February 8, 2019.

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Abstract

Other Sections



Limonene is a cyclic terpene found in citrus essential oils and inhibits methamphetamine- induced locomotor activity. Drug dependence is a severe neuropsychiatric condition that depends in part on changes in neurotransmission and neuroadaptation, induced by exposure to recreational drugs such as morphine and methamphetamine. In this study, we investigated the effects of limonene on the psychological dependence induced by drug abuse. The development of sensitization, dopamine receptor supersensitivity, and conditioned place preferences in rats was measured following administration of limonene (10 or 20 mg/kg) and methamphetamine (1 mg/kg) for 4 days. Limonene inhibits methamphetamine- induced sensitization to locomotor activity. Expression of dopamine receptor supersensitivity induced by apomorphine, a dopamine receptor agonist, was significantly reduced in limonene-pretreated rats. However, there was no significant difference in methamphetamine-induced conditioned place preferences between the limonene and control groups. These results suggest that limonene may ameliorate drug addiction-related behaviors by regulating postsynaptic dopamine receptor supersensitivity.

Keywords: Dopamine receptor supersensitivity, Methamphetamine, Sensitization, Limonene