

Public Abstract

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Title: Effect of SA 4503 on the Locomotor Stimulatory and Discriminative Stimulus Properties of Psychostimulants

Addiction to psychostimulants, particularly methamphetamine and cocaine, is a major public health concern in the United States. Currently, there are no effective and Food and Drug Administration approved medications for treatment of methamphetamine and cocaine addiction. The lack of viable treatments has led researchers to investigate sigma receptors as potential targets for the development of novel medications.

Sigma receptors are located in the same brain regions where cocaine and methamphetamine produce their effects. Additionally, these receptors modulate brain neurotransmitter systems that psychostimulants target. Previous research has determined that sigma receptors may play a role in psychostimulant-induced behaviors. Cocaine produces increases in activity levels in rats compared to placebo. In rats pretreated with a sigma receptor activator, cocaine-induced hyperactivity was potentiated. However, in rats pretreated with a sigma receptor inhibitor, cocaine-induced hyperactivity was prevented. These studies suggest that activation and blockade of sigma receptors increases and decreases cocaine-induced hyperactivity, respectively.

The goal of these experiments was to investigate sigma receptors involvement in the locomotor activating and subjective properties of methamphetamine and cocaine. In the present study, pretreatment with a sigma receptor activator dose-dependently increased and decreased methamphetamine-induced hyperactivity. Furthermore, sigma receptor activator pretreatment potentiated the subjective effects of methamphetamine. Together, these results support a role for sigma receptors in the locomotor activating and subjective effects of psychostimulants, although the mechanism warrants further examination. Overall, sigma receptors may be important targets for investigating the mechanism underlying psychostimulant-induced behaviors and future studies are necessary to elucidate these mechanisms.