COCAINE-INDUCED HYPERACTIVITY IS MORE INFLUENCED BY ADENOSINE RECEPTOR AGONISTS THAN AMPHETAMINE-INDUCED HYPERACTIVITY

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The influence of adenosine receptor agonists and antagonists on cocaine- and amphetamine-induced hyperactivity was examined in mice. All adenosine receptor agonists significantly decreased the locomotor activity in mice, and the effects were dose-dependent. It seems that adenosine A1 and A2 receptors might be involved in this reaction. Moreover, all adenosine receptor agonists: 2-p-(2-carboxyethyl)phenethylamino-5'-N-ethylcarboxamidoadenosine (CGS 21680), A2A receptor agonist, N\(^6\)-cyclopentyladenosine (CPA), A1 receptor agonist, and 5'-N-ethylcarboxamidoadenosine (NECA), A2/A1 receptor agonist significantly and dose-dependently decreased cocaine-induced locomotor activity. CPA reduced cocaine action at the doses which, given alone, did not influence motility, while CGS 21680 and NECA decreased the action of cocaine at the doses which, given alone, decreased locomotor activity in animals. These results suggest the involvement of both adenosine receptors in the action of cocaine although agonists of A1 receptors seem to have stronger influence on it. The selective blockade of A2 adenosine receptor by DMPX (3,7-dimethyl-1-propargylxanthine) significantly enhanced cocaine-induced locomotor activity of animals. Caffeine had similar action but the effect was not significant. CPT (8-cyclopentyltheophylline) – A1 receptor antagonist, did not show any influence in this test. Similarly, all adenosine receptor agonists decreased amphetamine-induced hyperactivity, but at the higher doses than those which were active in cocaine-induced hyperactivity. The selective blockade of A2 adenosine receptors (DMPX) and non-selective blockade of adenosine receptors (caffeine) significantly increased the action of amphetamine in the locomotor activity test. Our results have shown that all adenosine receptor agonists (A1 and A2) reduce cocaine- and amphetamine-induced locomotor activity and indicate that cocaine-induced hyperactivity is more influenced by adenosine receptor agonists (particularly A1 receptors) than amphetamine-induced hyperactivity.

Key words: adenosine, cocaine, amphetamine, locomotor activity

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