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Role of the dopamine receptors in the development of learned helplessness

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Background

The dopaminergic system is involved in the emotional and motivational behavior as well as the mechanisms underling the effects of typical antidepressants; thus, the activity of dopamine receptors may participate the psychological kinetics of mood disorders, for example the depression. The aim of this study was to elucidate the role of dopamine D1 and D2 receptors in the development of behavioral learned helplessness, one of the depression animal models.

Materials and methods

The male SD rats were handled (10 min) and tested in an open field (10 min) on two consecutive days; thereafter, a 2-day learned helplessness session was performed. The rats received a 10-trial inescapable foot shocks (0.5 mA, 10 sec) and followed by a 15-trial active avoidance test, escapable foot shocks, on the next day 30 min after the intraperitoneal injection of apomorphine (0, 0.05, 0.5, or 5 mg/kg), an agonist of D1 and D2 receptors.

Results

The number of avoidance, escape, and failure in the active avoidance test was not influenced by the low dose of apomorphine. The escape number was decreased but the failure number was increased by the highest dose of apomorphine; these effects were not affected by the pretreatment of haloperidal (0.4 mg/kg), a D2 antagonist.

Discussion

The present results indicate that the excessive stimulation of D1 receptor may participate the development of learned helplessness.