Effect of acute injection of norharmane on learning and spatial memory in rats

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Abstract

Background: Although endogenous and exogenous β-Carbolines, which have been found in blood and tobacco, have neurotoxic effects, some of these compounds have been shown to have a stimulating effect on the dopaminergic system and to increase dopamine levels in hippocampus, leading to memory improvement. The aim of the present study was to determine the effects of acute injection of norharmane as a benzodiazepine receptor inverse agonist on learning and spatial memory in water maze.

Methods: 40 female and 40 male Wistar rats (200-250 gr) were divided into 5 groups: control, ethanol and norharmane (1, 2 and 4 mg/kg, i.p.). Norharmane and ethanol groups respectively received norharmane and ethanol (0.2ml) intraperitoneally on the 5th day 30 min before the test and on the 8th day 30 min before the probe test. All rats were examined in terms of learning and spatial memory in the water maze.

Results: The results showed that acute injection of norharmane in both males and females improved learning and spatial memory in low doses (1, 2 mg/kg, i.p.) but attenuated learning and spatial memory retention in high doses (4 mg/kg, i.p.).

Conclusion: According to the findings, the effects of norharmane on learning and spatial memory were dose-dependent not sex-dependent. Although norharmane is useful for learning and memory at low doses, it can impair learning and memory in high doses.

Key Words: β-Carboline, norharmane, learning, spatial memory

neurite growth and synapse remodeling after axotomy.


