Effect of an NMDA receptor agonist on T-maze and passive avoidance test in 12-week streptozotocin-induced diabetic rats

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Abstract:
This study examined behavioral effects mediated by NMDA (N-methyl-D-aspartic acid) receptors in 12-week streptozotocin (STZ)-induced diabetic rats. Effects of an NMDA receptor agonist on behavior in the open field test, passive avoidance test and T-maze were examined in control groups of rats and in rats with diabetes mellitus (DM). We have used 116 rats for experiments. Experimental type 1 diabetes was induced by a single intravenous injection of streptozotocin at a dose of 65 mg/kg, dissolved in citrate buffer. Stimulation with the NMDA receptor agonist at a dose of 15 mg/kg was performed 30 min before the experiments. In control rats, NMDA increased the number of crossing and rearings in the open field test, improved acquisition and consolidation processes and did not influence recall in the passive avoidance situation and was ineffective in the T-maze. Diabetes significantly inhibited locomotor and exploratory activity and profoundly impaired acquisition, consolidation and recall in a passive avoidance and significantly decreased working memory in T-maze. NMDA treatment of diabetic rats significantly improved memory in passive avoidance and T-maze. The NMDA receptor agonist increased locomotor activity in open field test. The obtained results suggested that stimulation of NMDA receptors had beneficial effects on learning and memory in type 1 diabetic rats.

Key words:
behavior, diabetes, NMDA, mth