REVIEW OF CLINICAL PHARMACOLOGY AND
PHARMACOKINETICS INTERNATIONAL
EDITION 24: 125 (2010)

Effects of low doses of the nitric oxide synthase inhibitor L-NAME on recognition and spatial memory deficits produced by NMDA receptor antagonists in rats

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SUMMARY

There is experimental evidence that the nitric oxide synthase (NOS) inhibitor L-NAME is involved in learning and memory processes, although its exact role is still matter of investigations. The aim of the present study was to clarify the exact role of L-NAME on memory using different testing procedures. In a first study, the effects of a single injection of L-NAME (1, 3 and 10 mg/kg, i.p.) on recognition memory and its ability in counteracting MK-801-induced memory deficits were evaluated in the novel object recognition test. Subsequently, the effects of L-NAME on rats' spatial reference and spatial working memory and its ability to counteract ketamine-induced spatial memory deficits were assessed in the radial water maze task. L-NAME alone did not affect rats' performance and at 1 and 3 mg/kg, antagonized MK-801 (0.1 mg/kg)-induced performance deficits in the novel object recognition task. L-NAME (3 mg/kg) disrupted rodents' performance in the radial water maze test, whereas at 10 mg/kg, it attenuated ketamine (15 mg/kg)-induced spatial working, but not spatial reference memory deficits. In a last experiment aiming to evaluate the effects of the treatment conditions (acute vs. sub-chronic) on rats' performance, L-NAME given sub-chronically antagonized delay-dependent deficits in the novel object recognition task (1 and 10 mg/kg), while at 3 mg/kg it was unable to do so. The present results indicate that the L-NAME displays a dual effect on rats' memory and this effect might be influenced by the treatment regimen.