Influence of \( \text{N}^\text{G} \)-nitro-L-arginine on the anticonvulsant and acute adverse effects of some newer antiepileptic drugs in the maximal electroshock-induced seizures and chimney test in mice

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Abstract:
Overwhelming evidence indicates that nitric oxide (NO) plays an important role in epileptogenesis and seizure activity in the brain. The results of experimental studies on animals provide, however, discrepant information reporting that NO has both anti- and pro-convulsant action in the brain.

The objective of this study was to determine the effect of \( \text{N}^\text{G} \)-nitro-L-arginine (L-NA – a non-specific NO synthase inhibitor) on the anticonvulsant and acute-adverse-effect profiles of four second-generation antiepileptic drugs (felbamate [FBM], lamotrigine [LTG], oxcarbazepine [OXC] and topiramate [TPM]) in the maximal electroshock (MES)-induced seizure model and the chimney test in mice.

Results indicated that L-NA (at 40 mg/kg, \textit{ip}) did not affect significantly the antiseizure activity of all examined drugs. However, the antielectroshock action of FBM and LTG after co-administration of L-NA was attenuated by 36% and 28%. In contrast, the anticonvulsant effects of TPM and OXC were almost unchanged after L-NA administration. Moreover, the NO synthase inhibitor (40 mg/kg, \textit{ip}) did not enhance the acute adverse-effect profiles of the studied antiepileptic drugs in the chimney test.

In conclusion, the observed reduction of the anticonvulsant effects of FBM and LTG after co-administration of L-NA may suggest a pro-convulsant activity of L-NA and the cooperation of NO with the antiseizure properties of FBM and LTG in the MES test in mice.

Key words:
nitric oxide, maximal electroshock, \( \text{N}^\text{G} \)-nitro-L-arginine, felbamate, lamotrigine, oxcarbazepine, topiramate