Short communication

Effects of acute and chronic treatment with magnesium in the forced swim test in rats

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Abstract:
The antidepressant-like activity of magnesium, the non-specific N-methyl-D-aspartate glutamate receptor antagonist, in the mice forced swim test was demonstrated previously. In the present study, the effects of this biometal were studied in the rat forced swim test. Magnesium (MgCl₂) at doses ranging from 15 to 50 mg Mg/kg reduced the immobility time in the forced swim test, thus exerting antidepressant-like activity. To evaluate tolerance to this effect, we also performed experiments with the following acute/chronic magnesium treatment schedule: chronic saline and saline challenge at 0.5 h before behavioral experiments (S + S), chronic saline and magnesium challenge (S + Mg), chronic magnesium and saline challenge (Mg + S), chronic magnesium and magnesium challenge (Mg + Mg). The antidepressant-like effect of magnesium was demonstrated in the group treated acutely with magnesium (S + Mg) but not in the chronically treated group (Mg + S) and (Mg + Mg). It is interesting to note that in Mg + Mg group serum concentration of magnesium was quite similar to the S + Mg group (6.44 vs. 6.08 mg/100 ml, respectively), which displayed antidepressant-like effect.

The results confirmed that magnesium administered acutely induced the antidepressant-like effects also in rats. However, contrary to mice, chronic treatment with magnesium induced tolerance to this effect in rats.

Key words:
Magnesium, depression, NMDA receptor, forced swim test, rats