**Short communication**

Immobility stress induces depression-like behavior in the forced swim test in mice: effect of magnesium and imipramine

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**Abstract:**

Previously, we demonstrated antidepressant-like effect of magnesium (Mg) in the forced swim test (FST). Moreover, the joint administration of Mg and imipramine (IMI) at ineffective doses \(\text{per kg}\) resulted in a potent reduction in the immobility time in this test. In the present study, we examined the effect of immobility stress (IS), and Mg and/or IMI administration on FST behavior. IS induced enhancement of immobility time, which was reversed by Mg or IMI at doses ineffective in non-stressed mice (10 mg/kg and 15 mg/kg, respectively). The joint administration of Mg and IMI was effective in both IS and non-stressed animals in FST. IS did not significantly alter locomotor activity, while IMI or Mg + IMI treatment in IS mice reduced this activity. We also measured serum and brain Mg, IMI and its metabolite desipramine (DMI) concentration in mice subjected to FST and injected with Mg + IMI, both restrained and non-restrained. In the present study we demonstrated a significant increase (by 68%) in the brain IMI and a slight, non-significant reduction in DMI concentration in IS + Mg + IMI + FST vs. Mg + IMI + FST groups, which might indicate the reductase in brain IMI metabolism. The IS-induced reduction in brain IMI metabolism did not participate in the activity in FST, since no differences in such activity were noticed between IS + Mg + IMI + FST and Mg + IMI + FST groups.

The present data suggest that IS-induced increase in immobility time in FST is more sensitive for detection antidepressant-like activity. However, further studies are needed to examine the effect of other antidepressants in such an experimental paradigm.

**Key words:**

immobility stress, forced swim test, magnesium, imipramine, serum, brain, magnesium concentration, imipramine concentration, desipramine concentration, mice