



Review

Antidepressant activity of zinc and magnesium in view of the current hypotheses of antidepressant action

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Abstract:

The clinical efficacy of current antidepressant therapies is unsatisfactory; antidepressants induce a variety of unwanted effects, and, moreover, their therapeutic mechanism is not clearly understood. Thus, a search for better and safer agents is continuously in progress. Recently, studies have demonstrated that zinc and magnesium possess antidepressant properties.

Zinc and magnesium exhibit antidepressant-like activity in a variety of tests and models in laboratory animals. They are active in forced swim and tail suspension tests in mice and rats, and, furthermore, they enhance the activity of conventional antidepressants (e.g., imipramine and citalopram). Zinc demonstrates activity in the olfactory bulbectomy, chronic mild and chronic unpredictable stress models in rats, while magnesium is active in stress-induced depression-like behavior in mice. Clinical studies demonstrate that the efficacy of pharmacotherapy is enhanced by supplementation with zinc and magnesium. The antidepressant mechanisms of zinc and magnesium are discussed in the context of glutamate, brain-derived neurotrophic factor (BDNF) and glycogen synthase kinase-3 (GSK-3) hypotheses.

All the available data indicate the importance of zinc and magnesium homeostasis in the psychopathology and therapy of affective disorders.

Key words:

zinc, magnesium, depression, antidepressants, NMDA, BDNF, GSK-3

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