

Abstract

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Effect of chromium picolinate on modified forced swimming test in diabetic rats: involvement of serotonergic pathways and potassium channels.

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BACKGROUND: Depression occurs frequently in patients with diabetes mellitus. Chromium picolinate, an essential trace element is recommended for diabetes and also has been reported to benefit depression, but its mechanism is still debated.

OBJECTIVE: To investigate the mechanism, we studied its effects on serum insulin, serum glucose and on modified forced swimming test, a behavioural paradigm for depression in rats.

METHODS: The study involving co-administration of sub-active doses of glimepiride, a K(+) channel blocker and chromium picolinate on blood glucose levels and modified forced swimming test was also performed to probe any role of K(+) channels in its antidiabetic and antidepressant effects. Streptozotocin (55 mg/kg, intraperitoneally) was injected in rats to induce diabetes (Type 1). After a week, chromium picolinate (8 microg/ml in drinking water) was administered for 4 weeks. Normal rats received similar drug treatment. The sub-active doses of chromium picolinate (4 microg/ml in drinking water) and glimeperide (2.5 mg/kg, orally) were co-administered and their effects on modified forced swimming test and on glucose levels were measured.

RESULTS: Chromium picolinate (8 microg/ml in drinking water) produced hypoglycaemia in diabetic and normal rats. It had no effects on the streptozotocin-induced reduction in insulin levels. Chromium picolinate (8 microg/ml in drinking water) increased swimming with subsequent decrease in immobility. The sub-active doses of chromium picolinate and glimeperide showed significant additive effects in modified forced swimming test and reduction in serum glucose concentrations, though statistically insignificant.

CONCLUSION: In conclusion chromium picolinate shows antidepressant action on modified forced swimming test affecting only swimming that suggests serotonergic pathways involvement. The additive effects on swimming in modified forced swimming test and reduction in serum glucose levels shows involvement of K(+) channels in antidiabetic and antidepressant actions of chromium picolinate.

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