Protective effects of oral crocin against intracerebroventricular streptozotocin-induced spatial memory deficit and oxidative stress in rat striatum

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Intracerebroventricular (ICV) streptozotocin (STZ) has been shown to cause cognitive impairment, associated with free radical generation. In this study, the effects of crocin on cognitive performance in ICV STZ-lesioned rats (3 mg/kg bilaterally, on day 1 and 3) were evaluated. Crocin (100 mg/kg, p.o.) was administered for 21 consecutive days, starting 1 h prior to the first dose of STZ. Animals were randomly divided into four groups (five each). Group 1 (sham), were treated with normal saline (2 ml/kg, p.o.). Group 2 (STZ-lesioned or lesion) were injected with ICV-STZ (3 mg/kg bilaterally, on day 1 and 3) and treated with normal saline (2 ml/kg, p.o.) respectively, for 21 days. Group 3 (sham+Cro) were injected ICV on day 1 and 3 with artificial CSF and treated with crocin (100 mg/kg, p.o.) for 21 days. Group 4 (lesion+Cro), were injected with ICV STZ (3 mg/kg bilaterally, on day 1 and 3) and treated with crocin (100 mg/kg, p.o.) for 21 days. Cognitive performance was assessed via Morris water maze task while the parameters of oxidative stress assessed, were malondialdehyde (MDA) and total thiol levels besides glutathione peroxidase (GPx) activity using the homogenized striatums. Crocin treatment improved cognitive performance and resulted in a significant reduction in MDA concentration as compared to the STZ-lesioned rats. Moreover, crocin produced a significant elevation in total thiol content and GPx activity, as compared with STZ-lesioned group. STZ-lesioned rats showed a severe deficit in memory associated with elevated MDA levels, reduced GPx activity and total thiol content. This study demonstrates that crocin may have beneficial effects in the treatment of neurodegenerative disorders such as Alzheimer’s disease.

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