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Naringenin attenuates behavioral changes in social defeat stressed mice via inhibition of oxidative stress, release of pro-inflammatory cytokines and acetyl-cholinesterase activity

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The effects of naringenin; a dietary flavonoid, with potent anti-oxidant and anti-inflammatory activities on social defeat stress (SDS)-induced neurobehavioral and biochemical changes were evaluated in mice using the resident-intruder paradigm. The intruder male mice were distributed into 6 groups (n = 6). Mice in group 1 (control) received vehicle (3 % DMSO, i.p), group 2 (SDS-control) were also given vehicle, groups 3-5 received naringenin (10, 25 and 50 mg/kg, i.p.) while group 6 had ginseng (50 mg/kg, i.p) daily for 14 days. However, 30 min after treatment on day 7, mice in groups 2-6 were exposed to SDS for a period of 10 min confrontation with aggressive counterparts for 7 consecutive days. Neurobehavioral phenotypes: spontaneous motor activity (SMA), memory, anxiety and depression were then evaluated on day 14. The brain tissues were homogenized for the estimation of malondialdehyde (MDA), reduced glutathione (GSH), and catalase and superoxide dismutase (SOD). The acetyl-cholinesterase activity and the concentrations of tumor necrosis factor-alpha (TNF-α) and interleukin-6 (IL-6) were also determined. The impaired locomotion, memory deficits, anxiety and depression-like behaviours induced by SDS were attenuated by naringenin. Naringenin improved the antioxidant status of SDS-mice as it reduced MDA level and elevated endogenous antioxidant molecules. It also reduced the levels of nitrite, acetyl-cholinesterase activity, TNF-α and IL-1β in the brains of SDS-mice. The results of this study revealed that naringenin ameliorates memory deficits, anxiety and depression-like behavior in SDS-mice, which may be related to inhibition of oxidative stress, release of pro-inflammatory cytokines and acetyl-cholinesterase activity.

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