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FLAVONOID LUTEOLIN UP-REGULATED ANTIOXIDANT DEFENSE SYSTEMS AND DECREASED OXIDATIVE STRESS IN TAIL-SUSPENDED RATS

Abstract

Space flight can increase free radical formation, and therefore it is associated with an increase in oxidative stress. Many lines of evidence suggest that microgravity results in increased oxidative stress especially in the nervous system. In previous study, we found that flavonoid luteolin could protect neuronal SH-SY5Y cells against oxidative stress induced by clinostat simulated microgravity. Therefore, in the present study, we further study the protective effects of luteolin in the tail-suspended rats. The effects on oxidant, antioxidant enzymes and some biomarkers of oxidative damage in plasma and hippocampus were studied after feeding tail-suspended rats with flavonoid luteolin (10mg/kg, 80mg/kg, and 160mg/kg). The results showed that 21 day's tail-suspension down-regulated some antioxidant defense systems by decreasing antioxidant enzyme activity and increasing oxidant enzyme activity. Luteolin treatment could increase activity of superoxide dismutase (SOD), increase glutathione S-transferase (GST) activity, decrease glutathione peroxidase (GPx) activity, decrease the level of lipid peroxidation product, MDA, and elevate total antioxidant capacity (TAC) in tail-suspended rat plasma. Furthermore, the content of reduced glutathione (GSH) in hippocampus was also significantly elevated in rats treated with luteolin. These results indicate that flavonoid luteolin could protect against simulated microgravity-induced oxidative stress by up-regulating antioxidant defense systems and down-regulating the level of oxidant products. Flavonoid luteolin may have potential for preventing oxidative stress induced by space flight or microgravity.

Key words: Simulated microgravity, oxidative stress, flavonoid, luteolin

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