Abstract

Introduction: It is well established that soy protein diets as well as aerobic exercise could promote antioxidant capacity and consequently reduce free radicals overproduction on brain. However, little is know regarding to the high-protein diets and high intensity exercise on oxidative stress production. The aim of this study was to analyse the effects of high-protein diets and high-intensity exercise (HIE) on brain oxidative stress markers. Materials and Methods: A total of 40 male Wistar rats were randomly distributed in 4 experimental groups (n=10): normal-protein or high-protein diets with or without HIE for an experimental period of 12 weeks. Main oxidative damage markers in brain such as thiobarbituric acid-reactive substances (TBARs) and protein carbonyl content (PCC) were assessed. In addition, brain manganese superoxide dismutase (Mn-SOD), cooper/ zinc superoxide dismutase (CuZn-SOD) and catalase (CAT) antioxidant enzymes activity, and protein level of Nuclear factor erythroid 2 related factor 2 (Nrf2) were measured. Results and discussion: Brain TBARs, PCC, tSOD, Mn-SOD, CuZn-SOD and CAT levels were higher in the high-protein compared to the normal-protein groups (all, p<0.05). In addition, the expression of Nrf2 protein was higher in the high-protein and HIE groups compared to the normal-protein and sedentary groups, respectively (both, p<0.01). A protein amount*HIE interaction was found on brain TBARs content, and tSOD and CuZn-SOD activity derived from a HIE-induced decrease in the high-protein but not in the normal-protein group (p<0.05). Conclusions: The high-protein diets consumption produce higher levels of brain lipid peroxidation, in spite of higher levels of antioxidant enzymatic capacity. However, HIE may attenuate the deleterious effect of a high-protein diet on brain lipid peroxidation when both effects are combined.

Keywords

Superoxide Dismutase, Catalase, Thiobarbituric Acid Reactive Substances, NF-E2-Related Factor 2, Soybean Proteins, Hypertrophy.