

Intense physical exercise increased anxiety-like behavior but is harmless to cognition function of adult mice

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Abstract

The regular exposition to low or moderate physical exercise is associated to ameliorate cognitive impairments, increased neuroplasticity responses and to balance brain oxidative stress levels in humans and rodents. However, these adaptations are not completely understood when the physical exercise is applied at high efforts. Therefore, the objective of this study was to investigate the effect of intense physical exercise on behavioral and biochemical parameters in adult male mice. Here, animals were exposed to an incremental running' and swimming' program of high intensity during 4 weeks. At the end of physical training, it was observed an increased anxiety-like behavior due to elevated number of risk assessment only in the running group. Both exercised groups increased the long-term habituation response and had not short-term habituation and spatial memory differences from untrained controls. On the other side, the biochemical analysis showed that the striatal and cortical activity of glutathione peroxidase was significantly increased, while the glutathione reductase activity and non-protein sulfhydryl content were unchanged. We propose that intense physical exercise reduce the cognitive beneficial effects of low- and moderate-intensity exercise but without inducing neurological injury in adult mice. Furthermore, one probable mechanism of neuroprotection is the increased activity of glutathione peroxidase and the maintenance of sulfhydryls donors in the cortex, striatum and hippocampus of adult mice.

Keywords: physical exercise, behavioral parameters, oxidative stress
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