Long-term Various Load Training Effects on Free Radical Metabolism in the Brain of Aging Mice

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Objective To investigate the effects of long-term various load aerobic exercise on the free radical metabolism of the brain in aging mice through the establishment of different swimming exercise models.

Methods sixty 3-month-old male Kunming mice were randomly and equally divided into five groups, which were the control group (group C), 10 minute exercise group (group E_1), 30 minute exercise group (group E_2), 60 minute exercise group (group E_3), and 90 minute exercise group (group E_4). Group C had regular feeding during the natural aging time in 8 months without any exercise intervention. All other exercise groups performed different load swimming exercise (from 10 to 90 minutes as mentioned above) during the same 8 month period. All subjects were decapitated after exercise on the last day of the 8th month; and the brain tissues were harvested as samples. The malondialdehyde (MDA) amount was measured by the Thiobarbituric Acid method, and the superoxide dismutase (SOD) activity level was measured with Xanthine Oxidase method.

Results group E3 demonstrated significantly higher SOD activity level and lower MDA amount than the other groups.

Conclusions Long-term, medium-load aerobic exercise had greatly impacted the metabolism of free radicals in the brain of the mouse, evidenced by increased SOD activity level and decreased MDA production. These effects may indicate that this exercise model may be beneficial in slowing down brain aging by eliminating free radicals and improving brain anti-oxidation ability.