Exercise Training and Calorie Restriction Influence the Metabolic Parameters in Ovariectomized Female Rats

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Abstract

The estrogen deficiency after menopause leads to overweight or obesity, and physical exercise is one of the important modulators of this body weight gain. Female Wistar rats underwent ovariectomy surgery (OVX) or sham operation (SO). OVX and SO groups were randomized into new groups based on the voluntary physical activity (with or without running) and the type of diet for 12 weeks. Rats were fed standard chow (CTRL), high triglyceride diet (HT), or restricted diet (CR). The metabolic syndrome was assessed by measuring the body weight gain, the glucose sensitivity, and the levels of insulin, triglyceride, leptin, and aspartate aminotransferase transaminase (AST) and alanine aminotransferase (ALT). The exercise training combined with the CR resulted in improvements in the glucose tolerance and the insulin sensitivity. Plasma TG, AST, and ALT levels were significantly higher in OVX rats fed with HT but these high values were suppressed by exercise and CR. Compared to SO animals, estrogen deprivation with HT caused a significant increase in leptin level. Our data provide evidence that CR combined with voluntary physical exercise can be a very effective strategy to prevent the development of a metabolic syndrome induced by high calorie diet.

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