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Chronic (-)-hydroxycitrate administration spares carbohydrate utilization and promotes lipid oxidation during exercise in mice

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(-)-Hydroxycitrate (HCA) is an active ingredient that is extracted from the rind of the Indian fruit Garcinia cambogia, which is available as a herbal supplement, and is being used to lose weight. In the present study, the acute and chronic effects of HCA on energy metabolism were examined in male Std ddY mice. Mice were placed into metabolic chambers and orally administered 10 mg of HCA or water (control). Serum free fatty acid levels were significantly higher 100 min after administration in the HCA group, but the respiratory exchange ratio was not different from that in the control group. The concentration of glycogen in the gastrocnemius muscle was higher in the HCA group 16 h after the administration and in a separate study, the maximum swimming time until fatigue was slightly longer (P = 0.21) than that in the control group on d1. The difference was significant on d3 after 3 days administration. Other mice were orally administered 10 mg of HCA or water twice a day for 25 d. On d 26, they were placed into metabolic chambers after administration, and allowed to rest for 1 h, followed by 1 h's running at 15 m/min. The respiratory gas was monitored. The respiratory exchange ratio was significantly lower in the HCA group during both resting and exercising conditions. These results suggest that the chronic administration of HCA promotes lipid oxidation and spares carbohydrate utilization at rest and during running in mice.

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Effects of a rugular endurance exercise or an acute-exercise and rest on the levels of lipids, carnitines and carnitine palmitoyltransferase-I in rats

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The effects of a rugular endurance exercise or an acute-exercise and rest on the levels of lipids, carnitines and carnitine palmitoyltransferase-I (CPT-I) were investigated in Sprague-Dawley male rats. The rats were exercise trained on a treadmill for 60 min per day for 60 days (long-term trained, LT) or non-trained for 59 days (NT) and exercised for 60 min in the 60th day. The levels of lipids, carnitines and CPT-I were measured in the rats of LT and NT during post-exercise recovery period (PERP). In NT rats, the levels of serum nonesterified carnitine (NEC), acidsoluble acylcarnitine (ASAC), total carnitine (TCNE) were increased significantly during the PERP, reached peak at 4 h after the 60 min acute-exercise. In LT rats, ASAC and TCNE which were increased right after the 60 min running decreased to the levels of pre-exercise during the PERP. The levels of skeletal muscle ASAC in NT rats which were increased significantly by the acute-exercise decreased to the pre-exercise levels during the PERP. However, the ASAC level in LT rats reached peak at 4 h after the 60 min running. In NT rats, liver triglyceride (TG) and total lipid (TL) which were significantly increased by the acute-exercise decreased to the pre-exercise levels during the PERP. The levels of liver TG and TL in LT rats, which were increased slightly by the 60 min running, were also maintained at the pre-exercise levels during the PERP. CPT-I activity in NT rats was increased significantly after 1 h of the 60 min exercise and decreased to the pre-exercise levels during the PERP. However, the CPT-I activity in LT rats, which was increased significantly by the 60 min exercise, was decreased slowly and reached to the pre-exercise level in 8 h of the PERP. Northern blot analysis showed that the changes of CPT-I activities during the PERP coincided with changes in CPT-I mRNA levles. This study demonstrates that both exercise and rest can influence differently the levels of carnitines, lipids and CPT-I in rats of NT and LT.