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Effect of prolonged exercise on esterification of blood-borne free fatty acids into lipids of thr rat liver

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Prolonged exercise affects metabolism of certain lipid fractions in the liver. The most outstanding example is accumulation of triacylglycerols in the tissue. The aim of the present study was to examine the effect of exercise on esterification of the plasma-borne long-chain fatty acids into different lipid fractions in the liver. The experiments were carried out on three groups of male Wistar rats: 1-control, 2-run 3 h (1200 m•h⁻¹, +10° incline), and 3-run as above and recovering 3 h thereafter. ¹⁴C-palmitic acid suspended in albumin was administered intravenously at a dose of 20 µCi/100g and the liver samples and the blood from the abdominal aorta were taken 20 min later. The liver lipids were separated into the following fractions: phospholipids, mono-, di-, and triacylglycerols, free fatty acids, cholesterol and cholesterol esters and their radioactivity was counted. The content of phospholipids and triacylglycerols in the liver and the concentration of the blood glucose and plasma free fatty acids was also determined. The exercise reduced radioactivity in the fraction of phospholipids and monoacylglycerols but it did not influence the radioactivity of the other lipid fractions. However, the specific activity of the plasma free fatty acids was much lower, both after exercise and recovery, than at rest. When this is taken into account, it is seen that a considerable elevation in the incorporation of the blood-borne fatty acids into each lipid fraction examined occurred. Formation of cholesterol also increased. During recovery, a tendency to normalization is observed. It is concluded that prolonged exercise of moderate intensity affects the activity of the enzymes responsible for esterification of the plasma-borne free fatty acids and synthesis of cholesterol in the liver cells.

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