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ULTRASTRUCTURAL CHARACTERISTICS OF SLOW AND FAST TWITCH MUSCLE RAT FIBERS AFTER THE CYCLE OF FORCED SWIMMING WITH ADMINISTERING OF GREEN TEA EXTRACT AND AMMONIUM SALTS

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Search and study of the mechanism of action of substances of natural origin, reducing fatigue and restoring the performance of skeletal muscles during extreme physical exertion, is one of the most important tasks of sports physiology and medicine. Comparison of the effects of decaffeinated green tea extract (GTE) and ammonium chloride (ChA), which was previously tested separately and in combination with GTE in the forced swimming model, allowed us to establish the stimulating effect of ChA, which exceeded the effect of GTE. In the present work, morphometric studies of muscle fibers of rats, m. soleus (SOL) and m. extensor digitorum longus (EDL), were carried out on the basis of electron microscopy data after a forced swimming cycle with administering the rats GTE and low doses of ammonium salts, chloride (ChA) or carbonate (CrA). In rats of the GTE group, adaptation to physical activity occurs mainly due to an increase in the average mitochondrial area in the SOL muscles. In rats of the ChA group, ad-

aptation is caused by an increase in the average area of mitochondria in the EDL muscles, while the average area transversely oriented with respect to the cutting plane of the T-tubules (TT) in these muscles decreases along with an increase in the proportion of longitudinally oriented TT, which indicates breaks in muscle fibers. The combined effect of ChA and GTE provides the additivity of the functional effect by increasing the average area and volume density of mitochondria in the EDL muscles, the average TT area in the SOL and EDL muscles, as well as their number in the EDL muscles. In rats of the CrA group, the functional effect is due to an increase in the average area of the TT in the EDL muscles and their number in the SOL muscles. At the same time, the proportion of longitudinal TT in the muscles of the EDL, and hence the breaks in the muscle fibers, increases. In the group of joint action of CrA and GTE, changes in the mitochondrial apparatus in the slow, but especially in the fast twitch muscles, as well as an increase in the TT area in the SOL muscles, were revealed. Analysis of ultrastructural characteristics suggests that the effectiveness of preparations is mainly due to adaptive changes in TT and mitochondria of fast twitch muscles, but it increases with the participation of slow twitch muscle fibers in the structural and functional adaptation to the exhaustive physical load.

Keywords: m. Soleus, m. Extensor digitorum longus, rat, mitochondria, T-tubules, calcium, exhaustive exercise