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Effects of estrogen related receptor α inhibition on metabolic adaptations to endurance training in skeletal muscle of male wistar rats

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Fuel consumption is dependent on severity and duration of the exercise. Medium-Chain Acyl-CoA Dehydrogenase (MCAD) and Carnitine Palmitoyl Transferase 1 (CPT1) are involved in this process. MCAD performs the first step in fatty acid oxidation and CPT1 catalyzes the limiting step in mitochondrial beta oxidation. Estrogen-Related Receptor-alpha (ERR α) regulates the genes involved in fatty acid oxidation and mitochondrial biogenesis. The aim of this study was to investigate the effect of 4 weeks of endurance training on the expression of genes involved in lipid metabolism. 30 male wistar rats (8 weeks-old) were randomly divided into four groups: Control (n=7), XCT790 (n=8), trained (n=8) and trained+XCT790 (n=7). Expression of ERR α , MCAD, CPT-1 β , PGC-1 α , PDK4 and CS genes was measured by Real-Time PCR and quantified by $2^{-\Delta\Delta CT}$ method. The expression of ERR α , MCAD, CPT1 β , PGC-1 α , PDK4 and CS genes were significantly higher in trained compared to control group. The expression of MCAD and CPT1 β genes was significantly lower in trained+XCT790 compared to trained and the expression of PDK4, CPT1 β and PGC-1 α were significantly higher in Trained+XCT790 compared to control+XCT790. Taken together, expression of ERR α is a trainable factor and its changes are parallel with higher expression of the enzymes which involved in lipid metabolism. This indirectly suggests a significant role of ERR α in adaptation of lipid metabolism evoked by endurance training.

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