Forschungsgesuch Tappy

Effects of fatty acids on muscle lipid oxidative capacity during endurance training

Abstract

ABSTRACT

Endurance training improves exercise performance and insulin sensitivity, and these effects may be in part mediated by an enhanced fat oxidation induced. Since n-3 and n-9 unsaturated fatty acids may also increase fat oxidation, we hypothesized that a diet enriched in these fatty acids may enhance the effects of endurance training on exercise performance and insulin sensitivity. To assess this hypothesis, 16 normal-weight sedentary male subjects were randomly assigned to an isoenergetic diet enriched with fish- and olive oils (UFA: 52% carbohydrates, 34% fat [12% SFA, 12% MUFA, 5% PUFA], 14% protein), or a control diet (CON: 62% carbohydrates, 24% fat [12% SFA, 6% MUFA, 2% PUFA], 14% protein) and underwent a 10-day gradual endurance training protocol. Exercise performance was evaluated by measuring VO_2max and the time to exhaustion during a cycling exercise at 80% VO_2max; glucose homeostasis was assessed after ingestion of a test meal. Fat oxidation was assessed by indirect calorimetry at rest and during an exercise at 50% VO_2max. Training significantly increased time to exhaustion, but not VO_2max, and lowered incremental insulin area under the curve after a test meal, indicating improved insulin sensitivity. The effects were however of similar magnitude in UFA and CON. Fat oxidation was not significantly altered at rest, after ingestion of the meal, and during exercise. It is concluded that a diet enriched with fish- and olive oil does not modify the effects of a short-term endurance training protocol on physical performance and insulin sensitivity in healthy young subjects.