TACSM Abstract

A Family History of Type 2 Diabetes does not Impact Skeletal Muscle Lipid Content

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ABSTRACT

A high intramyocellular lipid (IMCL) has been associated not only with insulin resistance, obesity, and type 2 diabetes; but also in insulin sensitive endurance trained athletes – known as "athlete's paradox". A family history of type 2 diabetes (FH+) has been shown as a risk factor for the development of insulin resistance and type 2 diabetes (T2D). However, it is unclear whether a FH+ affects IMCL content and exercise induced changes in IMCL when compared to those without a family history of type 2 diabetes (FH-). **PURPOSE**: The purpose of this study were 1) to compare IMCL content between normoglycemic FH+ vs. FH- and 2) to determine if exercise induced changes in IMCL is affected by a FH+. **METHODS**: Fourteen sedentary males with (Mean ± SEM; n=6; age: 27.33 ± 2.65 years; BMI: 26.48±1.25 kg/m^2) and without (n=8; age: 26.63 +1.44 year; BMI: 26.46 ± 0.57 kg/m^2) FH were trained on a stationary bike for 30-55 minutes (70% of VO_{2peak}) per session on alternate days in combination with interval training (70-85% VO_{2peak}) for 13 days over 3 weeks. Insulin sensitivity (IS) was assessed by hyperinsulinemic euglycemic clamp and maximal aerobic fitness (VO_{2max}) was measured by standardized graded exercise test. At baseline and two days after the completion of the last bout of exercise, IMCL of the vastus lateralis was measured by proton spectroscopy. **RESULTS**: There were no differences in IS, VO_{2max}, and IMCL content between groups at baseline (all p>0.05). Three weeks of exercise increased VO_{2max} in FH- (33.66 ± 2.12 to 35.35 ± 1.85 ml/kg/min, p=0.04) and tended to increase VO_{2max} in FH+ (29.96 ± 2.09 to 31.49 ± 2.07 ml/kg/min, p=0.09). IS did not change in any group (FH- 7.84 ± 0.82 to 8.42 ± 1.11 mg/kg/min, p=0.80; FH+ 5.39 ± 0.48 to 6.62 ± 0.83 mg/kg/min, p=0.49) There was no effect on fiber type I specific IMCL content (FH- 11.21 ± 2.61 to 9.97 ± 2.25 AU, p=0.56; FH+ 7.98 ± 2.88 to 8.51 ± 1.91 AU, p=0.92), fiber type II specific IMCL content (FH- 11.04 ± 2.69 to 9.46 to 2.13 AU, p=0.41; FH+ 7.82 to 2.78 to 7.30 to 2.18 AU, p=0.92), and total IMCL (FH- 11.18 ± 2.67 to 9.69 ± 2.18 AU, p=0.44; FH+ 7.88 ± 2.82 to 7.88 ± 2.04 AU, p>0.99). **CONCLUSION**: A family history of type 2 diabetes does not seem to impact insulin sensitivity and IMCL content. Three weeks of combined endurance and interval exercise training did not change insulin sensitivity or IMCL content in a healthy sedentary population regardless of FH status.