Public Abstract

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Title:Short-Term Aerobic Exercise Training in Type 2 Diabetes

Type 2 diabetes (T2D) is a worldwide problem, and people with T2D have impaired postprandial glycemic control which contributes to cardiovascular morbidity and mortality. While current pharmaceutical therapies are targeted to reduce glycosylated hemoglobin and may not be effective in improving postprandial glycemia (PPG), exercise is an effective treatment to enhance postprandial glycemic control in patients with T2D. As little as seven days of aerobic exercise has previously been shown to reduce PPG in this population, but the mechanisms by which this occurs currently are not understood. Further, the assessment of postprandial glycemic control generally is done using a non-physiological glucose overload uncharacteristic of normal human feeding and what the body experiences throughout the day when meals of mixed macronutrients are consumed. Thus, the primary aims of this dissertation were: 1) to identify tissues contributing to changes in glycemic control after short-term exercise training and identify the systemic mechanisms by which exercise improves overall PPG in patients with T2D (Study One), and 2) to determine, in patients with T2D, if a mixed meal tolerance test is a more effective tool for assessing improvements in glycemic control following exercise training than the standard oral glucose tolerance test (Study Two). The data presented here add to current evidence that improved insulin sensitivity is an early adaptation of exercise and short-term exercise training, but we did not see improvements in overall postprandial glucose responses in the sample studied. Further, we show that a mixed meal test is an effective alternative to the oral glucose tolerance test in assessing differences in PPG and the underlying factors which influence PPG. Collectively, when viewed in the presence of the existing literature, these data suggest that while exercise training is ultimately known to enhance postprandial glycemic control, and testing this with a mixed meal test is a viable alternative to the current oral glucose tolerance test, subjects with T2D have variable responses and may not always see improvements in PPG following one week of aerobic exercise training.