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Effects of Treadmill-Training on Solid Meal Gastric Emptying in a Rodent Model

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PURPOSE: Patients suffering from gastrointestinal (GI) dysfunction are frequently prescribed physical activity to improve their symptoms. Yet, physical activity has also been shown to provoke GI disturbances including diarrhea, abdominal pain, and gastroesophageal reflux. These GI disturbances commonly occur after bouts of prolonged or high-intensity exercise, and the GI disturbance frequency is twice as high during running compared to other endurance sports. The effects of GI function following exercise are diverse; studies have reported increases, decreases, or no changes in gastric emptying (GE) rate following treadmill-training. In this study, we evaluated the effects of moderate-intensity treadmill-training (66.6% VO2max) on GE rate in rats. **METHODS**: Male Wistar rats (n = 16) were exercised on a treadmill five days/week for 8 weeks. Baseline, mid-point, and final GE measurements were conducted throughout the study. On the days of the GE experiment, rats were fasted overnight with unlimited access to water, and then placed into individual chambers where GE was indirectly measured. Baseline air measurements were collected before the fasted rats received 1g of pancake containing 5µL of the stable isotope [^{13}C]-octanoic acid. The exhaled breath was collected and analyzed to determine the [^{13}C]- to [^{12}C]- carbon dioxide ratio. **RESULTS**: Body mass increased over the duration of the study by 41%; however, there were no significant differences between exercise and control rats (325.40±3.11 vs. 325.99±3.06g; $p>0.05$). Food intake remained similar between exercise and control rats (23.23±0.20 vs. 23.19±0.20; $p>0.05$). Not surprisingly, mean energy intake (MEI; kcal/100g/day) also revealed no significant differences between exercise and control rats (28.99±0.50 vs. 28.90±0.55; $p>0.05$). There was no significant difference in GE between the exercise and control group gastric emptying coefficient (5.10±1.37 vs 5.04±0.40; $p>0.05$). **CONCLUSIONS**: Moderate-intensity treadmill-training for 8-weeks has no significant effect on anthropometric factors. Interestingly, however, as body mass and food intake increased, MEI decreased. We have validated that moderate-intensity treadmill running has no significant effect on gastric emptying.

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