EFFECT OF PRIOR EXERCISE ON GLUCOSE METABOLISM IN TRAINED MEN
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Previous studies have demonstrated that oral glucose tolerance is impaired in the immediate period after exercise compared with 24 hr postexercise (Bonen et al., 1998; King et al., 1995). Further, the insulinaemic response to oral glucose is greater (King et al., 1995) or not different (Bonen et al., 1998) after exercise. Taken together, these results indicate a relative whole-body insulin resistance in the immediate period after exercise. Using a double tracer technique (Steele et al., 1968) glucose kinetics were examined during a 75g, 2 h oral glucose tolerance test (OGTT) 30 min postexercise (EX; 60 min, 71 ± 2% VO₂peak, mean ± SEM) and at rest (REST) in six physically trained men (29.2 ± 4.9 yr, 23.2 ± 1.2 kg.m⁻² BMI, 65.4 ± 6.9 mL kg⁻¹ min⁻¹ VO₂peak; mean ± SD).

As shown in the Figure, the integrated area under the plasma glucose curve was 102 ± 35% greater in EX versus REST (P=0.011). The higher glucose response occurred even though whole-body glucose R_d was 24% higher after exercise (P=0.044, main effect). Whole body R_d was 25% higher after exercise (P=0.033, main effect). There were no differences in total (2 h) endogenous glucose appearance (R_aE) or magnitude of suppression of R_aE despite a higher R_aE from 15-30 min of the OGTT in EX. However, cumulative oral glucose appearance was 30% higher in EX (P=0.030, main effect).

There were no differences in glucose clearance rate, or plasma insulin and lactate responses between the two conditions. Plasma NEFA were significantly higher 30 min postexercise, however, were suppressed to similar levels during the OGTT.

The greater appearance of oral glucose after exercise may be a result of a higher intestinal absorption rate and/or reduced glucose uptake by the liver. Similar to other studies (Hamilton et al., 1996; Mehlum et al., 1978) these results suggest that adaptations in splanchnic tissues by prior exercise facilitate greater glucose output from the splanchnic region following glucose ingestion, thereby mediating a greater glycaemic response and consequently, greater systemic glucose uptake.


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