

Metabolic responses to high intensity aerobic and anaerobic exercises.

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Purpose: The purpose of this study was to compare metabolic responses to different types of high intensity exercise. **Methods:** Healthy, physically active females (n = 11) and males (n = 9) each performed a $\text{VO}_{2\text{max}}$ test, Wingate Anaerobic Test (WAT), and 30 s of one-leg maximal isokinetic extension and flexion ($180^\circ/\text{s}$) of the lower leg (ISO) on separate occasions at least 48 hours apart. Each test was preceded by 10 minutes of quiet rest for measurement of baseline values. VO_2 , rate of perceived exertion (RPE), and respiratory exchange ratio (RER) were measured throughout each testing period. Finger stick blood samples were taken for determination of glucose and lactate during rest and immediately post exercise. Peak values were analyzed for significant differences ($p < 0.05$) using repeated measures ANOVA and post-hoc testing with Bonferroni correction. **Results:** All data reported as mean \pm SE. Participants averaged 23 ± 1 yr, 19.8 ± 1.4 %, and 52.9 ± 2.3 mL/kg/min for age, body fat, and $\text{VO}_{2\text{max}}$, respectively. Although peak RER did not differ between the 3 conditions ($\text{VO}_{2\text{max}}$ 1.14 ± 0.01 , WAT 1.14 ± 0.03 , and ISO 1.14 ± 0.03), peak VO_2 ($\text{VO}_{2\text{max}}$ 52.9 ± 2.3 , WAT 41.4 ± 2.0 , and ISO 16.8 ± 1.3 mL/kg/min) and lactate immediately post-exercise ($\text{VO}_{2\text{max}}$ 8.1 ± 0.4 , WAT 7.0 ± 0.2 , and ISO 3.5 ± 0.2 mmol/L) were significantly different between all tests. RPE at peak exercise ($\text{VO}_{2\text{max}}$ 19 ± 0.2 , WAT 17 ± 0.5 , and ISO 16 ± 0.5) and glucose immediately post-exercise ($\text{VO}_{2\text{max}}$ 123 ± 5 , WAT 95 ± 2 , and ISO 89 ± 2 mg/dL) were higher during the $\text{VO}_{2\text{max}}$ test than during the WAT and ISO tests, but these values were not different between the WAT and ISO tests. **Conclusions:** The metabolic demands of a $\text{VO}_{2\text{max}}$ test are greater than a WAT or ISO test, and the metabolic demands of a WAT test are greater than those of an ISO test.