The purpose of this investigation was to characterize cardiovascular, hormonal, and metabolic responses to a single bout of whole-body resistance exercise (RE) in healthy, young individuals (n=6, 25±1y). To account for normal circadian variation, comparisons between the RE group and a group of healthy, young non-exercising control (CON) subjects (n=6, 24±1y) were completed. Catecholamine, cortisol, insulin, glucose, free fatty acids (FFA), and lactate assays were completed for both groups from blood samples collected pre, 10 min post, 2 h post, and 3.5 h post either acute RE or rest. Statistical analyses for differences over time within groups and differences between groups were performed.

Whole-body RE resulted in robust physiological responses. Average heart rate (HR) during the bout was 70 ± 2% of HRmax and peaked at 87 ± 1% HRmax. Differences in hormonal and metabolic responses between RE and CON were most prevalent at the 10 min post timepoint. The RE group observed increased concentrations of cortisol (+93%), insulin (+233%), glucose (+53%), and lactate (+840%) compared to the CON group at the 10 min post timepoint (P<0.05). Additionally, there was an observed main effect for
time for increases in FFA concentrations (P<0.05). There were also observed main effect for time in cortisol concentrations (P<0.05). However, in the CON group the cortisol levels dropped significantly by the 10 min post timepoint, while the RE group remained elevated, highlighting its circadian rhythmicity.

In summary, these data support a large and transient hormonal and metabolic responses to RE in the minutes and hours following the stimulus. Additionally, these data highlight the effect RE has on the normal circadian variations of cortisol and FFA and has implications for time of day factoring into RE responses and adaptations. These findings highlight fluctuations in energy homeostasis after RE and expand our knowledge of basic physiological responses to this stimulus.