

SWACSM Abstract

The Effects of a High-Carbohydrate Versus a High-Fat Shake on Biomarkers of Metabolism and Glycemic Control When Used to Interrupt a 38-Hour Fast: A Randomized Crossover Study

CAMERON JACOBSEN, LANDON DERU, & BRUCE W. BAILEY, FACSM

Lifestyle Medicine Lab; Department of Exercise Science; Brigham Young University; Provo, UT

Category: Undergraduate

Advisor / Mentor: Bailey, Bruce (bailey.bruce@gmail.com)

ABSTRACT

As the link between metabolic health and chronic diseases have come into focus, it has highlighted the need to establish methods for improving metabolic flexibility. The ability to efficiently switch metabolic fuels from glucose to fatty acid-derived ketones is an indication of good metabolic health. Regular fasting allows the body to make the metabolic switch to ketones more often, which is commonly identified through the measurement of the ketone beta-hydroxybutyrate (BHB). Measuring both BHB and glucose levels can provide information about the body's response to various foods, fasting regimens, or other metabolic stressors, and give valuable insights to measuring a metabolic switch. **PURPOSE:** The primary aim of this study was to determine the impact of various fast-interrupting shakes on markers of glycemic control including glucose, β -hydroxybutyrate (BHB), insulin, glucagon, GLP-1, and GIP. **METHODS:** Twenty-seven adults (12 female, 15 male) completed all three conditions of this study. One condition consisted of a 38-hour water-only fast, and the other two conditions were similar but the fasts were interrupted at 24 hours by either a high carbohydrate/low fat (HC/LF) or a low carbohydrate/high fat (LC/HF) shake. **RESULTS:** The water only fast resulted in 135.3% more BHB compared to the HC/LF condition ($t = 7.77$, $p < 0.0001$) and 69.6% more compared to the LC/HF condition ($t = 5.12$, $p < 0.0001$). Conversely, the LC/HF condition exhibited a 38.8% higher BHB level than the HC/LF condition ($t = 2.70$, $p = 0.0086$). Additionally, the area under the curve (AUC) for glucose was 14.2% higher in the HC/LF condition than in the water condition ($t = 6.23$, $p < 0.0001$) and 6.9% higher compared to the LC/HF condition ($t = 3.14$, $p = 0.0024$), with the LC/HF condition yielding 7.8% more glucose than the water condition ($t = 3.21$, $p = 0.0020$). At the 25-hour mark, insulin was significantly elevated in the HC/LF condition compared to the LC/HF condition ($F = 3.84$, $p = 0.0002$) and compared to the water condition ($F = 7.00$, $p < 0.0001$). Furthermore, insulin was increased in the LC/HF condition compared to the water condition at 25 hours ($F = 3.19$, $p = 0.0016$). **CONCLUSION:** While a LC/HF shake does not mimic a fast completely, it does preserve some of the metabolic changes including elevated BHB and glucagon, and decreased glucose and insulin compared to a HC/LF shake.