

The Effects of a High Carbohydrate vs. High Fat Pre-Fast Meal on Incretin Hormone Secretion: A Randomized Crossover Study

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ABSTRACT

Chronic illness such as strokes, heart disease and diabetes all rank among the leading causes of death in the United States. Recently, fasting has gained popularity as a means of preventing and treating chronic illness. **PURPOSE:** Fasting produces multiple beneficial physiological responses that have been shown to aid in chronic disease prevention, one of which is observed in relation to incretin hormones such as glucose-dependent insulin tropic polypeptide (GIP) and glucagon-like peptide-1 (GLP-1). These incretin hormones are released by the gut to augment the secretion of insulin to regulate postprandial glucose levels. During a fast, the decrease in incretin hormones, and resultant insulin levels can aid the body to regain insulin sensitivity. This can lead to more effective blood glucose management and chronic illness prevention. The purpose of the study was to determine the impact of an acute 24-hour fast started with either a high fat (HF) or high carbohydrate (HC) meal on plasma GIP and GLP-1. **METHODS:** Subjects were over the age of 55, had a BMI equal to or greater than 27, and had no diagnosed metabolic disorders or some other disqualifying medical issues. Using a randomized crossover design, each participant performed two 24-hour fasts. One fast beginning with a high carbohydrate meal and the other a high fat meal, both of equal calories. Venous blood draws were taken at 0, 1, 24, and 48 hours. **RESULTS:** GIP and GLP-1 ($P < 0.001$) were both elevated 1 hour after consuming the pre-fast meal in both conditions. In addition, both GIP ($P = 0.0122$) and GLP-1 ($P = 0.0068$) were higher in the high fat condition compared to the high carbohydrate condition at 1 hour. There were no significant differences between conditions for either GIP or GLP-1 at any other time point. **CONCLUSION:** As expected, both incretin hormones spiked postprandially. We did find that GIP and GLP-1 levels were significantly higher at 1-hour postprandial for the HF meal compared to the HC meal. This could give evidence to show how macronutrient levels can affect incretin secretion and alter sensitivity to insulin. However, the impact of the pre-fast meal on GLP-1 and GIP did not persist throughout the fast.