

A Study Comparing Pre-Ingested L-Leucine and L-Isoleucine on Glycemic Responses in Healthy Inactive Adults: Preliminary Data

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ABSTRACT

BACKGROUND: The co-ingestion of amino acids with a glucose drink has been shown to blunt the elevated post-prandial glucose response. Though not entirely clear, some suggest amino acids will facilitate an incretin-driven insulin response that improves glucose sensitivity. Therefore, the purpose of this study is to examine the “priming” effect of pre-ingested amino acids on glycemic control in healthy inactive adults. We present here some preliminary data from 7 adults. **HYPOTHESIS:** We hypothesize that the pre-ingested amino acids would attenuate the post-prandial rise in glucose during a 75 g glucose tolerance test. **METHODS:** To test this, seven healthy adults (Females: n=4, Males: n=3, Age 27.17 ± 4.7 y; Height 165.84 ± 9.53 cm; Weight 82.47 ± 14.63 kg; BMI 30.14 ± 7.54 kg/m²; Lean body mass (LBM) 56.83 ± 20.56 kg; Fasting blood glucose (FBG) 87.43 ± 5.29 mg/dL) completed four trials in a randomized, single blinded fashion. The four trials required participants to ingest either Leucine (LEU), L-Isoleucine (ISO), an equal combination of LEU/ISO combined and lastly a control. Each treatment was ingested 30-min prior to a 2 h 75-g oral glucose tolerance test. The amino acid drink (200 mL) was standardized by the participant LBM (0.3g/kg) while the control consisted of inert stevia and non-amino acid ingredients found in equal amounts as other treatment mixtures (3.54 g). Venous blood samples were taken at baseline, and at 10, 30, 40, 60, 90, 120, and 150-min post-treatment and 75 g glucose drink. Because data collection is ongoing, the researchers are still blinded to the composition of the amino acid drinks and thus results are presented as: Red A, Green B, Yellow C, and control (White D). Plasma glucose (GLU) was analyzed using a YSI 2900 analyzer (Yellow Springs Instruments) and insulin (INS), glucagon (GCG), glucose-dependent insulinotropic peptide (GIP) and glucagon-like peptide-1 (GLP-1) concentrations were quantified by fluorescent bead-based technology (MAGPIX, Luminex xMAP technology). A 2-way RMANOVA was used to assess glucose data (Graphpad Software). **RESULTS:** Pre-ingestion of amino acid had no significant treatment effect on GLU compared to control ($P = 0.5912$). Currently, only 2 individuals have been analyzed for insulin, C-peptide, glucagon, GLP-1_{Active}, and GIP_{Total}. However, we observed early and promising, non-statistical supported differences in concentrations between trials of insulin (Red A, Yellow C > Green B, White D), GLP-1_{Active} (Red A, Green B, Yellow C > White D), and GIP_{Total} (Red A > Green B, Yellow C, White D). **CONCLUSION:** Based on these preliminary results, it appears that pre-ingestion of an amino acid drink does not influence glucose control in healthy and inactive young adults. It remains to be seen if pre-ingestion of the amino acids LEU and ISO, have any definitive effect on incretin secretion or subsequent insulin and glucagon responses.