"Incretin secretion in different strains of wild-type mice in response to a meal"

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Background: Glucose-dependent insulinotropic polypeptide (GIP) and glucagon-like peptide-1 (GLP-1) are intestinal incretin hormones produced from enteroendocrine cells. One of the primary roles of incretin hormones is to augment postprandial insulin secretion. GIP also enhances lipogenesis while GLP-1 maintains glucose homeostasis. It has been found in previous studies with rats that oral ingestion of nutrients stimulates secretion of GIP and GLP. We will examine incretin secretion in different strains of wild-type mice (C57BL/6J, 129/SvJ, and FVB/N) in response to a meal.

Aims/Hypothesis: This study explores any differences across strains of wild-type mice in incretin secretion and subsequent changes in lymphatic glucose and triglyceride levels upon feeding.

Methods: Mice (n=8-10) were fasted overnight with free access to water. Under isoflurane anesthesia, the superior mesenteric lymphatic duct was cannulated with polyvinyl chloride tubing. A duodenal cannula was also placed and secured by purse-string suture. Following an overnight recovery, the animals were given a mixed meal bolus intraduodenal infusion (0.3ml) [Ensure, Abbott Nutrition, Columbus, OH; 3.125 kcal/animal – 0.075 g fat (21.6%), 0.5 g carbohydrate (64.0%), 0.1125 g protein (14.4%)]. Lymph samples were continuously collected on ice every 15 minutes for the first hour, once after 2 hours, and then again 3 hours following the mixed meal bolus. GIP and GLP-1 concentrations were determined using commercially available ELISA kits (LINCO Research, St. Charles, MO). Lymph triglyceride was determined using Randox TG kits (Randox Laboratories, Crumlin, UK). All procedures were approved by the University of Cincinnati Internal Animal Care and Use Committee and complied with the NIH Guide for the Care and Use of Laboratory Animals.

Results: When given a mixed meal bolus, the different strains of mice showed subtle differences in GLP, GLP-1, Triglyceride, and Glucose levels. However, these differences were not statistically significant.

Conclusions: Our findings suggest that incretin secretion between different strains of wild-type mice in response to a meal does not vary. This is a continuing study and it has been discovered that there are no significant baseline differences. However, there may be physiological implications—the different strains of mice may have different responses to glucose or insulin and have different susceptibility to adiposity—that were not measured; these will be incorporated in future studies. Future studies will include putting the mice on a high fat diet and subjecting them to a glucose tolerance test.