Title: A Randomized, Controlled, Crossover Trial to Assess the Effects of a Lean Pork-containing, High-protein Breakfast on Indices of Satiety and Metabolic Health In Men and Women with Prediabetes – NPB #16-104

Investigator: Kevin C Maki, PhD

Institution: Midwest Biomedical Research: Center for Metabolic and Cardiovascular Health

Co-Investigators: Orsolya Palacios, RD, PhD
Midwest Biomedical Research: Center for Metabolic and Cardiovascular Health
Indika Edirisinghe, PhD
Britt Burton-Freeman, PhD
Illinois Institute of Technology

Date Submitted: June 22, 2017

Scientific Abstract:

BACKGROUND: Pre-diabetes is a common condition in the U.S. and places individuals at a higher risk for developing diabetes. Replacing refined carbohydrates (CHO) with protein in the diet may impact satiety and glucose and lipid metabolism.

OBJECTIVE: The objectives of this study were to assess the effects of consumption of a lean pork-containing, high protein (pPro) breakfast versus a refined CHO-rich breakfast for 2 weeks on satiety and cardiometabolic parameters in overweight or obese adults with pre-diabetes.

METHODS: In this crossover study, overweight or obese men and women with pre-diabetes were provided with either a pPro breakfast meal or a refined CHO breakfast meal (2-week intervention, ≥2-week washout). Visual analog scales (VAS) were used to determine satiety and related outcome measures; fasting glucose, insulin, lipids and related markers of glucose and lipid metabolism were assessed.

RESULTS: A total of 21 (13 females and 8 males) were included in the efficacy evaluable sample and had a mean (± standard error of the mean; SEM) age of 44.4 ± 3.1 y and a mean BMI of 30.4 ± 0.9 kg/m². Mean hunger net incremental area under the curve from pre-meal to 240 min post-meal (niAUC0-240min) was significantly (p = 0.041) lower following the pPro breakfast intake compared to the refined CHO breakfast intake; mean desire to eat niAUC0-240min was also significantly (p = 0.040) lower following the pPro breakfast intake compared to the refined CHO breakfast intake. No other assessed markers of satiety, including mean niAUC0-240min for fullness and prospective consumption, daily VAS average scores for hunger and fullness and
ad libitum lunch energy intake and food intake, were significantly affected by diet condition. Energy niAUC\textsubscript{0-240min} and focus niAUC\textsubscript{0-240min} were also not significantly affected by intake of a pPro breakfast or refined CHO breakfast. The mean incremental AUC for glucose and insulin were significantly lower, \( p = 0.003 \) and \( p = 0.001 \), respectively, following the pPro breakfast intake versus the refined CHO breakfast intake. The mean percent change from baseline for triglycerides (TG) at 120 min was significantly (\( p = 0.006 \)) less pronounced following intake of the pPro breakfast (10.0 \( \pm \) 6.8\% increase) compared to intake of the refined CHO breakfast (32.3 \( \pm \) 7.7\% increase). No other significant differences were observed related to the assessed lipid parameters.

CONCLUSIONS: Intake of a lean-pork containing breakfast may have a favorable effect on some acute aspects of satiety, and circulating glucose, insulin and TG levels. Evaluation of the longer-term effects of some of the acute differences observed between consuming lean pork versus refined CHO at the breakfast meal is warranted.