RESEARCH ABSTRACT

HUMAN NUTRITION

Title: Effect of pork ingestion on postprandial mitochondrial protein synthesis and inflammation in healthy weight, overweight, and obese adults - **NPB # 16-012**

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Scientific Abstract:

Context:

Excess fat mass may diminish the anabolic potency of protein-rich food ingestion to stimulate muscle protein sub-fractional synthetic responses. However, the impact of adiposity on mitochondrial protein synthesis rates (MPS) after protein-rich food ingestion has not been thoroughly examined *in vivo* in humans.

Objective:

We compared basal and postprandial MPS and markers of muscle inflammation (Toll-like receptor 4 [TLR4] and myeloid differentiation primary response protein 88 [MyD88] protein content) in young adults with different BMIs.

Methods:

10 normal-weight (NW; BMI 22.7±0.4 kg/m^2), 10 overweight (OW; BMI 27.1±0.5 kg/m^2), and 10 obese (OB; BMI 35.9±1.3 kg/m^2) adults received primed continuous L-[*ring*-$^{13}C_6$]phenylalanine infusions, blood sampling, and skeletal muscle biopsies before and after the ingestion of 170 g of pork.

Results:

Pork ingestion increased muscle TLR4 and MyD88 protein content in the OB group (P<0.05), but not in the NW or OW groups. Basal MPS were similar between groups (P>0.05). Pork ingestion stimulated MPS (P<0.001) (0-300 min) in the NW (2.5±0.6-fold above baseline values), OW (1.7±0.3-fold), and OB groups (2.4±0.5-fold) with no group differences (P>0.05).

Conclusions:

Protein-dense food ingestion promotes muscle inflammatory signaling only in obese adults. However, the consumption of a dinner-sized amount of protein strongly stimulated a postprandial MPS response irrespective of BMI. Our data suggest that alterations in postprandial mitochondrial protein synthesis are unlikely to contribute to compromised muscle macronutrient metabolism witnessed with obesity.