

# STUDY ABSTRACT

## MEAL REPLACEMENT

### Endotoxemia, inflammatory stress, and insulin resistance following 2-Week High Protein dietary intervention in morbidly obese patients with Type 2 Diabetes Mellitus undergoing Roux-en-Y Gastric Bypass Surgery

**BACKGROUND:** We have shown previously that weight loss and the resolution of insulin resistance following Roux-en-Y gastric bypass (RYGB) is accompanied by reduction in endotoxemia, toll-like receptor (TLR) expression, and proinflammatory mediators. Because it is known that RYGB limits carbohydrate and fat intake it is plausible that a higher protein and fat deprived diet may contribute to these effects. This study aims to evaluate the effect of a 2-week high protein, low carbohydrate and fat deprived diet intervention on endotoxemia, inflammatory stress, and insulin resistance preceding RYGB.

**METHODS:** Ten adults with morbid obesity and T2DM undergoing RYGB were studied over a 2-week normal diet control period and 2-week dietary intervention immediately preceding RYGB. Subjects were instructed to follow normal dietary habits during control period and a regimen of four Bariatric Fusion shakes, each containing 7g carbohydrate, 0g fat, and 27g of protein, during diet intervention. Shakes were mixed with water or skim milk (additional 9g carbohydrate, 0g fat, 6g protein per shake). Thus, total daily intake was 550-785 calories distributed as 108-132g protein, 28-64g carbohydrate, and 0g fat. Fasting blood samples were obtained at start of the control period, before diet intervention, and day of surgery to assess changes in weight, glucose, insulin, free fatty acids, endotoxin, TLRs, SOCS-3, ICAM-1 and MMP-9.

**RESULTS:** At completion of the high protein diet intervention subjects had a significant reduction in weight by  $6.0 \pm 0.4$  %, glucose by  $11 \pm 3$ %, insulin by  $48 \pm 9$ % and HOMA-IR by  $61 \pm 14$ %. Free fatty acid concentration increased significantly by  $58 \pm 18$ %. The mRNA expression of TLR-2 and SOCS-3 in MNC was reduced by  $15 \pm 5$ % and  $29 \pm 9$ %, respectively. Plasma concentrations of endotoxin, MMP-9 and ICAM-1 fell following the dietary intervention by  $16 \pm 4$ %,  $11 \pm 3$ % and  $22 \pm 7$ %, respectively. There was no change in TLR-4 and CD14 expression or in plasma MCP-1. There was no significant change in these indices after 2 weeks of the normal diet period

**CONCLUSION:** A 2 week Bariatric Fusion® High Protein, Low Carb Meal Replacement diet preceding RYGB reduces the chronic inflammatory state of obesity. The diet also reduces liver size and improves liver function associated with less steatosis. This 2 week diet before WLS may contribute to fewer postoperative complications.

