

The Satiating Effect of Dietary Protein Is Unrelated to Post-Prandial Ghrelin Secretion

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Increasing dietary protein relative to carbohydrate and fat enhances weight loss, at least in part by increasing satiety. The mechanism for this is unclear.

We aimed to compare the effect of isocaloric test meals with differing protein-to-fat ratios on fasting and post-prandial ghrelin, insulin, glucose, appetite and energy expenditure before and after weight loss on the respective dietary patterns.

The design was a randomised parallel design of 12 weeks weight loss (6081 kJ/day) and 4 weeks weight maintenance (7346 kJ/day) with test meals administered at weeks 0 and 16. Our main outcome measures were weight loss, fasting and post-prandial ghrelin, insulin, glucose, appetite, energy expenditure and respiratory quotient before and after weight loss.

Fifty-seven overweight (BMI 33.8 ± 3.5 kg/m²) hyperinsulinaemic men (n=25) and women (n=32) were recruited. Diets and test meals were: High-protein/low-fat (HP-LF) (34% protein/29% fat) or standard-protein/high-fat (SP-HF) (18% protein/45% fat).

Weight loss (9.2 ± 0.7 kg) and improvements in fasting and post-prandial insulin and glucose occurred independent of diet composition. At weeks 0 and 16, subjects desired less to eat after the HP-LF than the SP-HF meal (p=0.02). Fasting ghrelin increased (15.5 ± 3.4 pmol/L, p<0.001) and the post-prandial ghrelin response improved (p=0.043) with weight loss independent of diet composition. Post-prandial hunger decreased with weight loss (p=0.018) and was predicted by changes in fasting and post-prandial ghrelin ($r^2 = 0.246$, p=0.004). Lean mass was the best predictor of fasting ($r^2=0.182$, p=0.003) and post-prandial ghrelin ($r^2=0.096$, p=0.039).

We conclude that exchanging protein for fat produced similar weight loss and improvements in metabolic parameters and ghrelin homeostasis.

The reduced appetite observed with increased dietary protein appears to not be mediated by ghrelin homeostasis.