

Egg Nutrition Center



Protein Research

Krieger JW, Sitren HS, Daniels MJ, Langkamp-Henken B. Effects of variation in protein and carbohydrate intake on body mass and composition during energy restriction: a meta-regression. *Am J Clin Nutr* 2006;83:260-74.

**Background:** It is unclear whether low-carbohydrate, high-protein, weight-loss diets benefit body mass and composition beyond energy restriction alone.

**Objective:** The objective was to use meta-regression to determine the effects of variations in protein and carbohydrate intakes on body mass and composition during energy restriction.

**Design:** English-language studies with a dietary intervention of  $\geq 4200$  kJ/d (1000 kcal/d), with a duration of  $\geq 4$  wk, and conducted in subjects aged  $\geq 19$  y were considered eligible for inclusion. A self-reported intake in conjunction with a biological marker of macronutrient intake was required as a minimum level of dietary control. A total of 87 studies comprising 165 intervention groups met the inclusion criteria.

**Results:** After control for energy intake, diets consisting of  $\leq 35$ –41.4% energy from carbohydrate were associated with a 1.74 kg greater loss of body mass, a 0.69 kg greater loss of fat-free mass, a 1.29% greater loss in percentage body fat, and a 2.05 kg greater loss of fat mass than were diets with a higher percentage of energy from carbohydrate. In studies that were conducted for  $>12$  wk, these differences increased to 6.56 kg, 1.74 kg, 3.55%, and 5.57 kg, respectively. Protein intakes of  $>1.05$  g/kg were associated with 0.60 kg additional fat-free mass retention compared with diets with protein intakes  $\leq 1.05$  g/kg. In studies conducted for  $>12$  wk, this difference increased to 1.21 kg. No significant effects of protein intake on loss of either body mass or fat mass were observed.

**Conclusion:** Low-carbohydrate, high-protein diets favorably affect body mass and composition independent of energy intake, which in part supports the proposed metabolic advantage of these diets.