Original Investigation

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Effect of Low-Fat vs Low-Carbohydrate Diet on 12-Month Weight Loss in Overweight Adults and the Association With Genotype Pattern or Insulin Secretion

The DIETFITS Randomized Clinical Trial

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Key Points

Question What is the effect of a healthy low-fat (HLF) diet vs a healthy low-carbohydrate (HLC) diet on weight change at 12 months and are these effects related to genotype pattern or insulin secretion?

Findings In this randomized clinical trial among 609 overweight adults, weight change over 12 months was not significantly different for participants in the HLF diet group (−5.3 kg) vs the HLC diet group (−6.0 kg), and there was no significant diet-genotype interaction or diet-insulin interaction with 12-month weight loss.

Meaning There was no significant difference in 12-month weight loss between the HLF and HLC diets, and neither genotype pattern nor baseline insulin secretion was associated with the dietary effects on weight

loss.

Abstract

Importance Dietary modification remains key to successful weight loss. Yet, no one dietary strategy is consistently superior to others for the general population. Previous research suggests genotype or insulin-glucose dynamics may modify the effects of diets.

Objective To determine the effect of a healthy low-fat (HLF) diet vs a healthy low-carbohydrate (HLC) diet on weight change and if genotype pattern or insulin secretion are related to the dietary effects on weight loss.

Design, Setting, and Participants The Diet Intervention Examining The Factors Interacting with Treatment Success (DIETFITS) randomized clinical trial included 609 adults aged 18 to 50 years without diabetes with a body mass index between 28 and 40. The trial enrollment was from January 29, 2013, through April 14, 2015; the date of final follow-up was May 16, 2016. Participants were randomized to the 12-month HLF or HLC diet. The study also tested whether 3 single-nucleotide polymorphism multilocus genotype responsiveness patterns or insulin secretion (INS-30; blood concentration of insulin 30 minutes after a glucose challenge) were associated with weight loss.

Interventions Health educators delivered the behavior modification intervention to HLF (n = 305) and HLC (n = 304) participants via 22 diet-specific small group sessions administered over 12 months. The sessions focused on ways to achieve the lowest fat or carbohydrate intake that could be maintained long-term and emphasized diet quality.

Main Outcomes and Measures Primary outcome was 12-month weight change and determination of whether there were significant interactions among diet type and genotype pattern, diet and insulin secretion, and diet and weight loss.

Results Among 609 participants randomized (mean age, 40 [SD, 7] years; 57% women; mean body mass index, 33 [SD, 3]; 244 [40%] had a low-fat genotype; 180 [30%] had a low-carbohydrate genotype; mean baseline INS-30, 93 μIU/mL), 481 (79%) completed the trial. In the HLF vs HLC diets, respectively, the mean 12-month macronutrient distributions were 48% vs 30% for carbohydrates, 29% vs 45% for fat, and 21% vs 23% for protein. Weight change at 12 months was −5.3 kg for the HLF diet vs −6.0 kg for the HLC diet (mean between-group difference, 0.7 kg [95% CI, −0.2 to 1.6 kg]). There was no significant diet-genotype pattern interaction ($P = .20$) or diet-insulin secretion (INS-30) interaction ($P = .47$) with 12-month weight loss. There were 18 adverse events or serious adverse events that were evenly distributed across the 2 diet groups.

Conclusions and Relevance In this 12-month weight loss diet study, there was no significant difference in weight change between a healthy low-fat diet vs a healthy low-carbohydrate diet, and neither genotype pattern nor baseline insulin secretion was associated with the dietary effects on weight loss. In the context of these 2 common weight loss diet approaches, neither of the 2 hypothesized predisposing factors was helpful in identifying which diet was better for whom.

Trial Registration clinicaltrials.gov Identifier: NCT01826591

Full Text

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