

## Dissecting Low-carbohydrate Diets

Obesity-associated risk factors that contribute to the development of metabolic syndrome continue to challenge the medical community and the food industry. The two dominant risk factors are central obesity and insulin resistance, which contribute to cardiovascular disease and type 2 diabetes. Weight-loss strategies to reduce these co-morbidities include behavior modification and physical activity, as well as various forms of

controversial, however.

Seven randomized, controlled studies with 6–12-mo follow-up, published between 2003 and 2007, compared VLCD (20–60 g of carbohydrates/day) without energy restriction to low-fat diets (LFD) with < 30% of calories from fat or very low-fat diets (VLFD) with < 10% of calories from fat with energy restriction. Approximately 600 obese individuals participated in these studies. Within the LCD groups,

showed that the weight loss in the VLCD group consisted of a similar percentage of fat mass as in the LFD group as well as similar estimates of total body water and lean body mass. Thus, earlier explanations for changes in weight and body composition ascribed to short-term diuresis were unfounded in these 6-mo trials.

Even though the LCD groups consumed fewer calories than the LFD groups, there were no significant differences

800 overweight and obese individuals who followed several weight-loss regimens suggested significant weight reduction is comparable, regardless of the macronutrient profile (Sacks, 2009). The results suggest that alternating LCD and LFD diets would be a possible approach to reducing boredom and continuing to challenge the body's metabolism to decrease body fat. While weight reduction is important to reduce the risk of cardiovascular disease and diabetes, the macronutrient composition may provide other benefits, such as lower blood pressure and reduced chronic inflammation. These observations suggest that weight reduction programs may be tailored to accommodate dietary preferences and cultural differences while achieving desired and lasting healthful outcomes. **FT**

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energy restriction with respect to dietary fat or carbohydrates.

In recent years, low-fat (high-carbohydrate) diets—the traditional approach to weight loss—were challenged by very low-carbohydrate diets (VLCD). The rationale of these regimens is to change basal insulin levels and glycogen storage concentrations by reducing the amount of available glucose, causing a decrease in fat storage and increasing fat oxidation. Most low-carbohydrate diets (LCD) focus on replacing refined carbohydrates with controlled increases in fiber or complex carbohydrates without restricting dietary protein or fat. Such diet regimens also recommend increasing unsaturated fat intake and limiting saturated fat and *trans* fatty acids. The effectiveness of LCD remains

individuals reported the consumption of fewer calories and a concomitant greater weight loss throughout the first 6 mo.

One explanation for this is that higher fat and protein diets are more satiating, with possible perturbation of gut peptides and plasma hormones that increase satiety. Another explanation could be the inhibition of appetite from ketosis developed from fat oxidation. Surprisingly, at 3 mo, there did not appear to be any significant differences in ketosis among the intervention groups and no apparent correlation between weight loss and plasma ketones. Thus, there does not appear to be a clear explanation for a spontaneous reduction in energy intake by those consuming LCD.

The analysis of body composition in these two trials

between the LCD and LFD groups at any time during the follow-up at 12 mo. Clearly, more evidence is needed to clarify the mechanisms in which LCD appear to facilitate weight loss during long-term periods.

These few, short-term studies suggest low-carbohydrate regimens may provide more satiety and greater satisfaction than other approaches to weight loss. Among these studies, which included Atkins, Zone, Weight Watchers, and an Ornish-based VLFD, there was a greater attrition and lower adherence among those using more extreme restrictions. After 3 mo, the adherence to these LCD regimens gradually diminished, resulting in a weight gain plateau after 6 mo.

Recently, a two-year study among more than

*The reference cited in this article is available from the authors.*



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