Low-fat or low-carb: can genes or insulin say which is right for you?

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.

Introduction

We tackled this breakout study in a recent blog post, Low-fat vs. low-carb? Major study concludes: it doesn't matter for weight loss. If you have already read this, we go into even *greater* detail in this ERD analysis (aka we went Full Nerd) and include previously unreleased ERD exclusive Q&As with the lead author — Dr. Christopher Gardner. We also have an extended FAQ section where we tackle many common questions and misconceptions about the study. We also found a blog post from a man who recounted his experiences during this one-year trial (definitely worth a read), a Vox article interviewing four other participants, and a podcast interview with Dr. Gardner himself. Now, onto the analysis!

In free-living, long-term trials (longer or equal to 12 months), multiple studies have found that low-fat diets and low-carbohydrate diets result in small weight loss differences, when compared head-to-head. But there is one central limitation with many of these trials: adherence to the dietary intervention. Many participants start off strong in their assigned low-fat or low-carb diet, but by the end of the study, they have often returned to their usual pre-study eating habits.

Even though these studies report minimal **between-group** differences, individual weight changes **within** either dietary group can be wildly different: some participants losing 25.0 kilograms (55 pounds) while others gaining 5.0 kilograms (11 pounds).These results suggest that some diets may work better for certain individuals than for others. The reasons for these individual responses are not well understood. Emerging data indicate that insulin sensitivity or select genetic markers might help predict a person's success or failure on differing dietary interventions. The present study was designed to identify and investigate potential interactions between diet × genotype and diet × insulin secretion from participants who were actually adhering to their assigned diet.

Many long-term studies comparing low-fat and low-carb trials have yielded minimal between-group weight loss differences. However, individual weight changes within either group can vary tremendously. The study under review was designed to test whether select genetic markers or insulin production could predict weight loss success in participants assigned to either a low-fat or low-carb diet.

Who and what was studied?

This $8 million dollar trial was undertaken at Stanford University and was funded by the US National Institutes of Health (NIH) and the Nutrition Science Initiative (NuSI). NuSI was co-founded by Gary Taubes, a prominent low-carb advocate and champion of the carbohydrate-insulin hypothesis of obesity — a hypothesis that would receive additional support if the authors of the study under review managed to find a link between insulin secretion and weight loss.

Unlike previous studies comparing low-fat and low-carb diets, this study was not intended to determine if one diet is superior to the other. Rather, researchers sought to answer the following question: do differences in genetics or insulin production predict weight loss success in participants who adhere to either a low-fat or a low-carb diet?

This was a preregistered RCT that assigned 609 participants to either a low-fat diet or a low-carb diet for 12 months. In total, 263 males and 346 premenopausal females were included. People with major health considerations were excluded (i.e., no diabetes, cancer, heart disease, high cholesterol, high blood pressure, women who were pregnant/just gave birth, current smokers, excessive drinkers, weight loss or psychiatric medication, etc.). Participants were weight-stable over the previous two months, had an average BMI of 33 (class I obesity), and an average age of 40 years.

Primary Outcomes

This study was novel in that it had enough participants to adequately test two primary outcomes. Dr. Gardner, lead study author, explains:

> *"Initially, the study was meant to test genotype patterns and diet interactions with insulin resistance as a secondary hypothesis. However, when NuSI came along and offered us additional funding … we had the opportunity to increase the sample size from n=400 to n=600. At this point, I went to the statistician and confirmed that we would now have the statistical power with n=600 to test two primary hypotheses."*

The **first primary hypothesis** tested was for a potential interaction between genotype pattern and diet type for weight loss success. In other words: do your genetics predispose you to be more successful at losing weight with a certain type of diet?

All participants were screened for 15 genotype patterns, including five "low-fat" patterns (hypothesized to be characteristic of people who do better on a low-fat diet), nine "low-carb" patterns (hypothesized to do better on a low-carb diet), and one "neutral" genotype. The three genetic markers of interest screened for this study were FABP2 (rs1799883), PPARG (rs1801282), and ADRB2 (rs1042714).

The **second primary hypothesis** tested was for a potential interaction between insulin secretion and diet type for weight loss success. In other words, does your insulin response to eating carbs predict which diet type will be better for losing weight?

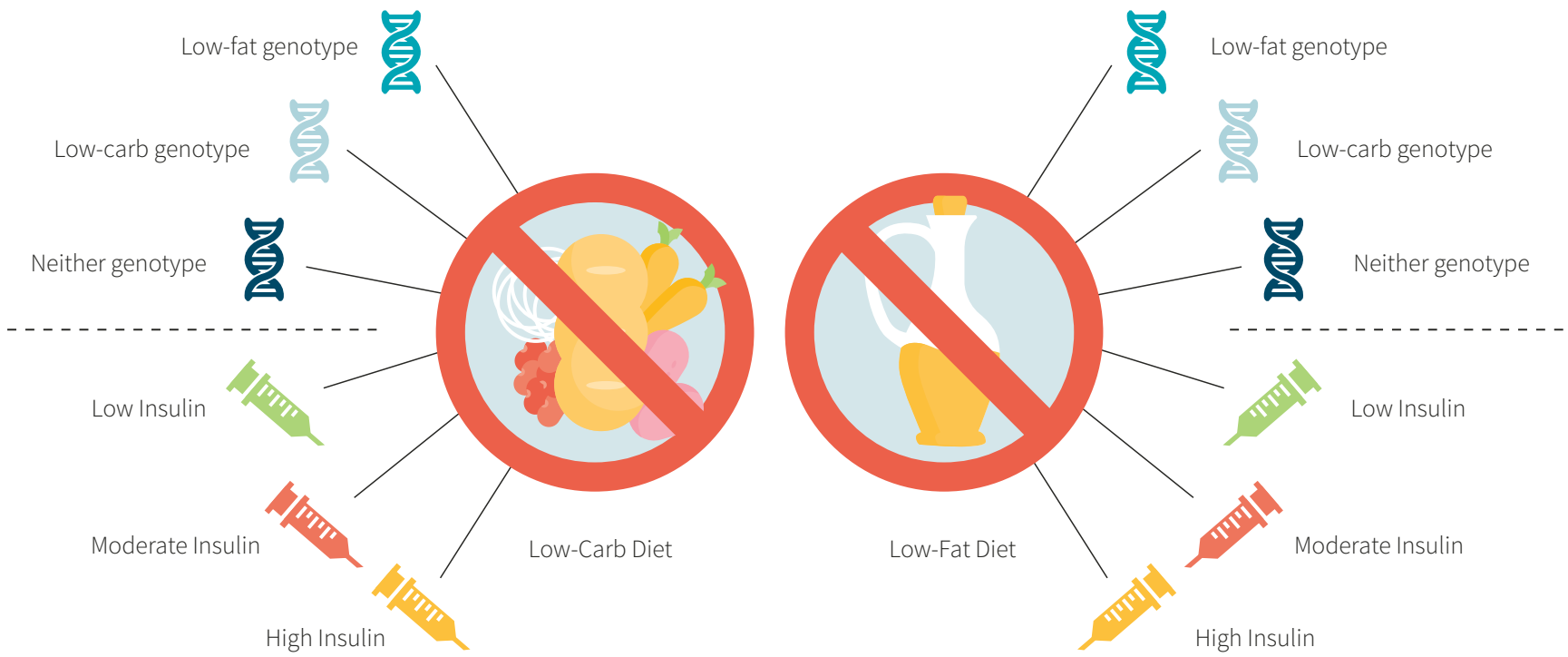
To elucidate the individual and diet-specific insulin response, the authors conducted four oral glucose tolerance tests (OGTTs) at baseline (right before the trial began) and again at months three, six, and 12. During the OGTT, they measured the insulin level 30 minutes (INS-30) after the subjects ingested a standardized amount of glucose (75g).

A breakdown of the study design can be seen in Figure 1.

Secondary Outcomes

Other outcomes measured included changes in body composition (assessed by DXA scan), cholesterol levels, blood pressure, fasting glucose and insulin, resting energy expenditure, and total energy expenditure (assessed by the Stanford Seven-Day Physical Activity Recall).

Figure 1: Study design



Nutrition Intervention

The nutrition intervention had three main goals:

1. Achieve maximal differences in intakes of fat and carbohydrate between the two groups.
2. Ensure both groups received equally challenging dietary goals.
3. Emphasize high dietary quality in both groups.

These three goals offered important advantages over previous studies. Often, the low carb diets had way too many carbs and low fat diets had way too much fat — DIETFITS aimed for appropriate intakes of both. Previous studies had also set ambitious goals for one group, while the others were more modest, making direct comparisons difficult. In some comparator trials, the low-fat group was instructed to use portion control (deliberate calorie intake reduction) while the low-carb group was not. The present study equated dietary instructions between groups. Lastly, previous studies often disregarded the potential effect of food quality, focusing too narrowly on macros or total calories — DIETFITS stressed diet quality in both groups.

During the first eight weeks, the low-fat group was instructed to consume no more than 20 grams of fat per day and the low-carb group was instructed to consume no more than 20 grams of carbs per day. For example, the reduction of edible oils, fatty meats, whole-fat dairy, and nuts was prioritized for the healthy low-fat group, whereas the reduction of cereals, grains, rice, starchy vegetables, and legumes was prioritized for the healthy low-carbohydrate group. However, they were not expected to stay at these levels. At the end of this eight-week period, participants were instructed to add fats or carbs back to their diets in increments of 5–15 g per day each week until they felt they had achieved the lowest possible intake levels that they could sustain for the rest of the study. No explicit daily calorie intake targets were given.

Each participant was instructed to attend 22 group dietary counseling sessions led by a registered dietitian. The average class size was approximately 17. For the first eight weeks, weekly classes were held. After that, sessions were less frequent — once every three weeks until month six, then once a month until the one-year mark. Average in-person attendance was 66% for both groups. Participants who missed classes were provided materials from the session and received either an email or phone call from their dietitian to keep them up to speed. Additional email or phone support was offered to those who requested it.

While the primary focus of the classes was on nutrition, the sessions also covered behavior, emotions, and physical activity. Topics included mindful eating, relationships between food and mood, sleep/weight interactions, food addiction, exercise, shopping tips, and food prep and cooking techniques. A list of class topics can be viewed here.

Diet Quality

Central to both intervention groups was the heavy emphasis placed on consuming whole foods. Specifically, all participants were instructed to "*maximize vegetable intake ... minimize intake of added sugars, refined flours, and trans fats; and ... focus on whole foods that were minimally processed, nutrient dense, and prepared at home whenever possible*." Additionally, they were encouraged to shop at community supported agriculture (CSA) groups or seek out food delivery services that offered high-quality foods.

Diet Adherence

Twelve random and unannounced multi-pass 24-hour dietary recalls were taken over the course of the study to assess food intake. This method involves an interviewer asking the individual to recall all the foods and drinks they have consumed in the previous 24 hours (if you're curious, you can try a multi-pass 24-hour recall on yourself here). Compliance to the prescribed

diet was corroborated by changes in blood lipids and in respiratory exchange ratio (RER — indicating whether an individual is primarily "burning" fat or carbs). If low-carb participants were adhering to their diet, a lower RER would be expected. Conversely, the low-fat participants would be expected to have a higher RER.

Physical Activity

All study participants were encouraged to undertake 60–90 minutes of moderate-intensity physical activity per day. Those not already meeting these levels at baseline were encouraged to increase activity over the first three months of the study until they were achieving the recommendations. The authors noted there was widespread use of activity monitors (e.g., Fitbit, Jawbone) among participants.

Blinding

A double-blind protocol is not feasible in a diet study like this. It's not possible to blind a participant to which diet they are on, as they will know once they receive instructions to restrict fat or carb intake. However, the study was single-blinded. All staff collecting data and laboratory personnel processing samples taken were blinded to diet group assessments. Conversely, dietitians were blinded to all laboratory measures and genotype results. Participants were instructed not to reveal their diet assignment to staff conducting assessments.

This trial randomly assigned 609 participants to either a healthy low-fat diet or a healthy low-carb diet for 12 months. Participants attended 22 dietitian-led classes, where they were taught how to stick to a high-quality whole-food eating plan on their assigned diet. The study was adequately powered to identify potential interaction between weight loss and the subjects' genotypes or insulin production. Other health outcomes measured included weight change, body fat (DXA), cholesterol, blood pressure, and fasting glucose.

What were the findings?

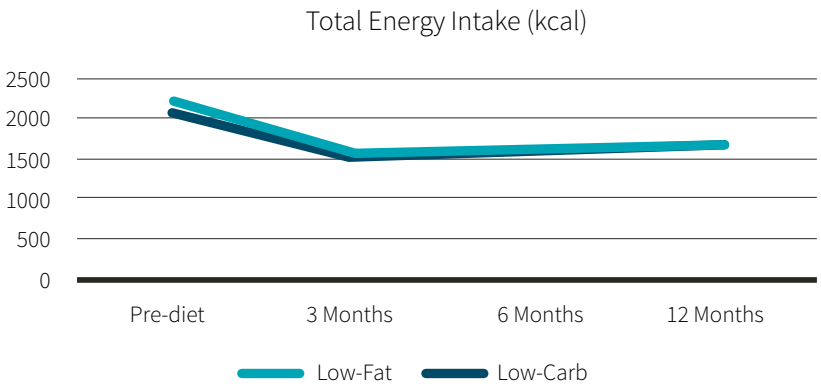
In total, 481 participants completed the entire trial — a 21% dropout rate, which is not unexpected for a diet study of this duration. There were no significant dietary differences between groups at baseline (before the dietary interventions started) or in total calorie intake over the duration of the trial. However, there were significant differences at months three, six, and 12 with regard to the intake of carbohydrate, fat, protein, fiber, and added sugars as seen in Figure 2. Saturated fat intake was significantly reduced in the low-fat group, while the overall glycemic index was lower in the low-carb group. While both groups experienced reductions in glycemic load, the decline was much larger in the low-carb group.

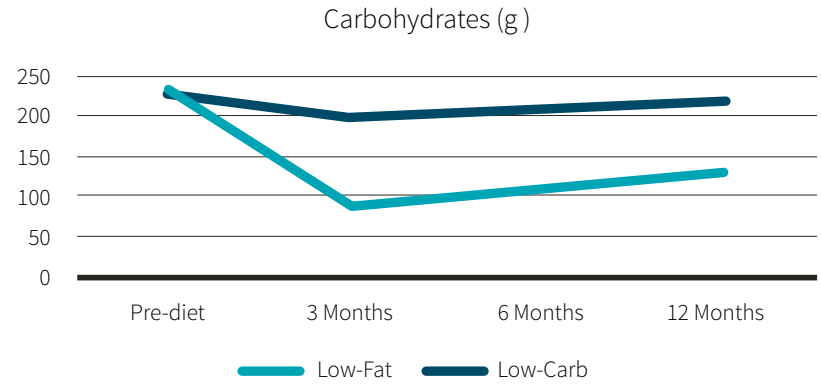
While not the primary outcome measure of the trial, the study showed no significant weight loss, fat loss, or waist circumference differences between the low-fat and low-carb groups. At 12 months, the low-fat group had lost 5.3 kilograms (11.7 pounds) and the low-carb group lost 6.0 kilograms (13.2 pounds). This difference of 1.5 pounds between groups was not statistically significant. There was a similar range for weight change of approximately 40 kg (88 lb) within each group (−30 to +10 kg or −66 to +22 lb). Calorie intake reduction compared to baseline was between 500–600 kcal per day for both groups at months three, six, and 12.

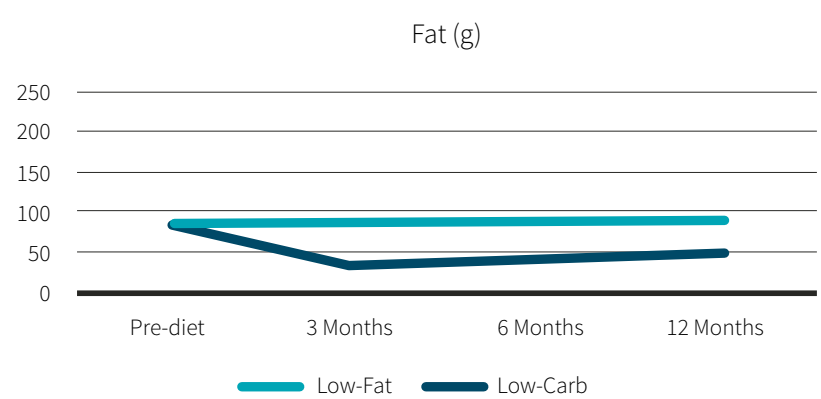
What's the glycemic index and glycemic load?

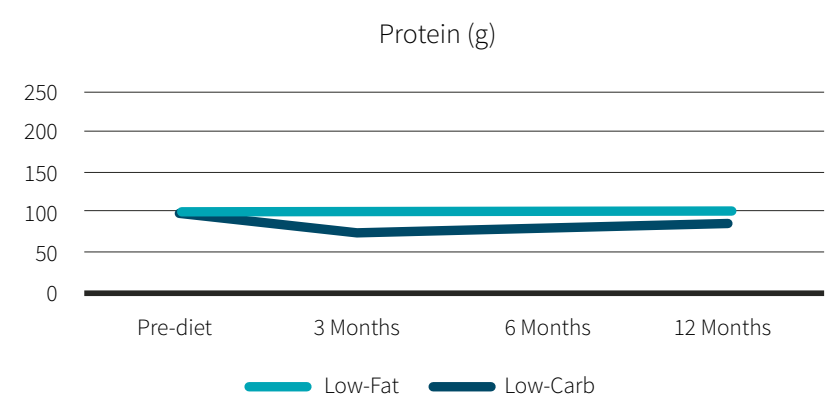
The glycemic index (GI) ranks foods according to the potential of 50 grams of carbohydrates from that food to raise blood glucose, compared to 50 grams of pure glucose. The glycemic load (GL) is the actual amount of carbohydrate eaten (in grams) multiplied by the GI score and then divided by 100 (glycemic index × grams of carbohydrates eaten / 100 = GL).

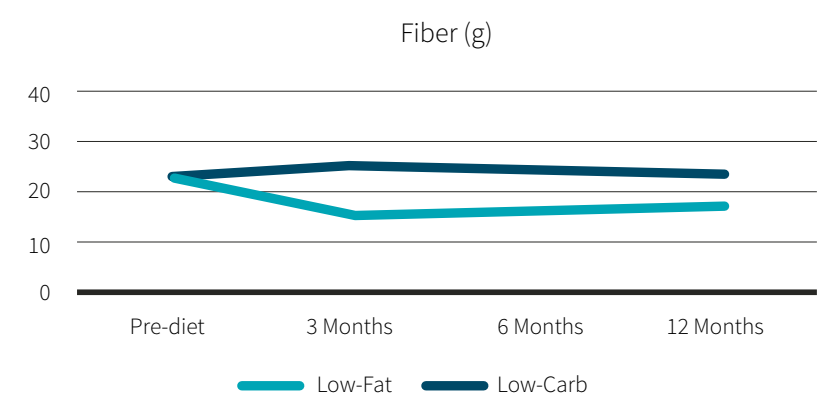
Figure 2: Results

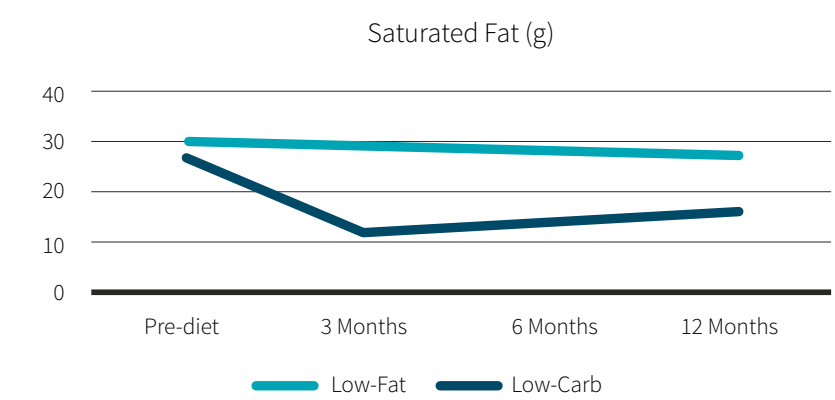


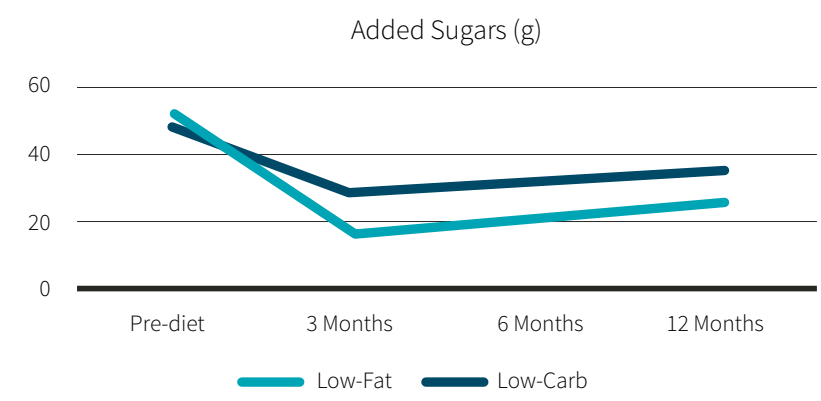


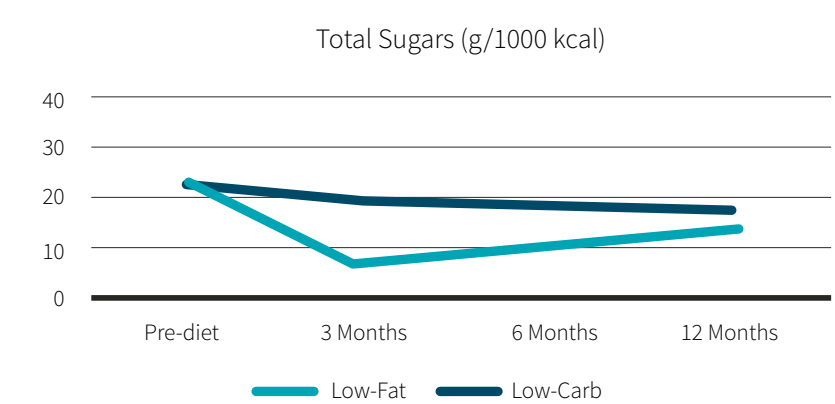


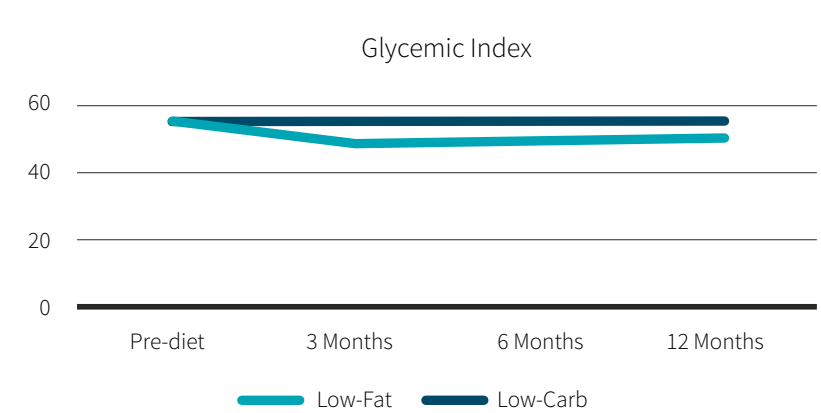


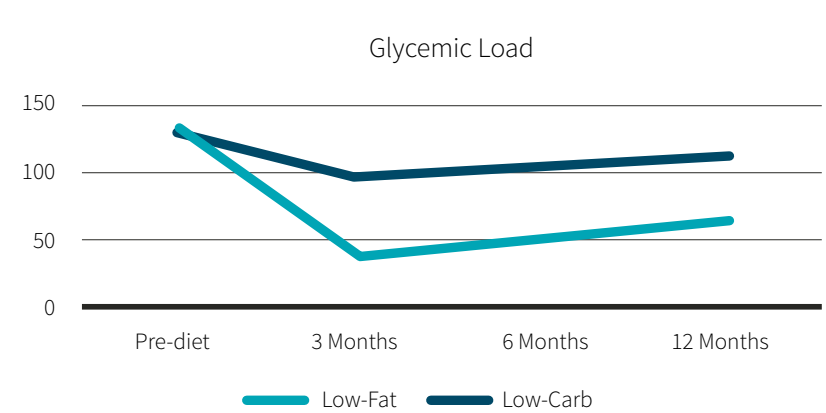












For the primary outcomes, differences in genotype or insulin secretion did not predict the weight change in either group. In other words, neither the genotypes tested nor peak insulin levels (INS-30) could predict weight loss success on either a low-fat or a low-carb diet.

Both groups improved health markers (BMI, body fat percentage, waist circumference, blood pressure, and fasting insulin and glucose levels), but none of these were significant between groups.

On the other hand, the blood lipids showed diet-specific changes. At the 12-month mark, low-density lipoprotein cholesterol (LDL-C) had significantly decreased in the low-fat group (−2.1 mg/dL or 0.05 mmol/L), while it had increased in the low-carb group (+3.6 mg/dL or 0.09 mmol/L). However, the low-carb group also experienced a significant increase in high-density lipoprotein cholesterol (HDL-C) (+2.6 vs +0.4 mg/dL in the low-fat group, 0.07 vs. 0.01 mmol/L) and greater reductions in triglycerides (−28.2 vs. −9.9 mg/dL in the low-fat group; 0.32 vs. 0.11 mmol/L).

While resting energy expenditure (REE) decreased by −66 kcals for low-fat and −77 kcals for low-carb by month 12 (a significant **within**-group change), these differences were not significantly different **between** groups. Total energy expenditure (TEE) was not significantly different between groups either.

Neither genetics nor insulin production could predict weight-loss success on either diet. No significant weight-loss differences were observed between the low-fat and low-carb groups. There were also no significant differences between groups for most other health markers tested, with some small between-group differences seen for blood lipids.

What does the study really tell us?

The most important result of the study is the absence of genotype- or insulin-diet interactions, which provides evidence against the hypotheses that a 'best diet' could be determined by a small cluster of genes or that higher insulin production would explain why some people seem to fare better on low-carb vs. low-fat diets. However, due to the limited number of genes studied, this study does not imply that personalized diets aren't possible. In addition, food quality was heavily stressed in both interventions and subjects were counseled to limit junk food. Ironically, the high food quality in both diets may have confounded the insulin measure's predictive power. Dr. Gardner speculated that "*...part of the reason we may not have seen a significant [insulin/diet] interaction is because we focused on both diets being as healthy as we could make them…. If the "low-fat" included sodas and refined grains, the insulin resistance could be a predisposing factor to differential weight loss.*" So, hope for a future DNA-based or insulin-response-based personalized diet prescription is not dead yet! While disappointing, the absence of significant results seen when testing the predictive power of select genotypes and insulin status for weight loss provides us with a better understanding of factors that may or may not have a relevant role in the fine-tuning of diets. This study also reaffirms a large body of evidence indicating that, in both tightly controlled and real-world settings, low-fat and low-carb are equally effective weight loss strategies.

Another important takeaway is that people can spontaneously reduce calorie intake and reduce bodyweight to the same extent when eating healthy whole-foods based low-fat or low-carb diets without being told to actively restrict calories (but while being coached to avoid mindless eating). Additionally, this study provides us with some intriguing information on what the realistic minimum carb and fat intakes are that most people

could live with long-term. Dr. Gardner noted that, of the participants who saw the greatest weight loss, many attributed their success to the study "*fundamentally changing their relationship with food*".

The present study was a free-living trial, which is limited by a reliance on food recalls from the participants. While diet control and measurement is subpar with food recalls, this type of study can reflect what happens in real life more closely. Furthermore, the study authors employed some strategies to help minimize these limitations.

1. The study included multi-pass 24-hour dietary recalls. This method involves the interviewer going over the reported food list multiple times to ensure the best possible accuracy. Though tedious, it provides more accurate data than food-frequency questionnaires (see a food-frequency sample here).
2. Participant 24-hour recalls were corroborated by lipid panels and RER tests. Typically, researchers have to hope participant food reporting is accurate. Using lipid panels and RER provides a more objective measure to help researchers confirm or refute the 24-hour recalls. Adherent low-carb participants would expect to see a lower RER, increases in HDL and LDL, and a decrease in triglycerides. Conversely, the low-fat participants would expect to see a higher RER, little change or a slight increase in HDL, a decrease in LDL, and a mild decrease in triglycerides.
3. Participants were offered intensive and continuous dietary counseling from a dietitian for the entire trial. Free-living studies often give initial support, after which participants must cope by themselves. The classes offered during the trial also gave participants a community support outlet, which may have increased adherence.

Finally, while the study results are suggestive of no interaction between genotype, insulin production, and diet intervention, a direct causal relationship cannot be drawn from this trial because the participants' diet adherence was variable. In our interview, Dr. Gardner notes that future analyses will be published that do examine this question with adherence factored in to determine if this could have possibly been a confounder.

DIETFITS confirms the work of other clinical trials indicating that the proportion of carbs or fat in the diet does not affect weight loss in a meaningful way when carbs and total calories are matched. While genotypes and insulin production did not predict weight loss in this study, further analyses are planned that will consider confounding factors, such as adherence rates.

> "[...] people can spontaneously reduce calorie intake and reduce bodyweight to the same extent when eating healthy whole-foods based low-fat or low-carb diets"

The big picture

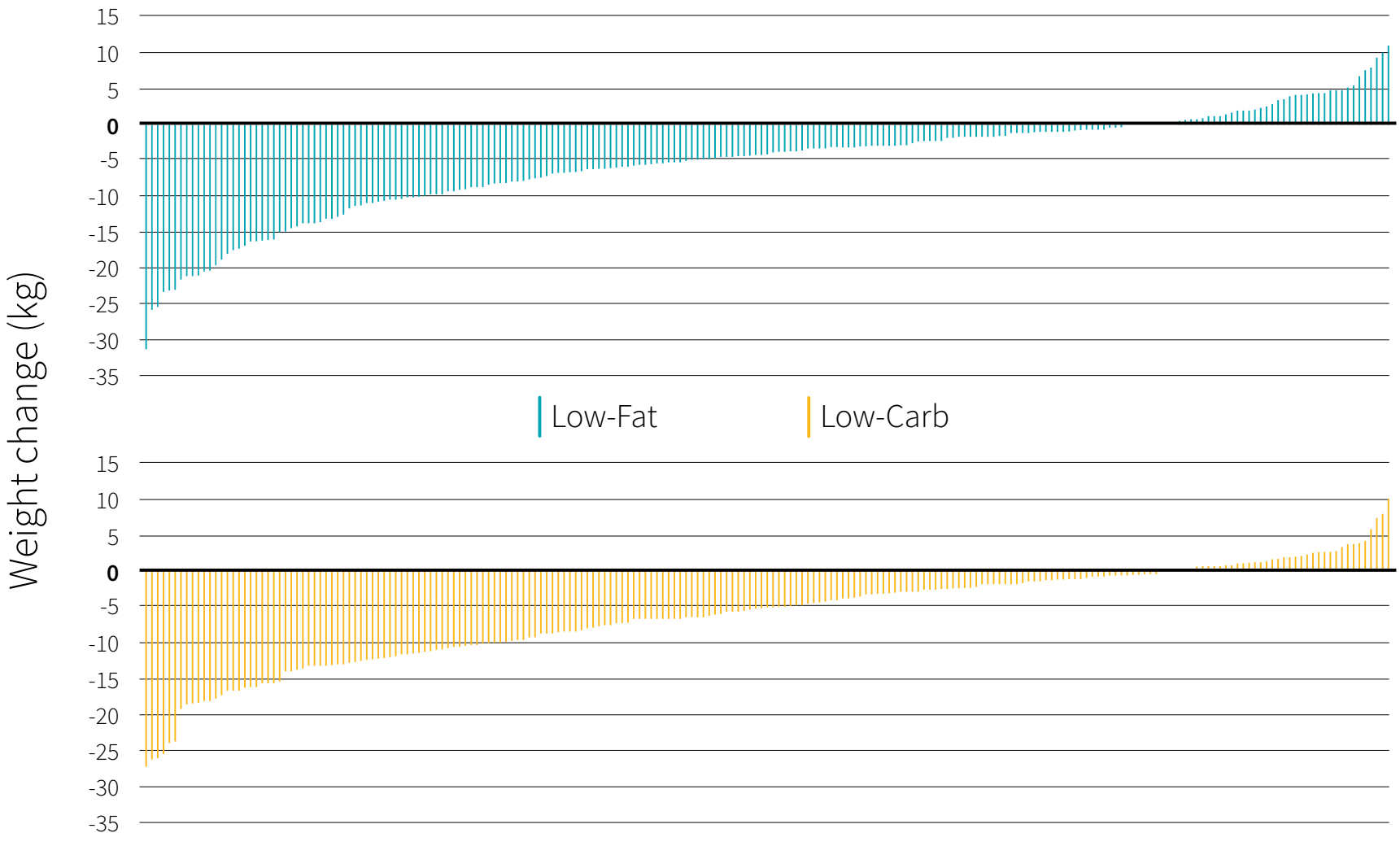
One important, but often overlooked, aspect of diet trials is that of individual variability. Studies often report averages even when individual responses are varied. As you can see in Figure 3, weight changes were all over the spectrum in **both** groups — ranging from –32 kilograms lost (70 pounds) to +11 kilograms gained (24 pounds). Each bar represents the weight change of a single participant. Impressively, when accounting for the approximate 10% of participants who gained weight, the combined overall weight loss was 3,000 kilograms (6,600 pounds).

Genetic differences are one factor that's been identified as a potential explanation for the variation seen between individuals in low-fat/carb diet studies. This trial tested a genotype pattern identified in previous studies potentially hypothesized to be able to influence weight change on low-fat or low-carb diets.

The study at hand used a small gene set to test the predictive power of genotyping in terms of weight loss success. However, Dr. Gardner collected extensive DNA data on many of the participants and has stated his plan to examine "*all the genomic data obtained ... to evaluate whether other genetic signatures*" may offer clinically relevant results.

The specific measure of insulin production used (INS-30) did not predict weight change. But like the DNA results, there are additional markers to be tried (INS-30 is, after all, only one out of many ways to quantify insulin production). Trials using different insulin measures have seen some insulin status interactions with regard to weight loss. Dr. Gardner did note that, based on prior work (including his own) that additional insulin measures (such as fasting insulin) may be worth investigating further. Fasting insulin may be a better indicator of a dysfunctional insulin metabolism which should have both spikes and troughs. Measuring the

Figure 3: Total weight loss for each individual participant



spike alone, as was done in the study at hand, would not capture these dynamics.

Reported study averages can often mask the variability of weight change in diet trials. Scientists have long speculated that these differences may depend on genotypes and/or insulin production. The study at hand refutes certain areas of these hypotheses, as it found no interactions with weight loss. Further analyses investigating alternative gene-sets, as well as markers of insulin sensitivity are warranted and, as the lead author of the study says, already underway.

Frequently asked questions: XXL Edition

Studies like DIETFITS tend to generate a lot of hype, with many misconceptions appearing in the news, blogosphere, and social media. This installment of the FAQ: XXL Edition is meant to cut through the hyperbole surrounding this trial.

NuSI co-founder Gary Taubes commented on the study that ***"... calories restricted in both groups are the most fattening carbs. Both groups are carb-restricted, but one also restricts fat."***

Taubes has previously asserted that the most fattening carbs are those that are highly refined, and that sugar and fructose, in particular, are exceptionally fattening. This hypothesis included the argument put forth in the fructose hypothesis, which contends that fructose plays a dominant role in weight gain and obesity, among other chronic diseases. So is there evidence that sugar or fructose is highly fattening?

In the present study, both groups did decrease their sugar intake, but the low-fat group was still consuming moderately more added sugars (about 11 grams more per day) than the low-carb group at each testing point (months three, six, and 12). For reference, the WHO recommends the following: "adults and children [should] reduce their daily intake of free sugars to less than 10% of their total energy intake. A further reduction to below 5% or roughly 25 grams (6 teaspoons) per day would provide additional health benefits." Over the course of the study, the low-fat groups added sugar consumption was about 30 grams per day (120 kcal). The low-carb group's consumption was about 19 grams per day (76 kcal), or about 44 kcal less than the low-fat group. Yet, no significant differences were seen in either body fat or total body-weight changes between groups. However, this study is limited by its reliance on self-reported dietary intakes. Of note is that there were huge differences in glycemic load, which is what drives glucose and insulin levels. Increased insulin levels are what Taubes has proposed is the critical component in accumulation of body fat.

To remove the limitations of self-reported data, researchers can look to tightly controlled metabolic ward studies. Metabolic ward studies are characterized by researchers confining participants to an area where they can control and *exactly* account for all participant dietary intake (calories in) and caloric expenditure (calories out). Recently, NuSI co-funded a two-month metabolic ward study that compared a ketogenic diet to a high-carb/high-sugar diet. The high-carb diet had participants eating 300 grams of carbs/day while the keto arm consumed just 31 grams/day. Of the carbohydrate content consumed in the high-carb group, 49% (147 grams/day) was sugar. During the ketogenic diet period, sugar consumption dropped by 93%, from 147 grams to 10 grams/day. Also important is that the groups were eating the same amount of total calories and protein — only the carb and fat intake differed.

The study found that no sustained energy expenditure increases were seen beyond the first 10 days in the keto group and fat mass loss did not accelerate. In fact, fat loss actually slowed down while participants were on the keto diet — the opposite of what would be expected if sugar were the main obstacle to fat loss.

Lastly, we can specifically examine the role of fructose in weight gain (the hypothesized most fattening carb). Two meta-analyses, one by Te Morenga et al. and the other by Sievenpiper et al., found that diets providing calorie-matched but different fructose intakes did not appear to affect the rate of weight gain. Surprisingly, the Sievenpiper *et al.*, study found that a subgroup of participants who were overweight or obese saw significant *weight loss* on the higher fructose diets. However, this finding became insignificant after a sensitivity analysis. The difference in weight loss could have been partially due to malabsorption of fructose. Participants may not have been fully absorbed the energy from fructose, excreting them instead. It is also possible that fructose may have a higher thermic effect over other carbohydrates like glucose, leading to slight but insignificant weight loss.

In essence, both fructose and sugar don't appear to have any *inherent* special weight-increasing effects beyond the calories they provide.

That isn't a free pass to binge on sugar though! Refined sugar tends to favor increased calorie intake, which can increase body fat through that mechanism. The best evidence still indicates that you should primarily be consuming a whole-foods diet to remain in good health.

Since the low-carb group was consuming about 130 grams of carbs, can they truly be considered low-carb?
To clear up some confusion about what is and is not a low-carb diet, here are the definitions proposed by a group of prominent low-carb scientists and advocates (Eric Westman, Richard Feinman, Jeff Volek, Stephen Phinney, and others):

- Less than 20–50 grams per day: very-low-carb ketogenic diet (VLCKD) or low-carb ketogenic diet (LCKD)
- 50–150 grams per day: low-carbohydrate diet (LCD)

These ranges have been similarly echoed in other publications, which provide a general consensus on these definitions. So, while the low-carb group in this study was not ketogenic, they were still consuming enough carbs to be classified as low-carb.

If the participants were in ketosis, wouldn't the low-carb group have lost significantly more weight?
It's possible that some participants in the low-carb group may have been in ketosis during the first two months of the study due to the low intake prescribed (less than or equal to 20 grams per day). While the low-carb group was able to achieve reduced carb intake throughout the trial (about 115 grams per day), only a very small minority reported consuming less than or equal to 50 grams per day — the intake threshold typically required to stay in ketosis. However, Dr. Gardner added this caveat, "*We did have a few participants (very few) that reported [carb intake] levels lower than 50 grams. However, they also tended to report unrealistically low levels of total calories. So those less than 50 gram data points could be due to under-reporting, rather than actually achieving a longer-term ketosis … if anyone did it, it was the exception and not the rule.*"

It can be reasonably assumed that the vast majority of low-carb participants were not in ketosis for most of the trial. But if they had all remained in ketosis, would that have given them a weight loss advantage?

It has been proposed that a ketogenic diet should provide a metabolic advantage to the tune of 300-600 more kcals burned per day due to increased energy expenditure. Thus, people on the ketogenic diet should lose more fat mass than people on non-ketogenic diets.

It is important to note that there is a difference between weight loss and fat loss. Weight loss can come from the loss of fat, water, carbohydrate stores (glycogen), or lean mass (protein). If the hypothesis that keto provides a metabolic advantage is correct, then keto should also result in substantially more fat loss.

With that in mind, consider the following questions:

1. Do researchers observe a metabolic advantage for the ketogenic diet when it is examined under tightly controlled metabolic ward studies?
2. If a metabolic advantage for keto is observed, is the effect large enough to produce better fat loss results in a free-living study?

This meta-analysis examined 32 high-carb vs. low-carb or ketogenic low-carb trials where participants were in a metabolic ward or where all food was provided and protein and total calories were equal between groups. These metabolic ward studies help us understand the mechanism of weight loss, rather than its real-world effectiveness. Overall, the results found that "both energy expenditure (26 kcal per day; P <.0001) and fat loss (16 grams per day; P <.0001) were greater with lower fat diets" — results that the authors go on to say are clinically meaningless differences.

There is a consistent effect of long-term free-living studies of low-carb or keto diets. Meta-analyses of RCTs of either low-carb or keto show that neither provide clinically relevant weight loss differences when compared to higher-carb diets.

The most plausible mechanism through which keto might work for weight loss is appetite control. Some have hypothesized that low-carb keto may reduce appetite by increasing circulating ketones, but this is still an area of active research.

None of the studies discussed here refutes people finding success on either a low-carb or low-carb keto diet. If anything, the DIETFITS trial stresses that there are multiple viable pathways to achieving weight loss, which can be very comforting to anyone who has tried and failed at maintaining either a low-carb or low-fat diet in the past.

Doesn't this study shows that diet* quality *is more important than diet* quantity*?

The calorie counting vs. diet quality debate is much like low-fat vs low-carb debate — lots of very strong opinions on either side of the argument. But just as this study demonstrated that the choice between low-carb or low-fat is a false dichotomy, so is the choice to use either calorie counting or focusing on diet quality.

This trial emphasized factors that most diets agree on. They maximize vegetable intake and stressed whole-foods that were minimally processed, nutrient dense, and prepared at home. They also minimize intake of added sugars, refined grains, and trans fats.

Additionally, in the study design and methods published for the DIETFITS study, it mentions that the most common dietary monitoring tool used by participants was the popular calorie-tracking app, MyFitnessPal. Others used similar calorie-tracking tools (MyNetDiary and Lose It!) while some simply used food diaries. While there is no specific data on this, there may have been some participants who opted to track via different methods altogether. Keep in mind that all participants across both diet groups received dietitian-led counseling, during which a very strong emphasis was placed on diet quality. It is possible that the food tracking tools and improved diet quality worked to complement each other.

ERD editors asked Dr. Gardner about the use of tracking apps during the study:

> **Examine.com**: "Do you have any insight into the percent of participants using these tracking tools / counted calories? Did they use them more upfront in the first two months, or was use fairly consistent over the entire trial period?"

Dr. Gardner: "We didn't track any of this. It wasn't required. We thought trying to track it would take away from our communication to the participants that this was optional and we wouldn't be tracking them. I could guess that they used them more early on compared to later. But it would only be a guess."

Now, we don't know how long or how consistently participants used any of these apps or if those that used them did better in terms of weight loss. But this isn't really the point, because these are all viable tools available to help you achieve your health goals. The most important takeaway is to see how they work for you.

P.S. - We covered questions about diet quality in ERD issue 26 volume 2: "What happens to diets when you control food quality?"

Neither group was able to stick to the 20 grams per day of fat or carbs recommendations. Doesn't that invalidate the study?

The ultimate goal of the study was to achieve maximal, yet sustainable, differences in intakes of fat and carbohydrate between the two groups. Within the framework of the study, it was of no importance if the participants were unable to stick to the 20 grams per day intake for the first two months. Dr. Gardner elaborates:

"The participants were all told from the start that the "20 grams/day" of fat or carb was a "made up number" that was more based on our intent to start them off anchored at a very low level than it was based on science. We told them we never intended them to stay at that level.

We advised the participants that they needed to find the lowest level of fat or carb intake they could achieve while not feeling hungry. We explained that if what they were doing left them feeling hungry, then when they achieved their weight loss goal or the study ended, they would likely go off their diet and back to what they were eating before, and so the weight would likely come back on."

However, Dr. Gardner notes that future studies will be comparing participants who were the most adherent to their assigned diet to determine if any genetic or insulin production interactions can be observed when eating at the more extreme ends of a low-fat or low-carb diet.

What should I know?

When it comes to weight loss, neither a low-fat diet nor a low-carb diet is inherently superior. Neither insulin production nor the tested genotypes were able to predict weight change on either diet. Further analyses of the data are planned to look at the predictive power of different insulin sensitivity measures and other various genetic markers.

When choosing an eating style, the importance of sustainability cannot be understated. Choose a style that fits your food preferences, health goals, and lifestyle. ◆

BONUS: Study participant Zac Townsend recounts his DIETFITS experience. Plus, more subject interviews over at Vox.com and an interview with Dr. Gardner on Sigma Nutrition Radio.

It's ***very*** rare that we get to hear from the participants who undertake these studies. In his blog post, Zac recounts his personal experiences of going through the low-carb diet. He even stuck it out for the entire year!

Accounts like his serve as a good reminder that there are actual people behind all the numbers reported in a study who are donating their time and bodies to help us explore scientific mysteries.

Check out his excellent blog post below:

Losing 58 Pounds For Science

Still want more? Julia Belluz over at Vox interviewed four people — two low-fat and two low-carb participants — about their success or failures trying to lose weight. Two lost a remarkable amount of weight, while the others lost little or gained weight.

Why do dieters succeed or fail? The answers have little to do with food.

Still not enough!? Danny Lennon from Sigma Nutrition sat down with lead author Dr. Gardner for a 45-minute interview about his thoughts on the DIETFITS results.

SNR #223: Prof. Christopher Gardner
DIETFITS Trial 2018: Low-Fat vs Low-Carb Weight Loss Diets and Effect of Genotype and Insulin Secretion

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Now that you've reached the end of our extended analysis of DIETFITS, head on over to the ERD Facebook forum for extended discussion!