

# NIH Director's Blog

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## Ultra-Processed Diet Leads to Extra Calories, Weight Gain

Posted on May 21st, 2019 by Dr. Francis Collins

Credit: Hall et al., Cell Metabolism,  
2019

If you've ever tried to lose a few pounds or just stay at a healthy weight, you've likely encountered a dizzying array of diets, each with passionate proponents: low carb, low fat, keto, paleo, vegan, Mediterranean, and so on. Yet most nutrition experts agree on one thing: it's best to steer clear of ultra-processed foods. Now, there's some solid scientific evidence to back up that advice.

In the first randomized, controlled study to compare the effects of ultra-processed with unprocessed foods, NIH researchers found healthy adults gained about a pound per week when they were given a daily diet high in ultra-processed foods, which often contain ingredients such as hydrogenated fats, high fructose corn syrup, flavoring agents, emulsifiers, and preservatives. In contrast, when those same people ate unprocessed whole foods, they lost weight.

Intriguingly, the weight differences on the two diets occurred even though both kinds of foods had been carefully matched from a nutritional standpoint, including calorie density, fiber, fat, sugar, and salt. For example, breakfast for the ultra-processed group might consist of a bagel with cream cheese and turkey bacon, while the unprocessed group might be offered oatmeal with bananas, walnuts, and skim milk.

The explanation for the differences appears to lie in the fact that study participants were free to eat as little or as much food as they wished at mealtimes and to snack between meals. It turns out that when folks were on the ultra-processed diet they ate significantly more—about 500 extra calories per day on average—than when they were on the unprocessed diet. And, as you probably know, more calories without more exercise usually leads to more weight!

This might not seem new to you. After all, it has been tempting for some time to suggest a connection between the rise of packaged, ultra-processed foods and America's growing waistlines. But as plausible as it might seem that such foods may encourage overeating,

perhaps because of their high salt, sugar, and fat content, correlation is not causation and controlled studies of what people actually eat are tough to do. As a result, definitive evidence directly tying ultra-processed foods to weight gain has been lacking.

To explore the possible connection in the study now reported in *Cell Metabolism*, researchers at NIH's National Institute of Diabetes and Digestive and Kidney Diseases took advantage of the Metabolic Clinical Research Unit at the NIH Clinical Center, Bethesda, MD. The unit is specially equipped to study issues involving diet and metabolism.

The researchers asked 20 healthy men and women of stable weight to stay at the center for 28 days. Each volunteer was randomly assigned to eat either an ultra-processed or unprocessed diet for two consecutive weeks. At that point, they switched to the other diet for another two weeks.

Both diets consisted of three daily meals, and volunteers were given permission to eat as much food as they liked. Importantly, a team of dietitians had carefully designed the ultra-processed and unprocessed meals such that they were well matched for total calories, calorie density, macronutrients, fiber, sugars, and salt.

At lunch, for example, one of the study's processed meals consisted of quesadillas, refried beans, and diet lemonade. An unprocessed lunch consisted of a spinach salad with chicken breast, apple slices, bulgur, and sunflower seeds with a side of grapes.

The main difference between each diet was the proportion of calories derived from ultra-processed versus unprocessed foods as defined by the NOVA diet classification system. This system categorizes food based on the nature, extent, and purpose of food processing, rather than its nutrient content.


Each week, researchers measured the energy expenditure, weight, and changes in body composition of all volunteers. After two weeks on the ultra-processed diet, volunteers gained about two pounds on average. That's compared to a loss of about two pounds for those on the unprocessed diet.

Metabolic testing showed that people expended more energy on the ultra-processed diet. However, that wasn't enough to offset the increased consumption of calories. As a result, participants gained pounds and body fat. The study does have some limitations, such as slight differences in the protein content of the two diets. and the researchers plan to address such issues in their future work.

During this relatively brief study, the researchers did not observe other telltale changes associated with poor metabolic health, such as a rise in blood glucose levels or fat in the liver. While a couple of pounds might not sound like much, the extra calories and weight associated with an ultra-processed diet would, over time, add up.

So, it appears that a good place to start in reaching or maintaining a healthy weight is to follow the advice shared by all those otherwise conflicting diet plans: work to eliminate or at least reduce ultra-processed foods in your diet in favor of a balanced variety of unprocessed, nutrient-packed foods.

### **Reference:**

[1] Ultra-processed diets cause excess calorie intake and weight gain: An inpatient randomized controlled trial of ad libitum food intake  Hall KD et al. *Cell Metab.* 2019 May 16.

### **Links:**

Obesity (National Institute of Diabetes and Digestive and Kidney Diseases/NIH)

Healthy Eating Plan (National Heart, Lung, and Blood Institute/NIH)

Body Weight Planner (NIDDK/NIH)

Kevin D. Hall (NIDDK/NIH)

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***Bruce Vaughn says:***

May 21, 2019 at 11:20 am

If you had included a link to a listing of high processed foods that would have been helpful.

Reply

***L.M.B. says:***

May 21, 2019 at 3:22 pm

I agree with a list of some high processed foods wood be very helpful. I am diagnosed with EOE, and I need to drop wheat, all dairy and gluten, so need some help here. Thanks.

Reply

***Judith Miller says:***

May 21, 2019 at 12:37 pm

I need to know what are the highly processed foods. I would not think the tortilla for the quesadilla and refried beans would be processed.. What is a definition of "processed?"

Reply

***Charles Carter says:***

May 22, 2019 at 3:38 am

You are writing more as a promoter than scientist. Claims made about this study vastly over-reach. An NIH director should know better than to sensationalize science! The study shows convincingly that diets of very different compositions can lead to short term weight change. Comparators do NOT allow sole implication of processing.

It would be wonderful if sustained weight loss were so simple, yet no RCT to date has shown meaningful sustained weight loss for any particular diet.

This really adds little or nothing except to support criticism of nutrition science as a whole and of overstated claims by scientists and the press.

Reply

***Jeffrey Lerner says:***

May 22, 2019 at 7:28 am

I followed the links, beginning with the reference at the bottom of the blog post, and got to the actual diets. The unprocessed is definitely abstemious.

Reply

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