

# Always hungry? Here's why

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For most of the last century, our understanding of the cause of obesity has been based on the first law of thermodynamics: that energy can neither be created nor destroyed. When it comes to body weight, this means that calorie intake minus calorie expenditure equals calories stored. Surrounded by tempting foods, we overeat, consuming more calories than we can burn off, and the excess is deposited as fat. The simple solution is to exert willpower and eat less.

The problem is that this advice doesn't work, at least not for most people over the long term. In other words, your New Year's resolution to lose weight probably won't last through the spring, let alone affect how you look in a swimsuit in July. More of us than ever are obese, despite an incessant focus on calorie balance by the government, nutrition organizations and the food industry.

But what if we've confused cause and effect? What if it's not overeating that causes us to get fat, but the process of getting fatter that causes us to overeat?

The more calories we lock away in fat tissue, the fewer there are circulating in the bloodstream to satisfy the body's requirements. It's a distribution problem: We have an abundance of calories, but they're in the wrong place. As a result, the body needs to increase its intake. We get hungrier because we're getting fatter.

It's like edema, a condition in which fluid leaks from blood vessels into surrounding tissues. No matter how much water they drink, people with edema may experience unquenchable thirst because the fluid doesn't stay in the blood, where it's needed. Similarly, when fat cells suck up too much fuel, calories from food promote the growth of fat tissue instead of serving the energy needs of the body, provoking overeating in all but the most disciplined individuals.

We discuss this hypothesis in an article just published in *JAMA*, *The Journal of the American Medical Association*. According to this alternative view, factors in the environment have triggered fat cells in our bodies to take in and store excessive amounts of glucose and other calorie-rich compounds. Since fewer calories are available to fuel metabolism, the brain tells the body to increase calorie intake (we feel hungry) and save energy (our metabolism slows down). Eating more solves this problem

temporarily but also accelerates weight gain. Cutting calories reverses the weight gain for a short while, making us think we have control over our body weight, but predictably increases hunger and slows metabolism even more.

This is why diets that rely on consciously reducing calories don't usually work. Only one in six overweight and obese adults in a nationwide survey reports ever having maintained a 10 percent weight loss for at least a year. (Even this relatively modest accomplishment may be exaggerated, because people tend to overestimate their successes in self-reported surveys.) In studies by Dr. Rudolph L. Leibel of Columbia and colleagues, when lean and obese research subjects were underfed in order to make them lose 10 to 20 percent of their weight, their hunger increased and metabolism plummeted. Conversely, overfeeding sped up metabolism.

For both over- and under-eating, these responses tend to push weight back to where it started — prompting some obesity researchers to think in terms of a body weight "set point" that seems to be predetermined by our genes.

But if basic biological responses push back against changes in body weight, and our set points are predetermined, then why have obesity rates — which, for American adults, are almost three times what they were in the 1960s — increased so much? Most important, what can we do about it?

As it turns out, many biological factors affect the storage of calories in fat cells, including genetics, levels of physical activity, sleep and stress. But one has an indisputably dominant role: the hormone insulin. And of everything we eat, highly refined and rapidly digestible carbohydrates produce the most insulin.

By this way of thinking, the increasing amount and processing of carbohydrates in the modern diet has increased insulin levels, put fat cells into storage overdrive and elicited obesity-promoting biological responses. High consumption of refined carbohydrates — chips, crackers, cakes, soft drinks, sugary breakfast cereals and even white rice and bread — has increased body weights throughout the population.

A study published by Dr. Ludwig and colleagues in *The Lancet* in 2004 suggested that a poor-quality diet could result in obesity even when it was low in calories. Rats fed a diet with rapidly di-

gested carbohydrates gained 71 percent more fat than their counterparts, who ate more calories over all, though in the form of slowly digested carbohydrates.

The notion that we overeat because we're getting fat isn't new, but it's been generally ignored, perhaps because it challenges the popular belief that we have conscious control over our weight. In addition, the food industry invokes calorie balance as its first line of defense. If all calories are the same, then there are no bad foods. It's simply a question of portion control. The fact that this rarely works is taken as evidence that obese people lack willpower, not that the idea itself might be wrong.

Unfortunately, existing research cannot provide a definitive test of our hypothesis. Several prominent clinical trials reported no difference in weight loss when comparing diets purportedly differing in protein, carbohydrate and fat. However, these trials had major limitations; at the end, subjects reported that they had not met the targets for complying with the prescribed diets. We wouldn't discard a potentially lifesaving cancer treatment based on negative findings, if the research subjects didn't take the drug as intended.

There are better ways to do this research. Studies should provide participants with at least some of their food, to make it easier for them to stick to the diets. Two studies that did this reported benefits associated with the reduction of rapidly digestible carbohydrate compared with conventional diets.

If this hypothesis turns out to be correct, it will have immediate implications for public health. It would mean that the decades-long focus on calorie restriction was destined to fail for most people. People in the modern food environment seem to have greater control over what they eat than how much. With reduced consumption of refined grains, concentrated sugar and potato products and a few other sensible lifestyle choices, our internal body weight control system should be able to do the rest. Eventually, we could bring the body weight set point back to pre-epidemic levels. Addressing the underlying biological drive to overeat may make for a far more effective solution to obesity than counting calories.

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Are we fat  
because we  
overeat, or do  
we overeat  
because  
we're fat?

