A randomized controlled trial recently published in The Journal of Nutrition found that intermittent calorie restriction and continuous calorie restriction were equally effective in promoting weight loss, with no significant differences in outcomes. Forty-six healthy women between the ages of 18 and 55 living in the U.K. who had overweight or obesity (BMI 25 or greater) were randomized to follow either a diet that cut daily energy intake by 25 percent or one that alternated days of regular calorie consumption with “fasting” days on which calories were reduced by 75 percent. Thirty women achieved at least 5 percent weight loss within 12 weeks, regardless of which approach they used to limit caloric intake.

Some studies have suggested that intermittent calorie restriction may be less likely than continuous calorie restriction to lead to hunger and muscle loss, but this study showed that neither approach led to these undesirable outcomes.

Restricting overall calorie intake leads to weight loss no matter how it is done. People looking to lose weight should follow a healthy dietary pattern that deceases total calorie intake in whatever way works best for them.
Why Do We Overeat?
Humans eat for many reasons, and hunger is just one of them. Overeating contributes to excess weight gain, and subsequently cardiovascular disease, metabolic syndrome, diabetes, hypertension, and other problems. “Scientists have been working for decades to try to explain why we overeat,” says Emmanuel Pothos, PhD, an associate professor at Tufts Sackler School of Graduate Biomedical Sciences. Perhaps identifying the biological and psychological factors that contribute to overeating will lead to the discovery of an “off” switch that will make it a thing of the past. More likely, a combination of changes, at the personal, healthcare, and community levels, will be required to curb overeating.

The All-Controlling Brain:
“Feeding is controlled by neurons in our brain,” says Dong Kong, PhD, a neuroscientist and assistant professor at Tufts University School of Medicine. “Hunger, fullness, and even some of our food preferences are initiated, controlled, and managed through the central nervous system.”

Scientists have known since the 1950s that a region of the brain called the hypothalamus is involved in the regulation of feeding. The hypothalamus works to keep the body in balance (homeostasis): as energy needs increase, the hypothalamus tells the body to increase energy (calorie) intake by eating. When enough calories have been consumed, the hypothalamus signals that eating should stop. “The problem with this ‘homeostatic model’ is that it does not adequately explain the current obesity epidemic,” says Pothos. “If homeostatic mechanisms of energy balance were controlling everything, one would expect the majority of the population to be at their ideal weight.” So what else is going on that impacts the brain’s efforts to keep things in balance?

Is it Hormones?
“Humans evolved a very strong hormonal drive to seek and consume food,” says Anastassios G. Pittas, MD, MS, co-director of the Tufts Medical Center Diabetes and Lipid Center. “That served us very well throughout most of history when food was scarce. Today, food is abundant, but our bodies still have these robust food-seeking pathways.”

A hormone called ghrelin is sometimes referred to as the ‘hunger hormone.’ “Ghrelin is released by the stomach when the stomach is empty,” says Kong. “It travels in the bloodstream to the brain where it acts in the hypothalamus to stimulate appetite.” When administered to humans, ghrelin has been found to increase food intake by up to 30 percent. At the time of ghrelin’s discovery, it was hoped that finding a way to control ghrelin levels would be the key to taming overeating, but the body’s appetite regulation mechanisms are not so simple. Another hormone that stimulates feeding and calorie intake was identified recently, and it is quite possible that other mechanisms will be discovered in the future.

One hormone that opposes ghrelin is leptin, which inhibits appetite. “Leptin tells the brain to stop eating and start burning calories,” says Kong. “Leptin is secreted by fat cells. The more fat cells we have in our bodies, the more leptin should be signaling the brain to decrease appetite. Unfortunately, we find that leptin often doesn’t work in individuals with obesity. If we can solve this leptin resistance, perhaps we can cut down on overeating.”
Another hormone that has gotten attention with respect to overeating and weight gain is insulin. "There is no question that overeating leads to obesity, which leads to insulin resistance [a lack of normal response to circulating insulin]," says Pittas. "Whether insulin resistance leads to overeating is a very complicated topic." Insulin is responsible for getting the body's main fuel—glucose—out of the bloodstream and into the cells to provide energy. "It also acts in the central nervous system to indicate it's time to stop eating," says Pittas. "People who are insulin resistant may lose that satiety effect, which leads to overeating. More significantly, the body secretes more insulin in an effort to overcome insulin resistance. Research from our group suggests that a diet high in refined carbohydrates and added sugars in the setting of this hypersecretion of insulin leads people to eat more. Two to three hours after a meal high in refined carbohydrates, all that insulin causes blood sugar levels to drop, which is a robust signal for eating. So we end up with a vicious cycle: overeat, gain weight, become insulin resistant, secrete more insulin, overeat—and round and round."

Hormones released in times of stress are also related to appetite, meaning that "stress eating" does have some biological basis. In immediate short-term stressful situations, levels of epinephrine (adrenaline) rise, putting the body into "fight-or-flight" mode and dampening appetite. But if stress continues, another hormone, called cortisol, is released. Cortisol increases appetite.

Is it Food Addiction?
"One reason we overeat is because food can stimulate the reward system in our brains," says Sai Das, PhD, a scientist in the Energy Metabolism Laboratory at the Human Nutrition Research Center on Aging. "If eating particular foods makes us feel good, we are more likely to want more. While from an evolutionary standpoint this may have helped us remember where the berries grew or motivated us to hunt, in today's environment of easily-accessible food, it could be leading to overeating."

Pothos has done extensive animal research on food and the body's reward system. "A dominant theory in the 1990s that is still popular today is the concept that food can have addictive qualities," says Pothos. The neurotransmitter dopamine, which is known to play a role in drug addiction, has been studied for a possible connection to overeating. "Brain imaging studies in humans with obesity have shown dopamine receptors to be deficient," says Pothos. "This suggests that people may overeat in an effort to compensate by stimulating more dopamine release." Pothos has clearly demonstrated a link between deficient brain dopamine and overeating in rats and mice, and research in humans is ongoing.

"In rats that have been previously exposed to high calorie, high-fat, high-refined-carbohydrate foods, these foods stimulate dopamine release, but normal nutritious rat-chow does not," says Pothos. "The animal seeks out palatable food to boost low dopamine levels and try to derive pleasure from eating." Too few studies have been done to conclusively identify specific foods or ingredients capable of triggering an addictive-like response in humans.
Dopamine is unlikely to be the only brain chemical involved in overeating. “It is likely that a combination of chemical effects leads to overeating,” says Pothos.

Other Factors: Large portions, constant access to highly palatable foods, stress, mealtime distractions, and memories of pleasurable eating experiences are just a few of the many factors that contribute to satiety override—ignoring (or even being unaware of) the body’s signals that we have consumed enough fuel to keep us going. “Research has shown that external cues impact our eating behavior,” says Alice H. Lichtenstein, DSc, Gershoff professor of nutrition and policy at the Friedman School. “People tend to eat more when larger portions are in front of them, when they are offered a large variety of foods (think buffet), or when they eat mindlessly while focusing on electronic devises or the TV.”

We also know that lack of sleep can impact food intake. A recent systematic review published in the Journal of Sleep Research found that increases in the length of sleep time were associated with improved measures of insulin sensitivity and reductions in appetite, among other factors. “Another reason we overeat may be that we have extended our waking hours, which increases our window of eating opportunity,” says Das.

What to Do:

While the lack of a clear biological target for medications and the range of factors that contribute to overconsumption may seem discouraging, there are things we can do to help keep our eating in check. “What works for one person may not work for someone else,” says Pothos, “but there are a number of things we can try to curb overeating.” Being vigilant about portion sizes, avoiding distractions while eating, getting at least seven hours of sleep a night, and choosing a healthy dietary pattern low in highly-palatable low-nutrient foods are all strategies that may help cut down on overeating. “Finding healthy, non-food ways to stimulate the brain’s reward center (such as with exercise) may help if dopamine deficiency is an issue,” says Pothos.

Policy changes and industry decisions may be important to curbing overeating. Reducing portion sizes and making highly-processed, highly palatable foods more expensive and less available (while improving access to healthier options) could change the food environment our food-seeking brains must navigate.
The Facts About Natural Sugar Substitutes

Nutrition research is rarely unequivocal, but experts are in agreement on at least one fact: added sugars are bad for our health. Sugar substitutes are used by food manufacturers to try to satisfy our desire for sweets without cavities, calories, and blood-sugar impact. The most recent entries into the “sugar-free” scene are low calorie and calorie-free compounds derived from plants, including stevia, monk fruit extract, and yacon syrup. A closer look at these and other “natural” sugar substitutes may help you determine whether or not they are a good choice for you.

Why Sugar Substitutes?

Added sugars are associated with obesity, type 2 diabetes, and cardiovascular disease. They add calories to foods without adding nutritional value and they cause blood sugar (glucose) levels to rise. Low-calorie and non-caloric sugar substitutes are employed to reduce calorie content of sweet foods in the (unproven) hope this will help with weight management. They are also commonly used, particularly by people with diabetes, to help control blood sugar levels.

Sugar substitutes, which are often much more intensely sweet than sugar, are compounds that cannot be broken down by our digestive systems (or by the bacteria that live in our guts). They therefore do not provide us with any calories, and, since they cannot be converted to glucose, they do not boost blood sugar levels.

Some sugar substitutes are man-made artificial sweeteners, but many are compounds found in nature that are extracted, isolated, and added to foods or beverages in small quantities to increase the perception of sweetness. Although the extraction process sometimes makes these “natural” sugar substitutes somewhat distant from their source in nature, these products are appealing to many consumers looking for nature-based products that will sweeten their foods without the associated calories or spikes in blood sugar.

What to Do

“If you’re going to drink or eat something with a lot of added sugars, it’s pretty likely that low- or no-calorie natural sweeteners are better alternatives,” says Dariush Mozaffarian, MD, DrPh, dean of the Friedman School and editor-in-chief of Tufts Health & Nutrition Letter. “But remember that such drinks and foods can be unhealthy in other ways, so don’t allow lower calories to give a food a false aura of health.”

The best choice is to wean ourselves off the need for intense sweet tastes in general. On the way there, the no- or low-sugar plant-based sweeteners listed here might bring a little sweetness to your life with less worry of negative health effects.
SUGAR SUBSTITUTES

Examples of sugar substitutes and your health!

**STEVIA**

Steviol glycosides are extracted from the leaves of the stevia plant, which have been recognized for their sweet taste in South America for centuries. Although concerns about potential toxicity have been raised regarding stevia leaves and crude extracts, highly purified extracts have been judged to be safe by the U.S. Food and Drug Administration (FDA), which has approved their use in foods since 2008. The World Health Organization has also determined purified steviol glycosides to be safe, up to 4 milligrams per kilogram of body weight per day. For an individual weighing around 150 pounds, that’s about 280 mg—or around 10 single serving packets of stevia products—a day.

A randomized controlled trial in healthy subjects found that participants given a snack food with purified steviol glycosides 20 minutes before a meal had significantly lower blood sugar rises after meals compared to those consuming the same snack sweetened with sugar. Participants did not compensate by eating more at meals and reported similar feelings of fullness and satisfaction with the stevia- versus sugar-sweetened snack. In contrast, a similar trial using stevia in beverages found that the lower calories consumed from the stevia (vs. sugar) drink were completely offset by eating more food at later meals. These conflicting results mean more research is needed to understand whether using stevia extracts reduces overall calorie intake.

Purified steviol glycosides are used as a noncaloric natural sweetener in low-calorie or calorie-free beverages and other “diet” foods, and several forms are available for home use, including products mixing stevia extracts with other sweeteners. Stevia can have a bitter aftertaste and may not be suitable for all uses. Per gram, stevia is 200 times sweeter than sucrose (table sugar), so much less is needed to achieve the same level of sweetness. Check manufacturer’s instructions for uses and substitution recommendations.

**MONK FRUIT**

The monk fruit plant, luo han guo, is native to southern China and northern Thailand. The plant contains compounds called mogrosides which can be extracted from the fruit and purified. These compounds are 100 to 250 times sweeter per gram than sucrose. Like steviol glycosides, monk fruit sweetener is considered by the FDA to be Generally Recognized as Safe (GRAS), meaning it can be used as an ingredient in foods and drinks. It is also available as a component of sweetener blends or as a stand-alone sweetener.

Although mogrosides are phytochemicals with antioxidant and anti-inflammatory potential, it’s not clear they provide any health benefits that can’t be achieved by eating a plant-rich, healthy dietary pattern. Research on monk fruit sweetener’s potential impact on weight and blood sugar is limited.

**ALLULOSE**

This form of sugar occurs naturally in small amounts in some fruits and grains. Most commercially produced allulose is derived from corn. Allulose tastes sweet and is absorbed by the gut, but only small amounts are metabolized in the body, and most is excreted in the urine. Because of this, in April 2019, the FDA released draft guidance stating that allulose does not need to be counted toward either the total sugar or added sugar amounts reported on the Nutrition Facts panel. Food manufacturers can now use allulose in products considered “sugar-free.” Allulose is around 70 percent as sweet as sucrose, but with 10 percent of the calories. It has no bitter aftertaste, and browns like sugar, so baked goods made with allulose instead of sugar will have a similar color and taste. You may also find allulose used in beverages, candy, frozen confections, and dairy.

Some human trials report allulose causes less rise in blood sugar after a meal compared to regular sugar in healthy subjects and in people with pre-diabetes. Claims that allulose has cholesterol-lowering and anti-inflammatory effects are based primarily on animal studies. In one study, young healthy adults who weighed an average of 150 pounds started experiencing diarrhea, bloating, and belly pain after eating about 28 grams per day (about seven teaspoons) of pure allulose.

Source: Tufts University | February 2019
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The U.S. Food and Drug Administration (FDA) has issued a warning to consumers regarding 46 specific weight loss and male enhancement products. Laboratory analysis of these products found active pharmaceutical ingredients not listed on the labels. Many of these hidden ingredients are approved for use by prescription only and could cause potentially serious side effects or interfere with other medications or dietary supplements. See the FDA’s Tainted Products Marketed as Dietary Supplements database (https://www.accessdata.fda.gov/scripts/sda/sdnavigation.cfm?sd=tainted_supplements_cder) for more information.

The products tested were purchased by the FDA online from Amazon and eBay. Twenty of the 25 weight loss and male enhancement products purchased on eBay and all 26 of the products purchased from Amazon—some of which were designated as an “Amazon Choice” or “#1 Best Seller”—contained potentially hazardous ingredients. This does not mean all products purchased at these sites are dangerous: the FDA buyers chose products that had names similar to tainted products that had been the subject of previous consumer warnings.

Dietary supplements are not subject to testing and approval before going to market. The FDA is unable to test every product for sale. Be on alert for products that offer quick results which sound too good to be true, especially those promoted for sexual enhancement, weight loss, bodybuilding, sleep aid, or pain relief.
An analysis of data from multiple observational studies suggests 30 minutes of exercise a day may help you live longer, even if you’re otherwise sedentary. In the study, published recently in the British Journal of Medicine, researchers looked at data from activity trackers worn by 44,000 men and women (average age around 66 years) in the U.S., Norway, and Sweden. Most participants were sedentary eight-and-a-half to 10.5 hours a day and engaged in moderate or vigorous activity eight to 35 minutes a day. More sedentary time combined with less active time was associated with higher risk of death. About 30 to 40 minutes of moderate to vigorous activity a day seemed to be enough to attenuate the association between sedentary time and risk of premature death.

The Physical Activity Guidelines for Americans recommend adults get 150 to 300 minutes a week (an average of 30 minutes a day) of moderate-intensity activity (such as taking a brisk walk or raking the yard) or 75 to 150 minutes a week (an average of 15 minutes a day) of vigorous-intensity activity (like jogging or swimming). While moving more and sitting less—in this study and many others—is associated with the best health outcomes, fitting 30 minutes of movement into an otherwise sedentary day may help you live longer.