Late night eating may cause greater weight gain: New research points to why

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Credit: AI-generated image (disclaimer)

It's long been popular advice for people looking to lose weight to avoid late night snacking. It's no wonder, with a host of research showing that late night eating is linked to greater body weight and increased risk of obesity.

But until now, few studies have actually investigated precisely why late night eating is linked to greater body weight. This is what a recent U.S. study set out to uncover. They found that eating four hours later than normal actually changed many of the physiological and molecular mechanisms that favor weight gain.

This work adds to other recently published work which has found that eating earlier in the day is more beneficial for both appetite and body weight control.

Late eating

To conduct their study, the researchers had 16 participants follow two different meal schedules, each for a period of six days total.

The first protocol had participants eat their meals early in the day with the last meal consumed approximately six hours and 40 minutes before bedtime. The second protocol had participants eat all of their daily meals approximately four hours later. This meant they skipped breakfast and instead had lunch, dinner and an evening meal. Their last meal was consumed only two and a half hours before sleep.

The study was conducted in a controlled lab, which ensured the participants in each group consumed an identical diet, and that all of their meals were evenly spaced with around four hours between them.

To understand how late eating affected the body, the researchers specifically looked at three different measures which are associated with weight gain:

1. The influence of appetite,
2. The impact of eating time on energy expenditure (calories burned), and

3. Molecular changes from fat tissue.

Appetite was measured using two techniques. The first technique was having participants rate their feelings of hunger throughout the day. The second technique was by collecting blood samples to look at the levels of appetite-regulating hormones in participants' blood—such as leptin (which helps us feel full) and ghrelin (which makes us feel hungry). These hormones were assessed hourly over a 24 hour period during the third and sixth day of each trial.

To assess the effect of meal timing on daily energy expenditure, a technique called "indirect calorimetry" was used. This measures both the amount of oxygen a person uses alongside the amount of carbon dioxide they produce. This helps researchers estimate how many calories a person's body uses throughout a normal day.

To examine how late night eating affects the way the body stores fat on a molecular level, the researchers performed a biopsy on fat tissue taken from the abdomen. Only half of the participants agreed to this.

The team found that compared to an early eating pattern, late eating not only increased subjective feelings of hunger the following day, it also increased the ratio of "hunger" hormones in the blood—despite participants eating an identical diet in both protocols. Late eating also caused a decrease in the number of calories burned the following day. In the participants who did the fat tissue biopsy, late eating was also shown to cause molecular changes that promote fat storage.

Together, these results indicate that late eating leads to a number of physiological and molecular changes that, over time, could lead to weight gain.

Potential for weight gain

While we don't fully understand all of the mechanisms underlying why late night eating promotes weight gain, this study shows us that it's probably the result of many factors working together.

One theory for why eating late causes weight gain could be due to our circadian rhythm. The [human body](link) has a natural circadian rhythm, which is controlled by the brain to influence the normal ebb and flow of hormones. It's particularly responsive to daylight and food intake.

Time of eating is intrinsically linked to the circadian rhythm in humans, as we normally sleep when it's dark out and eat when it's daylight. When we eat late, this could challenge the natural circadian rhythm, causing disruptions to the body's hunger signals and the way it uses calories and stores fat. However, this link has only been shown in [studies on animals](link) thus far.

Given the new study was only conducted on a limited number of participants and over a very short time frame, more research will be needed to further understand whether these changes are only temporary, and what affect long-term late night eating can have on these [weight gain](link) mechanisms. But we do know from other studies that people who tend to eat late in the evening also tend to gain weight more easily.

Other large-scale studies looking at the relationship between [disturbances in meal timing on energy balance](link) (such as skipping breakfast, late night eating and [shift work](link)) have found these patterns of eating were linked to higher body weight and greater risk of metabolic disorders (such as high blood pressure or type 2 diabetes).

This study adds to a growing body of evidence showing just how important meal timing can be when it comes to body weight. Based on what this and other studies have shown, people who are watching their [weight](link) may want to ditch the late night snacks and favor of eating most

of their meals earlier in the day.

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