

Too little sleep may trigger the 'munchies' by raising levels of an appetite-controlling molecule

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Insufficient sleep may contribute to weight gain and obesity by raising levels of a substance in the body that is a natural appetite stimulant, a new study finds. The results were presented today at The Endocrine Society's 95th Annual Meeting in San Francisco.

The researchers found that when healthy, lean, [young adults](#) received only 4.5 hours of [sleep](#) a night, they had higher daytime circulating, or blood, levels of a molecule that controls the pleasurable aspects of eating, compared with when they slept 8.5 hours.

"Past experimental studies show that sleep restriction increases hunger and appetite," said Erin Hanlon, PhD, research associate (assistant professor) at the University of Chicago's Section of Endocrinology, Diabetes and Metabolism. "The mechanism for overeating after inadequate sleep may be an elevation in this endocannabinoid molecule, called 2-arachidonoylglycerol, or 2-AG."

With colleagues from the University of Chicago Medicine and the Medical College of Wisconsin in Milwaukee, Hanlon studied nine subjects with an average age of 23 years. The subjects spent six nights in a sleep lab and then another six nights there at least a month later. In a random order, the subjects were allowed to sleep from 11 p.m. to 7:30 a.m. ("normal sleep – 8.5 hours in bed") during one testing period and from 1 to 5:30 a.m. ("partial sleep restriction – 4.5 hours in bed") during

the other testing period. During [waking hours](#), the subjects ate a controlled number of calories based on their height and weight.

After the second night of each sleep condition, the researchers took [blood samples](#) from the subjects at one-hour intervals for 24 hours. Using a highly accurate laboratory assay, they analyzed the samples for 2-AG, a component of the [endocannabinoid system](#). Found throughout the body, this system plays an important role in the signaling of rewarding events and one's enjoyment of eating, similar to the [cannabinoids](#) in marijuana, Hanlon said.

Levels of 2-AG levels were the lowest halfway through sleep and the highest in the early afternoon, "when the pleasurable properties of food would be most beneficial," Hanlon said. She reported that the afternoon peak of 2-AG was even higher when the study participants had partial sleep restriction than when they had normal sleep.

The study results suggest that the increased hunger and appetite that subjects in previous studies have reported after sleep restriction might be due to increases in circulating 2-AG, she said.

"These findings," Hanlon said, "are highly relevant to millions of individuals who are at an increased risk of obesity and its health consequences because of chronic short sleep or sleep disruption."

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Provided by The Endocrine Society

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