

Sleep deprivation could do something surprising to your diet

Not sleeping enough can boost hunger, by disrupting the endocannabinoid system, researchers say.

While many publications had already linked a lack of sleep to overeating and poor food choices, this study, published in the journal *Sleep*, explains what happens in the body to trigger this desire to consume greasy, sweet or salty meals.

The team of scientists from the University of Chicago recruited 14 healthy volunteers in their 20s.

Their study was carried out over eight days.

During four days, they were allowed to have proper nights of sleep, spending 8.5 hours in bed and sleeping for an average of 7.5 hours.

They were then sleep-deprived for the next four days, spending only 4.5 hours in bed (4.2 hours asleep).

Researchers tested their eating behaviors in both contexts. They offered them three meals a day, at 9am, 2pm and 7pm and presented them with a wide range of snacks, two hours after eating.

The levels of two hormones – ghrelin, which boosts appetite and leptin, associated with feeling full– were measured. Low levels of leptin and high levels of ghrelin had already been linked to overeating, and the scientists wanted to monitor their presence in the volunteers' bodies.

However, the novelty in this study is that it also looks at another marker, the levels of endocannabinoids in the blood. Endocannabinoids are chemical compounds naturally synthesized by the body, which activate the same receptors as THC, the active ingredient of marijuana.

The researchers found out that being sleep-deprived increased the endocannabinoid levels, specifically of endocannabinoid (2-AG). Levels stayed elevated through the evening, beyond the typical midday peak observed on a normal day. During that period, the study participants reported higher scores for hunger and more urges to eat. When provided with the snacks, they ate twice as much fat as when they were not suffering from sleep deprivation.

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“We found that sleep restriction boosts a signal that may increase the hedonic aspect of food intake – the pleasure and satisfaction gained from eating,” explains Erin Hanlon, PhD, a researcher at the University of Chicago.

They now believe that this signal is the increase in 2-AG following sleep restriction, which may be part of the mechanism causing people to overeat.

Another possibility for overeating is that the body of sleep-deprived subjects need extra calories to compensate for the energy costs of staying awake longer, but scientists say that they still eat a lot more than they should.

“One study has reported that each added hour of wakefulness uses about 17 extra calories. That adds up to about 70 calories for the four hours of lost sleep. But, given the opportunity, the subjects in this study more than made up for it by bingeing on snacks, taking in more than 300 extra calories”, says Hanlon.

Despite the study’s limitation (small size and short duration), the team believe their findings should be taken into account when designing obesity-prevention strategies, especially considering many adults in the US and in Europe do not sleep enough. In 2013, a report showed that in the UK, 70% of adults sleep seven hours or less, with a quarter experiencing sleep disruptions on a regular basis.

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