Lack of Sleep: Cravings Similar to those Caused by Cannabis

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It has been known for a long time that a lack of sleep promotes overconsumption of food rich in calories. According to a fascinating recent study, this phenomenon is caused by activation of the endocannabinoid system, in a way that is similar to the hunger associated with consumption of cannabis.

Many studies have clearly shown that people who are deprived of sleep exhibit modifications to their eating habits, most notably with a pronounced attraction towards foods rich in sugar and fat.

INCREASED RISK

This increase in caloric intake is not harmless when it occurs chronically, because it is associated with an increased risk for numerous metabolic disorders including obesity, metabolic syndrome (a combination of hypertension, overweight and dyslipidemia) and type 2 diabetes.

Given that about half of the population doesn't get enough sleep (less than 7 hours nightly) or gets sleep of poor quality, it is thus quite probable that this phenomenon contributes to the high incidence of excess weight in the population, as well as to the numerous diseases which are associated with excess fat.

ENDOCANNABINOID SYSTEM

The endocannabinoid system stands out as an excellent candidate for explaining these effects of sleep deprivation on the overconsumption of calories.

This system is best known for its role in mediating the psychotropic effects of cannabis; in fact, it is the specific interaction between the principal constituents of cannabis (cannabidiol and Δ9-tetrahydrocannabinol) with certain receptors naturally present in the brain which is responsible for the euphoria associated with consumption of this drug.

However, the biological role of the endocannabinoid system goes well beyond its participation in these psychoactive effects; it functions instead as a basic physiological mechanism which appeared very early in the evolutionary course of animal life forms (about 400 million years ago) and its principal function is to ensure the control of metabolism, particularly everything which affects the consumption of food (stimulation of appetite) and the storage of calories.

This important role for the endocannabinoids in the control of appetite also explains why the consumption of cannabis is generally associated with a notable increase in hunger (the famous *munchies*) in people who have consumed the drug, a property which is also used for medical purposes to stimulate the appetite of people affected by certain diseases (AIDS, cancer).

A QUESTION OF SMELL

To determine the possible involvement of the endocannabinoid system in the increased caloric intake of people suffering from sleep deprivation, a team of researchers submitted 30 volunteers to episodes of either normal sleep (7-9 hours per night) or shortened sleep (4 hours per night) and then examined their eating choices when they were presented with a buffet containing a wide variety of foods.

They observed that people who had not slept sufficiently possessed higher levels of certain endocannabinoids such as 2-oleoylglycerol (2-OG) than had those who had slept normally, and that they exhibited a net preference for foods of higher energetic density (more calories per gram) such as doughnuts, sweet cookies and chips.[1]

Examination of the participants using magnetic resonance imaging suggests that this preference for hypercaloric foods arises from certain modifications in brain regions involved in the control of food intake. On one hand, the researchers observed that the brains of sleep-deprived persons showed greater activity within the piriform cortex, a region involved in smell and which is very rich in receptors for endocannabinoids. The lack of sleep thus caused a greater sensitivity to food odors and people who were sleep-deprived were thus more stimulated (and tempted) by the presence of food.

It should also be noted that this increased olfactory activity is produced along with a disturbance in the connectivity of the piriform cortex to the insula, the cerebral region which regulates caloric intake: people who have higher levels of cannabinoids are thus in less control of the quantities they consume, which could explain their attraction to foods with elevated levels of fat and sugars.

These observations thus confirm that a lack of sleep is not only damaging to our interaction with the external world (lack of attention, irritability, decreased productivity) but also disrupts the proper function of our metabolism and can lead to overconsumption of calories which, in the long run, promotes excess weight and the development of a host of serious chronic diseases. Even if sleeping is not very popular in our age where there is always something going on, 24 hours per day, seven days per week, this study reminds us that it remains nevertheless true that sleep is a time of rest that is indispensable to maintaining good health.

(1) Bhutani S et al. Olfactory connectivity mediates sleep-dependent food choices in humans. eLife 2019; 8: e49053.

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