

# Melatonin stimulates appearance of 'beige fat' that can burn calories instead of storing them

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Melatonin is a natural hormone segregated by the body and melatonin levels generally increase in the dark at night. It is also found in fruit and vegetables like mustard, Goji berries, almonds, sunflower seeds, cardamom, fennel, coriander and cherries.

Spanish scientists have discovered that melatonin consumption helps control weight gain because it stimulates the appearance of 'beige fat', a type of fat cell that burns calories in vivo instead of storing them. White adipose tissue stores calories leading to weight gain whereas 'beige fat' (also known as 'good or thinning fat') helps regulate body weight control, hence its metabolic benefits.

In the *Journal of Pineal Research*, scientists from the University of Granada Institute for Neuroscience, the Hospital Carlos III, Madrid, and the University of Texas Health Science Center in San Antonio (USA) have revealed, for the first time, the previously unknown enigma of why melatonin has metabolic benefits in treating diabetes and hyperlipidemia.

In earlier publications, the researchers analysed the effects of melatonin on obesity, dyslipidemia, high blood pressure and [type 2 diabetes mellitus](#) associated with obesity in young obese diabetic Zucker rats—an experimental model of metabolic syndrome.

In view of their most recent results, it seems the key lies in the fact that chronic melatonin consumption not only induces the appearance of 'beige fat' in obese diabetic rats, but also increases its presence in thin animals used as a control group. 'Beige fat' cells are found in scattered lentil-sized deposits beneath the inguinal skin in obese diabetic Zucker rats.

Melatonin is a natural hormone segregated by the human body itself and melatonin levels generally increase in the dark at night. It is also found in small quantities in [fruit and vegetables](#) like mustard, Goji berries, almonds, [sunflower seeds](#), cardamom, fennel, coriander and cherries. These findings, together with the pharmacologically safe profile of melatonin, mean it is a potentially useful tool both in its own right and to complement the treatment of obesity. Sleeping in the dark and consuming these foodstuffs could help control [weight gain](#) and prevent cardiovascular diseases associated with obesity and dyslipidemia.

The study—coordinated by University of Granada lecturer Ahmad Agil—showed that chronic administration of melatonin sensitizes the thermogenic effect of exposure to cold, heightens the thermogenic effect of exercise and, therefore, constitutes excellent therapy against obesity. The fact is that one of the key differences between 'beige fat', which appears when administering melatonin, and 'white fat', is that ['beige fat'](#) cell mitochondria express levels of UCP1 protein, responsible for burning calories and generating heat.

The study—authored by Aroa Jiménez-Aranda, Gumersindo Fernández-Vázquez, Daniel Campos, Mohamed Tassi, Lourdes Velasco-Perez, Tx Tan, Russel J. Reiter and Ahmad Agil—has been part-financed and supported by the Granada Research of Excellence Initiative on BioHealth (GREIB), the University of Granada Vice-Rectorate for Scientific Policy and Research, and the regional government of Andalusia research group CTS-109.

Given the importance of this discovery, the researchers are confident they will obtain the funding needed to continue their work—says principle researcher Ahmad Agil—"and be able to achieve their final objective: to confirm these findings in humans, by administering [melatonin](#) to help combat obesity and diabetes".

**More information:** Melatonin induces browning of inguinal white adipose tissue in diabetic fatty Zucker rats. Aroa Jiménez-Aranda, Gumersindo Fernández-Vázquez, Daniel Campos, Mohamed Tassi, Lourdes Velasco-Perez, Tx Tan, Russel J. Reiter and Ahmad Agil. *Journal of Pineal Research*. 2013. September. [DOI: 10.1111/jpr.12089](https://doi.org/10.1111/jpr.12089)

Provided by University of Granada

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