

# Researchers come up with new answers concerning a weight-regulating hormone

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For years, scientists have failed to locate the DNA variants that control the weight-regulating hormone, leptin. However, new research has enabled the identification of four genes associated with leptin levels, which is particularly relevant within an obesity context. The study focuses on the powerful hormone leptin, which regulates humans' long-term energy balance by informing the brain about the amount of stored body fat.

Finding [genes](#) that cause fatness either by influencing our behavior or biology allows for a deeper understanding of why some people

accumulate more fat than others. The research opens new avenues for treatments to counteract the genes that make us unhealthy.

The research has just been published in the science journal, *Nature Communications*.

## **Four new genes**

"By studying the genetic code of over 50,000 men and women, we identified four genes associated with leptin levels," says Assistant Professor Tuomas Oskari Kilpeläinen from the Novo Nordisk Foundation Center for Basic Metabolic Research, University of Copenhagen who directed the study "Genome-wide meta-analysis uncovers novel loci influencing circulating leptin levels".

Leptin also influences our appetite. "It is produced when we are well fed, and it signals to the brain that there is plentiful energy and therefore reduces eating," adds Kilpeläinen.

Under normal conditions, leptin is generated by fat tissue, and the amount of leptin in the blood equals the total amount of fat tissue in the body. However, as long as 20 years ago, it was discovered that rare mutations in the leptin gene could cause extreme obesity. This happens if the mutation leads to a complete lack of the leptin hormone, which makes the patients constantly hungry, and therefore they gain weight quickly at a young age.

However, such cases are very rare. Normally, the leptin gene is very functional, but it depends on the individual in terms of how much leptin circulates in the blood - people with equal levels of body fatness may have different leptin levels. These differences could affect our body weight and health, so it was important to look for genes that regulate leptin levels.

## Global collaboration

The study used data from 36 different genetic studies and involved scientists at 146 institutions worldwide. To look for genes determining leptin levels in blood, the researchers examined the links between 2.5 million DNA variants and leptin levels.

"We found that the strongest DNA-variant associated with increased leptin levels was near the [leptin gene](#) itself, but we also found leptin-increasing variants near three other genes," says co-author Niels Grarup, Assistant Professor and Group Leader from the Section for Metabolic Genetics, Novo Nordisk Foundation Center for Basic Metabolic Research.

At a closer look, the DNA variants linked to leptin levels in the blood did not seem strongly associated with body weight. Some previous studies suggest that people with low leptin levels may be more sensitive to changes in [leptin levels](#). More studies are needed to determine whether leptin-regulating variants may be important for appetite regulation in such individuals.

**More information:** Tuomas O. Kilpeläinen et al. Genome-wide meta-analysis uncovers novel loci influencing circulating leptin levels, *Nature Communications* (2016). [DOI: 10.1038/ncomms10494](https://doi.org/10.1038/ncomms10494)

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