

# Genes affect where fat is stored

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A recent study from Uppsala University has found that genetic factors influence whether people store fat around the trunk or in other parts of your body, and that this effect is predominant in women and much lower in men. In the study, which is published in *Nature Communications*, the researchers measured how fat was distributed in nearly 360,000

voluntary participants.

"We know that women and men tend to store fat differently—women have the ability to more easily store fat on the hips and legs, while men tend to accumulate fat around the abdomen to a higher extent," says lead author Mathias Rask-Andersen, Ph.D. and postdoctoral researcher at the department of Immunology, Genetics and Pathology at Uppsala University. "This has been attributed to the effects of sex hormones such as estrogen. But the molecular mechanisms that control this phenomenon are fairly unknown."

The researchers used data from U.K. Biobank, which is a cohort study of a half-million participants in the U.K. The participants gave blood samples for genotyping and the distribution of fat tissue was estimated using impedance measurements, i.e., measurements of resistance when an [electrical current](#) is fed through the body. In the current study, millions of genetic variants across the genome were tested for association with distribution of fat to the arms, legs or trunk, and the research team identified nearly a hundred genes that affect distribution of adipose tissue to the different compartments of the human body. The researchers also saw a high degree of heterogeneity between sexes.

"We were struck by the large number of genetic effects that were stronger, or only present, in females. Upon closer examination, several of the associated genes were found to encode proteins that actively shape the [extracellular matrix](#), which makes up the supporting structure around cells," says the group leader docent Åsa Johansson. The findings suggest that remodeling of the extracellular matrix is one of the mechanisms that generates differences in body fat distribution.

Fat stored in the trunk has previously been associated with increased disease risk. Men have a greater amount of abdominal fat than women and this may explain the increased prevalence of cardiovascular disease

observed in males. Epidemiological studies have even shown that the ability to store fat around hips and legs gives [women](#) some protection against cardiovascular disease. The result of the current study may therefore lead to the development of new interventions to reduce the risk of cardiovascular disease.

"The [biological systems](#) we highlight in our study have the potential to be used as points-of-intervention for new drugs that are aimed at improving the distribution of body fat and thereby reducing the risk of disease," says Mathias Rask-Andersen.

**More information:** Mathias Rask-Andersen et al, Genome-wide association study of body fat distribution identifies adiposity loci and sex-specific genetic effects, *Nature Communications* (2019). [DOI: 10.1038/s41467-018-08000-4](#)

Provided by Uppsala University

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