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Genetic effects are influenced by lifestyle

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The risk for developing obesity is influenced by our lifestyle as well as our genes. In a new study from Uppsala University, researchers show that our genetic risk for obesity is not static, but is influenced by our lifestyle. Results from the study have been published in the scientific journal *PLOS Genetics*.

In the current study, researchers have investigated if genetic effects are influenced by different lifestyle factors such as diet, smoking, socio-economic status, alcohol consumption and physical activity. The study builds on genetic and self-reported lifestyle information from 360,000 middle-aged people in the UK.

"The results of our study clearly show that the environment and the lifestyle interact with the genes," says Mathias Rask-Andersen, researcher at the Department of Immunology, Genetics and Pathology, who led the study.

For example, the effect of genetic factors was lower in the most physically active participants. Socio-economic status also influenced the genetic effects. The genetic risk for obesity was more pronounced in participants with lower socio-economic status than in participants with higher socio-economic status. One of the most surprising results of the study was that alcohol consumption also influenced the genetic effects. The researchers could clearly see that the genetic effects were lower among those with more frequent alcohol intake. The genetic effect was nearly half as strong in participants who consume alcohol every day compared with never-drinkers.

The results suggest that we can influence our genetic risk by changing our lifestyle. Someone with a strong predisposition for obesity, for instance a person with many overweight relatives, could reduce the effect of their genes by making lifestyle changes. The hope is that the results of this study will lead to new angles of approach to understanding the mechanisms that regulate body weight and to better methods of treating and preventing obesity and overweight. However, it is important to point out that the current study is a population-based study. In such a study, the researchers are unable to assess cause and effect.

"There could be related factors that we do not have information about, which are the real causes of our results. It is therefore important to follow up on our results with more controlled studies to determine cause and effect," says Mathias Rask-Andersen.

More information: Mathias Rask-Andersen et al. Gene-environment interaction study for BMI reveals interactions between genetic factors and physical activity, alcohol consumption and socioeconomic status, *PLOS Genetics* (2017). DOI: 10.1371/journal.pgen.1006977

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