

Omics data suggests larger effect of smoking on body mass index than previously thought

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Smoking-related DNA methylation patterns explain around a fifth of the variation in body mass index (BMI) between individuals, according to a study publishing September 9th in the open-access journal *PLOS*

Genetics, led by Carmen Amador at the University of Edinburgh.

Amador and colleagues analyzed [genomic sequence data](#) from over 390,000 white British participants enrolled in the Generation Scotland or UK Biobank databases to investigate how [tobacco smoking](#) and genetics interact to influence BMI and other obesity-related traits. They found that self-reported smoking status explained 2% of variation in BMI, while genetics accounted for 50% of the variation, and a further 10% was explained by the interaction between smoking status and genetics. They also found that sex played an important role: the interaction between genetics and [smoking](#) explained more of the variance in traits such as weight and body fat percentage in men than in women. For a subset of 8,821 Generation Scotland participants, the researchers repeated the analysis using DNA methylation data as a measure of tobacco exposure. They found that methylation status at 62 methylation sites previously been linked to tobacco consumption was able to explain 22% of the variation in BMI between individuals.

Body mass index is known to have a large genetic component, but the contribution of environmental factors is less well understood. The authors say that biomarkers like DNA methylation may be more accurate proxies for environmental factors than self-reported data and could be used to investigate the influence of other difficult-to-measure lifestyle variables on diseases like obesity.

Amador adds, "Our study highlights the potential of using biomarkers as a measure of an individual's past environment and lifestyle and also suggests that the environment we experience may have long-term effects by altering the way our genetic makeup influences our health and related traits."

More information: Amador C, Zeng Y, Barber M, Walker RM, Campbell A, McIntosh AM, et al. (2021) Genome-wide methylation data

improves dissection of the effect of smoking on body mass index. *PLoS Genet* 17(9): e1009750. doi.org/10.1371/journal.pgen.1009750

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