

Study reveals effects on body mass index of gene linked to heavy smoking

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Smoking harms nearly every organ in the body and causes many diseases. Credit: CDC/Debra Cartagena

A genetic variant which causes smokers to smoke more heavily has been shown to be associated with increased body mass index (BMI) - but only in those who have never smoked, according to new research led by the University of Bristol, UK and published today in *PLOS Genetics*.

It is likely that this finding has not come to light before because it has been masked by the effect of smoking, which acts to reduce BMI.

Professor Marcus Munafò from Bristol's School of Experimental Psychology and colleagues studied a variant in the *CHRNA5-A3-B4* gene cluster which is known to increase smoking heaviness.

They found that the variant is associated with lower BMI in current smokers, but higher in people who have never smoked. This difference in effects suggests that the variant influences BMI in opposite directions - via pathways other than smoking for those who have never smoked and by increasing the weight-reducing effects of smoking in those who smoke.

The reason for this association with BMI in never smokers is not yet understood. It is known that this genetic variant alters response to nicotine, which is why it affects the number of cigarettes that an individual smokes.

Professor Munafò said: "One explanation for the association with BMI in never smokers is that the [nicotinic acetylcholine receptors](#) this particular gene codes for may play a more general role in our response to reward - which could include natural rewards such as food."

This study also highlights the potential importance of accounting for environmental factors in genetic studies. The direct association between this genetic variant and BMI was only revealed when the study population was divided into never, former and current smokers. Therefore, it is possible that there may be important genetic influences on health outcomes which have not yet been discovered because they are hidden by environmental differences between individuals.

More information: Taylor AE, Morris RW, Fluharty ME, Bjorngaard

JH, Asvold BO, et al. (2014) Stratification by Smoking Status Reveals an Association of CHRNA5-A3-B4 Genotype with Body Mass Index in Never Smokers. *PLoS Genet* 10(12): e1004799. [DOI: 10.1371/journal.pgen.1004799](https://doi.org/10.1371/journal.pgen.1004799)

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