Medical Xpress

How genes affect tobacco and alcohol use

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The use of alcohol and tobacco is closely linked to several diseases, and is a contributing factor in many deaths. A recent study using data from 1.2 million people has now been published in the journal *Nature Genetics*. Several research groups around the world are involved, among them a group from the Nord-Trøndelag Health Study (HUNT) and the

K.G. Jebsen Center for Genetic Epidemiology.

"We discovered several genes associated with an increased use of alcohol and tobacco. We also looked at the correlation between these genes and the risk of developing various diseases and disorders," says Professor Kristian Hveem at the HUNT Research Centre. He is also the head of the Jebsen Center and one of the study's co-authors.

Genes and diseases

The research groups discovered a total of 566 gene variants at 406 different sites in the human genetic material that can be linked to the use of alcohol or tobacco. One hundred fifty of these sites are linked to the use of both tobacco and alcohol.

Alcohol consumption was measured in terms of the number of standard alcohol units. Tobacco use was measured in the number of cigarettes per day. "The study group that was genetically predisposed to smoking was also genetically predisposed to a number of health problems, including obesity, diabetes, ADHD and various mental illnesses, whereas a genetic risk for alcohol was associated with lower disease risk. This does not imply that consuming more alcohol improves health, but indicates a mechanistic complexity that needs to be investigated further," Hveem says

We reported evidence for the involvement of many natural signaling agents in tobacco and alcohol use, including genes involved in nicotinic, dopaminergic, and glutamatergic neurotransmission which, to some extent, may provide a biological explanation for why people seek artificial stimuli.

New insights

The data collected came from a number of studies and included different age categories, societies with different attitudes to the use of drugs and different patterns of alcohol and nicotine use. However, results showed that the correlation between genetic risk and the development of disease categories varied little between the population groups.

It is important to note that a gene variant that predisposes a person to a certain trait does not have to be "expressed" or biologically active, which could depend on several factors. The interplay between different genes may play a role, and social conditions also influence the use of alcohol and tobacco, making it difficult to draw any firm conclusions.

This research gives new insight into the complexity of genetic and environmental factors that compel some people to drink and smoke more than others. It is also interesting to note that some of these genes linked to increased use of alcohol also reduce the risk for some diseases.

More information: Association studies of up to 1.2 million individuals yield new insights into the genetic etiology of tobacco and alcohol use, *Nature Genetics* (2019). DOI: 10.1038/s41588-018-0307-5

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