Alcohol addiction is a chronic disease characterised by repeated and compulsive consumption of alcohol despite the health issues and social problems caused by alcohol. Due to the continuous alcohol consumption, increased tolerance to alcohol is also often linked to alcohol addiction, as well as physical addiction, which manifests itself as withdrawal symptoms when the person quits drinking.

It is known that alcohol addiction is often more prevalent in certain families, which indicates that it could be hereditary. In population studies, for example studies made with twins and adopted people, the hereditary background of alcohol addiction has in fact been proved repeatedly. Hereditary background, i.e. the genes an individual receives from their parents, account for about half of the risk of this illness.

Even though heredity has an effect on the prevalence of alcohol addiction, there is no individual gene of alcohol addiction that would result in this illness regardless of any environmental factors. Therefore, we prefer to talk about several genes, the combination of which increases a person’s risk of becoming ill in conditions that expose them to alcohol addiction. Such environmental risk factors are, for example, traumatic experiences in early childhood. Therefore, becoming addicted to alcohol is always the result of both hereditary and environmental factors.

Finding out the hereditary background of alcohol addiction is difficult, because it is a very multiform disease. Additionally, alcohol addiction is often connected to other psychiatric illnesses such as anxiety and mood disorders, antisocial personality disorder and other substance abuse disorders. Smoking, for example, has a strong connection to alcohol addiction.

Based on current knowledge, hundreds or even thousands of genes affect the risk of becoming addicted to alcohol, and there is no uniform view on how these genes work to produce an individual that is vulnerable to addiction. As the development of alcohol addiction is considered to be mostly brain-based, it is probable that several genes that are linked to the basic processes of brain functions also transmit the risk of addiction. For example, the target proteins of alcohol in the brain as well as several genes related to transmitter substance systems linked to motivation and emotional control have been connected to alcohol addiction.

Genes that protect a person from alcohol addiction are also known. There is an enzyme (aldehyde dehydrogenase) that disintegrates the first metabolite of alcohol, acetaldehyde. One known form of this enzyme’s gene produces an enzyme that functions poorly. The people carrying this gene form, which is especially prevalent in East Asia, produce large amounts of acetaldehyde in their bodies when drinking alcohol and this causes redness of the skin, heart palpitations and nausea, which effectively restricts the consumption of alcohol.

Currently, there are no methods of evaluating the hereditary risk of alcohol addiction aside from family history. The objective of new gene research is to find the genes behind this vulnerability, based on which new treatment methods could also be developed.

Petri Hyytiä
Docent, University of Helsinki

References

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