

Scientists find gene linked to alcohol consumption

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Scientists have identified a gene that appears to play a role in regulating how much alcohol people drink, in a study of over 47,000 people published today in *Proceedings of the National Academy of Sciences*.

The researchers say that finding a common genetic variation influencing levels of [alcohol consumption](#) may lead to a better understanding of mechanisms underlying alcohol drinking behaviour in the general population.

The gene, called "autism susceptibility candidate 2", or AUTS2, has previously been linked to autism and [attention deficit hyperactivity disorder](#), but its function is not known.

Today's study, by an international consortium led by scientists at Imperial College London and King's College London, found that there are two versions of the AUTS2 gene, one three times more common than the other. People with the less common version drink on average five per cent less alcohol than people with the more common version.

The gene is most active in parts of the brain associated with neuropsychological reward mechanisms, suggesting that it might play a part in regulating the positive reinforcement that people feel when they drink alcohol.

Alcohol consumption is known to be partly determined by [genes](#) but until now the only gene known to make a notable contribution was the

gene encoding alcohol dehydrogenase, an enzyme that breaks down alcohol in the liver.

Professor Paul Elliott, from the School of Public Health at Imperial College London, said: "Of course there are a lot of factors that affect how much alcohol a person drinks, but we know from twin studies that genes play an important role. The difference that this particular gene makes is only small, but by finding it we've opened up a new area of research into the biological mechanisms that control drinking."

The researchers analysed [DNA samples](#) from over 26,000 volunteers to search for genes that appeared to affect alcohol consumption, and then checked their findings in another 21,000 people. The volunteers reported how much alcohol they drank in questionnaires.

Once the researchers had identified AUTS2, they examined how much messenger RNA –a copy of the gene's code that is used to make a protein – was present in samples of donated human brain tissue. They found that the people with the version of the gene associated with lower alcohol consumption produced more of the messenger RNA, meaning that the gene was more active.

The researchers also investigated strains of mice that had been selectively bred according to how much alcohol they drink voluntarily. They found that there were differences in the AUTS2 gene activity levels among different breeds of mice that drink more or less alcohol. In addition, the researchers found that blocking the effect of a related gene in fruit flies made the flies less sensitive to alcohol. These results indicate that AUTS2 seems to be involved in regulation of alcohol intake in a number of different species.

Professor Gunter Schumann, from the Institute of Psychiatry, King's College London, said: "In this study we combine genetic studies with

investigations of animal behaviour. Since people drink alcohol for very different reasons, understanding the particular behaviour influenced by the gene identified helps us better understand the biological basis of these reasons. This is an important first step towards the development of individually targeted prevention and treatments for alcohol abuse and addiction."

More information: G. Schumann et al. Genome-wide association and genetic functional studies identify autism susceptibility candidate 2 gene (AUTS2) in the regulation of alcohol consumption. *Proceedings of the National Academy of Sciences*, published online 4 April 2011.

Provided by Imperial College London

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