### 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 King’s College London and Imperial 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 Günter Schumann, from the Institute of Psychiatry at 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.’

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 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 research was principally funded by the National Institute for Health Research Biomedical Research Centres at Imperial and the South London and Maudsley NHS Foundation Trust/King’s College London, as well as the European Commission and the Medical Research Council.

Genome-wide association and genetic functional studies identify autism susceptibility candidate 2 gene (AUTS2) in the regulation of alcohol consumption by G. Schumann et al. is published in Proceedings of the National Academy of Sciences.

**Notes to editors**

**King’s College London**

King’s College London is one of the top 25 universities in the world (2010 QS international world rankings), The Sunday Times 'University of the Year 2010/11' and the fourth oldest in England. A research-led university based in the heart of London, it has nearly 23,500 students (of whom nearly 9,000 are graduate students) from 140 countries and approximately 6,000 employees.

King’s has an outstanding reputation for providing world-class teaching and cutting-edge research. In the 2008 Research Assessment Exercise for British universities, 23 departments were ranked in the top quartile of British universities; over half of our academic staff work in departments that are in the top 10 per cent in the UK in their field and can thus be classed as world leading. The College is in the top seven UK universities for research earnings and has an overall annual income of nearly £450 million.

King’s has a particularly distinguished reputation in the humanities, law, the sciences (including a wide range of health areas such as psychiatry, medicine, nursing and dentistry) and social sciences including international affairs. It has played a major role in many of the advances that have shaped modern life, such as the discovery of the structure of DNA and research that led to the development of radio, television, mobile phones and radar. It is the largest centre for the education of healthcare professionals in Europe; no university has more Medical Research Council Centres.

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