

Gene mutation linked to reckless drunken behavior

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A depiction of the double helical structure of DNA. Its four coding units (A, T, C, G) are color-coded in pink, orange, purple and yellow. Credit: NHGRI

University of Helsinki researchers have identified a genetic mutation which renders carriers susceptible to particularly impulsive and reckless behaviour when drunk. More than one hundred thousand Finns carry this mutation.

Many Finns know somebody whose behaviour becomes excessively strange and erratic when drunk. They are said to be unable to "hold their liquor", and others are surprised at how inebriated they become from just a small amount of alcohol. Since the trait seems permanent, it can be assumed that there are underlying [biological factors](#).

Led by researcher and psychiatrist Roope Tikkanen, PhD, a new study has now demonstrated that a [point mutation](#) in a gene of serotonin 2B receptor can render the carrier prone to [impulsive behaviour](#), particularly when drunk. Published in the journal *Translational Psychiatry* (Tikkanen et al., 2015), the discovery follows an original observation from 2010 on the mutation of serotonin 2B receptor among Finns (Bevilacqua et al., 2010).

"The results also indicate that persons with this mutation are more impulsive by nature even when sober, and they are more likely to struggle with self-control or mood disorders," Tikkanen explains.

Little is known of the function of the serotonin 2B receptor in humans, but it is thought to be linked to impulsivity, which occurs with a number of [mental health problems](#). The mutation identified in the study is present in 2.2% of the population, meaning that more than 100,000 Finns are carriers.

"The impact of one gene on complex phenomena is typically minor. But it is possible to identify the impact of such a genetic mutation in the Finnish population, as our historical isolation has led to a relatively homogenous gene pool," Tikkanen states.

If these results prove significant in larger clinical samples of individual patients who suffer greatly from difficulties in impulse control, several preventive measures could be taken. The most important measure would obviously be controlling the consumption of alcohol. Other measures would include attempting to achieve control over behaviour through cognitive-behavioural psychotherapy or medication.

Apart from the putative effect on the health of Finnish population, the discovery of this biological mechanism may be groundbreaking in understanding the role of the serotonin 2B receptor in humans. Novel neurobiologic research is becoming increasingly aware of the fact that the expression of a gene - that is, the gene's production of proteins - can be affected in various ways. The findings may elucidate the role of the serotonin 2B receptor in the health of any given population. Moreover, increasing knowledge of the function of the [serotonin](#) 2B receptor may lead to new pharmacological innovations, since no medications specific to it are presently available.

The research took advantage of the unique data on impulsive sufferers of alcoholism and their relatives, compiled by Matti Virkkunen, Professor Emeritus of Forensic Psychiatry at the University of Helsinki. The discovery is based on long-term research cooperation between the University of Helsinki Psychiatry Clinic and the Dr David Goldman's laboratory of neurogenetics at the National Institute on Alcohol Abuse and Alcoholism in the United States.

More information: Tikkanen R, Tiihonen J, Rautiainen M-R, Paunio T, Bevilacqua L, Panarsky R, Goldman D, Virkkunen M. (2015) Impulsive alcohol-related risk-behavior and emotional dysregulation among individuals with a serotonin 2B receptor stop codon. *Translational Psychiatry*, 17 November 2015.

Laura Bevilacqua et al. A population-specific HTR2B stop codon

predisposes to severe impulsivity, *Nature* (2010). [DOI: 10.1038/nature09629](https://doi.org/10.1038/nature09629)

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