

Scientists explore new link between genetics, alcoholism and the brain

April 12 2011

Researchers at the University of Michigan Health System have uncovered a new link between genetic variations associated with alcoholism, impulsive behavior and a region of the brain involved in craving and anxiety.

The results, published online April 12 in *Molecular Psychiatry*, suggest that variations in the GABRA2 gene contribute to the risk of alcoholism by influencing impulsive behaviors, at least in part through a portion of the <u>cerebral cortex</u> known as the insula, says study senior author Margit Burmeister, Ph.D., research professor at U-M's Molecular and Behavioral Neuroscience Institute.

"Scientists often find a statistical association between behaviors and various genes, but the mechanism that's at work frequently remains unclear," Burmeister says. "Here we took some steps toward explaining how specific genetic risk factors are influencing behavior and the brain."

Individuals under distress who also have the risky genetic variant tend to act impulsively, a behavior that may lead to the development of <u>alcohol</u> <u>problems</u>, says lead author Sandra Villafuerte, Ph.D., a research investigator at U-M's Molecular and Behavioral Neuroscience Institute and Department of Psychiatry.

"Developing deeper understandings of the various genetic and environmental factors involved in <u>risky behaviors</u> may guide prevention and treatment efforts in the future," Villafuerte says.



The study included 449 people, who came from 173 families – 129 of whom had at least one member diagnosed with alcohol dependence or abuse. Those with certain variations in the GABRA2 gene were more likely to have alcohol dependence symptoms and higher measures of impulsiveness in response to distress, the study found. Stronger associations were found in women than in men.

"This wouldn't be a surprise to an alcohol researcher," Burmeister says. "Men and women tend to have different pathways to alcoholism. Drinking to relieve anxiety and distress is seen more in women."

Researchers also used functional magnetic resonance imaging (fMRI) to observe changes of blood flow in the brains of 44 young adults from these families as they performed a task in which they anticipated winning or losing money.

"The neuroimaging allowed us to see for the first time how these genetic variants create differences in how the brain responds in certain situations," says Mary M. Heitzeg, Ph.D., a research assistant professor in U-M's Department of Psychiatry and U-M's Addiction Research Center.

They found that individuals with one form of the GABRA2 gene associated with alcoholism showed significantly higher activation in the insula when anticipating rewards and losses than those with other combinations. This higher activation was also related to a greater level of impulsiveness in response to distress.

The insula's association with addictive behavior is well known: smokers who had insula damage due to stroke found it much easier to give up cigarettes, Science reported in 2007.

"We believe these results suggest GABRA2 exerts an influence on an



underlying neural system that impacts early <u>risk factors</u> and, later, alcohol dependency," says Burmeister, also a professor of psychiatry and human genetics at the U-M Medical School. "In the future, we hope to further examine the effects of family environment and other behavioral and environmental factors."

The authors stress that <u>genetic risk factors</u> don't act alone and simply having them does not mean that someone will become an alcoholic.

More information: "Impulsiveness and Insula activation during reward anticipation are associated with genetic variants in GABRA2 in a family sample enriched for alcoholism," *Molecular Psychiatry*, April 12, 2011.

Provided by University of Michigan

Citation: Scientists explore new link between genetics, alcoholism and the brain (2011, April 12) retrieved 3 May 2024 from <u>https://medicalxpress.com/news/2011-04-scientists-explore-link-genetics-alcoholism.html</u>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.