MedicalXpress

Researchers find link between genetic variation and alcohol dependence

March 24 2015, by Anne Dreyfuss

Jameson, Neat" by Flickr user Jeremy Brooks

Virginia Commonwealth University School of Medicine researchers have discovered a biological clue that could help explain why some drinkers develop a dependence on alcohol and others do not.

The findings move researchers closer to identifying those at risk for addiction early and designing better drug treatments to help people stop

drinking.

About 18 million people in the United States have an alcohol use disorder, according to National Institutes of Health statistics. The vast majority go untreated.

"There are few and inadequate pharmacological treatments to help people who want to stop drinking, because this is a terrifically difficult human genetics problem," said Jill C. Bettinger, Ph.D., associate professor in the Department of Pharmacology and Toxicology, VCU School of Medicine. "If we can better understand the molecular effects of alcohol, we can design more rational treatments and even warn people who are more susceptible to developing a dependence."

Bettinger is the senior author of a paper, "SWI/SNF Chromatin Remodeling Regulates Alcohol Response Behaviors in Caenorhabditis Elegans and is Associated With Alcohol Dependence in Humans," published Feb. 23 in the journal *Proceedings of the National Academy of Sciences*.

The paper describes how researchers examined the role of a protein complex—called switching defective/sucrose nonfermenting (SWI/SNF)—in determining the behavioral response of roundworms to alcohol.

Researchers watched through microscopes as the tiny worms became drunk on ethanol, studying how their initial sensitivity to the alcohol and tolerance changed based on which genes were expressed within the SWI/SNF complex.

Because humans and worms have a similar genetic makeup, Bettinger then turned to Brien P. Riley, Ph.D., associate professor in the Departments of Psychiatry and Human and Molecular Genetics at VCU

School of Medicine and co-author of the recently published paper. Riley is director of the Molecular Genetics Lab at the Virginia Institute for Psychiatric and Behavioral Genetics, where researchers have been studying the human genome and its relationship to the risk of illness or other traits.

Riley found that naturally occurring genetic variations in the same SWI/SNF complex so crucial to a worm's tolerance were also associated with alcohol dependence in humans. Unlike Huntington's and other diseases, which can be linked to a mutation in a single gene, the evidence suggests that the likelihood to develop alcoholism is the product of mutations in many genes, each with small effect. The SWI/SNF complex genes represent a piece of that puzzle.

The findings also give researchers a perfect model moving forward in their studies.

"The identification of genes that are critical in the development of tolerance in model systems such as worms will lead to future progress in understanding human dependence on alcohol," Riley said. "If the same effects are seen in worms, then it allows us to form and test a functional hypothesis about what kinds of changes lead to increased dependence risk in humans."

More information: *Proceedings of the National Academy of Sciences*, www.pnas.org/content/early/201 … 451112.full.pdf+html

Provided by Virginia Commonwealth University

alcohol.html