

Alcoholics who stay sober have healthier brain reward systems than those who relapse

April 29 2010

(PhysOrg.com) -- In a study of alcoholics who entered treatment for drinking, those who stayed sober for at least one year had the same levels of key biochemical indicators of brain health as non-alcoholic controls at the time they entered treatment. In contrast, the study showed, those who relapsed during that year had significantly lower levels of those indicators.

The results are reported by researchers at the San Francisco VA Medical Center and the University of California, San Francisco.

“This finding may indicate some kind of resilience factors are operating among the abstainers, or vulnerability factors among the relapsers,” says lead author Timothy Durazzo, PhD, an SFVAMC researcher and an assistant adjunct professor of radiology and biomedical imaging at UCSF. “Further study is necessary to understand the nature of the pattern of results we observed.”

The study appears in the March 2010 issue of the *“Journal of Studies on Alcohol and Drugs.”*

The study authors used [magnetic resonance imaging](#) to measure n-acetyl aspartate (NAA), an indicator of neuronal integrity, and creatine, which indicates cell metabolic integrity, in several regions of the brain known collectively as the “brain reward system.”

“Together, these [brain regions](#) are involved with reasoning, planning,

judgment, [impulse control](#), and anticipation and processing of pleasure,” explains Durazzo. “It’s the system that helps us weigh the pros and cons of our actions and then change our behavior based on the consequences.”

The researchers followed 51 individuals diagnosed with [alcohol dependence](#) who entered an outpatient alcohol treatment program, matched with 26 light-drinking control subjects. NAA and creatine were measured within four to ten days after the drinkers entered treatment.

One year later, the researchers looked at who among the alcoholics had stayed sober and who had relapsed, and compared their admission MRI data with that of the controls. They found that at the time of admission to treatment, the future relapsers had NAA and creatine levels that were significantly lower compared with both the controls and the future abstainers, while the abstainers’ levels did not differ from those of the controls.

“This study adds to the accumulating evidence that there are structural and biochemical abnormalities in the brain reward system in people who have chronic problems with substances and alcohol,” says principal investigator Dieter Meyerhoff, Dr. Rer. Nat., senior researcher at SFVAMC and professor of radiology and [biomedical imaging](#) at UCSF.

Durazzo notes that the majority of both the abstainers and the relapsers had been in treatment for drinking at least once before. “So, there are a number of questions to answer,” he says. “What, if anything, was different this time for the abstainers at the time they entered treatment? Had their brain neurobiology changed since their last treatment? Looking at the relapsers - did they have these biochemical abnormalities before they even started drinking at hazardous levels? Has chronic hazardous drinking interacted with a potential genetic predisposition to keep them locked into a chronic pattern of relapse? This will be addressed in future research.”

Alcohol and substance dependence are extremely complex issues, says Durazzo. “Speaking broadly, there are always social, cognitive, psychiatric, and biological issues that contribute to [alcohol](#) and substance abuse, and they interact differently in each individual. This study of the potential biological factors is simply one piece of a much larger puzzle that we’re just starting to fill in.”

Ultimately, he says, “the hope is that if we better understand the biological factors related to relapse, we can combine this information with knowledge of a patient’s social, cognitive, and psychiatric functioning to more thoroughly evaluate his or her risk of relapse. This may allow us to better tailor treatments.”

Provided by University of California, San Francisco

Citation: Alcoholics who stay sober have healthier brain reward systems than those who relapse (2010, April 29) retrieved 9 May 2024 from <https://medicalxpress.com/news/2010-04-alcoholics-sober-healthier-brain-reward.html>

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