

Adolescent Rats Help Prove that Early Exposure to Alcohol can Quickly Lead to Heavy Drinking Patterns

- *While adolescence is a vulnerable time for alcohol and drug experimentation, not all adolescents develop problems.*
- *A new study using rodents has found that drinking patterns can emerge quickly among adolescents.*
- *These findings suggest that humans who consume large quantities of alcohol during early exposure are those most likely to later become heavy drinkers*

No one can become alcohol dependent (AD) without repeatedly drinking alcohol, but not everyone who does so will become AD. Certain characteristics – adolescence, novelty seeking, reaction to stress, and response to first alcohol exposure – are believed to influence the vulnerability of developing AD. A new study using adolescent rats has found that early exposure to alcohol during adolescence can quickly lead to heavy drinking patterns.

Results are published in the May issue of *Alcoholism: Clinical & Experimental Research*.

“We know that adolescence is a vulnerable time,” explained Nicole L. Schramm-Sapyta, research associate in the department of pharmacology and cancer biology at Duke University Medical Center.

“People who start drinking the earliest tend to be the most likely to develop drinking problems,” said Schramm-Sapyta. “But we also know that not all adolescents get into trouble with alcohol and other drugs. We wanted to examine, within an adolescent population, whether these early ‘big drinkers’ were different in some way ... if they had individual characteristics that were responsible for the drinking. We chose to examine novelty seeking and stress because these are two characteristics we see in some populations that develop problem drinking.” Schramm-Sapyta is the study’s first author.

Researchers examined 48 male Sprague-Dawley rats that were 28 days old – the equivalent of rodent adolescence. The rats were exposed to an elevated-plus maze (to measure anxiety) as well as open-field locomotion and novel-object exploration (to measure response to novelty), and also had their blood collected after the maze (to measure stress hormone levels). After testing, the researchers measured how much each rat drank in special lickometer cages. The rats were habituated to the cages with water, which was then switched to an alcohol (10% v/v) solution for three nights, followed by a choice between the water or alcohol solutions for 10 consecutive nights. After two nights of abstinence, the rats were once again given a day’s choice between the water or alcohol solutions in order to measure relapse-like behavior.

“Our key finding is that drinking patterns may be established after only a few exposures to alcohol,” said Schramm-Sapyta. “Rats that demonstrated a ‘taste’ for alcohol after only three nights of drinking were very likely to be the biggest drinkers after longer-term exposure to alcohol.”

“The adolescent drinking in this study likely relates to those rats with low sensitivity to the sedative effects of alcohol, coupled with high consumption for adolescents in general,”

commented Fulton T. Crews, Director of the Center for Alcohol Studies at the University of North Carolina. “These findings support the interaction of genetics and environmental exposure to alcohol during adolescence as determining life-long drinking. They also support the hypothesis that adolescent drinking may predict risk of alcohol problems.”

Another key finding, said Schramm-Sapyta, was related to the *negative* results of the study: that measures of novelty seeking and stress responsiveness were *not* related to drinking outcomes. “This suggests that there are other characteristics that we as scientists should be looking for, which are related to the early experiences of drinking.”

Schramm-Sapyta extrapolated these findings to humans, saying that people who drink to excess when they first begin might be at higher risk for developing alcoholism. “The findings suggest that early ‘big drinkers’ are the people who should be targeted for alcoholism-prevention efforts,” she said. “Of course, the findings do not tell us what we should do to help those people, or why they are big drinkers so early in their experience. Future work will focus on determining other factors which can help to more accurately predict which rats will fall into that group.”

Both Schramm-Sapyta and Crews said these findings have important implications for parents, as well as parental monitoring. “They suggest that parents should understand the norms of adolescent drinking, that a small amount of drinking is normal,” said Schramm-Sapyta. “Drinking will need to be addressed when one’s child is *outside the norm* of his or her peers and other teenagers, or if the child endangers himself or others.”

Or, there is another option, said Crews: “Just dont give your kids alcohol.”

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Articles were written based on the following published research:

Nicole L. Schramm-Sapyta, Megan A. Kingsley, Amir H. Rezvani, Kiayia Propst, H. Scott Swartzwelder, Cynthia M. Kuhn. (May 2008). Early ethanol consumption predicts relapse-like behavior in adolescent male rats. *Alcoholism: Clinical and Experimental Research (ACER)*. 32:(5), 754–762.