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The Center for Alcohol Studies (CAS) and the Morehead Planetarium and Science Center at UNC have worked together to develop a Science 360 module, “The Developing Brain,” to help viewers understand the important parts of the brain that affect cognition; reasoning, learning and comprehension are identified.

For the presentation, the audience is provided with i-clickers, tools that allow viewers to answer multiple choice questions throughout the presentation that correspond to the information in the program, with the audience results displayed on screen. This approach allows a fun and interactive learning experience as audience members learn about the effects of alcohol on a developing embryo and fetus.

In “The Developing Brain,” audiences learn the amount of time it takes the brain to start developing in utero and how large an embryo is in its third week, when it is already vulnerable to alcohol-mediated damage. Audiences also learn that researchers use animal models to study the effects of alcohol on the brain, as animals, such as mice and fish, have brains that develop in similar ways to humans.

“What audiences should take away from this presentation is that the brain begins to develop very early in pregnancy, and alcohol can affect its development beginning at these very early stages until birth,” said Sulik. “This program is designed for everyone, but we really hope it will provide youth awareness about the effects of alcohol and subsequently aid in FAAs prevention.”

A team of educators, including scientists, writers, producers, and designers, create each Science 360 program. Each module is presented by trained Morehead specialists; typically UNC graduate students in varying fields. “The Developing Brain” is supported by a grant from the National Institute on Alcohol Abuse and Alcphism and will run through the end of the year.

Two additional learning modules on alcohol, directed at elementary, middle, and high school students, are in the planning stages for next year. For more information on this and other Science 360 programs, please visit http://www.moreheadplanetarium.org.

It’s been fourteen months since I walked into my first Alcoholics Anonymous meeting. It’s about thirteen months since I started working the Twelve Steps. [Then] why did I buy the bottle of Margaritas and drink it on December 21st? ... As soon as the bottle touched my lips I hated myself. How could I do this to myself anymore after all I’d been through in the past year? I wanted to throw the bottle through the window and get far away from it but I knew I would hug it near me until it was empty.

From “An Alcoholic Relapses” by Vicky S.

In alcoholism, the frequent occurrence of relapses such as the one Vicky S describes is the norm rather than the exception. Many alcoholics try to stop drinking and fail. Half to two thirds of alcoholics who attempt abstinence relapse within months of initiating treatment. Even alcoholics who have been abstinent for years are prone to relapse.

Most alcoholics relapse several times before achieving complete recovery. Relapse can devastate alcoholics and their families, cause or perpetuate serious health problems, and result in lost jobs. Although relapses often seem sudden and unpredictable, with causes inscrutable even to the alcoholic, scientific research suggests that relapse is provoked by specific, identifiable factors. Identification of these factors could help to pave the way for developing interventions that can decrease the probability of relapse. Dr. Gregory Breese, Professor of Psychiatry and Pharmacology at the Bowles Center for Alcohol Studies, is at the forefront of efforts to elucidate the causes of relapse and to discover means of preventing it. A productive and respected leader in alcohol research with approximately 400 publications to his name, Breese uses animal models to study mechanisms and manifestations of alcohol addiction.

Breese and his colleagues are particularly interested in the emotional factors that can lead to craving and relapse. Working with Drs. Darin Knapp and David Overstreet, Breese established several years ago that multiple withdrawals from moderate alcohol exposure causes kindling of negative affect (anxiety and dysphoria). In kindling, repeated stimulation sensitizes brain circuits such that they are more easily activated in response to subsequent stimulation. This sensitization is reflected in the finding that behaviors or emotional responses mediated by these brain circuits are more easily elicited. Breese found that moderate alcohol drinking was followed by a negative affect (anxiety-like reductions in social interaction) during alcohol abstinence that could be sensitized (kindled) by exposing rats to three 5-day regimens of alcohol-containing diet with two days of abstinence between each regimen. The Breese laboratory measures negative affect in rats with the social interaction test, which quantifies the level of social behavior between pairs of rats. Rats are normally very social animals; decreases in social interaction behavior among rat pairs in the social interaction test is interpreted as reflecting the presence of anxiety and negative affect. Rats exposed to repeated withdrawals showed more negative affect in the social interaction test than rats exposed to the same concentration of alcohol given continuously over 15 days with only one period of abstinence at the end of alcohol exposure. After the negative affect associated with repeated withdrawals had abated, re-exposure to a single 5-day treatment and withdrawal

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Understanding the mechanisms of anxiety and persistent changes in mood will help many who suffer from anxiety in alcohol dependence and many other brain pathologies associated with anxiety. For example, a recent study demonstrated that the subsequent mood of offspring, but it is clear alcohol can harm the fetus and prevention can stop it. Science 360 is directed at school children, but physician education of patients is also important. Our center uses all approaches, basic mechanisms of brain adaptation coupled with prevention messages for youth and adults. Hopefully, one or all will improve health.

This issue of the Center Line reflects the broad spectrum of health effects of alcohol. Our Center’s faculty cover areas including fetal development, medical screening for substance abuse problems.

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