

When 'just say no' isn't enough: Try science

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Teens are fascinated by their brains, the way they work, change, and even "freeze" sometimes. The American Association for the Advancement of Science (AAAS) recommends that parents, teachers and caregivers use that fascination to engage middle and high school students this holiday season in a discussion of why they shouldn't drink alcohol.

"Parents need every tool they can find to convince their teens not to drink alcohol, particularly during the holiday season," says Shirley Malcom, head of the Education & Human Resources Directorate at AAAS. "Science is such a tool, and it is providing new insights on alcohol's effects on the maturing brain."

Scientists used to believe that human brains finished developing before adolescence. But according to The Science Inside Alcohol Project, an alcohol education effort of the AAAS that is funded by the National Institute on Alcohol Abuse and Alcoholism (NIAAA), new and ongoing brain research shows that important brain regions and their interconnections are still developing well into a person's twenties.

The brain is made up of more than 100 billion neurons, each making tens of thousands of connections. Alcohol can damage or even kill neurons, perhaps altering development of those parts of the adolescent brain that are still forming. Research suggests that alcohol can cause teens to:

-- Make bad decisions. The prefrontal cortex, which is involved in

planning and decision-making, does not completely mature until after the teen years. Using alcohol can harm a teen's ability to reason and weigh options instead of just doing something because it is fun or feels good.

-- Develop a tolerance for alcohol and drink more over time. When adolescents drink on multiple occasions, their brains develop tolerance to alcohol, requiring more alcohol to obtain the same effects as previously. This encourages higher levels of use, potentially leading to alcohol abuse and even dependence. The highest rates of abuse and dependence on alcohol have been reported among youth in their late teens and early twenties, followed by 12-17 year olds.

-- Take risks they usually would not take. Connections between regions of the prefrontal cortex and the ventral striatum, an important part of the brain's reward system, are important in regulating impulsive behavior and are still maturing during adolescence. Alcohol can affect those connections, making teens more likely to do impulsive things they later may regret – like drinking and driving or having sex.

-- Harm their memories. The hippocampus, or the area in the brain that stores memory, is still maturing during adolescence. Research shows that ingesting even small amounts of alcohol can make teens less likely to recall something they learned earlier or remember what they did while drinking.

-- Cause problems with medications. Medication for attention deficit disorder, bipolar disorder or other problems with the brain may react badly with alcohol. For instance, if a teen takes Ritalin and drinks alcohol it may increase the effects of Ritalin, affecting the ability to perform tasks that require complete concentration. For those taking lithium for bipolar disorder, drinking alcohol, particularly in large quantities, can impair judgment, thinking and motor skills.

Source: American Association for the Advancement of Science

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