

Adolescent exposure to anesthetics may cause alcohol use disorder, new research shows

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Early exposure to anesthetics may make adolescents more susceptible to developing alcohol use disorder (AUD), according to new research from Binghamton University, State University of New York.

David Werner, associate professor of psychology, and Linda Spear, distinguished professor of psychology, led a team of Binghamton University researchers in examining whether exposure to anesthetics during adolescence could affect a person's response to alcohol in adulthood, especially the development of AUD.

Anesthetics are commonly used drugs in the healthcare field and are often administered to children to induce unconsciousness and immobility during surgeries.

Researchers discovered that [anesthetic](#) exposure during adolescence may be an environmental risk factor that leads to an increased susceptibility to developing AUD later in life. Although not all adolescents who drink alcohol develop AUDs, Werner said it's important to identify risk factors that contribute to an increased susceptibility to [alcohol abuse](#).

"This is highly concerning," Werner said. "Given that although the age of initiation and subsequent bingeing during adolescence are linked to alcoholism later in life, apart from stress, it was not clear what other environmental factors may play a role. This study now highlights a previously overlooked contributor."

To test this, researchers exposed early-[adolescent](#) male rats to isoflurane, a general anesthetic, in short durations and tested them on various alcohol-induced behaviors later in adolescence or adulthood.

The team found that exposure to anesthetics in adolescence had extremely similar behavioral and neural effects as adolescent chronic alcohol exposure. During their study, the adolescent rats exposed to isoflurane had a decreased sensitivity to the negative effects of alcohol, such as its aversive, sedative and socially suppressive effects. These rats also showed an increase in voluntary alcohol consumption and cognitive impairment, and certain behaviors continued into adulthood after their initial anesthetic exposure.

These results further suggest that exposure to anesthetics during adolescence, while in some cases is necessary, may have unintended consequences that incubate over time.

"Apart from infancy to [early childhood](#), adolescence can be considered the most critical developmental stage following birth," Werner said. "Given that adolescence is a time-period that most often coincides with initial exposure to drugs of abuse, primarily alcohol, we initially performed a retrospective analysis of [alcohol](#) responding to our previous data with regard to adolescents that had experienced a surgical event. Noting a potential difference, we then wanted to empirically test whether or not the relationship between adolescent anesthetic exposure and behaviors linked to [alcohol use disorder](#) susceptibility."

Although the use of anesthetics is vital for certain surgeries and can't be avoided, Werner said it's important to know the drug's potential effects.

"Above all, anesthetics are necessary—which obviously is why they are rightfully included in the essential medicines by the World Health Organization," Werner said. "In the event that the health condition of

children and adolescents necessitates an operative procedure, then these should absolutely be used. That being said, we hope that this work can be used to inform people, especially younger individuals considering elective procedures that could be delayed into adulthood such as plastic surgery or weight loss procedures, as well as potentially leading to additional screening diagnostics to help identify individuals who may have greater drug use disorder susceptibility."

Werner plans to continue research on this topic and hopes to examine whether the effects from anesthetics are similar to other substances, as well as the underlying molecular mechanisms in the brain and individual differences.

The paper, "General Anesthetic Exposure During Early Adolescence Persistently Alters Ethanol Responses," was published in *Alcoholism: Clinical and Experimental Research*.

More information: Justine D. Landin et al, General Anesthetic Exposure During Early Adolescence Persistently Alters Ethanol Responses, *Alcoholism: Clinical and Experimental Research* (2020). [DOI: 10.1111/acer.14291](https://doi.org/10.1111/acer.14291)

Provided by Binghamton University

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