

USU Researchers Study Teen Nicotine Addiction Using a Vaping System for Rats

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Dr. Amy Odum, a professor of Psychology at Utah State University, is researching ways to address adolescent nicotine usage with a new method to study nicotine addiction in rats. Supported by a grant from the National Institute on Drug Abuse, Odum is joined in this research by Psychology assistant professor Dr. Brenna Gomer, Psychology graduate research assistant Mariah Willis-Moore, and Dr. Abby Benninghoff, a professor in department of Animal, Dairy and Veterinary Science, as well as undergraduate researchers Kiernan Callister, Preston Alden, and Lucy Scribner.

In a study published by the U.S. Centers for Disease Control and Prevention and the U.S. Food and Drug Administration in 2022, 2.5 million middle and high school students in the U.S. reported current e-cigarette use. E-cigarettes contain nicotine in similar or sometimes higher concentrations than traditional cigarettes, and their lack of smoke and use of fruity or sweet flavors can be appealing to many who would otherwise not smoke. E-cigarettes have become the most used tobacco product among U.S. youth since 2014, presenting a growing health crisis. Nicotine is a highly addictive substance that can be damaging to adolescent brain development and may increase risk for future addiction to other substances.



Dr. Amy Odum

The rising trend of e-cigarette usage among adolescents was a significant motivator for Odum to pursue this area of research. "I was mom to three teenagers during the beginning of the teen vaping epidemic and was really alarmed by how prevalent it became so quickly," she said. "I wanted to do research to help understand the dangers from a psychological, behavioral, and physiological perspective."

To study the factors that influence nicotine addiction among youth, Odum and her team are in the final stages of developing the Rodent Electronic Nicotine Delivery System (RENDs), a novel system that allows rats to voluntarily inhale nicotine. "It may surprise you, but rats share common neurobiology of addiction with humans," said Odum. "If we can figure out what makes rats voluntarily vape nicotine, it can help us prevent and treat nicotine addiction in people." Odum's team will examine factors such as biological sex, use of fruity flavors, and epigenetics to determine what influences the rats' interest in using the RENDs. Additionally, because nicotine can change genetic expression and increase a user's vulnerability to addiction, the researchers are ultimately seeking a way to block that effect of the drug to help users recover.

As the project continues, the data the team collects will help illustrate the psychological and physiological impacts of vaping, contributing to the development of therapeutics and strategies to prevent people from vaping and help them quit. Odum is hopeful that the research project will be able to receive funding from the Tobacco Regulatory

Science program so that the RENDS can be used to help inform national tobacco regulations to protect adolescents from the dangers of vaping.