

Drug & Alcohol Abuse

New Treatments for Nicotine and Methamphetamine Abuse

Linda Dwoskin is on a search-and-find mission. In two related projects—one focused on nicotine and the other on methamphetamine—she is trying to find small molecules that block receptors and transporter proteins responsible for the “reward” associated with nicotine and methamphetamine use. These molecules might serve as therapeutic agents to help those hooked on the drugs, Dwoskin says. In this work, she is teaming up with UK colleagues Peter Crooks (pharmaceutical sciences) and Michael Bardo (psychology).

“The first project is focused on discovering small molecules that block nicotine receptors, proteins located in neuronal membranes in the brain. We chemically modify these molecules. Then, we see how they interact with specific nicotine receptors and determine their ability to block the rewarding effects of nicotine,” says Dwoskin (pharmaceutical sciences).

The most promising compounds are tested in animals, in this case rats conditioned to press a lever to get IV nicotine. NIH is supporting this work with a grant of more than \$6 million, the largest single award ever received by the College of Pharmacy.

The second project, focused on methamphetamine abuse, is centered on lobeline, an alkaloid from American Indian tobacco. “After determining that lobeline blocked the neurochemical effects of methamphetamine, we found that when rats that press levers to obtain IV methamphetamine are given lobeline, they don’t want the drug anymore. This was very encouraging evidence from animal studies,” Dwoskin says.

This was such good news, in fact, that the researchers patented lobeline as a methamphetamine-blocking agent, and Crooks and Dwoskin began working with investors in 2002 to form a company, Yaupon Therapeutics Inc., to further develop and market lobeline and agents from other native Kentucky plants.

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Fighting Drug and Alcohol Abuse

Devising effective ways to counter drug addiction and abuse is the goal of the Center for Prevention Research, which was established at UK in 1987. It was the first such U.S. center funded by the National Institute on Drug Abuse.

“In recent years much of our focus has been on changing the behaviors of smokers,” says Richard Clayton, center director and associate dean for research in UK’s College of Public Health. For more than 20 years, he has been actively promoting the Cooper/Clayton Method to Stop Smoking, which he developed with UK faculty member Thomas Cooper, a dentist and former heavy smoker. This successful science-based smoking cessation program uses education, skills training and social support in combination with use of nicotine replacement products.

Ten years ago, Clayton became the director of an experimental program funded by the Robert Wood Johnson Foundation for \$8 million. “We put together an interdisciplinary group—called the Tobacco Etiology Research Network—which consists of 24 scientists from institutions around the country. These scientists have conducted groundbreaking research and have published their results in nearly 75 articles.”

Recently, the group studied 912 freshmen for 35 weeks at Purdue University on their use of tobacco, alcohol and marijuana. “We found that a number of students who finish their exams early stay on campus for some partying before going home,” Clayton says. “So it’s the link between alcohol and tobacco consumption during final exam weeks that causes an increase in smoking rather than the belief that nicotine helps lower stress and intensify concentration, as researchers previously hypothesized.”



Therapeutic Storytelling

For the past decade, Carl Leukefeld, director of the UK Center on Drug and Alcohol Research, and several colleagues have been using the Appalachian tradition of storytelling to treat drug and alcohol addiction in several Eastern Kentucky communities, a project funded by the NIH.

Therapeutic storytelling, also called structured stories, is a behavioral intervention to increase the involvement and engagement of people at risk for substance abuse. Therapeutic stories create a familiar situation with an open ending for participants to complete in their own words. Providing an ending gives each person the chance to practice new and individual solutions to difficult and risky situations, Leukefeld explains.

Here’s how it works. The therapist tells a scripted story focused on drug or alcohol use that is designed to elicit responses about personal experiences. The group then discusses the damaging role of drugs and alcohol in their own lives.

In one trial of 500 people, the control group got traditional interventions, including discussions between a counselor and a client focused on the client’s attitudes, behavior and employment—and the other group added structured stories. The storytelling group was more successful in keeping their jobs as compared to the treatment-as-usual group. In addition to its storytelling component, this approach combined social skills training and “thought mapping”—writing thoughts and behaviors on paper to create an “attitudinal road map”—to help substance abusers change their behavior and, ultimately, become drug- and alcohol-free.

Building on the success of this approach, Leukefeld is now involved in a clinical trial that incorporates structured stories for women prisoners reentering their community. The focus is to help women change risky partner relationships.