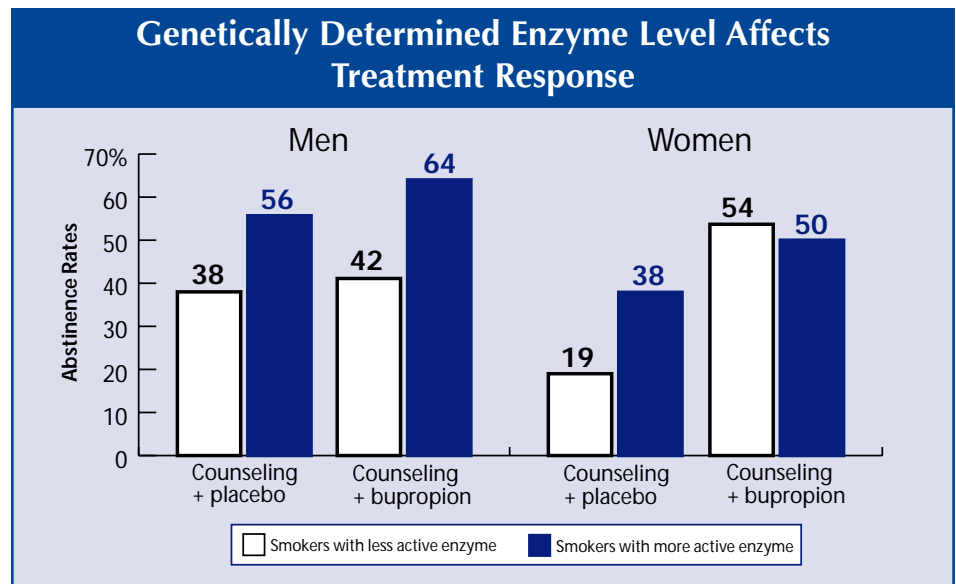


Genetic Variation May Increase Nicotine Craving and Smoking Relapse

By Patrick Zickler
NIDA NOTES Staff Writer

Smokers who want to quit can get help with a variety of treatments, including counseling, nicotine replacement therapy (patches, gum, lozenges, or inhalers), and medications. Some smokers use these treatments and succeed; for many, however, the discomfort of withdrawal and craving for nicotine lead to relapse. Recent NIDA-funded research suggests that our genes may partly explain this variable success.

The research evaluated the effect of an enzyme, designated CYP2B6, on craving and relapse. This enzyme breaks down nicotine in the brain. Some people's genes produce a more active form of the enzyme, while others have a less active form. Dr. Caryn Lerman at the NIDA- and NCI-supported Transdisciplinary Tobacco Use Research Center (TTURC) at the University of Pennsylvania found that



In a study of 426 smokers in a 10-week smoking cessation program, those with a gene form that decreases activity of an enzyme that metabolizes nicotine reported greater craving and were less likely to achieve abstinence during treatment than were participants with the gene form that increases the enzyme's activity. Supplementing counseling with bupropion helped women with the less active enzyme nearly triple their abstinence rate to 54 percent—roughly equal that of women with the more active enzyme.

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among smokers enrolled in a smoking cessation program, those with the genetic variant that decreases activity of CYP2B6 reported greater craving than did those with the more active form of the enzyme. Moreover, those with the less active enzyme were 1.5 times more likely to resume smoking during treatment.

The same enzyme helps break down bupropion, an antidepressant medication that acts on the brain's dopamine system—where nicotine exerts much of its

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Prevention strategies for sensation-seeking youths and others, p. 5



Multicultural prevention program effective, p. 8

Correction

Our story “New Animal Model Simulates Human Cocaine Use, Confirms Harm from Prenatal Cocaine,” in Volume 18, Number 1, inadvertently implied that Dr. Bret Morrow and colleagues originated the use of intravenous cocaine administration in rats to simulate human drug exposure patterns. This technique has been reported by several labs. The innovation of Morrow and colleagues was to combine i.v. administration with a short-term memory test that does not require training or subjecting the animal to stress.

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NIDA's home page:
www.drugabuse.gov

- NIDA's home page** includes:
- ➔ Information on Drugs of Abuse
 - ➔ Publications (including *NIDA NOTES*)
 - ➔ Calendar of Events
 - ➔ Links to NIDA Organizational Units
 - ➔ Funding Information
 - ➔ International Activities
 - ➔ Links to Related Web Sites





Bringing Research and Practice Together To Improve Drug Abuse Prevention

By NIDA Director Nora D. Volkow, M.D.

Each year, substance abuse and addiction contribute to the death of more than 120,000 Americans and cost taxpayers nearly \$300 billion in preventable health care, law enforcement, crime, and other costs, according to the U.S. Department of Health and Human Services. For NIDA, the key word in this assessment is “preventable.” The best approach to reducing the tremendous toll substance abuse exacts from individuals, families, and communities is to prevent the damage before it occurs.

The science of drug abuse prevention is still in its early stages. Yet it has already made great strides. Twenty-five years ago, drug abuse prevention programs, where they existed, were based primarily on ideology and good intentions. Today, we have effective prevention programs anchored solidly in a base of empirical knowledge about fundamental factors that can promote or reduce substance abuse. These research-based programs have demonstrated that we can modify individual, family, peer, and community factors that we know to be risk factors for drug abuse and, in this way, steer many young people away from abusing drugs. Two NIDA-sponsored National Prevention Conferences and a research-based guide on preventing drug abuse by children and adolescents synthesize key findings, detail fundamental

prevention principles, and describe programs that have successfully applied these principles.

While recognizing these accomplishments, we are also compelled to do better to protect our children and adolescents. Buoyed by our successes and encouraged by our ongoing research, we know that science can do more to make drug abuse prevention more effective. The most urgent need is to make better use of what we already know. Recent research indicates that only one in seven of the Nation’s public and private schools offers prevention programs that incorporate proven elements and deliver them in the most effective way (see “Few Middle Schools Use Proven Prevention Programs,” *NIDA NOTES*, Vol. 17, No. 6). These findings underscore the need for additional research focused on accelerating the faithful adoption and application of research-based prevention approaches in communities across the Nation.

The difficulties inherent in translating precisely structured research-based programs into the culture and operations of diverse communities require that the scientists who develop programs and the practitioners who deliver them work together effectively to improve drug abuse prevention. Toward this end, NIDA has been promoting a working alliance between research and practice to identify programmatic, organizational, and local

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*Buoyed by our successes
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Bringing Research and Practice Together To Improve Drug Abuse Prevention

continued from page 3

circumstances that foster or forestall the adoption and effective implementation of research-based programs by communities, schools, and service delivery organizations. A primary goal of this partnership is improved delivery of currently available interventions.

Our recently launched National Prevention Research Initiative (NPRI) has fast-forwarded this research-practice partnership with four large-scale community trials of programs that have been shown to prevent drug abuse on a smaller scale. In these trials, scientists and practitioners are delivering a research-tested intervention to populations in urban, suburban, and rural sites. Each trial examines specific implementation factors, such as how different training methods affect a program's delivery or how accurately the staff of a community service program delivers an intervention to different groups in various settings. Results of these studies should reveal systemic, structural, and other barriers to implementation and strategies to overcome these barriers. Ultimately, this information will enable many more communities to adopt research-based programs and use them effectively to prevent drug use. (For more information on NPRI, see "NIDA National Prevention Research Initiative Begins Broad Range of Studies," p. 5.)

Blending the knowledge gained from research with the realities of the community practitioner should do more than accelerate the adoption of current prevention programs. It also should foster the development and testing of the next generation of

prevention programs. Data from our field studies will inform the new prevention approaches that flow from NPRI's expanded basic and transdisciplinary prevention research and make them more feasible. Thus, tomorrow's prevention programs will more closely reflect the practical circumstances of the practitioners, the community settings in which programs are delivered, and the children, youths, and families who will take part in them.

Tomorrow's prevention programs will more closely reflect the practical circumstances of the practitioners, the community settings in which programs are delivered, and the children, youths, and families who will take part in them.

Because our schools play such a central role in preventing drug abuse, NIDA is particularly interested in bridging gaps between the researchers and practitioners who develop and deliver drug abuse prevention programs in our Nation's public and private schools. In April, NIDA took an important step toward this goal by bringing together educators,

researchers, and representatives of Federal and State funding agencies to discuss school-based prevention at a 2-day meeting in Bethesda, Maryland. More than 100 meeting participants explored the many challenges to and opportunities for conducting prevention research in schools and in integrating research-based programs into the school curricula and operating environment. Meeting these challenges and seizing these opportunities will be key to improving the feasibility and effectiveness of school-based prevention programs and increasing their impact on young people's drug abuse.

The final step in getting effective approaches working in the community is communicating the latest scientific findings on preventing drug abuse to those who are in a position to apply them. To accomplish this, we are building on the success of our first research-based guide to preventing drug abuse among children and adolescents. An updated version of the guide synthesizes the significant advances in prevention science during the last 5 years and makes them accessible to parents, teachers, and community leaders. (See Tearoff, "Education in Action: NIDA Goes Back to School," p. 15).

Our National Prevention Research Initiative, our conferences and meetings, and our dissemination of the latest prevention information demonstrate NIDA's strong commitment to closing the gaps between prevention research and practice. This blending of science-based knowledge with community realities will result in wider adoption of more effective programs and major progress toward the ultimate goal: that far fewer of our Nation's children and adolescents become snared in the destructive web of drug addiction. **NN**

NIDA National Prevention Research Initiative Begins Broad Range of Studies

By Robert Mathias
NIDA NOTES Staff Writer

NIDA's National Prevention Research Initiative (NPRI) has embarked on the next generation of prevention research. NIDA launched the comprehensive initiative last year with three requests for research that could accelerate the development of new approaches to preventing drug abuse and the adoption of research-based programs by communities in the United States. Now, a broad range of newly funded studies has put NPRI on a fast track to achieving its goals. The studies range from basic behavioral research to large-scale trials of proven prevention programs.

"We already have many interventions and prevention strategies that we know work," says Dr. Elizabeth Robertson of NIDA's Division of Epidemiology, Services and Prevention Research. "Instead of continuing to focus research on developing similar programs, NPRI is breaking new ground in all areas of prevention research. Basic studies are looking at fundamental features that could be incorporated into new prevention approaches. Comprehensive research centers are tapping knowledge from multiple scientific disciplines and applying them to innovative prevention approaches. And large-scale field trials are studying the implementation of research-tested programs at multiple sites with diverse populations."

Recently funded studies within each of three NPRI complementary components include the following efforts.



One recently funded study under the National Prevention Research Initiative seeks to identify more effective prevention strategies for high-sensation-seeking youths, whose strong need for stimulation places them at heightened risk for substance abuse. The study is examining how this population's motivation to seek reward affects how they respond to drug abuse prevention messages.

Basic Prevention Research

Studies in this arena seek to increase understanding of fundamental aspects of human behavior. Research findings will point to possible new prevention approaches or ways to improve existing programs. For example, more effective approaches are needed for youths with a strong need for stimulation that drives them to pursue new and thrilling experiences. These high-sensation-seeking (HSS) youths are known to be at increased risk for substance abuse. One of the first basic NPRI grants is a communications study assessing how basic differences in HSS youths' motivation to seek reward or avoid harm affect their responses to drug abuse prevention messages. Findings from this small lab study could aid the design of more precisely targeted media

messages to deter drug use among youths with this personality trait.

Transdisciplinary Prevention Research Centers (TPRCs)

TPRCs will focus the collaborative efforts of neuroscientists, behavioral and cognitive scientists, and drug abuse prevention researchers on a specific research area that has the potential for producing new approaches to drug abuse prevention. Working as a team, TPRC scientists will synthesize and translate basic science discoveries in these areas into new prevention approaches. They will also study the underlying biological, psychological, and social processes that account for the outcomes of successful research-based programs and develop and test new prevention hypotheses based on their findings.

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Genetic Variation May Increase Nicotine Craving And Smoking Relapse

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addictive influence—and helps some smokers quit. Dr. Lerman, along with colleagues at Georgetown University in Washington, D.C., the State University of New York at Buffalo, and Brown University in Providence, Rhode Island, also investigated the relationship of CYP2B6 activity with bupropion treatment. They found that bupropion nearly tripled the success rate for women with the less active enzyme.

“These findings provide initial evidence that smokers who have decreased CYP2B6 activity experience greater craving for nicotine than those with the more active form of this enzyme,” Dr. Lerman says. “Perhaps of greater interest is the preliminary evidence that, among women, bupropion may overcome the effect this genetic predisposition has on relapse.”

Genes, Treatment, and Abstinence

Most people—about 70 percent of the U.S. population—inheriting two copies of the “C” variant of the gene that influences CYP2B6 activity. The rest of the population inherits from one or both parents the less common form of the gene—the “T” variant associated with decreased CYP2B6 activity. Among the 426 participants (232 men, 194 women) in the TTURC study, 128 (29.6 percent) had one or two copies of the T form of the gene. All participants received counseling to quit smoking; 229 received bupropion (300 mg/day) and 197 received placebo throughout the 10-week study. The participants provided

weekly reports on craving and smoking rates. Abstinence (7 consecutive days without smoking) was verified with blood tests. At the end of treatment, participants who received counseling and bupropion had higher abstinence rates than those who

This study suggests that properly selected treatment matched to a patient’s characteristics can improve a smoker’s chance of quitting.

received counseling and placebo. With one exception, participants with the less active enzyme had lower abstinence rates than those with the more active enzyme. Women with the less active enzyme who received bupropion showed the largest treatment effect, with 54 percent achieving abstinence, up from a 19-percent rate among women in the placebo group, notes Dr. Lerman.

Theories To Explain Outcomes

The higher abstinence rate with bupropion for women with the lower

activity enzyme may be due, in part, to reduced susceptibility to low moods that accompany nicotine withdrawal; overall, women reported more negative feelings than did men when asked to rate their mood during withdrawal. “This rate may reflect better management of the negative moods and craving that abstinence can create. But more study is needed to clarify the mechanisms by which bupropion influences smokers’ success in quitting,” Dr. Lerman says.

Researchers theorize that the association between the less active enzyme and increased craving could be the result of nicotine’s remaining longer in the brains of smokers with the less active enzyme. When nicotine lingers in the brains of these smokers, it may change their brain cells more profoundly than those of smokers with the more active enzyme. If so, the changes might produce more severe addiction marked by more intense craving during abstinence and increased risk of relapse.

“This study offers additional evidence of the important role genes play in smoking and treatment,” says Dr. Joni Rutter of NIDA’s Division of Neuroscience and Behavioral Research. “While illustrating the increased craving and vulnerability to relapse that may be associated with inherited traits, it also suggests that properly selected treatment matched to a patient’s characteristics—in this case, bupropion for some women—can improve a smoker’s chance of quitting.”

Source

• Lerman, C., et al. Pharmacogenetic investigation of smoking cessation treatment. *Pharmacogenetics* 12(8):627-634, 2002. **NN**

Discovering, Developing, and Delivering Smoking Cessation Medications Is Focus of NIDA Symposium

By Patrick Zickler
NIDA NOTES Staff Writer

NIDA, joined by the National Cancer Institute (NCI) and the National Institute on Alcohol Abuse and Alcoholism (NIAAA), sponsored a symposium on drug discovery, development, and delivery as part of the 2003 Annual Meeting of the Society for Research on Nicotine and Tobacco. More than 300 researchers, treatment providers, and policymakers attended the 1-day meeting on February 9 in New Orleans. The symposium featured discussions of current efforts to discover new targets for potential medications, the development of medications based on existing knowledge of nicotine's effects in the brain, and factors that might speed the delivery of new treatments to smokers who want to quit.

During the discovery section of the program, speakers discussed recent findings in nicotine receptor biology and the role of neurotransmitters, such as gamma-aminobutyric acid (GABA) and glutamate, in nicotine's effects on the brain. The presentations on medication development provided a background on the drug development process; emerging medications, such as antidepressants and nicotine vaccines; and an overview of medications now in development. The delivery portion of the symposium focused on strategies to create widespread medication access and use by individual smokers and within the health care system.

Discovery. Dr. William Corrigan, director of NIDA's Nicotine and

Tobacco Addiction Program and symposium moderator, described the neurobiological targets of current research: genes and gene products that play a role in the structure and response of nicotinic receptors and in brain signaling pathways that involve the neurotransmitters dopamine, GABA, serotonin, and glutamate.

Dr. Caryn Lerman, of the University of Pennsylvania in Philadelphia, further explored the genetic factor in nicotine research, describing studies on the effect of genetic variations on the activity of enzymes that metabolize nicotine (see "Genetic Variation May Increase Nicotine Craving and Smoking Relapse," p. 1.)

Dr. Marina Picciotto, of Yale University in New Haven, Connecticut, discussed research that has expanded our understanding of the role of nicotine receptors—the sites at which nicotine attaches to brain cells. This portion of the program also featured discussions of the possibility that neurotransmitters other than dopamine might represent new avenues for pharmacotherapy. For example, Dr. Julie Staley, also of Yale University, described current investigations into

Nicotiana tabacum— Tobacco

Growing Area:

North, Central, and South America

Active Component: *Nicotine*

Annual U.S. Deaths From Smoking-Related Causes: *Nearly 450,000*

Annual U.S. Health-Related Economic Costs: *More Than \$150 Billion**

*CDC, Morbidity and Mortality Weekly Report, 2002.

the treatment possibilities represented by medications known to act on the serotonin system. The GABA neurotransmitter system, which normally acts to limit dopamine's effect in the brain's pleasure center, might also help in smoking cessation treatment, according to Dr. George McGehee of the University of Chicago. He discussed the mechanism by which nicotine simultaneously stimulates dopamine release and depresses the effect of GABA.

Development. Dr. Frank Vocci, director of NIDA's Division of Treatment Research and Development, described the steps involved in the development of new medications and their approval by the Food and Drug Administration (FDA)—a process that may require a decade of research and testing, at a cost as high as

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Multiculturalism at Least as Effective as Cultural Specificity in Test of Prevention Program

By Jill Schlabig Williams
NIDA NOTES Contributing Writer

A multicultural version of a substance use prevention program tested in middle schools in Phoenix, Arizona, proved at least as effective as culturally targeted versions, according to recent research by Drs. Michael L. Hecht, Michelle Miller-Day, and Flavio Marsiglia and colleagues at Pennsylvania State University and Arizona State University. The NIDA-funded researchers compared a multicultural version of a drug prevention program—which included cultural values from all of the groups participating in the program—to two culture-specific programs. The latter programs are based on the hypothesis that messages matched to the student’s culture are more effective than messages that are not culture-specific.

“This is good news for the future of drug prevention in schools serving culturally diverse students,” says Dr. Hecht. “It is very difficult logistically to deliver culture-specific programs in culturally diverse schools. Multicultural programs are much easier to deliver, and now we find that they’re also as effective as culture-specific programs.”

Research has shown that students respond better to drug prevention programs when they see their culture and images of themselves represented in the prevention message. Moreover, minority youth respond favorably to programs that feature a teacher or characters from their own ethnic group.

“We know that kids need to see something of their own lives and cultures reflected in the programs,” Dr. Hecht explains. “But we wanted to test the effectiveness of multicultural prevention programs and compare their effectiveness to selectively targeted or matched interventions.”

The prevention program, dubbed “keepin’ it R.E.A.L.” (see text box on p. 10), is a school-based intervention targeting substance use among urban middle schoolers. Its goals are to reduce use of alcohol, cigarettes, and marijuana; promote antidrug norms and attitudes; and develop effective drug resistance decisionmaking and communication skills. Through NIDA funding, “keepin’ it R.E.A.L.” was developed, tested, and evaluated in 35 middle schools in Phoenix. Designed to reflect aspects of the

adolescents’ cultures and learning styles in content and format, it includes 10 classroom lessons that promote antidrug norms and teach substance use resistance skills, life skills, risk assessment, and decision-making skills. The intervention was reinforced by a public service announcement radio and billboard campaign and by booster activities.

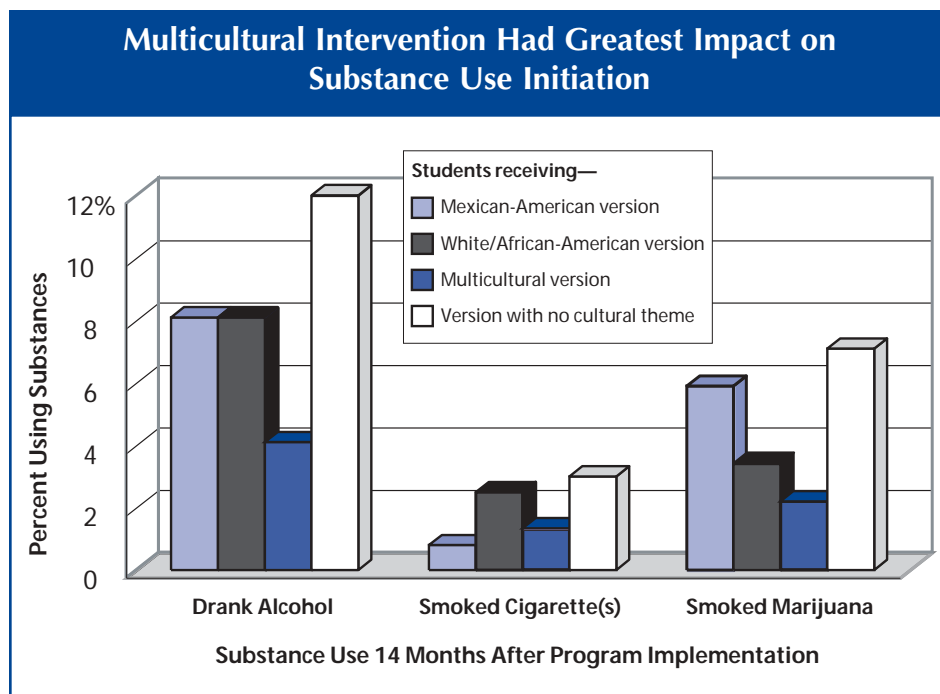
Three versions of the curriculum were created and delivered: one based on Mexican-American culture, one based on African-American and



European-American culture, and a multicultural version using five lessons from each of the other two versions. The large proportion of Mexican or Mexican-American students (approximately 74 percent) in the study population contributed to the choice of Mexican-American culture for one curriculum version.

“In developing this program, we studied the process by which kids resisted drugs and used a narrative approach to teach these skills to other kids. The whole program is from youth through youth for youth,” observes Dr. Hecht. Stories of drug resistance were collected from adolescents in each ethnic group and used to write scripts for videos that were then performed and videotaped by local high school students. These 10 videotapes (5 for the Mexican-American version, 5 for the African-American/European-American version) form the core of the program. They teach resistance skills through enactments of successful drug resistance in recognizable locales, by youths similar to the students in age and ethnicity.

The lessons’ content is built on previous research on what is effective in drug prevention. In addition, researchers infused the curriculum with cultural norms and values that are predominant within certain groups—for example, the value of family to Mexican Americans, respect to African Americans, and individualism to European Americans. Affirming these values can help students use familiar behaviors and attitudes to resist drugs. The curriculum emphasizes family and cultural norms that discourage behaviors like drug use, equipping students with the skills to tap their social support systems to effectively resist drug offers.



The multicultural version of the intervention program “keepin’ it R.E.A.L.” had the greatest positive impact on initial substance use over the course of the study, compared to controls and to the culture-specific versions. Students who participated in the multicultural version of the program had the smallest increase in alcohol or marijuana use and the second smallest increase in cigarette use from the initial preintervention survey to the final postintervention survey, 14 months after implementation of the curriculum.

“We don’t generalize about the cultures. We give them stories. We show them scenarios that come from their mouths. It’s always a specific situation, with no moralizing,” says Dr. Hecht.

In the fall of 1998, 25 Phoenix middle schools were randomly assigned to one of the three versions of the curriculum, and 10 schools were assigned to the control condition. Schools in the control condition received other drug prevention programs already planned for those schools, including a statewide antitobacco campaign. The research team administered a preintervention survey to all participants and then implemented the curriculum in 7th-grade classes in the 25 treatment schools.

Followup surveys were conducted 2 months, 8 months, and 14 months after curriculum implementation. Surveys included questions on demographics; recent alcohol, cigarette, and marijuana use; use of resistance strategies learned in the program; antidrug norms; and intentions to accept substances. The final sample included 6,035 students, of whom 55 percent were Mexican American, 17 percent were non-Hispanic white, 9 percent were African American, and 19 percent were of other Latino or multiethnic Latino origin.

The results showed that the interventions were significantly more effective than the control condition, with statistically significant effects on

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Multiculturalism at Least As Effective as Cultural Specificity in Test of Prevention Program

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the use of gateway drugs (alcohol, tobacco, and marijuana) and on norms, attitudes, and use of resistance strategies. Students participating in any of the three test versions reported better behavioral and psychosocial outcomes related to substance use than did the control students. Although use of alcohol, cigarettes, and marijuana increased over time for both sets of students, the rate of increase was significantly less for students who participated in the intervention. Those students also reported adopting more resistance strategies.

When researchers compared the three versions of the curriculum against the control group, they found that the Mexican-American and multicultural versions of the curriculum had far more significant effects over the course of the study. Students who participated in the multicultural curriculum had, on average, the smallest increases in use of alcohol and marijuana from pretest to final posttest, and the second-smallest increase in use of cigarettes. The Mexican-American and multicultural versions of the program had positive effects on several of the psychosocial outcomes studied, including intent to refuse substance offers and antidrug attitudes for themselves and their friends.

To determine if matching program content to a student's ethnicity enhanced program outcomes, the researchers used the students' ethnic self-labeling to categorize them as matched to the curriculum they received, mismatched, or mixed (i.e., various ethnicities receiving the multicultural program). Very few significant

differences in program effectiveness emerged; therefore, the researchers found little support for the cultural matching hypothesis.

"We created an intervention that worked, and we found that the multi-

students as early as 5th grade. They also plan to look at the process of acculturation, examining how Mexican-American youth make the transition to a new culture and language, how that process puts them

A Name to Remember: "keepin' it R.E.A.L."

Preliminary research identified four strategies adolescents use to successfully resist offers of substance abuse:

- **Refuse** by verbalizing simple "no" statements.
- **Explain** by elaborating reasons for refusing.
- **Avoid** situations known to involve alcohol, tobacco, or other drugs.
- **Leave** the environment once substance use enters the picture.

These strategies constitute the acronym "R.E.A.L.," which students later translated into "keepin' it R.E.A.L." Each of the four videos focused on one of these strategies, and an introductory video was added to kick off the program.

cultural version worked as well as—or better than—the culture-specific versions," says Dr. Hecht. "We found that it is not necessary to ethnically segregate students into narrowly tailored programs to achieve effectiveness. Rather, it is critical to incorporate a representative level of relevant cultural elements."

The Center for Substance Abuse Prevention has recently added the "keepin' it R.E.A.L." curriculum to its National Registry for Effective Prevention Programs, recognizing it as an effective program and making it available to middle schools across the country for implementation. In the future, Dr. Hecht and his colleagues plan to study the effectiveness of offering intervention programs to

at risk for increased drug use, and how to combat those risks.

"This is one of the first studies to compare multicultural and culturally specific substance abuse prevention approaches," says Dr. Aria Davis Crump of NIDA's Division of Epidemiology, Services and Prevention Research. "This research highlights the importance of continuing efforts to better understand how to effectively provide prevention services in a culturally diverse society."

Source

- Hecht, M.L., et al. Cultural grounding in substance use prevention: An evaluation of the Drug Resistance Strategies intervention. *Prevention Science*, in press. **NN**

NIDA Neuroscience Symposium Honors the Late Dr. Roger M. Brown

By Robert Mathias
NIDA NOTES Staff Writer

Sometimes, advice that offers just the right encouragement or urges a shift in direction can launch a whole career of scientific research. For more than two decades, Dr. Roger M. Brown provided insight and support to scientists exploring the ways that drugs act on the brain; the work he initiated and encouraged became the foundation of the neuroscience of addiction. Dr. Brown, associate director for neuroscience in NIDA's Division of Neuroscience and Behavioral Research, died last June.

On May 14 and 15, more than 300 researchers met in Natcher Auditorium on the National Institutes of Health campus in Bethesda, Maryland, to honor the life and legacy of Dr. Brown at a NIDA-sponsored symposium, "Foundations and Innovations in the Neuroscience of Addiction." Invited speakers represented research centers around the world and shared their latest findings or provided retrospective overviews on addiction research topics, including pain modulation, brain reward circuitry, cocaine binge-abstinence patterns, and amphetamine neurotoxicity.

NIDA Director Dr. Nora D. Volkow, in welcoming participants to the symposium, noted the broad impact of Dr. Brown's influence. "This meeting and all the science that we will hear about over the next 2 days are a product of Roger's insight," she said. "Some of the earliest work in neuroscience and much of the work that formed the foundation of our knowledge in the field are the results of Roger's effort."



Dr. Volkow also shared a personal recollection from early in her research career. "In 1988, I was submitting my first grant applications to conduct brain imaging studies. Not everyone recognized the technology's promise," she recalled. "Roger was my program officer. He understood how imaging studies could be applied to very basic science and said 'Nora, don't give up.' I didn't, and thanks to Roger's encouragement, we were able to establish the brain imaging program at Brookhaven National Laboratory."

In her keynote presentation, Dr. Patricia Goldman-Rakic of Yale University School of Medicine in New Haven, Connecticut, described Dr. Brown's contributions when he joined her intramural research team at the National Institute of Mental Health. "Roger was a wonderful colleague," she said, "inquisitive, energetic, and generous. And he made important contributions to the very first steps in understanding how dopamine and other neurotransmitters

work in the brain—that they are part of chemical systems that act like electrical circuits to send and receive signals." Other researchers built on this base, said Dr. Roy Wise of NIDA's Intramural Research Program, to characterize the drug-reward circuitry—the brain areas, neural pathways, and cellular mechanisms that produce rewarding effects and motivate people to abuse drugs.

Throughout the symposium, speakers described how Dr. Brown had ignited similar sparks. Dr. Gerald Gebhart of the University of Iowa in Iowa City and Dr. Conan Kornetsky of the Boston University School of Medicine recalled how Dr. Brown had encouraged their research into the mechanisms that transmit pain signals throughout the central nervous system and the respective effects in the brain of pain-killing and addictive drugs.

Several presentations focused on the drug-induced brain changes over time that lead to the loss of control over drug-taking that characterizes drug addiction. Psychostimulant drugs such as methamphetamine and cocaine sensitize the brain, resulting in a greater effect with later administration that increases the likelihood of continued self-administration, noted Dr. Paul Vezina of the University of Chicago. Cocaine exposure also disrupts the brain's dopamine reward systems; over a period of years, this damage spreads to areas affecting cognition and movement, said Dr. Linda Porrino of Wake Forest University School of Medicine in Winston-Salem, North Carolina. These and other studies of drug effects in

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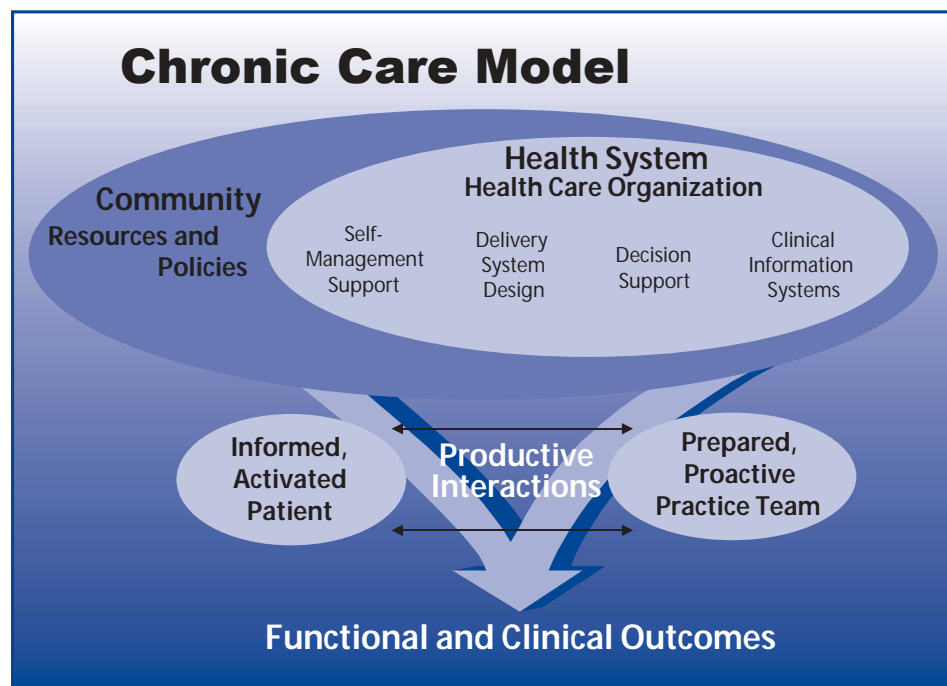
Discovering, Developing, and Delivering Smoking Cessation Medications Is Focus of NIDA Symposium

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\$500 million per medication. Accelerating the process at any stage, from basic research to human clinical trials, will speed the availability of new treatments. Dr. John Hughes, of the University of Vermont in Burlington, suggested that psychiatric medications already approved for treating neurochemical imbalances in the brain might hold clues for developing medications to treat the neurochemical effects of smoking.

Dr. Charles Grudzinskas, of Georgetown University Medical Center in Washington, D.C., summarized potential medications now in FDA Phase I, II, or III trials. These medications include additional nicotine replacement therapies and nicotine vaccines. Dr. Paul Pentel of the Hennepin County Medical Center in Minneapolis, Minnesota, described progress in the development of one type of nicotine vaccine—antibodies that bind to nicotine in the blood, preventing it from crossing the blood-brain barrier and reaching the areas of the brain that underlie addiction. Vaccines may be particularly effective as relapse-prevention medications for smokers who are trying to remain abstinent.

Delivery. Dr. Scott Leischow, chief of NCI's Tobacco Control Research Branch, discussed barriers to delivery and utilization of current tobacco cessation treatments. These include the high relapse rate associated with current treatments and the cost and "hassle" factor that deter patients from using nicotine replacement therapy, which they contrast to the simplicity of nicotine delivery by cigarettes. To address barriers to use,



At the 2003 meeting of the Society for Research on Nicotine and Tobacco, Dr. Susan Curry discussed use of a chronic care model to improve the delivery, utilization, and effectiveness of tobacco cessation treatment. This approach draws on the community—of which the health system is a part—to help patients and their practitioners effectively work toward desired health goals.

Dr. Saul Shiffman of the University of Pittsburgh discussed strategies that might increase utilization of existing treatments, including regulatory changes that make cigarettes more expensive and increased advertising and education to encourage more smokers to try to quit.

Providers and insurers also need to address barriers within their control, noted several speakers. Dr. Richard Hurt, of the Mayo Clinic's Nicotine Dependence Center in Minneapolis, Minnesota, discussed the limitations of current clinical treatment. He noted that relatively few medications are available, clinicians are not familiar with them, and patients are reluctant to begin treatment because of embarrassment, inadequate relief from withdrawal, and the difficulty of complying with instructions for use of gum, inhalers, or nasal sprays. Dr. Susan Curry of the University of Illinois at Chicago

suggested steps that insurers and health care organizations could take to improve the delivery, utilization, and effectiveness of treatment. For example, she said, health care systems should adopt a chronic disease model to treat smoking, and insurers should include the cost of medications in coverage that provides comprehensive pharmacological and behavioral treatment.

In concluding remarks, Dr. Corrigan noted that the enthusiastic response to the day-long discussion illustrates broad support for steps that will increase and accelerate available treatment options for smokers. "Clinicians and patients need better treatment options, and this symposium represents a significant first step in a collaboration that can help speed the process of getting new and more effective medications to smokers who want to quit." **NN**

NIDA National Prevention Research Initiative Begins Broad Range of Studies

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Late last year, NIDA awarded \$6.5 million to the University of Southern California's Keck School of Medicine in Los Angeles to establish the first TPRC. This Center is conducting basic research on memory, cognition, and peer group dynamics. For example, one study is assessing how a prevention program that has shown it can reduce drug use affects memory associations and unconscious thought processes that trigger drug use. Better understanding of the underlying behavioral states and thought processes that influence the program's efficacy could be applied to developing new prevention approaches or refining existing programs. NIDA is continuing to solicit applications to establish additional TPRCs.

Large-Scale Community Prevention Field Trials

Field trials bring together researchers, State and local agencies, and prevention practitioners to identify the processes and mechanisms that contribute to the successful implementation and sustainability of science-based interventions in a range of settings. Late last year, NIDA

awarded more than \$4.5 million in grants for four field trials. Each trial is implementing a research-proven prevention intervention in a variety of communities. For example, a University of Oregon study is integrating a family drug abuse prevention program that focuses on improving

quency and substance abuse prevention program targeting 5th- and 6th-graders who exhibit early signs of aggressive behavior.

- Study how using onsite and remote training and technical assistance approaches affects the costs, accuracy, and effectiveness



A University of Oregon field trial is using USDA's Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) as a vehicle for delivering a family drug abuse prevention program to rural, suburban, and urban communities.

parenting practices into the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in rural, suburban, and urban communities. WIC is a nationwide U.S. Department of Agriculture program that provides nutritional and other assistance to low-income women who are pregnant or have young children. The study is examining how the characteristics of program participants and the settings in which the program is delivered affect program implementation and effectiveness. Other field trials will

- Test whether school staffers in several different urban settings can effectively deliver a delin-

of implementing a school-based program in middle schools.

- Examine systemic barriers to successfully implementing a parent-focused program in government-sponsored health programs on a countrywide scale in 435 municipalities in Norway. This international collaboration should answer questions about how cultural adaptation affects the program and whether government-sponsored health programs and municipalities can train large numbers of social workers, psychologists, and health workers to deliver the program accurately and effectively. **NN**

NIDA Neuroscience Symposium Honors the Late Dr. Roger M. Brown

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animals point to neurobiological mechanisms that may produce both positive and negative emotional states in humans that drive them from initial

drug use to drug addiction, suggested Dr. George F. Koob of the Scripps Research Institute in La Jolla, California.

Dr. Frank Vocci, director of NIDA's Division of Treatment Research and Development, described the role of neuroscience in the development of medications to treat drug addiction. "Without the basic neuro-

science foundation that Roger helped develop, today's treatments just wouldn't be possible," Dr. Vocci said. "And listening to the rest of the speakers at this meeting makes me even more impressed by Roger's incredible contributions. I'm glad to have known him and to be here to say what none of us ever said often enough: Thanks, Roger." **NN**

Spotlight on Reality of Drug Abuse and Addiction: Seventh Annual PRISM Awards

Los Angeles was host to the 7th annual PRISM Awards, held on May 8 and presented by the Entertainment Industries Council, Inc. (EIC), in partnership with NIDA and the Robert Wood Johnson Foundation. The awards honor accurate portrayals of drug, alcohol, and tobacco use and addiction in television, feature film, music, and comic book entertainment.

Actor James Woods received the PRISM Heritage Award, presented for performances in productions dealing with addiction themes released before the inception of the PRISM Awards in 1997. He was acknowledged for his Emmy Award-winning performance in "My Name is Bill W.," in which he played the role of the Alcoholics Anonymous co-founder. Woods also was recognized for his depiction of a successful businessman's descent into drug addiction and insanity in "The Boost." Past PRISM Heritage Awards have gone to Meg Ryan and Andy Garcia for "When a Man Loves a Woman" and Michael Keaton and Kathy Baker for "Clean and Sober."

Dick Askin, Tribune Entertainment Company President and CEO, won the Larry Stewart Leadership and Inspiration Award. Acknowledging leadership and inspiration by example, the award is named in memory of writer/producer/director Larry Stewart, a founding Board Director of EIC and a forefather in EIC's efforts to collaborate with the entertainment industry in accurately depicting health and social issues. Askin oversees all television program development, production, and distribution activities of Tribune's content and has been active in EIC since 1990, including his current seat on EIC's Board of Trustees. As a board



NIDA Director Nora D. Volkow, M.D., at the 7th PRISM Awards ceremony with Actor Andy Dick (center) and Dr. Drew Pinsky, a physician and public personality known as "Dr. Drew." Mr. Dick stars as Owen Kronsky on the ABC sitcom "Less Than Perfect" and is shown accepting a PRISM Award for the "E! True Hollywood Story: Andy Dick" special. The special focuses on Mr. Dick's rebellious personality and turbulent life, emphasizing his past substance abuse and ongoing recovery. Dr. Drew hosts a Web site, www.drdrew.com, which counsels young people on health and social issues, including substance abuse and addiction. He is an on-camera commentator for the CBS reality show "Big Brother" and co-hosted the MTV show and syndicated radio show "Loveline."

member, Askin was instrumental in bringing the PRISM Awards to television. Past Larry Stewart Award recipients include actors Martin Sheen and Michelle Lee.

For the first time since the awards were launched, individual actors were recognized for outstanding performances. Val Kilmer, Neve Campbell, Bernie Mac, John Spencer, Tim Matheson, and Noah Wyle were honored in the following categories:

- Kilmer: Performance in a Theatrical Feature Film, "Salton Sea";
- Campbell: Performance in a TV Movie or Miniseries, "Last Call";
- Mac: Performance in a Comedy Series, "The Bernie Mac Show";
- Matheson and Spencer (tied): Performance in a Drama Series Episode, "The West Wing"; and

- Wyle: Performance in a Drama Series Multi-Episode Storyline, "E.R."

The feature film "Skins" was honored, as were "E.R.," "The Bernie Mac Show," "Yes Dear," "The Young and the Restless," "Strong Medicine," "Behind the Music: Aerosmith," "The E! True Hollywood Story: Andy Dick," "Flipped and Wasted," "Ozzy and Drix," and the documentary, "Sudden Impact: The Ripple Effects of Drunk Driving." In the Music Recording category, Kenny Chesney ("The Good Stuff") and Ivan Neville ("Ode to 5 a.m.") shared the award. Honoring a film not yet released but playing the festival circuit, the PRISM Film Festival Award was given to "Never Get Outta the Boat." "Cat Woman" was the winner in the Comic Book category. **NN**

Education in Action: NIDA Goes *Back to School*

In addition to conducting and supporting the lion's share of the world's research on drug abuse and addiction, NIDA works hard to ensure that the results of this research reach key audiences, including educators and the children they teach. In this spirit, September marks the launch of the NIDA Goes Back to School initiative.

"We are excited about expanding the resources available to students and teachers on the science behind drug abuse and addiction," says Dr. Nora D. Volkow, Director of NIDA. "Beyond their educational value, our materials hold the promise of sparking students' general interest in the biological sciences as a possible career choice, while meeting teachers' need for engaging curricula that also fulfill national science education objectives."

This isn't the first time NIDA has gone to school. Its first schools-based educational campaign was launched in 1998 after a dramatic response to newly developed middle school materials presented at a National Biology Teachers Association meeting. The current initiative offers educational materials to help K-12 students learn about the impact of drugs on the brain and the body. Some of these materials are self-contained science curricula, satisfying national standards of learning—as well as students' and teachers' curiosity. Others are intended for students—and parents—to access in school or at home. They include age-appropriate magazines that feature real stories of youths who have struggled with drug abuse, Web sites that offer interactive activities and games, brief information sheets on specific drugs or trends in drug abuse, and topic-targeted booklets for handy reference in clearly written Q&A format.

An exciting component of the NIDA Goes Back to School initiative is

NIDA for Teens: The Science Behind Drug Abuse, an interactive Web site due to launch as students return to school in September. After doing its homework through focus group testing, NIDA realized it needed a targeted vehicle to reach adolescents ages 11–15. The answer: www.teens.drugabuse.gov. In developing this electronic forum, NIDA worked with a University of Baltimore design team



that included youths and was funded through a National Science Foundation grant. This young group of content and usability "experts" reacted to concepts NIDA pitched, many of which were based on the highly successful *Heads Up* campaign that partners NIDA and Scholastic Magazines, Inc., and reaches more than 8 million students a year. The team also helped NIDA sharpen the site's design, with an eye toward attracting and informing their media-savvy peers.

To announce the launch of this site and promote popular materials that engagingly educate, NIDA sent roughly 40,000 middle and high school science teachers packages that contain:

- a cover letter from Dr. Volkow, also known as Dr. NIDA on the new teen Web site, which offers a Q&A forum with Dr. Volkow;
- an art card promoting the new teen Web site and its features;
- a flyer promoting NIDA's Spanish publications;

- a flyer announcing the NIDA Goes Back to School initiative and noting items of interest to educators: the *Mind Over Matter* poster series, developed for students in grades 5–9; *The Brain: Understanding Neurobiology Through Addiction*, a high school curriculum; CD-ROM slide packets on drug abuse topics for educators and students; the recently updated *Preventing Drug Abuse among Children and Adolescents: A Research-Based Guide for Parents, Educators, and Community Leaders* and its abbreviated version; *Scholastic* materials jointly developed by NIDA and Scholastic Magazines, Inc.; and two booklets on marijuana—one for teens (*Marijuana: Facts for Teens*) and the other for parents (*Marijuana: Facts Parents Need to Know*).

Adults involved in the lives of children—teachers, school nurses and counselors, and parents—are encouraged to download these and other educational resources from www.backtoschool.drugabuse.gov or to order items from the National Clearinghouse for Alcohol and Drug Information at 1-800-729-6686.

"NIDA is back to school to stay," Dr. Volkow says, noting that new curricula are in the works. By next fall, NIDA hopes to offer additional elementary grade curricula for *Brain Power! The NIDA Junior Scientists Program*, which now has modules for grades 2-3.

"Science education—especially in the field of drug abuse and addiction—is dynamic," concludes Dr. Volkow. "We want to convey that excitement, while keeping students and their parents, teachers, and school counselors informed of the latest findings our research offers."

NN

NIDA NOTES

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