

NIDA News

New Vaccine Reduces Behavioral Effects of Nicotine

NIDA-funded scientists have developed a new vaccine that successfully reduces the behavioral effects of nicotine in rats. Unlike previously developed vaccines, the new vaccine does not have to be administered with an adjuvant—a substance that enhances the production of antibodies and has been associated with side effects—to be effective.

Nicotine vaccines produce their effects by stimulating the production of antibodies that bind to nicotine and prevent it from reaching the brain. The researchers found that rats vaccinated with the new vaccine had a higher concentration of nicotine-specific antibodies in their blood compared with nonvaccinated rats. When exposed to nicotine, vaccinated rats exhibited a weaker behavioral response.

- **WHAT IT MEANS:** These findings indicate the new vaccine is effective in reducing the behavioral effects of nicotine. An appropriately designed nicotine vaccine would be beneficial to those who do not respond to conventional nicotine treatments or who cannot tolerate the side effects associated with current pharmacotherapies.

Dr. Rick A. Bevins at the University of Nebraska-Lincoln and colleagues at the University of Nebraska Medical Center-Omaha published the study in the March 2003 issue of the journal *International Immunopharmacology*.

Drugs of Abuse and Stress May Cause Similar Changes in the Brain

Scientists from the Stanford University School of Medicine and the University of California, San Francisco, have found that drugs of abuse and stress may trigger similar changes in brain circuitry. The scientists demonstrated that in mice, five drugs of abuse (each with different mechanisms of action) and stress enhanced the transmission of electrochemical signals in dopamine neurons, which previous research suggests may be involved in addiction.

In the study, the scientists administered cocaine, amphetamine, morphine, nicotine, ethanol, or the nonaddictive psychoactive medications, fluoxetine and carbamazepine, to groups of mice. The addictive substances caused an increase in the signaling to dopamine neurons while the nonaddictive drugs did not.

- **WHAT IT MEANS:** Certain drugs of addiction and stress appear to produce similar changes on dopamine signaling, which may play a role in addiction. This also may contribute to the effects of stress on drug seeking and relapse. Understanding the effects of drugs of abuse and stress on brain circuitry may aid in developing therapeutic medications to treat addiction.

This study was published by lead investigator Dr. Robert Malenka in the February 2003 issue of *Neuron*. It was funded, in part, by the National Institute on Drug Abuse.

Patients Pay Greater Portion of Costs for Substance Abuse and Mental Health Treatment Than for Medical Services in Many Managed Care Plans

A survey of 434 managed care plans in 60 market areas found that patients receiving substance abuse and mental health services often had to make a higher copayment or pay a higher share of allowed charges than did patients receiving general medical care.

Researchers from Brandeis University found that at least 30 percent of the managed care service providers surveyed imposed higher cost sharing requirements for outpatient substance abuse and mental health treatment than for medical services. Among the plans using copayments (a fixed dollar amount per visit), the mean copayment for medical care was \$11.73 compared to mean copayments of \$17.39 for substance abuse treatment and \$18 for mental health services. Similarly, among plans using co-insurance (a preset percentage of allowed charges), the mean co-insurance rate was significantly lower for medical care (19.1 percent) compared to 34.9 percent for substance abuse treatment and 35.9 percent for mental health services.

- **WHAT IT MEANS:** These findings imply that to achieve parity in behavioral health benefits, attention needs to be paid to cost sharing as well as to limits on benefits.

Dr. Dominic Hodgkin and colleagues from Brandeis University published this study in the March 2003 issue of the journal *Medical Care Research and Review*. The research was supported by grants from the National Institute on Drug Abuse, the National Institute on Alcohol Abuse and Alcoholism, and the Substance Abuse and Mental Health Services Administration.

Individuals With Medical Conditions Related to Alcohol or Drug Abuse Benefit From Integrating Medical and Substance Abuse Treatment

Researchers examining the impact of integrating medical and substance abuse treatment services found that for substance abuse patients as a whole, integrating the two services had little effect on health care utilization or cost. However, among those patients with substance abuse-related medical conditions, integrating medical and substance abuse treatment services resulted in decreases in hospitalization rates, fewer days of inpatient treatment, and fewer emergency room visits. Also, total medical costs per patient per month were halved, from \$431.12 to \$200.03.

Adult patients entering treatment at the Kaiser Permanente Outpatient Chemical Dependency Recovery Program in Sacramento were randomly assigned to one of two treatment modalities: an integrated care model where medical care was provided with substance abuse treatment and an independent care model where medical care was provided in primary care clinics, independent from substance abuse treatment.

The investigators tracked medical utilization and costs of the 654 patients for 12 months pretreatment and for 12 months following treatment entry. They found that for the full group, there were no statistically significant differences between the two treatment groups over time. However, for those patients with substance abuse-related medical conditions, such as depression, hypertension, asthma, psychoses, pneumonia, cirrhosis, or hepatitis C, integrated care produced significant benefits. They had significant decreases in hospitalization rates, inpatient days, emergency room use, and total medical costs. Patients with substance abuse-related medical conditions who received independent care had a slight reduction in inpatient days and emergency room costs but incurred no significant decrease in total medical cost.

- **WHAT IT MEANS:** Integrating substance abuse treatment with primary care may be cost-beneficial and provide a better quality of care for substance abuse patients with medically related problems.

The study was published in the February 2003 issue of the journal *Medical Care* by a research team headed by Dr. Sujaya Parthasarathy from Kaiser Permanente.

Genetics, Shared Environment Have Little Impact on Choice of Commonly Abused Drugs

Drug abuse has a strong hereditary component; however, new research suggests genetics and shared environment have little impact when it comes to selecting a particular illegal drug.

Scientists interviewed 1,196 male twin pairs about their history of use, abuse, and/or dependence on marijuana, sedatives, stimulants, cocaine, opiates, hallucinogens, inhalants, and over-the-counter medications. Subjects in the study ranged from 20 to 58 years old.

Upon analyzing data from the interviews the scientists could find no evidence that shared genetic or environmental factors increased the risk of abusing one specific illegal drug over another. The decision to use and abuse a specific drug seemed to depend on unshared factors, such as ease of access.

- **WHAT IT MEANS:** The findings suggest that the search for genetic variations that affect human drug abuse should focus on factors that increase or decrease the risk of abuse of all types of illegal substances, not just a specific drug.

Dr. Kenneth Kendler and colleagues from the Medical College of Virginia, Virginia Commonwealth University in Richmond published this research in the April 2003 issue of the *American Journal of Psychiatry*.

College on Problems of Drug Dependence Publishes Position Statement on Opioid Use and Abuse

Nonmedical use of prescription opioids is increasing in the United States. In a new position statement, a task force of the College on Problems of Drug Dependence says programs to control and reduce such abuse must be balanced against the need for access to these drugs for legitimate medical purposes.

Opioids are drugs that include morphine, codeine, hydrocodone (Vicodin®), and oxycodone (Percodan®, OxyContin®), to name a few. Prescription opioids often are prescribed to treat pain that is not alleviated by such nonopioid medications as acetaminophen.

Results of surveys and other data collection sources show that use of prescription opioids appears to have risen in recent years.

Data from the Monitoring the Future survey show that usage of prescription opioids over a 30-day period by high school students who reported taking these drugs without a physician telling them to do so increased by 173 percent between 1991 and 2001. The Monitoring the Future survey is conducted annually by the University of Michigan for the National Institute on Drug Abuse.

The National Household Survey on Drug Abuse tracks incidence and prevalence of drugs of abuse in Americans aged 12 and older. Survey results showed that the number of people using prescription opioids for nonmedical purposes for the first time increased by 400 percent between the mid-1980s and 2000 (from 400 thousand to 2 million). Prevalence of opioid abuse was higher in people aged 12–25 than in people aged 26 and over. The survey also showed that the prevalence of opioid abuse is similar to that of cocaine and heroin.

The Drug Abuse Warning Network collects information on drug-related visits to emergency departments. It shows that the number of ED visits related to opioid analgesics and opioid analgesic combinations increased by 123 percent between 1994 and 2001.

The task force emphasized that prescribed opioids are an effective means for treating pain. It also expressed the concern that an undue focus on opioid abuse, and the addiction that may result because of misuse of opioids, may unwittingly lead to less use of opioids for treating pain.

Members of the task force recommend several steps be taken to improve the ability to make informed policy decisions on prescription opioid abuse. These include: further epidemiological research, laboratory testing of prescription opioids to determine abuse liability, and clinical trials to determine the efficacy of different approaches to the prevention and treatment of prescription opioid abuse.

- **WHAT IT MEANS:** Overuse and abuse of prescription opioid drugs can have harmful ramifications for their legitimate and appropriate use. A balanced approach is needed so programs developed to reduce and prevent such abuse do not deter physicians from prescribing these drugs for appropriate patients.

Dr. James Zacny of the University of Chicago chaired the task force. The position paper was published in the April 2003 issue of *Drug and Alcohol Dependence*.

Methamphetamine Abuse May Cause Functional Abnormalities in the Brain

Researchers from the University of California, Los Angeles, have found more evidence that methamphetamine abuse may cause alterations in the brain. The researchers used a highly sensitive technique called quantitative electroencephalography (QEEG) to assess electrical activity in the brain, or “brainwaves,” of recently abstinent methamphetamine abusers and nonusers. Excess amounts of slow brainwaves—delta and theta—have been associated with head injuries and memory problems.

For the study, Dr. Thomas Newton and colleagues recruited methamphetamine users who reported using at least one-half gram of the drug per week for the previous 6 months. After four days of methamphetamine abstinence, the researchers obtained QEEG recordings of the users’ brains. The scientists also obtained QEEG recordings from healthy nonusers. The researchers found that methamphetamine users had increased delta and theta brainwave activity compared to nonusers.

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- **WHAT IT MEANS:** These findings indicate that methamphetamine abuse may result in functional changes in the brain that are similar to those seen in people with degenerative brain diseases.

This study, funded by NIDA, was published in the March 2003 issue of the journal, *Clinical Neurophysiology*.

Upcoming Events

Colorado Blending Conference Scheduled

The Blending Conference—Blending Clinical Practice and Research: Forging Partnerships in the Rocky Mountain States to Enhance Drug Addiction Treatment—will take place September 8–9 at the Westin Westminster in Westminster, Colorado.

The 2-day conference will bring together clinicians and researchers to examine cutting-edge scientific findings about drug use and addiction and their application to clinical practice. It is designed to bridge the gap that exists between clinical practice and scientific research.

Highlights include a keynote address by Dr. Nora D. Volkow, Director of NIDA, and sessions on Addressing HIV/Hepatitis C, Medication Strategies for Addiction, Integrating Treatment of Psychiatric Comorbidity, and Craving, Decision-Making, and Addiction: New Knowledge About the Brain.

The meeting is sponsored by NIDA and the Rocky Mountain Clinical Trials Network (CTN) Node, together with the University of Colorado Health Sciences Center; Colorado Department of Health Services, Alcohol and Drug Abuse Division; and the Signal Behavioral Health Network, Inc.

More details about the conference can be found on NIDA's Web site at www.drugabuse.gov. A registration Web site is located at www.mac1988.com/blendingcolorado.

For more information about any item in this *NewsScan*:

- Reporters, call Michelle Person at 301-443-6245.
- Congressional staffers, call Mary Mayhew at 301-443-6071.

The National Institute on Drug Abuse (NIDA) is a component of the National Institutes of Health, U.S. Department of Health and Human Services. NIDA supports more than 85 percent of the world's research on the health aspects of drug abuse and addiction. The Institute carries out a large variety of programs to ensure the rapid dissemination of research information and its implementation in policy and practice. Fact sheets on the health effects of drugs of abuse and other topics are available in English and Spanish. These fact sheets and further information on NIDA research and other activities can be found on the NIDA home page at <http://www.drugabuse.gov>.

(25)



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