

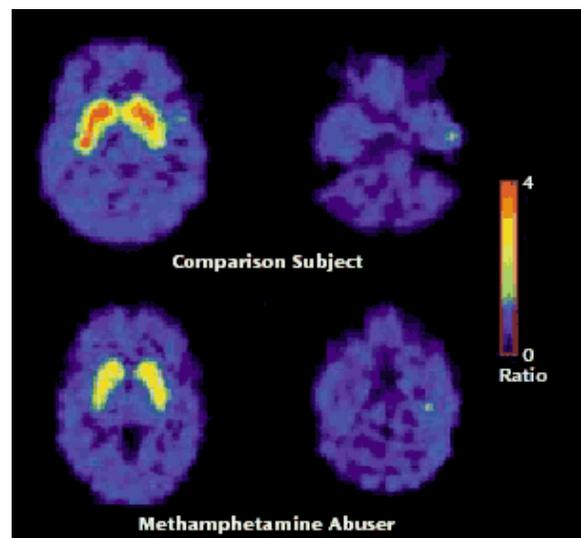


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Brookhaven Lab's Latest News on Addiction Research

- Scientists at Brookhaven National Laboratory have reached new milestones in their understanding of how addictive drugs affect the human brain.
- In research that was published last month, scientists showed that topiramate — a new anticonvulsant drug sold under the brand name Topamax®, currently used for the treatment of epilepsy — can block nicotine-triggered changes in brain chemistry, and may have potential for the treatment of nicotine addiction in humans.
- Another brain-imaging study revealed that, compared with people who don't use drugs, people who abuse methamphetamine have fewer receptors for dopamine, a brain chemical associated with feelings of reward and pleasure. In the drug abusers, low dopamine receptor levels were linked with reduced metabolic activity in a brain region that regulates motivation and "drive."



These brain scans show that dopamine receptor levels are lower in methamphetamine abusers than in control subjects. High dopamine receptor levels appear red, while low levels appear yellow/green.

"These findings mirror those from a similar

Brookhaven study on cocaine abusers, and may help explain why drugs addicts lose control and take drugs compulsively," said Nora Volkow, the lead researcher. Abuse of methamphetamine — also known as "speed" or "crank" — has risen dramatically over the past decade. "It has become a significant public health problem," said Volkow, whose team has worked for years to uncover the neurological mechanisms of addiction.



Nora Volkow

- The scientists have also shown that some of the damage caused by methamphetamine can be reversed by prolonged abstinence from the drug.

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Other Addiction Milestones

- In 1987, Brookhaven National Laboratory became the first research institution to use positron emission tomography (PET) and other medical imaging techniques to investigate the brain mechanisms underlying drug addiction.
- Laboratory researchers and their collaborators and colleagues at other institutions have probed the mysteries of how drugs such as cocaine, heroin, marijuana, and nicotine affect the brain and how they lure a person into the cycle of use and abuse that is addiction. The researchers have used information gathered from these studies to investigate potential pharmacological treatments for drug abuse.
- Much of this research has used medical imaging techniques of ever-increasing sophistication. Brookhaven scientists were pioneer developers of PET technology and the radiotracers whose movement is tracked by PET scanners.
- BNL chemists were the first to make a radiotracer-labeled form of cocaine that could be used for addiction studies. They also developed a fluorine-glucose compound now used in hospitals and research institutions worldwide to make images of brain function and to diagnose cancer.
- Using the radio-labeled cocaine, BNL scientists made the first images of cocaine in the brain and the first studies linking cocaine's effects on brain function to the compulsive use of the drug. These efforts led to the first documentation of stroke-like changes in the brains of cocaine abusers and the beginning of a series of studies to map the biochemical and anatomical changes responsible for drug-addictive behaviors.
- In the mid 1990s, researchers were concerned by reports of Ritalin abuse, aware that thousands of teens and adults snort it and inject it in order to get "high." The researchers showed that Ritalin is safe in therapeutic doses administered orally and that its effects are not sufficient to make children feel "high" or put them at risk of becoming addicted.
- Brookhaven researchers also found that GVG, or gamma vinyl-GABA, appears to prevent the biochemical and behavioral effects of nicotine and cocaine in much the same way it prevents an epileptic seizure: by altering the way brain cells talk to one another. The research was done on primates and rodents; human-subject trials have not yet been conducted.

Upcoming Events Open to the Public:

- *The Stony Brook Baroque Players, December 12, Noon, Berkner Hall.* The Stony Brook Baroque Players is a group of instrumentalists and singers who will perform lyrical and virtuoso Baroque music. Free.
- *"Proton Accelerators for Cancer Therapy and Imaging," December 12, 4:00 p.m., Berkner Hall.* Stephen Peggs of the Collider-Accelerator Department will give this lecture. Free.

Due to heightened security, everyone who enters the Laboratory site must have a photo ID.