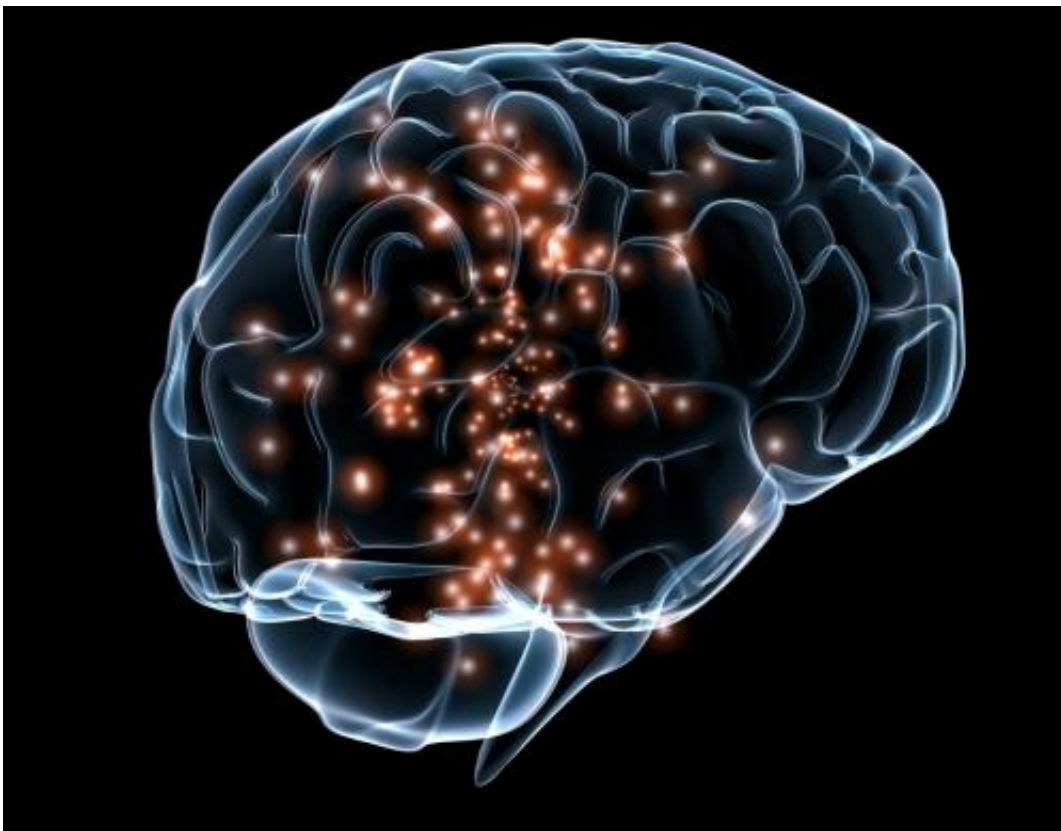


# Researchers discover how cocaine, amphetamines disrupt the brain's normal functioning

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Credit: Wikimedia Commons

In a major advance in the field of neuropsychiatry, researchers in the Vollum Institute at Oregon Health & Science University have illuminated how cocaine and amphetamines disrupt the normal

functioning of the dopamine transporter in the brain. This discovery paves the way for developing treatments that could blunt the effects of cocaine and amphetamines in patients who are addicted.

Currently, there are no approved drug therapies for amphetamine abuse, and the rate of relapse for people addicted to [cocaine](#) and amphetamines is high. The researchers' work was published online today in the journal *Nature*.

The dopamine transporter serves as a 'pump' that removes the neurotransmitter from the synapse, or the regions of nerve cell to nerve cell communication. Amphetamines and cocaine block dopamine signaling by interfering with the dopamine transporter.

"Addiction to amphetamines and cocaine devastates lives, families and communities in Oregon and across the U.S. Our research pinpoints how these addictive drugs interfere with the dopamine transporter and normal signaling in the brain, bringing us closer to developing effective treatments for people who are addicted to cocaine and [amphetamines](#)," said Eric Gouaux, Ph.D., senior scientist in the Vollum Institute at OHSU, and Howard Hughes Medical Institute Investigator.

In showing how cocaine and amphetamine block normal dopamine signaling, the research provides insights, which may, in turn, lead to an understanding of why some drugs are addictive and others are not. It also opens the door to the development of drugs that could block the interference of cocaine and amphetamine with dopamine signaling.

"This research paper fills in a major gap in our knowledge that's persisted for decades: how exactly these highly addictive drugs impact normal brain functioning. This groundbreaking research arms the pharmaceutical industry with specific information about targets for treatment, opening the door for new therapeutic approaches for blocking

the effects of cocaine and amphetamine." said Richard Goodman, M.D., Ph.D., director of the Vollum Institute at OHSU. "In light of the profound economic and social costs of drug addiction in the U.S., this research could have a transformative effect."

This paper is the culmination of more than 20 years of work at the Vollum Institute investigating regulation of the critically important [dopamine transporter](#), a protein that has key contributions to such neuropsychiatric diseases as schizophrenia, depression, drug abuse behavior, and attention deficit disorder. The economic cost of mental illness in the U.S. is now estimated to be more than \$300 billion annually, with 20 percent of adults reporting a diagnosable mental illness each year.

**More information:** Neurotransmitter and psychostimulant recognition by the dopamine transporter, [nature.com/articles/doi:10.1038/nature14431](https://doi.org/10.1038/nature14431)

Provided by Oregon Health & Science University

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