

Addiction

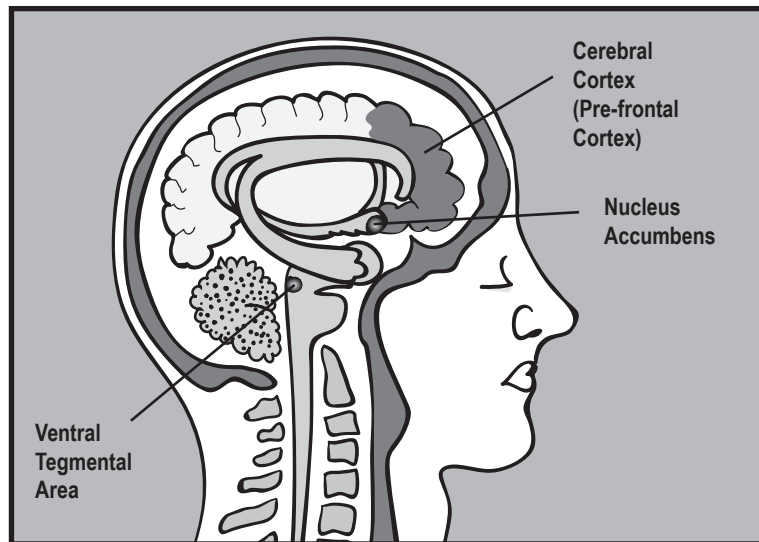
NIDA



Long-term drug abusers can become addicted to drugs. Addiction is a disease that changes the way the brain works. People addicted to drugs need drugs to feel normal. It's hard for them to stop using the drug, even though it causes major problems. They usually need medical help to overcome the addiction.

Reward System

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The "reward system" is made up of a specific part of the brain stem called the ventral tegmental area, the limbic system, and part of the cerebral cortex. It is activated when you are feeling good. For example, when you eat a tasty meal, neurotransmitters in the brain's "reward system" are released and make you feel good. Illegal drugs affect the brain in the same way.

Compulsive Use:

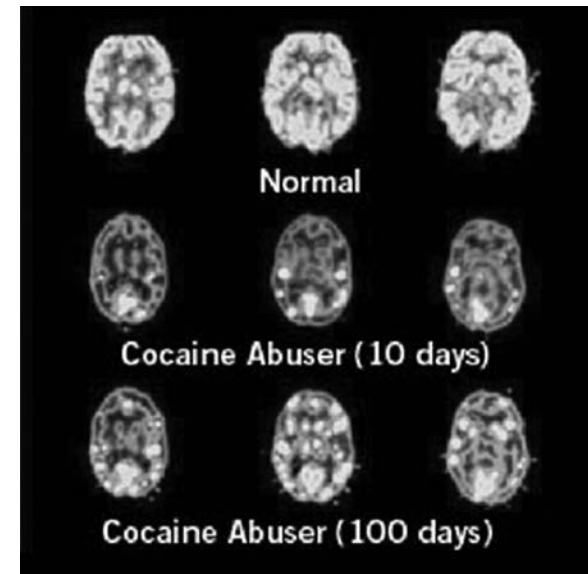
An addicted person keeps using the drug over and over again. Even if he is having serious problems.

Tolerance:

An addicted person uses more and more of the drug over time to get the same effect as before.

Withdrawal:

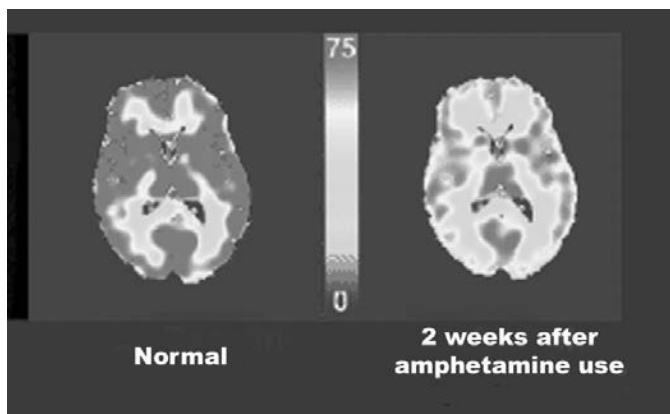
An addicted person has an intense craving for the drug when he or she doesn't have it.



Cocaine abuse can cause changes in the brain. The PET scans above show normal brains, brains of abusers that have not taken cocaine in 10 days, and abusers that haven't taken cocaine in 100 days. Even after 100 days without the drug, the activity (bright areas) in the cocaine abusers' brains is still much less than in the normal brains.

Amphetamine Effects

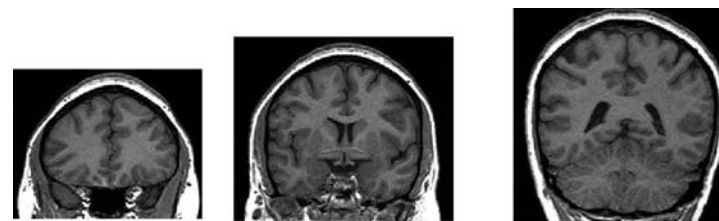
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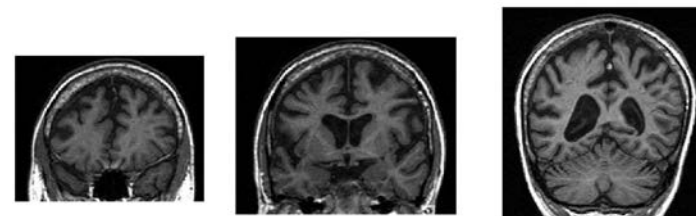
The picture above shows how blood flow in the brain is affected by amphetamine use. The image on the left is a PET scan of the person before using amphetamine. The one on the right shows the same brain 2 weeks after amphetamine use. There is less blood flow through the brain of a person who has used amphetamine. When the flow of blood is affected like this, the level of activity is decreased.

Alcohol Addiction

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Healthy non-alcoholic woman, 43 yrs old

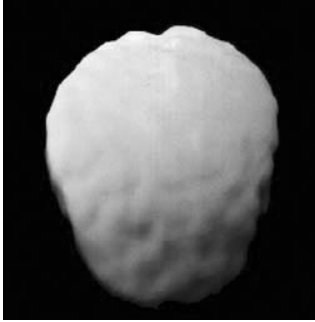


Alcoholic woman, 43 yrs old

Research has shown that alcohol addiction can cause changes in the structure of the brain. The MRI above shows the differences between the brain of a healthy woman, and an alcohol-addicted woman. Notice how much larger the holes are in the middle of the alcoholic woman's brain.

Heroin Addiction

NIDA



The images above show two brain scans using SPECT imaging. The image on the left shows a normal brain, and the image on the right shows the brain of someone who has abused heroin for 20 years. The holes in the picture aren't actually holes in the brain. They show areas of the brain that should be working but aren't. The brain of the heroin abuser has much less activity.