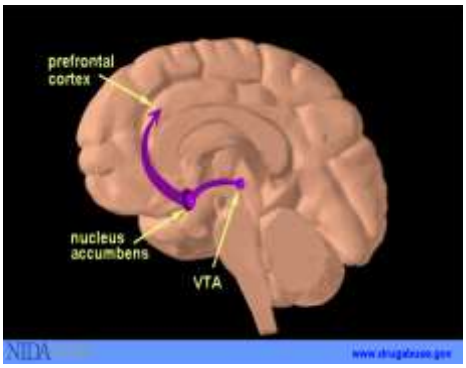
THE BRAIN REWARD CIRCUIT

The "reward circuit" (also known as the reward pathway or circuit) is a series of structures within the human brain[1] that reinforces behaviors (e.g., eating, sex) that are essential to the survival of the individual as well as the species. The structures that make up the reward circuit include the nucleus accumbens, ventral tegmental area (VTA) and fibers projecting to the pre-frontal cortex (Figure 1).



Graphic courtesy of the National Institute on Drug Abuse

Most (but not all) psychoactive drugs work by stimulating the reward circuit and thereby producing a sense of pleasure or reinforcement. In the case of some drugs (e.g., amphetamines and cocaine), the level of reinforcement is greater than that produced by survival-oriented behaviors such as eating and sexual activity. This action may cause the brain to unconsciously reorder its priorities and react to these drugs as if they were more important than food, water, sex and nurturing.

The prefrontal cortex is involved in impulsive control, judgment, decision-making and other highly complex executive functions. Normally, it exerts control over the more primitive and deeply-imbedded reward circuit. If the brain's priorities are changed through the chronic administration of addicting drugs, this control may be reversed, with the reward circuit influencing behavior more powerfully than the prefrontal cortex. This is a key concept in the understanding substance use disorders and other addictive behaviors.

[1] A similar circuit is found in the brains of all mammals