

# Amygdala Encyclopedia Article

## Amygdala

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# Amygdala

The amygdala, a region of the brain, is part of the limbic system. The limbic system is a group of similar brain structures related functionally. They provide the basis for emotion and motivated behaviors including REWARD-related events. The amygdala is located in the temporal lobe and consists of several different parts. It plays a role in various brain functions including epilepsy, emotion, learning and memory, and drug abuse.

In particular, the role of the extended amygdala has become an area of recent investigation. The extended amygdala refers to a group of brain structures that extend from the amygdala to the NUCLEUS ACCUMBENS; these brain regions are believed to participate in the general reward circuitry of the brain. The MESOLIMBIC DOPAMINE SYSTEM sends projections to the amygdala; these axons arise from the dopamine cells in the VENTRAL TEGMENTAL AREA.

The amygdala has long been established as an important area mediating stimulus-reward associations. This behavior is believed to play an important role in the seeking and using of drugs of abuse, especially COCAINE. An informative way to study drug abuse in animal models is through the SELF-ADMINISTRATION of drugs that are abused by humans. Rats can be trained to self-administer cocaine, and then the experimenter can interfere with the neurochemical transmission in the amygdala in particular, modulating DOPAMINE RECEPTORS and concentrations. The result of this manipulation is that the animals will increase or decrease their rate of administration of drugs. Thus, the amygdala makes a significant contribution to the study of cocaine-taking behavior.

The amygdala also contributes to the rewarding properties of ETHANOL. Studies have examined the effect of altering neurotransmission in the amygdala on ethanol self-administration. Similar to the findings reported for cocaine, modulation of the amygdala causes animals to change their rate of ethanol administration.

The amygdala is also involved in the effects of chronic drug exposure on the brain. Small changes in neurochemicals in the extended amygdala suggest that it may be mediating chronic drug action. These studies indicate that changes in the amygdala after long-term drug exposure may contribute to relapse.

Together, the amygdala and nucleus accumbens may be the main brain regions that underlie the brain changes associated with drug (particularly cocaine) addiction.