The Brain's Reward Pathways

The reward system that links pleasure with completing a task is caused by the hormone dopamine. Dopamine is a strong neurotransmitter/hormone that dictates the nature of an individual's relationship with reward, pleasure, movement, and motivation.[1] Dopamine is released in the brain through positive experiences such as completing a task or spending time with friends. Reinforcement of this pathway increases motivation over time, encouraging a repeat of that behavior.

First, the reward is evaluated if it is a desired object at all through the hippocampus and the amygdala. Once the object is perceived as rewarding, this triggers neurons in the ventral tegmental area (VTA), activating and releasing dopamine. This powerful neurotransmitter "travels along a neural highway called the mesolimbic pathway to the nucleus accumbens (NAc)."[2] Here, "dopamine molecules bind to receptors on neurons, producing neural changes that correspond to feelings of pleasure and reward.[3] Subsequently, a signal is sent from the NAc to the prefrontal cortex noting the association between receiving the reward and the behavior performed to obtain the reward. Encountering this similar reward again, the VTA, NAc and prefrontal cortex use feedback loops to adjust behavior accordingly. If the reward was worse or better than the first time, our brains remember that to alter motivation levels.

While this reward system is beneficial for individuals to build habits, likes/dislikes, values, and beliefs, when exposed to substances that produce a neurological high similar to dopamine it can have devastating effects, especially for adolescents and young adults with developing brains. Teenagers and those in their early twenties are more likely to chase these neurological highs by taking drugs because their brains seek risk-taking and lack impulse control.[4] Brain maturation is dependent on several environmental and genetic factors, most notably age and drug use.[5] Abuse of substances like marijuana, cocaine, and opioids before the brain finishes developing at the age of 25 can alter the brain's ability to better recognize stimulants that previously were exciting or interesting.

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[1] Editors of Encyclopaedia Brittanica's "dopamine" in *Encyclopaedia Brittanica* (Encyclopaedia Britannica, Inc., 2025)

[2] Olivia Guy-Evans' "Brain Reward System" in SimplyPsychology, June 30, 2025
[3] Olivia Guy-Evans' "Brain Reward System" in SimplyPsychology, June 30, 2025

[4] TEDx, "Never Enough: The Neuroscience and Experience of Addiction," presentation by Judy Grisel, TEDx, February 2020, YouTube video, 12:14, https://www.ted.com/talks/judy_grisel_never_enough_the_neuroscience_and_experience_of_addiction.

[5] Arain, Mariam et. Al "Maturation of the adolescent brain" in PUBMED Journal, April 3, 2013