

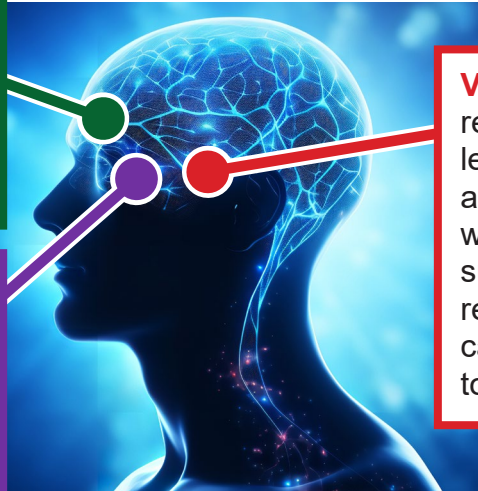
The Science of Substance Use Disorder

What is Substance Use Disorder (SUD)?

Substance use disorder is a treatable chronic mental health disorder that affects a person's brain and behavior, leading to an inability to control their use of the substances despite negative consequences on health, work, and or relationships. Substance use disorders can involve the use of legal or illegal drugs, alcohol or medications.

Substance Use: Impact on the Brain and Behavior

Certain substances change three key parts of the reward system of the brain, namely the prefrontal cortex, nucleus accumbens and ventral tegmental areas. These changes contribute to continued substance use despite harmful outcomes and the desire to quit.



Prefrontal cortex is responsible for decision making and impulse control. Substances impact the prefrontal cortex leading to poor decision making and risky behaviors.

Nucleus accumbens (the "pleasure center") receives the dopamine signals from the VTA. The nucleus accumbens becomes overstimulated by the large amount of dopamine, creating intense pleasure and the desire for more of the substance.

Ventral Tegmental Area (VTA) is responsible for regulating reward, learning, memory, and behaviors associated with substance use. When certain substances are used, the VTA releases a flood of dopamine causing intense pleasure leading to the desire to use again.

These changes in the brain due to substance use impair the ability to:

- Quit substances despite waning interest, side effects or consequences
- Regulate cravings
- Experience satisfaction in regular activities
- Feel "normal" without the substance