

## **Part II**

Learn About the Disease

### **Seminar # 7**

“Substance Use Disorder is a Brain Disease”



#### **SEMINAR GOALS:**

1. The attendee will be able to name the three (3) primary parts of the brain that deals with the reward system.
2. The attendee will be able to identify in their family triggers that can cause relapse.
3. Using the information, identify within these exercises the family will complete their family plan of action with information needed to further develop their understanding to their loved one's diagnosis and determine what impact this will have on the family members.

---

## *Introduction*

---

What is drug addiction? Addiction is defined as a chronic, relapsing brain disease that is characterized by compulsive drug seeking and use, despite harmful consequences. It is considered a brain disease because drugs change the brain—they change its structure and how it works. These brain changes can be long-lasting and can lead to the harmful behaviors seen in people who abuse drugs.

The brain is made up of many parts that all work together as a team. Different parts of the brain are responsible for coordinating and performing specific functions. Drugs can alter important brain areas that are necessary for life-sustaining functions and can drive the compulsive drug abuse that marks addiction. Brain areas affected by drug abuse include: 1. The **brain stem**, which controls basic functions critical to life, such as heart rate, breathing, and sleeping. 2. The **cerebral cortex**, which is divided into areas that control specific functions. Different areas process information from our senses, enabling us to see, feel, hear, and taste. The front part of the cortex, the frontal cortex or forebrain, is the thinking center of the brain; it powers our ability to think, plan, solve problems, and make decisions. 3. The **limbic system**, which contains the brain's reward circuit. It links together a number of brain structures that control and regulate our ability to feel pleasure. Feeling pleasure motivates us to repeat behaviors that are critical to our existence. The limbic system is activated by healthy, life-sustaining activities such as eating and socializing—but it is also activated by drugs of abuse. In addition, the limbic system is responsible for our perception of other emotions, both positive and negative, which explains the mood-altering properties of many drugs.

The brain is a communications center consisting of billions of neurons, or nerve cells. Networks of neurons pass messages back and forth among different structures within the brain, the spinal cord, and nerves in the rest of the body (the peripheral nervous system). These nerve networks coordinate and regulate everything we feel, think, and do. 1. **Neuron to Neuron** Each nerve cell in the brain sends and receives messages in the form of electrical and chemical signals. Once a cell receives and processes a message, it sends it on to other neurons. 2. **Neurotransmitters**—The Brain's Chemical Messengers The messages are typically carried between neurons by chemicals called neurotransmitters. 3. **Receptors**—The Brain's Chemical Receivers The neurotransmitter attaches to a specialized site on the receiving neuron called a receptor. A neurotransmitter and its receptor operate like a “key and lock,” an exquisitely specific mechanism that ensures that each receptor will forward the appropriate message only after interacting with the right kind of neurotransmitter. z **Transporters**—The Brain's Chemical Recyclers Located on the neuron that releases the neurotransmitter, transporters recycle these neurotransmitters (that is, bring them back into the neuron that released them), thereby shutting off the signal between neurons

Drugs are chemicals that affect the brain by tapping into its communication system and interfering with the way neurons normally send, receive, and process information. Some drugs, such as marijuana and heroin, can activate neurons because their chemical structure mimics that of a natural neurotransmitter. This similarity in structure “fools” receptors and allows the drugs to attach onto and activate the neurons. Although these drugs mimic the brain's own chemicals, they don't activate neurons in the same way as a natural neurotransmitter, and they lead to abnormal messages being transmitted through the network. Other drugs, such as amphetamine or cocaine, can cause the neurons to release abnormally large amounts of natural neurotransmitters or prevent the normal recycling of these brain chemicals. This disruption produces

a greatly amplified message, ultimately disrupting communication channels.

We know that the same sort of mechanisms involved in the development of tolerance can eventually lead to profound changes in neurons and brain circuits, with the potential to severely compromise the long-term health of the brain. For Long-term drug abuse impairs brain functioning. Example, glutamate is another neurotransmitter that influences the reward circuit and the ability to learn. When the optimal concentration of glutamate is altered by drug abuse, the brain attempts to compensate for this change, which can cause impairment in cognitive function. Similarly, long-term drug abuse can trigger adaptations in habit or non-conscious memory systems. Conditioning is one example of this type of learning, in which cues in a person's daily routine or environment become associated with the drug experience and can trigger uncontrollable cravings whenever the person is exposed to these cues, even if the drug itself is not available. This learned "reflex" is extremely durable and can affect a person who once used drugs even after many years of abstinence

Chronic exposure to drugs of abuse disrupts the way critical brain structures interact to control and inhibit behaviors related to drug use. Just as continued abuse may lead to tolerance or the need for higher drug dosages to produce an effect, it may also lead to addiction, which can drive a user to seek out and take drugs compulsively. Drug addiction erodes a person's self-control and ability to make sound decisions, while producing intense impulses to take drugs.

Our brains are wired to ensure that we will repeat life-sustaining activities by associating those activities with pleasure or reward. Whenever this reward circuit is activated, the brain notes that something important is happening that needs to be remembered and teaches us to do it again and again without thinking about it. Because drugs of abuse stimulate the same circuit, we learn to abuse drugs in the same way.

Cognitive Behavioral Therapy seeks to help patients recognize, avoid, and cope with the situations in which they are most likely to abuse drugs.

- **Contingency Management** uses positive reinforcement such as providing rewards or privileges for remaining drug free, for attending and participating in counseling sessions, or for taking treatment medications as prescribed.
- **Motivational Enhancement Therapy** uses strategies to evoke rapid and internally motivated behavior change to stop drug use and facilitate treatment entry.
  - **Family Therapy** (especially for youth) approaches a person's drug problems in the context of family interactions and dynamics that may contribute to drug use and other risky behaviors.
  - **Behavioral treatments** help engage people in substance use disorder treatment, modifying their attitudes and behaviors related to drug use and increasing their life skills to handle stressful circumstances and environmental cues that may trigger intense craving for drugs and prompt another cycle of compulsive use. Behavioral therapies can also enhance the effectiveness of medications and help people remain in treatment longer.

Did you know that a family system has direct impact on the environment of the person with substance use disorder? If this person is in treatment and then discharged from care, back into an unchanged family environment, it is likely the triggers which were present before treatment are still present in the family, after treatment. The family members will benefit from seeking Multidimensional Family

Therapy while their loved one is in the treatment center. Doing this, has proven to reduce the likelihood of relapse by 69%.

### **The Story**

The bi-chemical signature tells the truth. The dopamine rewiring in our brain, creates a new condition stimulation. Prediction of stimuli creates a new channel towards reward and our memory stores it for retrieval.

### VIDEO ONE



**ASSIGNMENT VIDEO: On [www.youtube.com/](http://www.youtube.com/)**

**Search Title: Brain Reward: Understanding How the Brain Responds to Natural Rewards and Drugs of Abuse?**

**Link:** <https://www.youtube.com/watch?v=7VUIKP4LDyQ>

**Duration: 9:11 min**

### VIDEO TWO



**Search Title: Addiction Neuroscience 101**

This is an overview of the neurobiology of addiction

**Link:** <https://www.youtube.com/watch?v=bwZcPwIRRcc&t=930s>

**Duration: 23:29min**

### VIDEO Three



**Search Title: Matrix Pt II TRIGGERS AND CRAVINGS FOR MORE**

**LINK:** <https://www.youtube.com/watch?v=kqZak9ctzGo>

Comprehensive kit provides substance abuse treatment professionals with a year-long intensive outpatient treatment model for clients with dependence on stimulant drugs such as methamphetamine and cocaine. Includes family education sessions and handouts.

**Duration: 35:17 min**

---

*The triggers at home with the family?*

---

What are your words that might become triggers?

---

---

---

What visual stimuli are present in the home environment?

---

---

---

---

What activities does the family do that might create triggers?

- 1.
- 2.
- 3.

What are the roles of each family member and how might they create triggers?

---

---

---

---

### **Reference Publications:**

NIDA's Special Initiatives for Students, Teachers, and Parents Heads Up: Real News About Drugs and Your Body—A drug education series created by NIDA and SCHOLASTIC INC. for students in grades 6 to 12. [www.headsup.scholastic.com](http://www.headsup.scholastic.com)

NIDA for Teens: The Science Behind Drug Abuse—An interactive Web site geared specifically to teens, with age-appropriate facts on drugs. [www.teens.drugabuse.gov](http://www.teens.drugabuse.gov) Drug Facts Chat Day— A Web chat between NIDA scientists and teens, held through school computer labs once a year during National Drug Facts Week (below). [www.drugabuse.gov/chat](http://www.drugabuse.gov/chat)

National Drug Facts Week— A week-long observance that encourages community-based events and dialogue between teens and scientists during National Drug Facts Week (below). [www.drugfactsweek.drugabuse.gov/](http://www.drugfactsweek.drugabuse.gov/)

Publications on Prevention and Treatment Principles Preventing Drug Use among Children and Adolescents: A Research-Based Guide for Parents, Educators, and Community

Leaders—NIDA's research-based guide for preventing drug abuse among children and adolescents provides 16 principles derived from effective drug-prevention research and includes answers to questions on risk and protective factors as well as on community planning and implementation.

Principles of Drug Addiction Treatment: A Research-Based Guide—This guide summarizes the 13 principles of effective treatment, answers common questions, and describes types of treatment, providing examples of scientifically based and tested treatment components.

---

### ***Family Plan of Action***

---

1. The family members will name the type of rewards in the brain that are most likely to trigger a relapse with their loved one.
2. The family members will identify the types of triggers the family creates that can cause relapse.
3. Using the information, identify within these exercises the family will complete their family plan of action of the changes they will make to create as much of a trigger free environment for their loved one, as is reasonable for them to complete.