Northeast & Caribbean (HHS Region 2)

ATTC Addiction Technology Transfer Center Network

Funded by Substance Abuse and Mental Health Services Administration

Basic Neurochemistry for Non-Scientists

Presented by Mary McCarty-Arias, MA

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SAMHSA

Substance Abuse and Mental Health Services Administration

Disclaimer

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The use of affirming language inspires hope and advances recovery.

LANGUAGE MATTERS.

Words have power.

PEOPLE FIRST.

The ATTC Network uses affirming language to promote the promises of recovery by advancing evidence-based and culturally informed practices.

Mary McCarty-Arias, M.A.

More than 25 years experience

training in co-occurring disorders,

HIV, and vocational rehabilitation.

Housekeeping

- Hours: 12 – 2:00
- If you are sharing a computer, please write your name in the chat box.
- Evaluations/GPRAs – At the end of this session
- A copy of the slides will be sent with your certificate
- Certificates – 2 CASAC hours

Guidelines

Chat box – you can write in questions as I present. Also, I will ask you to answer questions in the chat box.

Anonymity – I don't call people by name. You can also write in questions privately.

Goal

Review the basics of neurochemistry as it applies to substance use and some co-occurring disorders.

Objectives

1. Identify the neuron as the basic building block of the central nervous system
2. Identify neurotransmitters (dopamine, norepinephrine, and serotonin)
3. Describe 3 parts of the brain (cortex, limbic system, and brain stem) & how they work together around the use of substances and behavior
4. Describe how this information helps people in recovery & can be applied to prevention

What is Neurochemistry?

The study of the chemical composition and processes of the nervous system.

(Your Dictionary, retrieved 7/9/20)

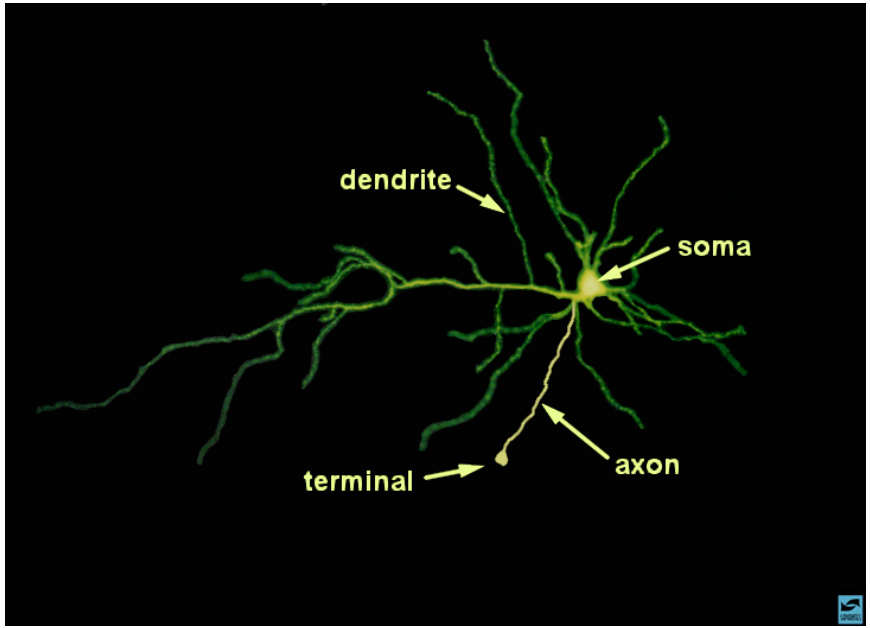
Central Nervous System

- Brain and the spinal cord
- “Command post”
- All movement, thoughts, emotions, breathing, heart rate, body temperature go through the CNS

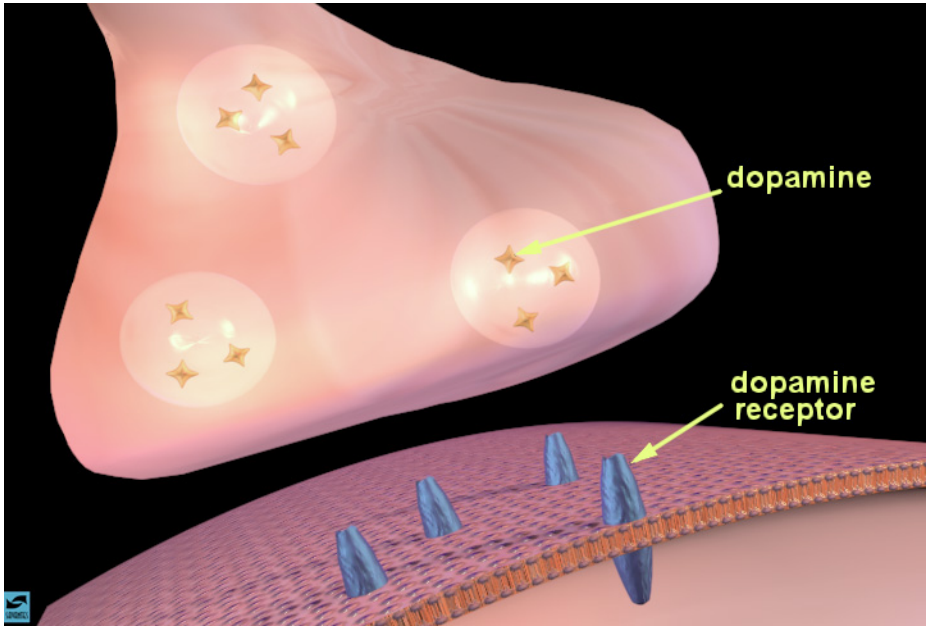
Terms to Know

- Neuron
- Axon
- Dendrite
- Synapse
- Neurotransmitters
- Vesicles
- Action Potential
- Reuptake

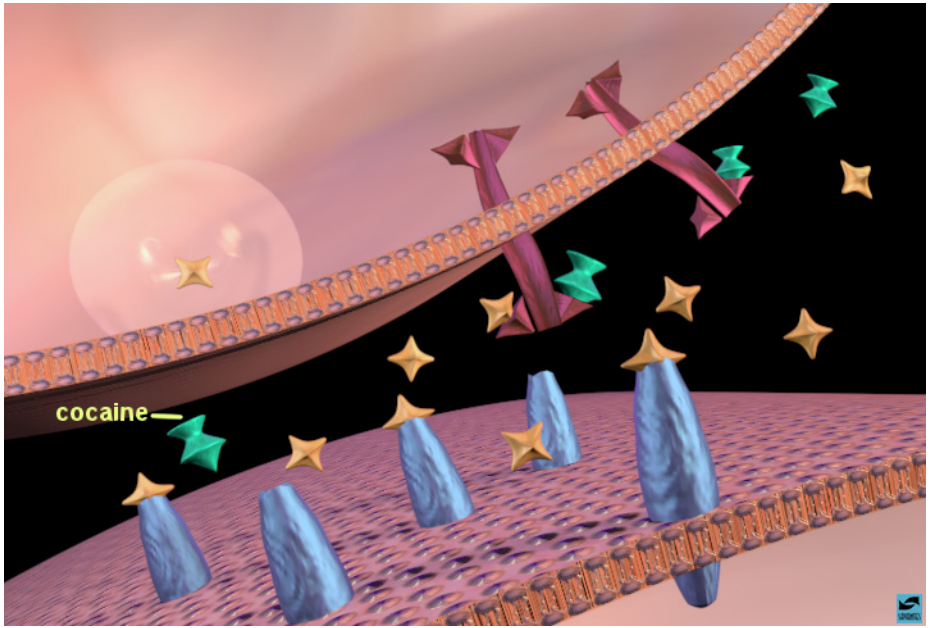
The Neuron



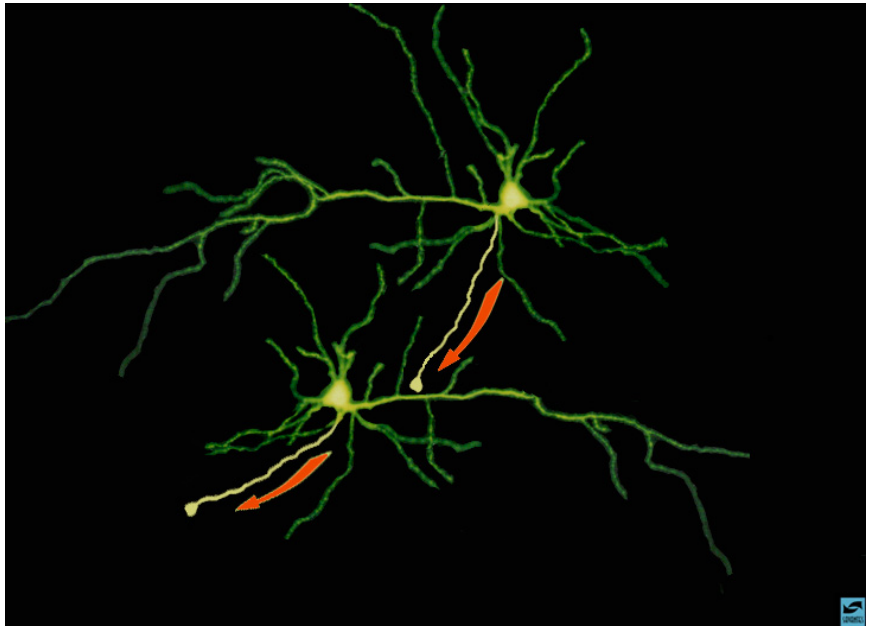
Dopamine Binding



Uptake and Reuptake



Two Neurons



The Brain

Prefrontal cortex

- Judgment and reason

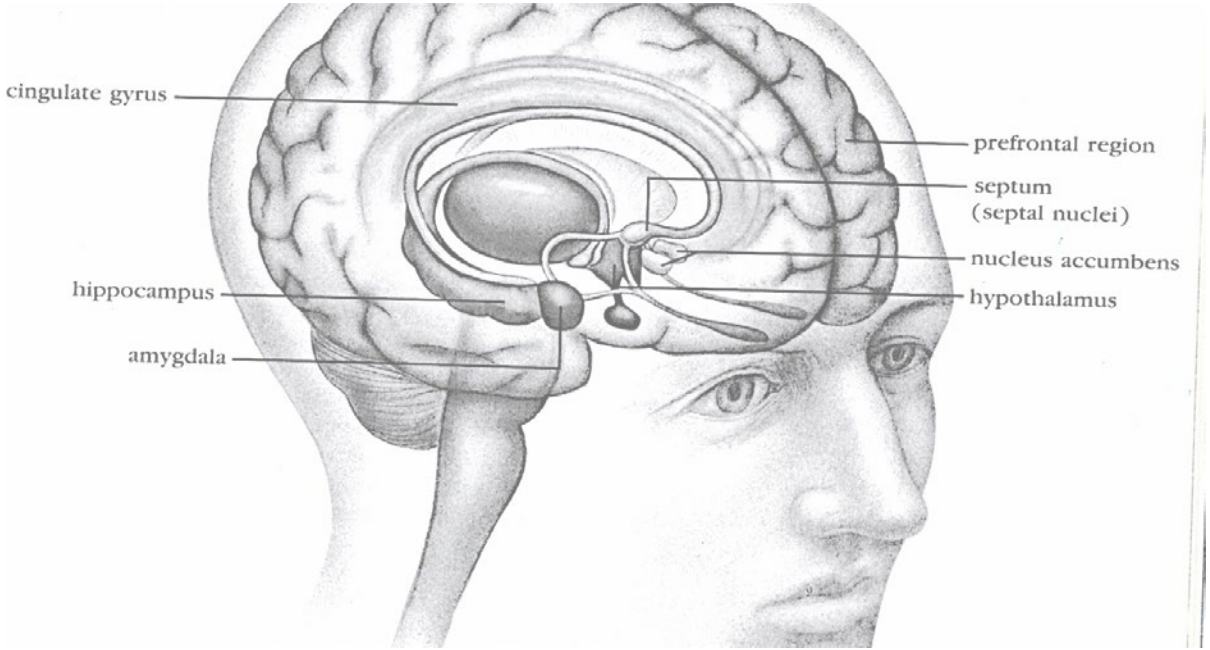
Limbic system

- Emotions and reward sites

Brain Stem

- Bodily functions

Limbic System



Drug Effects on Neurotransmitters

1. Increase the levels of neurotransmitters
2. Decrease the levels of neurotransmitters
3. Mimics other neurotransmitters
4. Blocks access to receptor sites

Neurotransmitters

1. Norepinephrine
2. Dopamine
3. Serotonin
4. Endorphins (not a neurotransmitter but important to know)
5. Acetylcholine

Norepinephine (NE)

Brain Stem	Increases metabolic rate, heart rate, blood pressure, strength, and energy
Limbic System	High levels are associated with euphoria Pleasure
Cortex	Focuses thinking and improves concentration Levels that are too high are associated with hyper-vigilance

Dopamine (DA)

Brain Stem	Fine motor control and functioning
Limbic System	Stimulates the pleasure and reward sites
Cortex	Attention span, mental stability and organization

Serotonin (5HT)

Brain Stem	Regulates sleep and appetite
Limbic System	Regulates mood
Cortex	Interpretation of sensory input

Endorphins

Brain Stem	Inhibit pain Slow motor response
Limbic System	Cause euphoria Reduce pain and help control stress
Cortex	May reduce compulsive behaviors

Acetylcholine (ACH)

Brain Stem	Affects motor control, muscular reflexes, sleep, blood pressure, heart rate, and fluid balance
Limbic System	Affects perception, mood, aggression and sexual activity
Cortex	Affects memory, information storage

Neuroplasticity

- Brains capacity to adapt
- Can rebuild to recovery

(Blazes, Christopher, MD, San Diego Summer School, 2020)

Some Challenges for Adolescents & Women

Adolescents	Neurotransmitters are developed when a child is around 2 Neurotransmitters decrease sharply when an adolescent is 13
Women	May have lower levels of serotonin than men

How Can You Use This Information?

Write in….

1. For yourselves?
2. For your clients?


hope