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The Addiction Epidemic in Rhode Island: A Mini Lecture Series

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The Addiction Epidemic in Rhode Island: A Mini Lecture Series

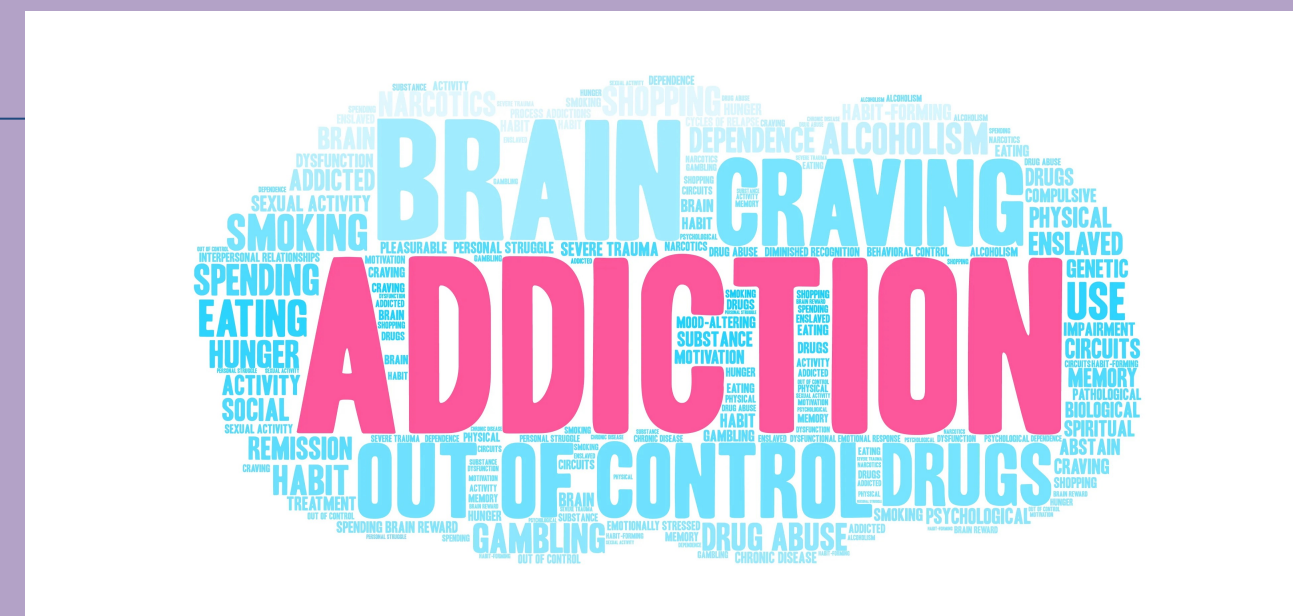
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Drug Use in Rhode Island

- Since the year 2002, the rate of heroin use in RI has quadrupled.
- Within 2015 50% of reported overdose deaths involved fentanyl compared to 37% in 2014, previous years show percentages of less than 5%.
- Fatal overdoses involving fentanyl throughout the state of RI are more likely to occur with males.

(Rhode Island Governor's Overdose Prevention and Intervention Task Force, 2015)



Addiction

- The National Institute on Drug Abuse defines addiction as “a chronic disease characterized by drug seeking and use that is compulsive, or difficult to control, despite harmful consequences.”
- Science currently understands that drugs work in at least 2 different ways within the brain.
 - Emulation of natural chemicals produced in the brain.or
 - Hijack of the brain's reward circuit through overstimulation
 - This activation causes the action to be **remembered** and **repeated**.
- Drug Exemplar: **Cocaine**
 - Ingestion of cocaine activates neuronal cells resulting in an over-release of dopamine and impairment of reuptake.
 - Results in immediate feelings of excitement, pleasure and happiness.
 - Flooding of neurotransmitters overstimulates the brain reward circuit and with chronic use the brain can experience either down regulation or up regulation depending on the drugs' effect (National Institute on Drug Abuse, 2021).
 - **Down Regulation**- Agonistic drugs that enhance NT effects cause the brain to decrease available receptors.
 - **Up Regulation**- Antagonistic drugs that counteract NT will cause the brain to increase receptors.

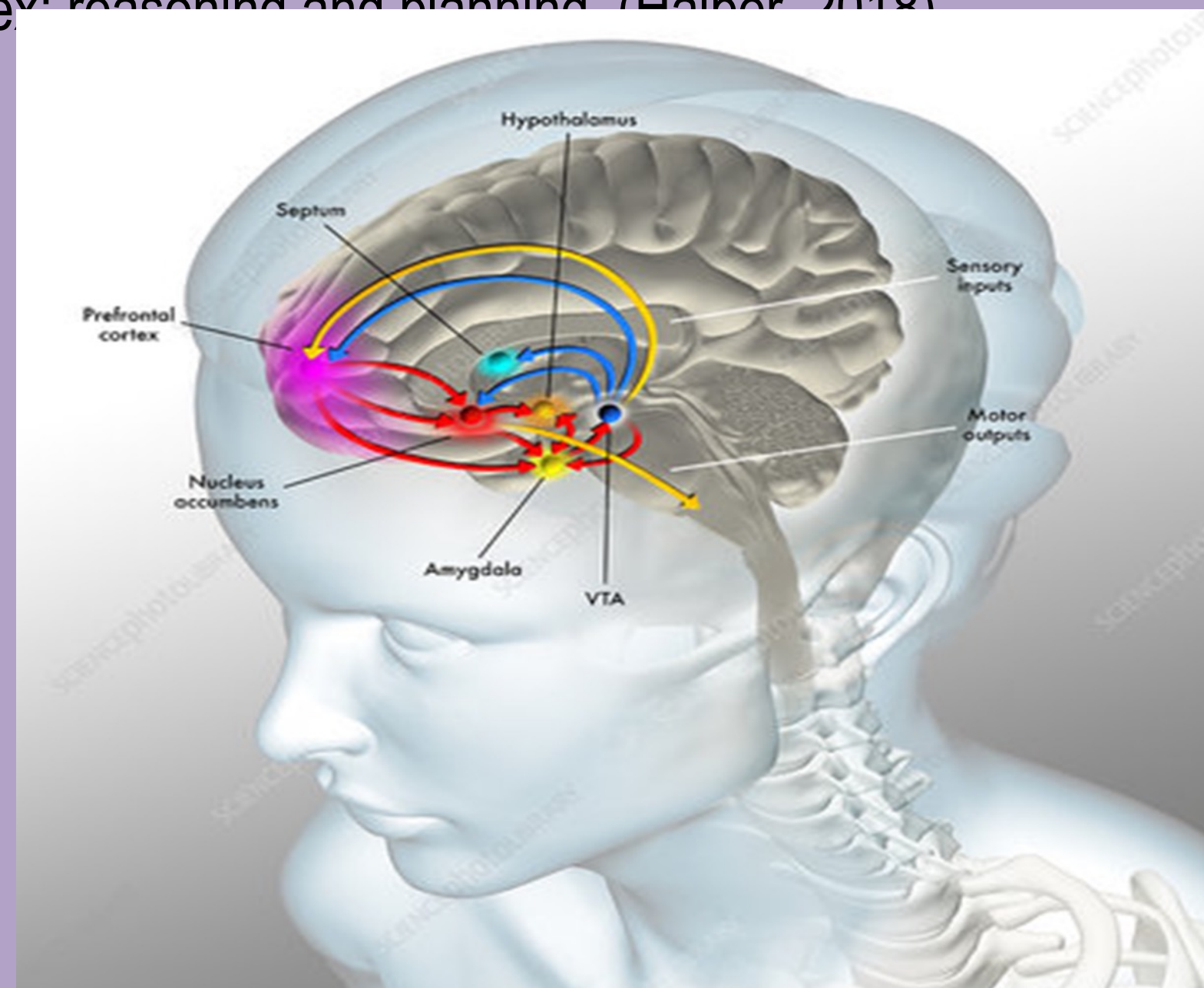
The Brain Reward Circuit

What is it?

- ❑ A reward circuit in the brain sensitive to pleasures within life: “food, sleep, avoidance of pain” (Halber, 2018).
- ❑ Performance of these activities causes a pleasurable feeling within the body.
- ❑ Communication occurs through the neurotransmitter dopamine, creating learned behaviors of pleasurable experiences (Halber, 2018).

Dopamine

- ❑ Dopamine receptors become activated when we anticipate a reward.
 - ❑ This activation strengthens synapses (gap between neurons) located in the hippocampus (area specific for memory).
- ❑ This pathway elicits activation of the
 - ❑ Amygdala: emotion center
 - ❑ Prefrontal Cortex: reasoning and planning. (Halber, 2018)



Structures of the Brain Involved

- ❑ Prefrontal Cortex
 - ❑ Controls the maintenance of working memory, impacting reward quality, quantity and reliable attainment (Cooper, 2002).
- ❑ Amygdala
 - ❑ Reactive to novel stimuli, causes an emotional response comparable to the significance of the reward (Cooper, 2002).
- ❑ Subiculum
 - ❑ Integrates information surrounding the location and environment where the reward was experienced (Cooper, 2002).
- ❑ Nucleus Accumbens / Striatal Complex
 - ❑ Influences the actions taken to obtain a reward.
 - ❑ Crucial in determining if the action should be repeated for more exposure (Cooper, 2002).
- ❑ Ventral Tegmental Area
 - ❑ Impacts motivation, reward, cognition and aversion to rewards.
 - ❑ “Potential target for the treatment of addiction, depression and other stress linked disorders (Bouarab et al., 2019).”

Opioids

What is it?

- Medication prescribed for the treatment of chronic and severe pain.
- **MOA:** Binds to pain receptors present in the Central Nervous System resulting in decreased perception of pain and a decreased CNS status (Vallerand and Sanoski, 2017).

Origin of Opioids

- Derived from the poppy plant *Papaver Somniferum* (Department, 2020).

What Makes Opioids Addictive?

- Opioids modulate perceptions of pain providing a feeling of relief among users.
- Chronic use of opioids slows the bodies natural production of endorphins (NT that reduce pain naturally), potentiating effects when chronic drug use is stopped.

Side Effects of Opioid Use

- Confusion, Sedation, Hypotension, Constipation, Respiratory Depression

Overdose Triad

1. **Decreased Consciousness**
2. **Decreased Respirations**
3. **Pinpoint Pupils- reflects anoxic state within body**

Treatment: Narcan

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