



Understanding Addiction: Why Can't Those Affected Just Say No?

The Stigma of Addiction

- There continues to be a stigma surrounding addiction even among health care workers.
- Consider the negative opinions about the behaviors, morals, or lifestyles of smokers, alcoholics, and other substance users that you hear in the community.
- Consider times when you may have fallen back on negative conceptions of a persons behaviors as choices rather than considering the extent of an addiction.

Disease

- A disorder of structure or function in a human, animal, or plant, especially one that produces specific signs or symptoms.
- An abnormal condition; a disorder of structure or habit....



Addiction

Choice?

- Do individuals choose to engage in a behavior that strips them of dignity, family, finances, health, and sanity?

Or Disease?

- A disorder of structure or function.
- An uncontrollable impulse to use a substance that is driven by chemical impulses in the brain.

Use Of Psychoactive Substances

- Psychoactive drugs are chemical substances that change brain function and result in alterations in perception, mood, or consciousness.
- May be used for:
 - Recreational reasons
 - Ritual, spiritual, or shamanic reasons
 - To treat neuro, or psychiatric disorder

Use Of Psychoactive Substances Cont.

- There is archeological evidence of the use of psychoactive drugs (mostly plants) dating back at least 10,000 years.
- There is historical evidence of cultural use over the past 5,000 years.
- Humans have sought to alter consciousness, disrupt or take a break from reality since the beginning of time.

What do these substance do for an individual?

Psychoactive substances affect a person's neurochemistry causing changes in...

1. Mood
2. Perception
3. Cognition
4. Behavior

Each substance has a specific action on one or more neurotransmitter, or neuro receptor in the brain.

Two Main Ways Drugs Work In The Brain

Heroin:

- Opioid agonist
- Substances work as agonists: these chemicals bind to a neuro-receptor and activates the receptor to create a biological response.

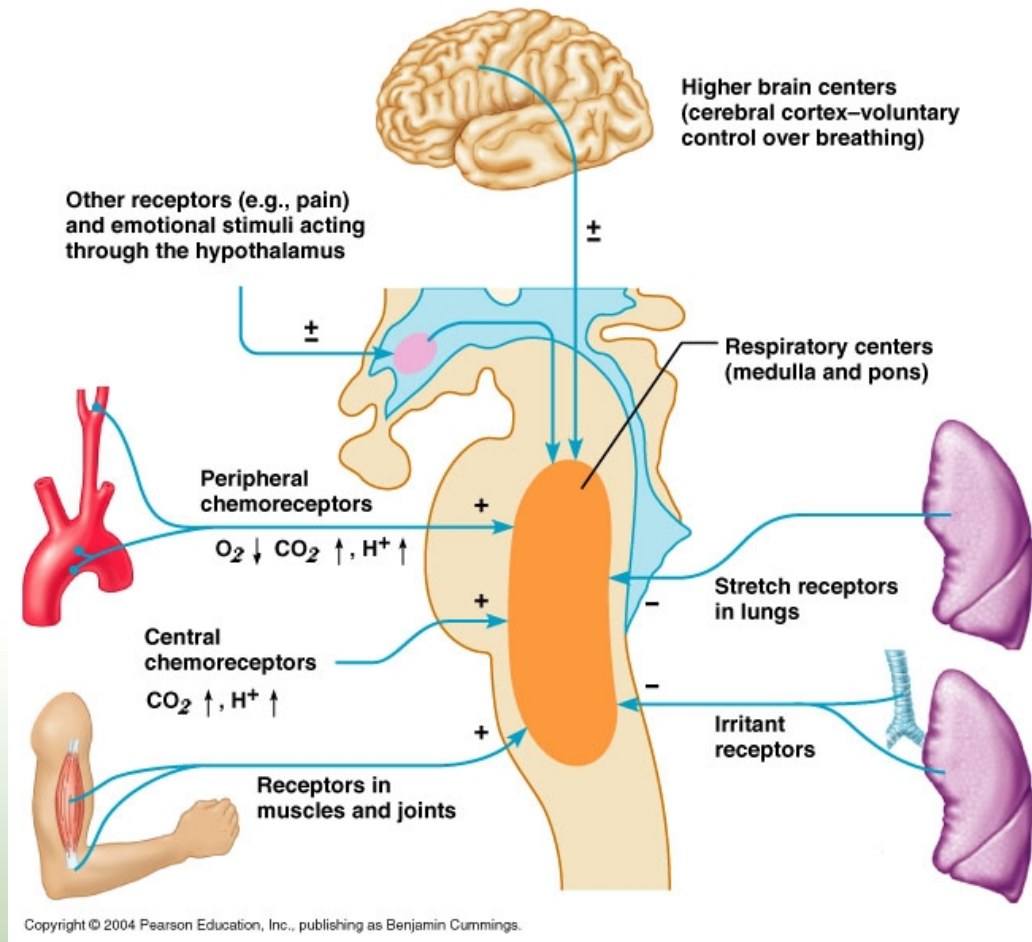
Naloxone:

- Drug antagonist that blocks the effects of opiates
- Substances work as antagonists: these chemicals reduce neurotransmitter activity by blocking post synaptic neurons so neurotransmitters can't bind to them.

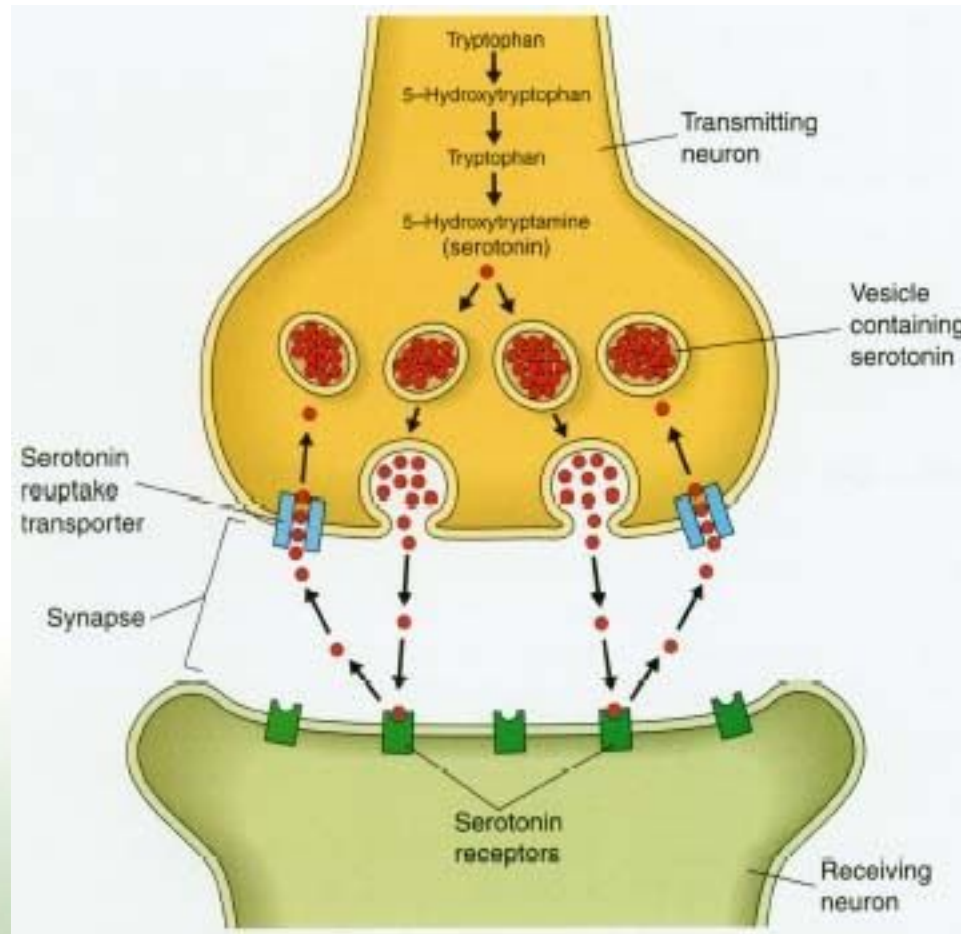
The above is a very minimal version of how drugs may interact in the brain. For example, the following are additional ways a substance may act as an antagonist:

- **Competitive**- These antagonists bind at the same site that the target ligand or agonist binds to. However, it does not activate the receptor sites, but rather blocks it so that the target ligand or agonist cannot attach and activate the site.
- **Non-competitive**- These antagonists bind to allosteric sites and is effective from there. It does not need to attach to the same site as the target ligand or agonist to block or dampen its effects.
- **Uncompetitive**- Uncompetitive antagonists cannot work on their own. Instead they require the ligand or agonist to be bound to the receptor site before they can attach themselves to an allosteric site and begin their work. In general, these antagonists block higher concentrations of agonists better than lower concentrations.
- **Partial Antagonist**- Partial antagonists can attach to the active site but do not completely block out the receptor's effects. However, it does lower it from its maximum potential.
- **Silent Agonists**- These antagonists have zero ability to activate a receptor. They simply attach and block the receptor from activating.
- **Inverse Agonists**- They attach to the same site as an agonist, but induce biological responses opposite to that agonist.

Certain Areas of the Brain Regulate Certain Functions



Neurotransmitter



Why is it important to addiction?

- Exposure, especially chronic exposure that occurs in addiction, changes the structure and functioning of neurons over time.
 - Sensitization
 - Desensitization
- These neurological changes can take months or years to correct for the individual to return to normal functioning.
- Neurological changes can significantly impact mental health, stress sensitivity, and relapse potential.

Drug Addiction

A disease that is a chronically relapsing disorder, characterized by compulsive behavior and a lack of control over seeking and taking the drug, loss of control in setting limits, and a negative emotional state when the drug is absent (withdrawal).

It can result in relapse even after a lengthy period of abstinence.

The Prevalence of Relapse

- 15.6% (or 29 million) of the US adult population will engage in illicit drug use at some time in their lives. 2.9% of those (4.5 million) will become chemically addicted.
- Alcohol abuse is significantly higher: approximately 120 million using, with 7.7% meeting the criteria for abuse or dependence.



The Cycle of Addiction

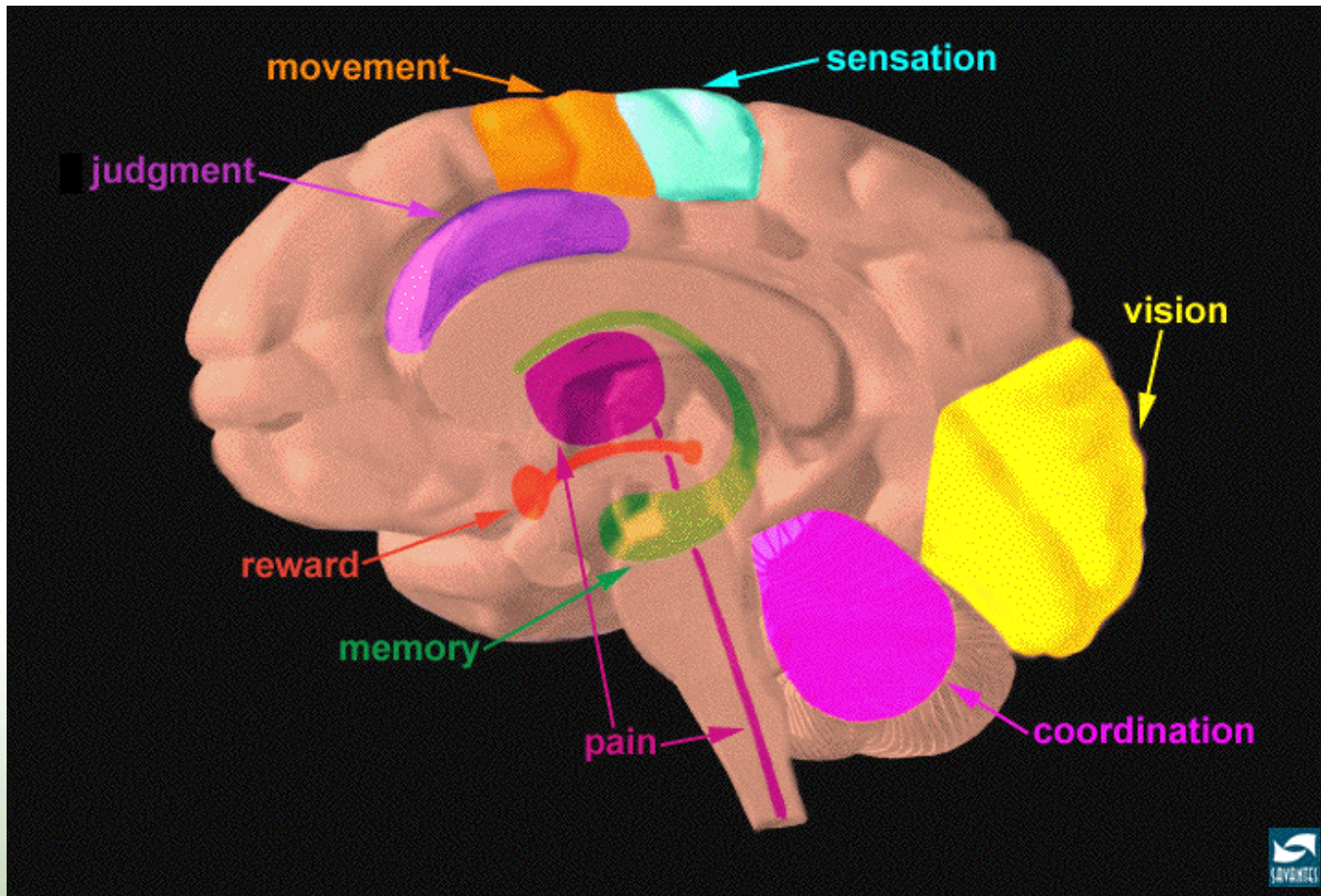
- The behavior of an addict typically follows a cycle:
 - Binge/ Intoxication
 - Withdrawal/ Negative Effect
 - Craving/ Pre-occupation



The Binge/ Intoxication Stage

- Pleasurable experience or high
- Reward center of the brain is stimulated
 - VTA - Ventral Tegmental Area
 - NA - Nucleus Accumbens
 - SN - Substantia Nigra
- Memory becomes involved
 - Reinforced by the experience and the reward

Reward & Memory in the Brain



The Transition from Use to Addiction

- Drugs affect a person's neurochemistry causing changes in mood, perception, cognition, and behavior.
- Chronic drug use affects the brain in many ways, but significantly in the areas of reward and memory. Overtime making it more and more difficult to focus on anything outside of seeking and using the substance.



Why do some people become addicted and others do not?

People respond differently due to :

- Individual chemistry/ heredity - just as a predisposition to diabetes, asthma, or other chronic disorders.
- Dosage - can determine whether an experience will be pleasurable.
- Time and circumstances - such as internal attitude, expectations, and peers present. What is happening in the persons life currently and risk vs. protective factors.

Comorbidity

- High rate of trauma survivors who seek addiction treatment.
- 59% of childhood trauma survivors will develop substance use disorders.
- According to NIDA, approximately 80% of women in treatment have suffered sexual or physical abuse.
- Compared with the general population, people addicted to drugs are twice as likely to suffer from mood disorder or anxiety.

(National Child Traumatic Stress Network)
(NIDA. Drug Facts – Comorbidity, 2011)

Binge/ Intoxication

- If substances are rewarding, and positively reinforcing, they can result in continued use despite negative consequences.
- Whether the substance is rewarding depends in part on the information we just covered; chemistry, pre-disposition, and circumstances which include what is going on now, what has happened in the past, peer pressure, age and protective factors.

Neurochemistry

- All drugs of abuse, when administered acutely, (ie. smoking, snorting, injecting so that they reach the brain quicker, and in larger quantities), decrease brain stimulation reward thresholds (ie. the reward is increased). This action causes a goal directed response to acquire more of the substance resulting in the compulsive behavior witnessed in the addictive process.
- The rapid changes in dopamine are associated with reported “high” or euphoria.

The reward reinforces the
desire to use more.
**It is intense in relation to
other positive experiences.**

Continued Long Term Use

- Reduction of dopamine receptors
- Affects thinking and behaviors
- Reduced receptors in the SN are associated with increased impulsive behavior
- Anhedonia – loss of pleasure
- Decision making is affected
- Compulsive drug use in an attempt to feel pleasure

Factors for Addiction

- The person's own chemistry and heredity
- Dose – how much was used (and the more often it is used, the more the pattern of use is reinforced)
- Circumstances and sometimes age and trauma history

WITHDRAWAL/NEGATIVE EFFECT STAGE

The next part in the cycle of addiction....

Addiction is Impulsive and Compulsive

Impulse Control Disorders

- Characterized by increased tension or arousal prior to the impulsive act, followed by pleasure, gratification, or relief when committing the act.
- Positive reinforcement

Compulsive Disorders

- Characterized by stress and increased anxiety before acting on the compulsion, followed by relief when acting on the compulsion.
- Negative reinforcement

Negative Reinforcement

- The compulsive behavior associated with addiction is related to avoidance of physical or psychological effects of absence of the substance:
 - Increased stress & anxiety
 - Cravings
 - Difficulty concentrating
 - Mood dysregulation
 - Decreased dopamine leading to lack of motivation for non-drug related activities

If there is continued absence of the drug...

- Physical symptoms of withdrawal may occur:
 - Nausea
 - Fatigue
 - Increased sensitivity to pain
 - Psychomotor retardation
 - Increased anxiety
 - Seizures



Cues for that remind us

- Old friends – stimulate memories, or offer use
- Places that they have used before
- Smells
- Sounds
- Emotional triggers (happy, sad, excited)
- Seeing substances (pill bottles, needles, etc.)
- Habits (always use when I can't sleep)

Negative Effects of Withdrawal

Psychological Symptoms

- Irritability
- Increased anxiety
- Anhedonia
- Depression
- Difficulty concentrating
- Stress of life pressures or external consequences

Physical Symptoms

- Nausea
- Fatigue
- Insomnia
- Motor retardation
- Increased sensitivity to pain



Second Stage of the Cycle of Addiction: Withdrawal / Negative Effect

- Compulsive drive to avoid negative consequences
- Lack of pleasure
- Lack of motivation toward non-drug related activities.
- Physical and psychological symptoms in early or acute withdrawal.

Craving/Preoccupation Stage

- Cravings will begin prior to full-blown withdrawal
- Negative experiences cause the individual to return to drug seeking/ using behavior.
- Brain development predisposes the addicted person to increased sensitivity to conditioned drug related cues to use, or triggers.

Once the cycle is broken, why does a relapse occur?

- Approximately ½ of those who try to get sober return to heavy use.
- 70-90% experience at least one mild to moderate slip.
- The first 90 days in recovery are when most relapses occur.
- After 90 days the chances of relapse decrease and continue to decrease with time.
- Between 30 & 90 days in recovery, symptoms of underlying psychological issues can peak.

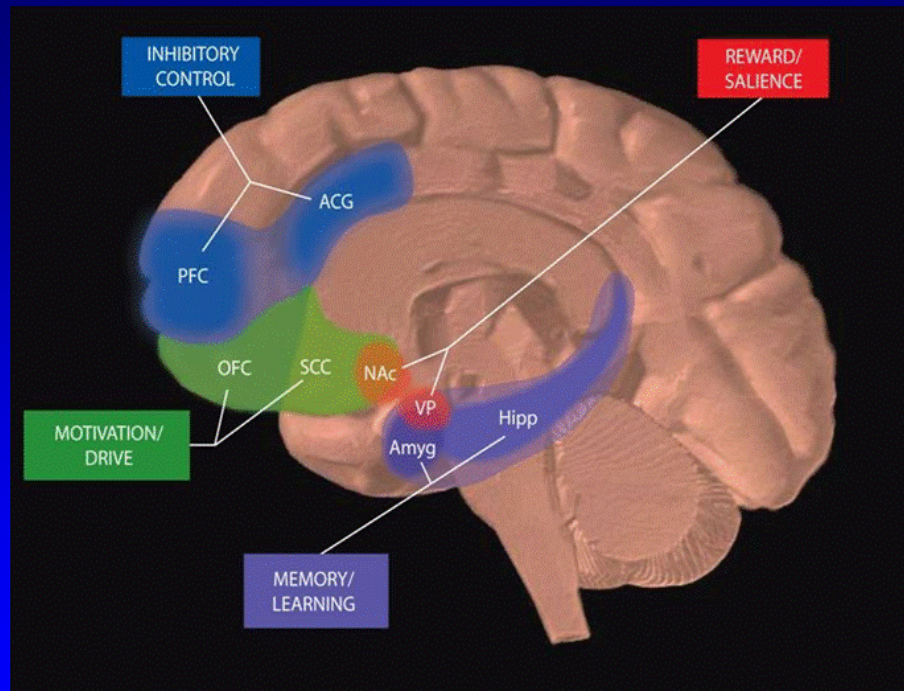
Managing Triggers

- Triggers can manifest in internal and external responses.
- They can trigger memory even after an extended period of stability.
- The human brain adapts to patterns of behavior.
- Responses to psychoactive drug use can be more intense, develop patterns quicker, and be longer lasting due to the neurochemistry associated with it.



Drug use over time affects brain connections between the reward center and memory hubs.

Circuits Involved In Drug Abuse and Addiction



All of these brain regions must be considered in developing strategies to effectively treat addiction

NIDA

Comorbidity of Mental Health and Substance Use Disorders

- Compared with the general population, people addicted to drugs are roughly twice as likely to suffer from mood and anxiety disorders, with the reverse also true.
- *Drug abuse may bring about symptoms of another mental illness.* Increased risk of psychosis in vulnerable marijuana users suggests this possibility.
- *Mental disorders can lead to drug abuse*, possibly as a means of “self-medication.” Patients suffering from anxiety or depression may rely on alcohol, tobacco, and other drugs to temporarily alleviate their symptoms

- NIDA

Risk of Relapse

- First 90 days is critical in recovery and relapse is more likely to occur.
- The human brain adapts to patterns of behavior even in non-addictive processes.
- The processes associated with memory and behavior can be more intense with addiction due to the over stimulation of the reward centers.
- Responses to psychoactive drug use can develop quicker and be longer lasting.

Conclusion

- Addiction is a disease characterized by impulsive/compulsive behaviors.
- Includes positive and negative reinforcement.
- As the disease progresses neurochemistry and brain process and function change.
- The stages of the cycle of addiction reinforce continued use and make it difficult to interrupt due to intense, negative physical and psychological discomfort.
- Triggers for continued use and relapse can be intense and long lasting.

Bibliography

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THANK YOU!

Questions?