



Effect of Opioid Use Disorder on Brain Chemistry

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Learning Objectives

- Understand the major ways that opioids impact the brain
- Explain the neurobiological mechanisms behind how opioids affect the brain
- Understand how medication assisted treatment (MAT) reverses some of the affects opioids have on the brain
- Understand how stigma can negatively impact treatment for opioid use disorder

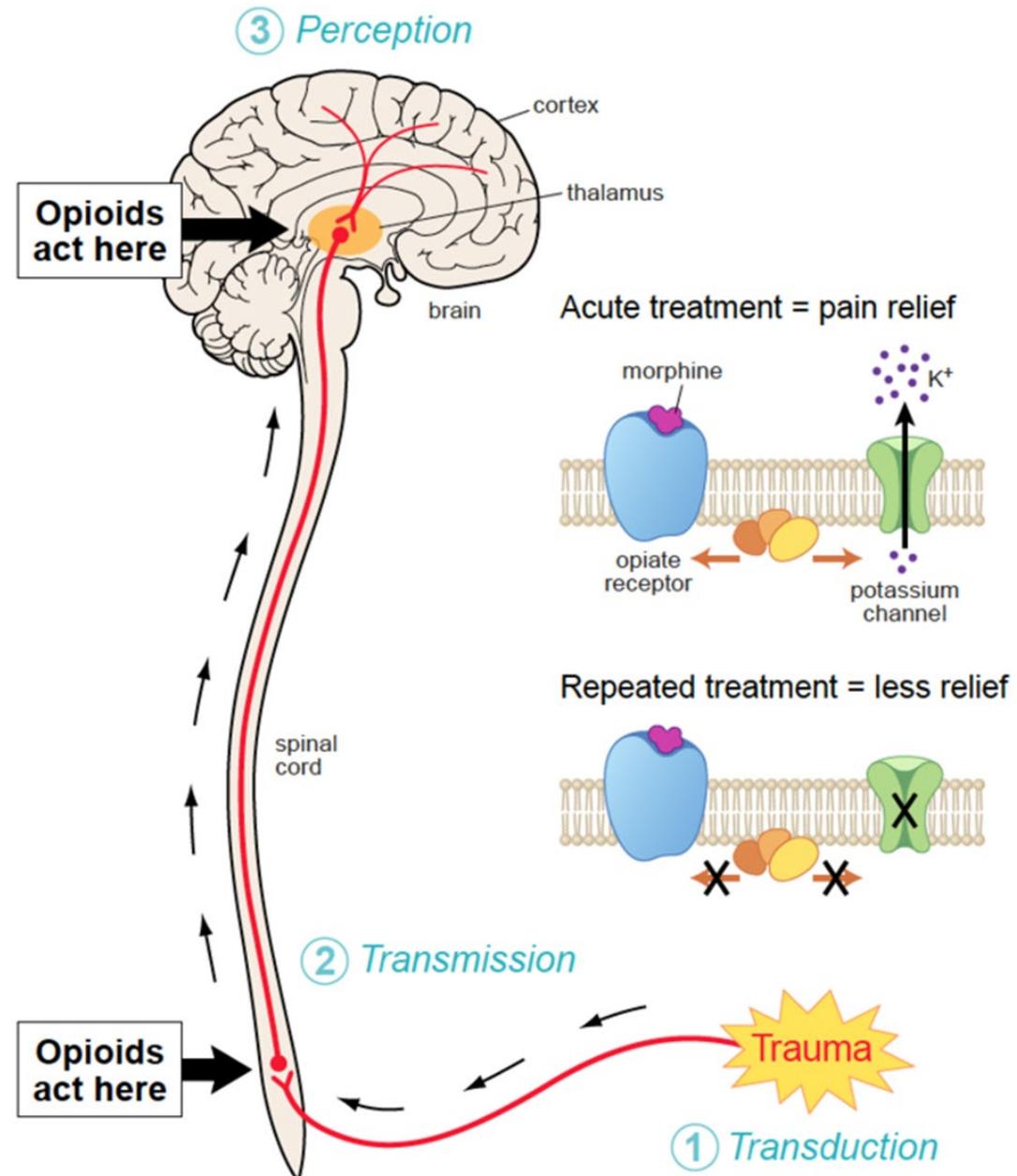




Effect on Brain Processes

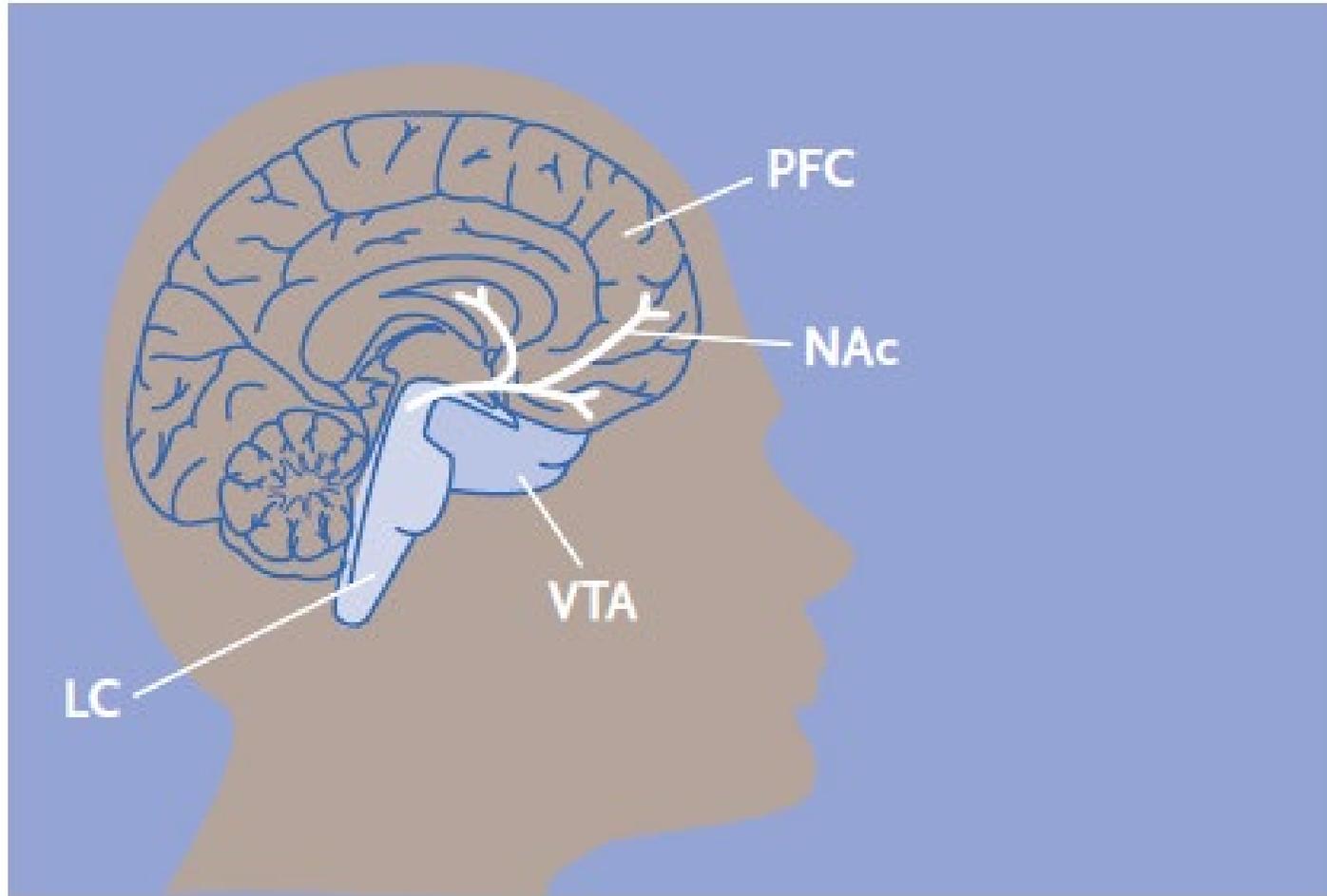


Effect of Opioids on Pain Relief Over Time





Drug-Liking





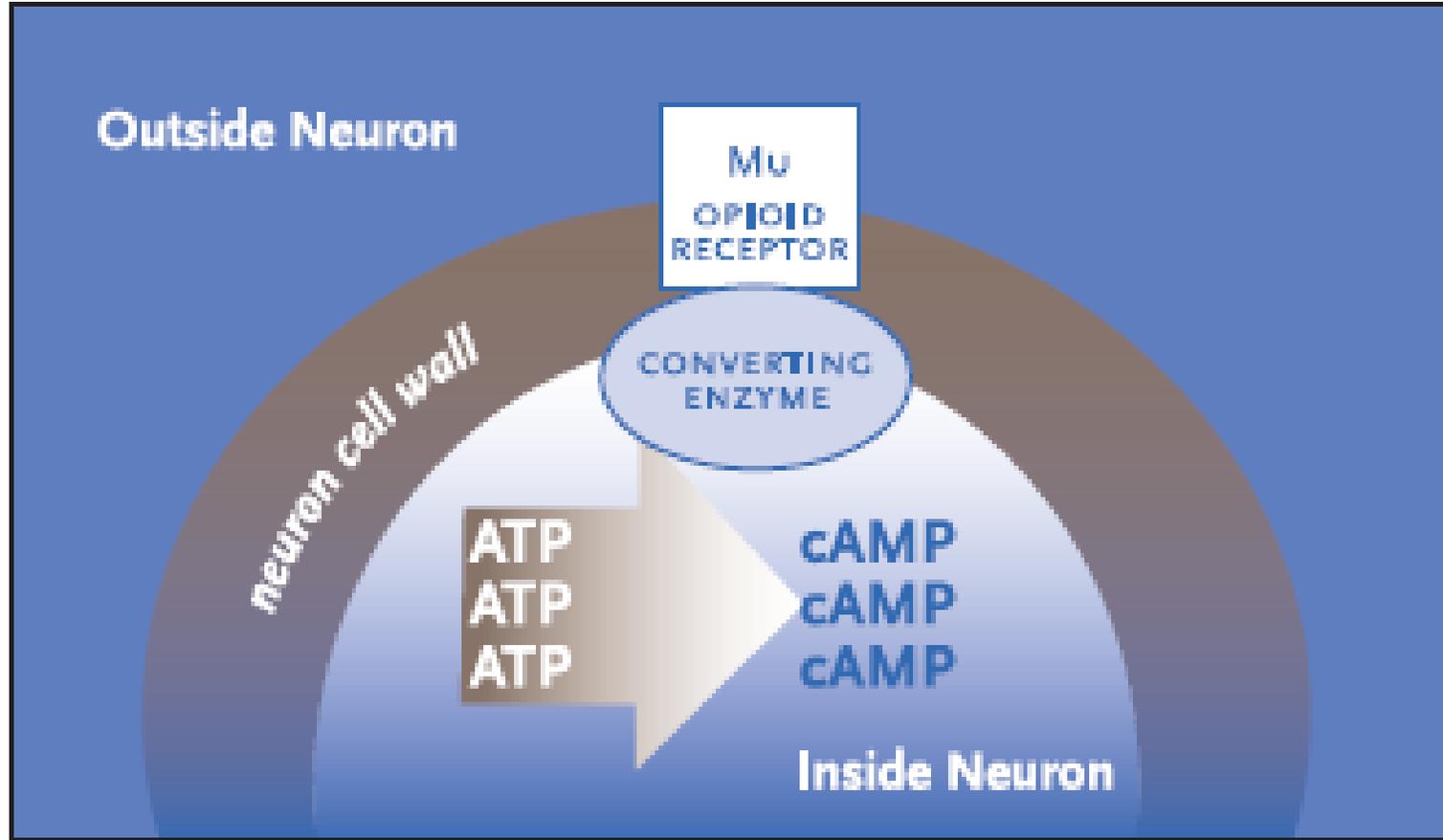
Neurobiology of Dependence and Withdrawal

- Locus Coeruleus is an area of the brain that is critically involved in dependence and withdrawal with opioids
- Repeated exposure to escalating dosing of opioids alters the brain so it functions “normally” when opioids are present and “abnormally” when opioids are absent
- Clinical important alterations:
 - Tolerance- need to take higher dosage of drugs to achieve the same effect
 - Dependence- susceptibility to withdrawal symptoms



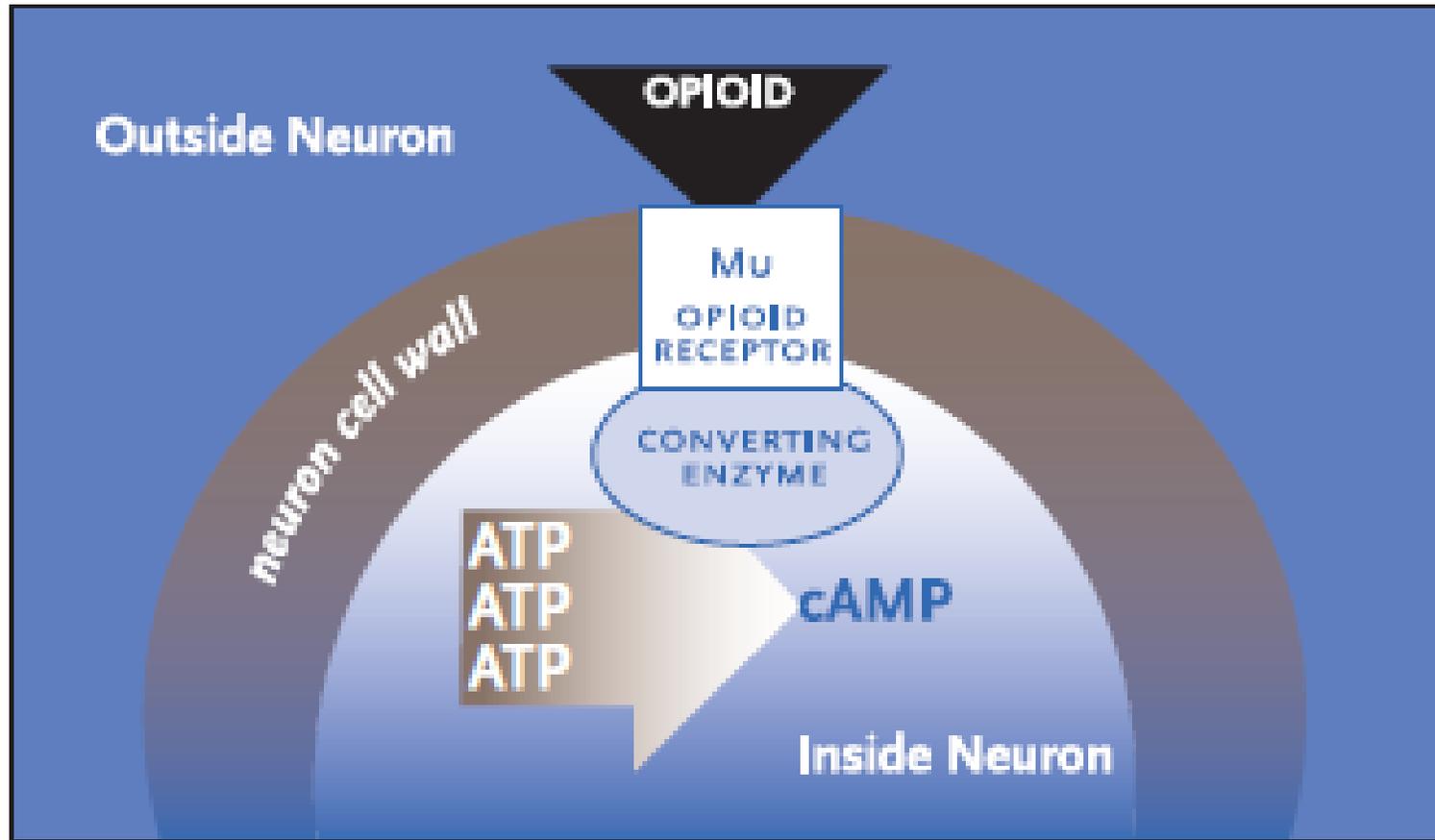


Baseline-Normal Production



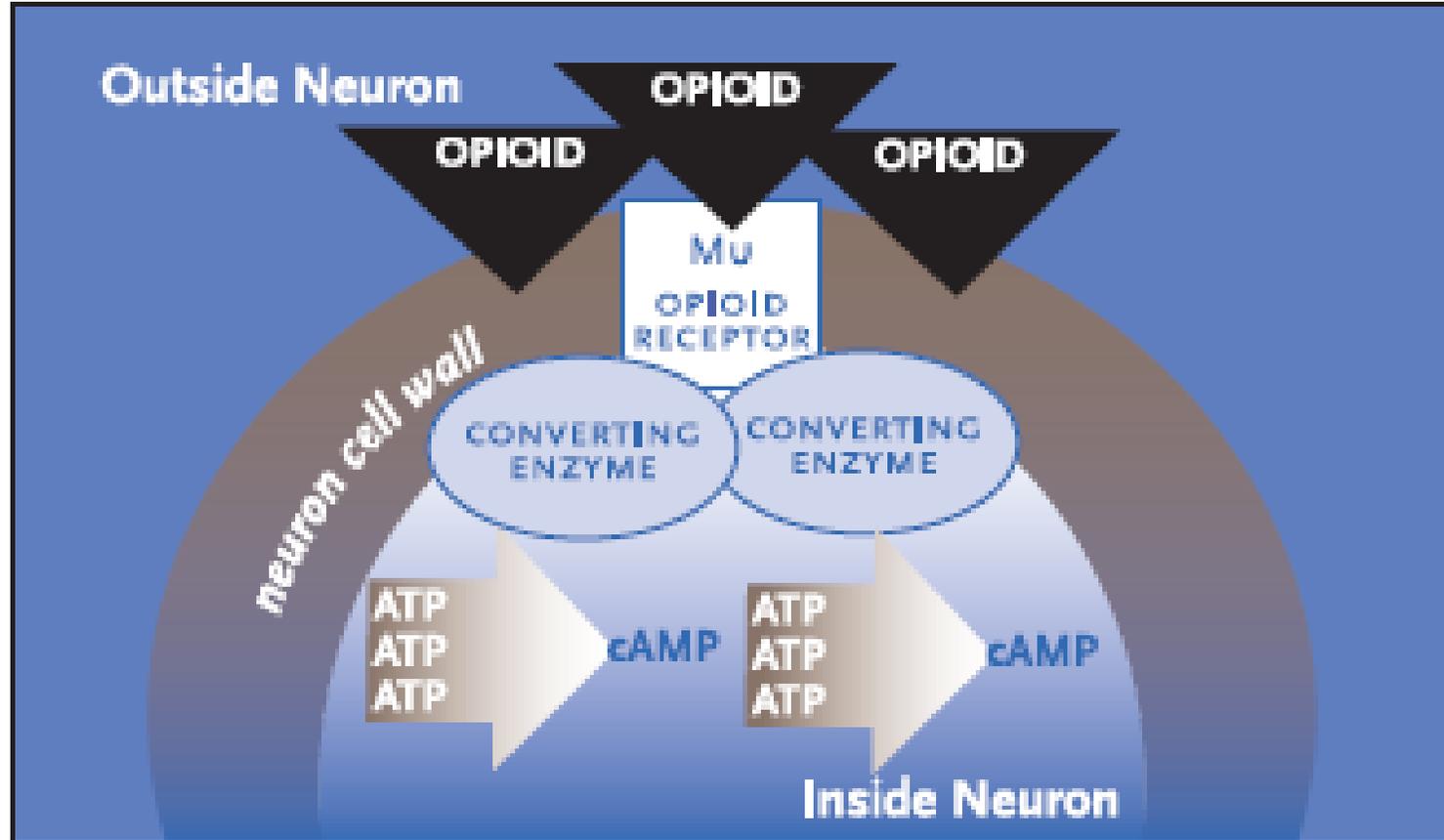


Acute Opioid Inhibition



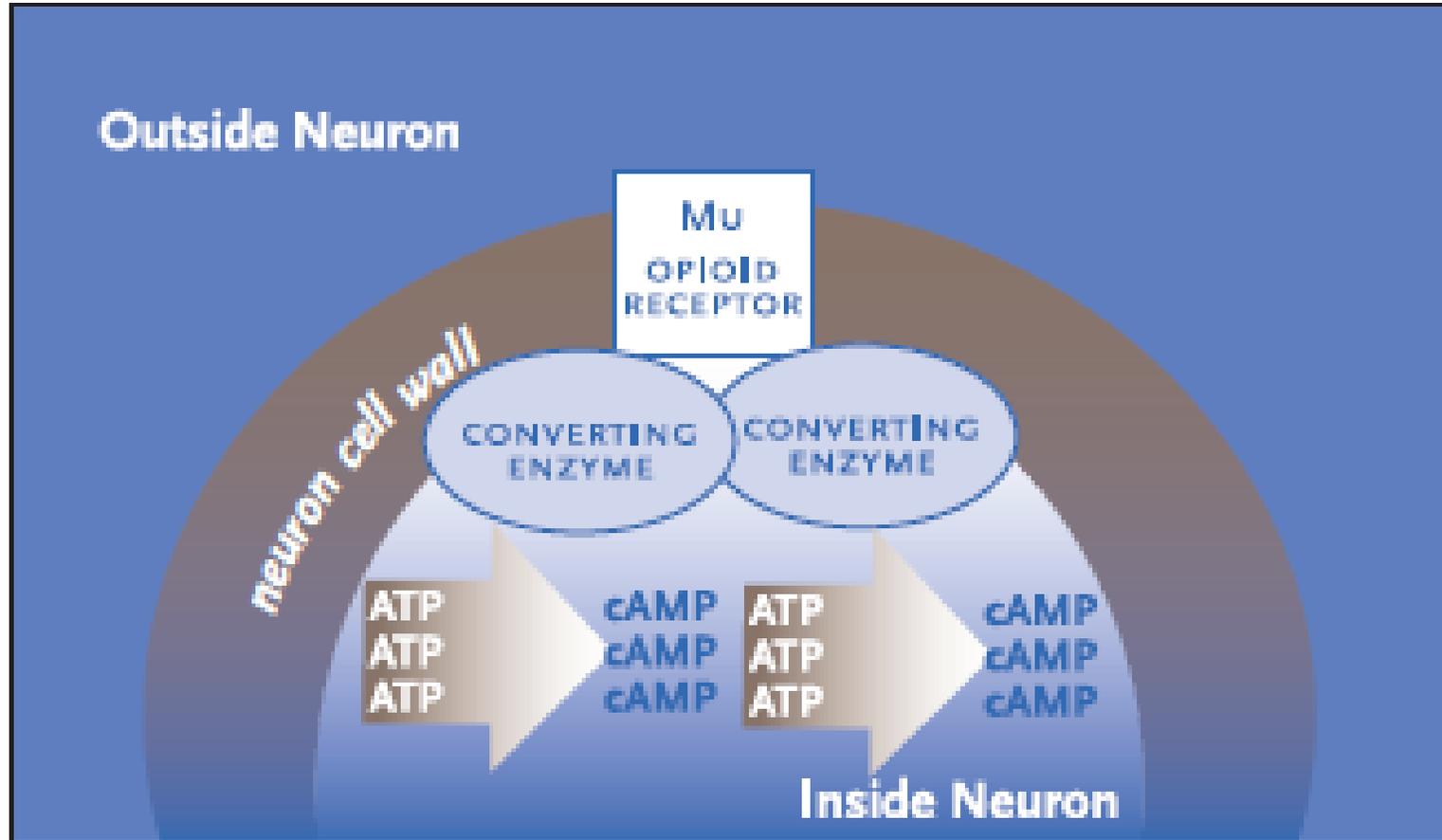


Chronic Opioid Inhibition

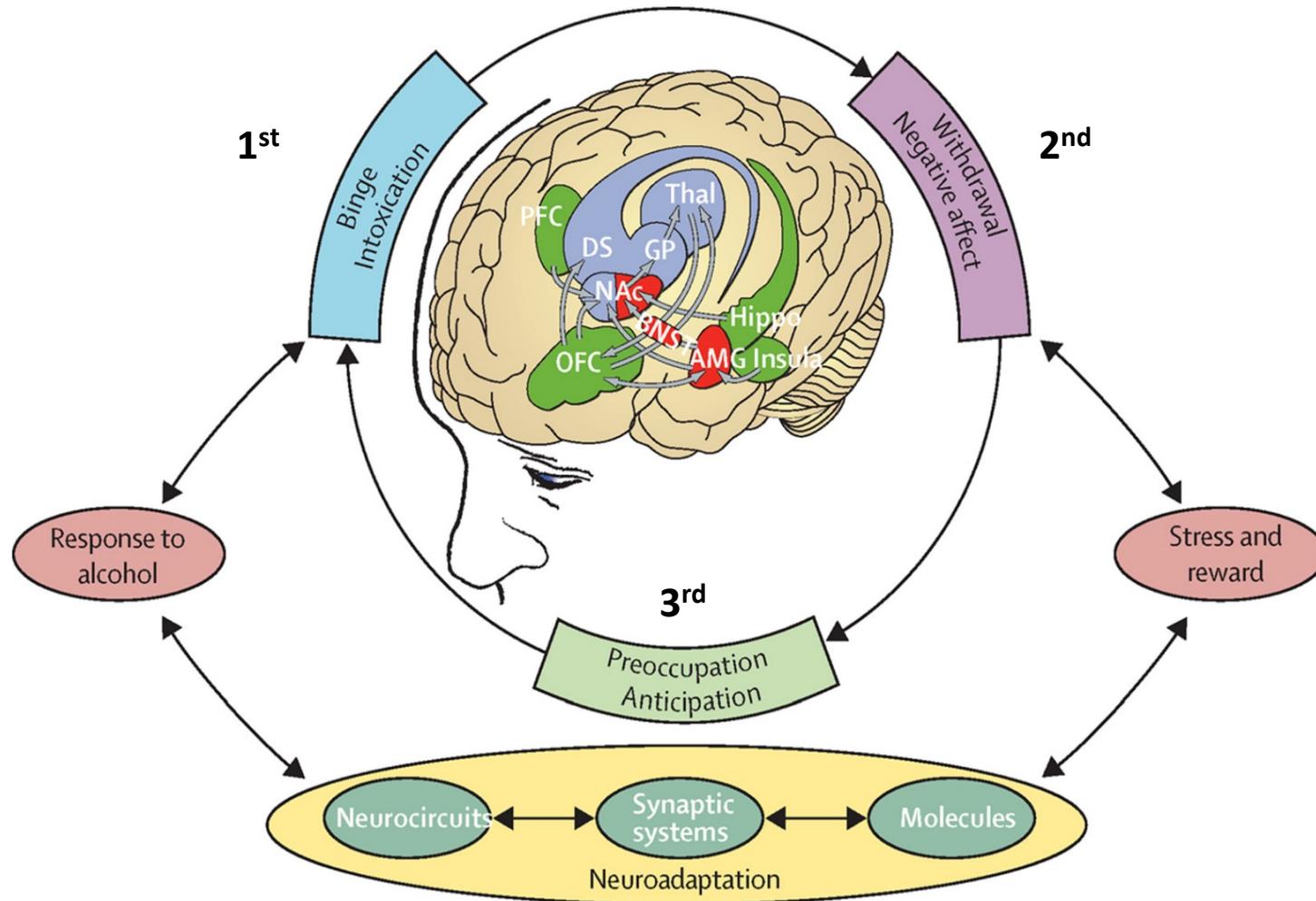




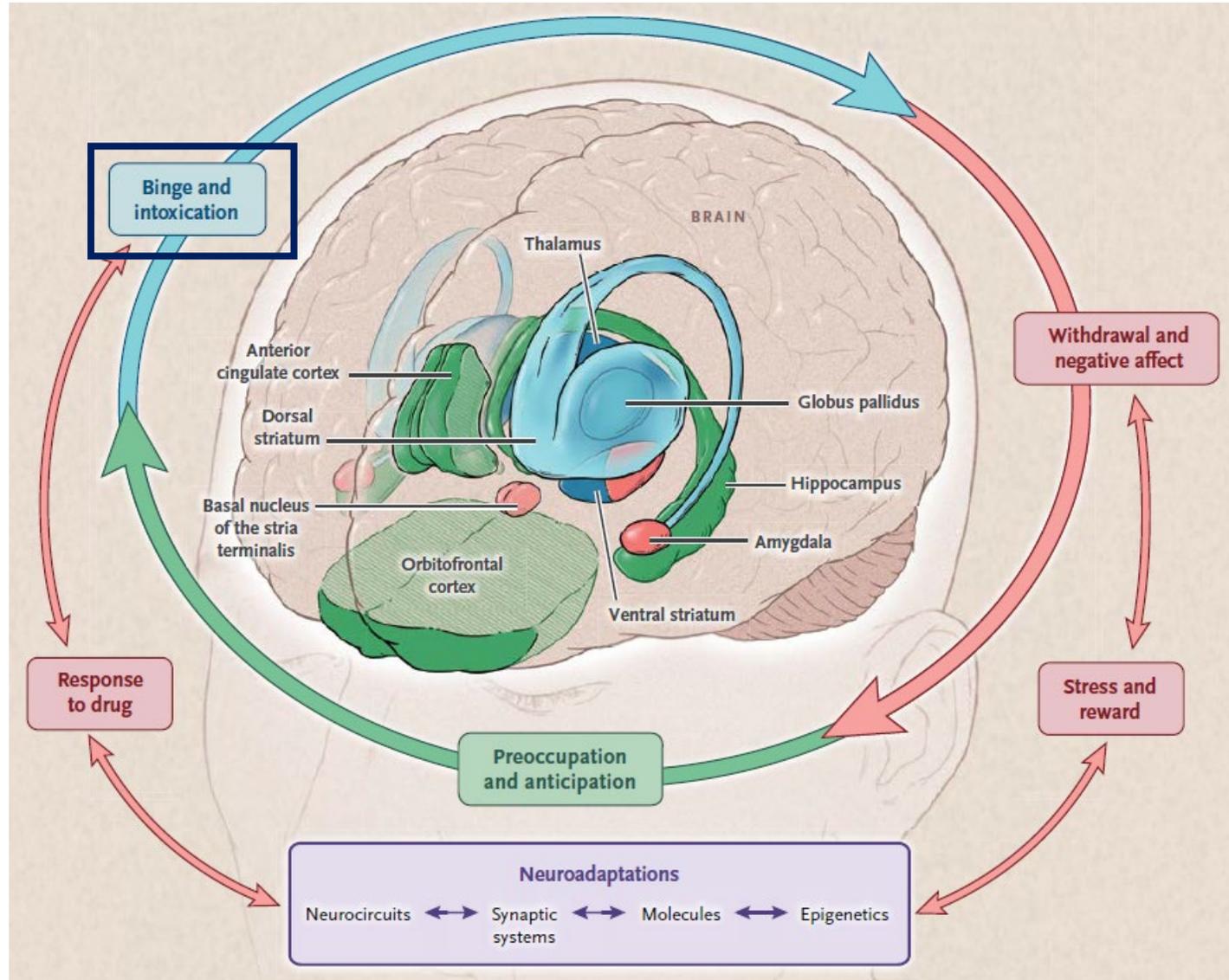
Discontinuation of Opioids



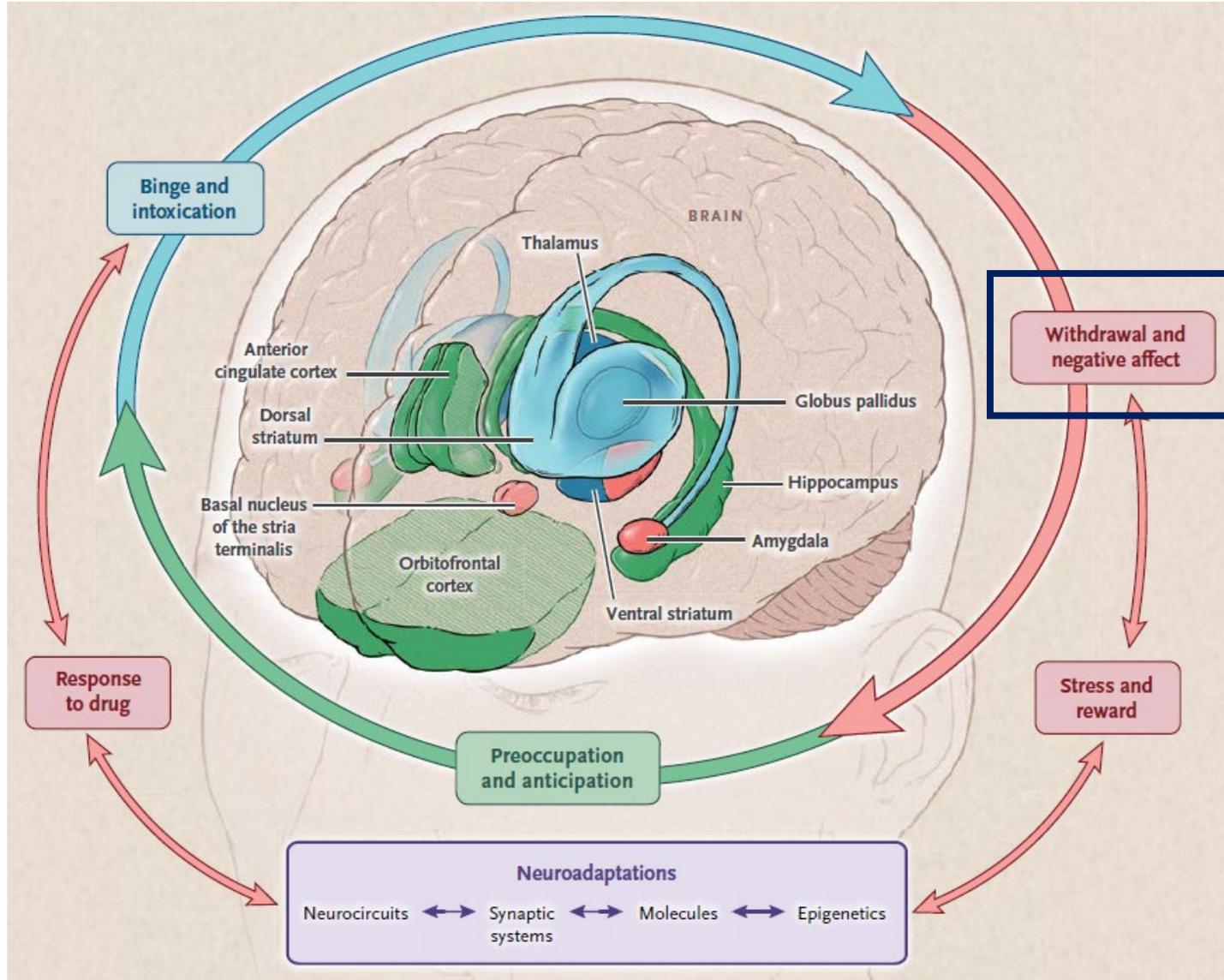
Stages of Addiction



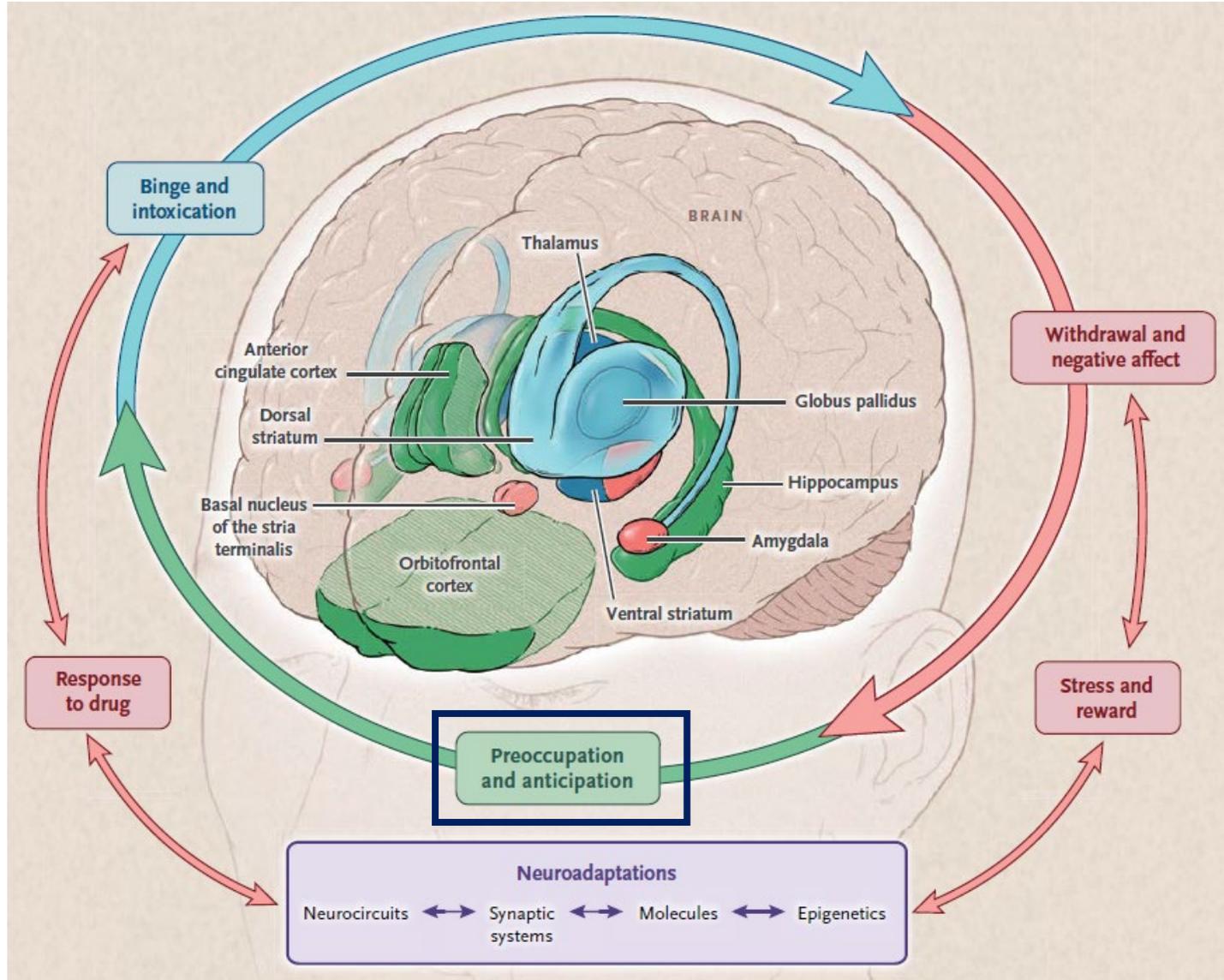
Binge/Intoxication



Withdrawal/Negative Affect



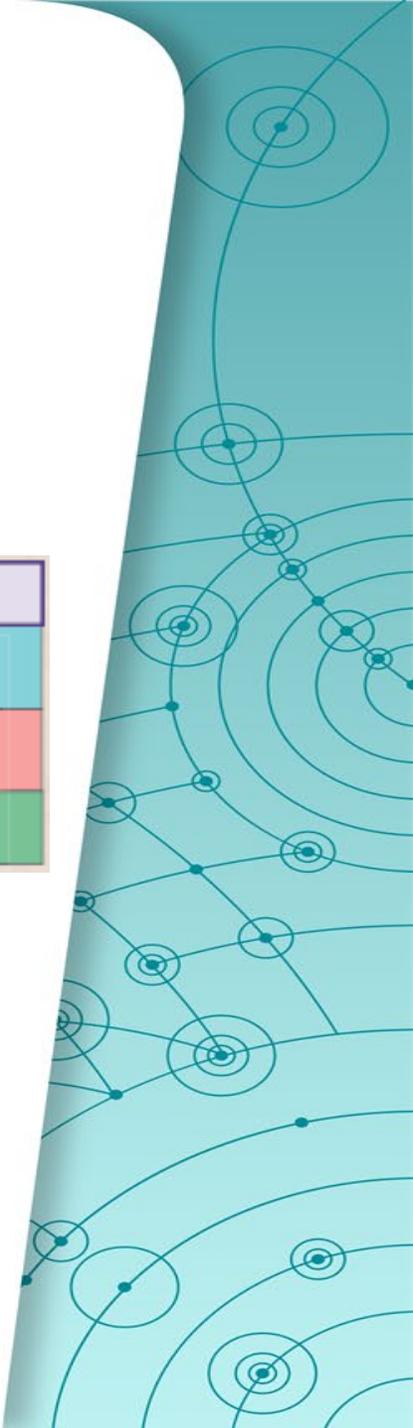
Pre-occupation/Craving





Shifting Drivers for Drug Use

Stage of Addiction	Shifting Drivers Resulting from Neuroadaptations		
Binge and intoxication	Feeling euphoric	Feeling good	Escaping dysphoria
Withdrawal and negative affect	Feeling reduced energy	Feeling reduced excitement	Feeling depressed, anxious, restless
Preoccupation and anticipation	Looking forward	Desiring drug	Obsessing and planning to get drug





Dopamine Release

- Two factors in dopamine release in Nucleus Accumbens
 - Glutamate that drives dopamine release
 - Auto-receptor (“brakes”) that shut down further release when dopamine concentrations become excessive
- Opioid use initially bypasses these “brakes” leading to large amount of dopamine release
 - With repeated use brain increases the number and strength of these “brakes”
 - Reduces resting dopamine levels- leading to dysphoria





Environmental Impact

- Memories or environmental cues that lead to drug wanting or craving
 - Craving can increase glutamate activity which drives the resting dopamine levels higher
 - Glutamate can also drive resting noradrenaline levels higher potentially worsening withdrawal symptoms → increased craving





Biologic and Social Factors

- Family history
- Early exposure to drug use (particularly adolescence)
- High risk environments (e.g. easy access to drugs, normative attitudes towards drug taking, high stress environment, lack of familial support)
- Mental illness (e.g. mood disorder, ADHD, anxiety)





Medication Treatment

- Help prevent relapse while the brain is healing and emotional and decision making capacities are being restored
- Medication assisted treatment play an essential role in reducing the three main stages of addiction
 - Dosed appropriately to not provide euphoria
 - Prevent withdrawals
 - Prevent cravings
- Usually medication assisted treatment is given in conjunction with psychotherapy





Behavioral Therapies

- Brief motivational models
- Contingency management models
- Cognitive behavioral therapy





Important to Remember



- Substance use disorder is a chronic brain disorder from which people can and do recover.
- Addictive substances can lead to dramatic changes in brain function and reduce a person's ability to control his or her substance use.





Stigma Definition

Dehumanization of the individual based on their social identity or participation in a negative or an undesirable social category.





Four Identified Types of Stigma

- Public
 - Endorsement by the public of negative attitudes against a specific stigmatized group, which manifests in discrimination towards individuals belonging to that group.
- Perceived
 - Stigmatized individuals think that most people believe common negative stereotypes about individuals belonging to the same stigmatized category.
- Enacted
 - Direct experience of discrimination and rejection from members of the larger society.
- Self
 - Negative thoughts, feelings, and diminished self-image resulting from identification with the stigmatized group and anticipation of rejection from the larger society.





Consequences of Stigma

- People with substance use disorders are viewed more negatively than people with physical or psychiatric disabilities.
- The terminology often used can suggest that substance use disorders are the result of a personal failing/choice.
- The term “abuse” is highly associated with negative judgments and punishment.
- Even trained clinicians are likely to assign blame when someone is called a “substance abuser” rather than a “person with a substance use disorder.”
- Negative attitudes among health professionals have been found to adversely affect quality of care and subsequent treatment outcomes.





Language Matters

- American Society of Addiction Medicine and others have recommended the adoption of clinical, non-stigmatizing language for substance use.
- “Person-first language” has been widely adopted by professional associations to replace negative terms that have been used to label people with other health conditions and disabilities.
- “Person with a mental health condition” or “person with a disability” carry neutral rather than pejorative connotations, and distinguish the person from his/her diagnosis.





Person with a Substance Use Disorder

- Person-first language is the accepted standard for discussing people with disabilities and/or chronic medical conditions.
- Use of the terms “abuse” and “abuser” negatively affects perceptions and judgments about people with substance use disorders.
- Terms such as “addict” and “alcoholic” can have similar effects.





Person in Recovery

- Various terms are used colloquially to label the people with SUD, including the terms “clean” and “dirty.”
- Instead of “clean,”
 - “negative” (for a toxicology screen)
 - “not currently using substances” (for a person)
- Instead of “dirty,” the term
 - “positive” (for a toxicology screen)
 - “currently using substances” (for a person)
- The term “person in recovery” refers to an individual who is stopping or at least reducing substance use to a safer level, and reflects a process of change.





Medication-Assisted Treatment

- Terms “replacement” and “substitution” have been used to imply that medications merely “substitute” one drug or “one addiction” for another. This is a misconception.
- The dosage of medication used in treatment for opioid use disorder does not result in a “high,” rather it helps to reduce opioid cravings and withdrawal.
- “Medication-assisted treatment” (MAT) is used to refer to the use of any medication approved to treat substance use disorders and may be combined with psychosocial support services.





Summary

- Opioids impact the brain in many different ways that can lead to addiction
- Opioid tolerance develops very quickly requiring higher doses of opioids for the same effect
- Opioid use can quickly lead to dependence and withdrawal
- Three main stages of addiction:
 - Binge/intoxication
 - Withdrawal/negative affect
 - Pre-occupation/craving
- Treatment can give the brain time to heal and restore neural circuitry





Know The Facts



FACT 1
**It's a
disease.**



FACT 2
**There is
treatment.**



FACT 3
**Recovery is
possible.**



the facts.





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