

# Science of Addiction

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Opioid  
Response  
Network



# Working with communities.

- ✧ The SAMHSA-funded *Opioid Response Network (ORN)* assists states, organizations and individuals by providing the resources and technical assistance they need locally to address the opioid crisis and stimulant use.
- ✧ Technical assistance is available to support the evidence-based prevention, treatment and recovery of opioid use disorders and stimulant use disorders.

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# Working with communities.

- ✧ The *Opioid Response Network (ORN)* provides local, experienced consultants in prevention, treatment and recovery to communities and organizations to help address this opioid crisis and stimulant use.
- ✧ *ORN* accepts requests for education and training.
- ✧ Each state/territory has a designated team, led by a regional Technology Transfer Specialist (TTS), who is an expert in implementing evidence-based practices.



# Contact the Opioid Response Network

✦ To ask questions or submit a request for technical assistance:

- Visit [www.OpioidResponseNetwork.org](http://www.OpioidResponseNetwork.org)
- Email [orn@aaap.org](mailto:orn@aaap.org)
- Call 401-270-5900



# Presenter Bio – Jennifer Mathis MD

Jennifer is the Medical Director for Addiction Medicine Services, Northeastern Health System. Jennifer completed her Fellowship in Addiction Medicine at the University of Arizona-Phoenix campus. Where she focused on improvement of care systems concerning patients with benzodiazepine resistant alcohol withdrawal in hospital settings. She was one of the first Family Medicine physicians in Oklahoma to complete the stringent Certification for Focused Practice in Hospital Medicine. She completed her residency in Family Medicine in Columbia, SC and is a proud graduate of the University of Oklahoma College of Medicine.

Jennifer is an expert developing systems of care for rural addiction medicine. She is one of the first physicians to bring advanced addiction treatment to Northeastern Oklahoma. She excels at diagnosis, treatment and evaluation of patients suffering from addictions for the entire care continuum from primary prevention and community engagement to outpatient clinic management to care of the most critically ill patients in withdrawal. She is a frequent lecturer on subjects such as adverse childhood experiences in relation to addiction, addiction as a learned response, inpatient management of severe alcohol withdrawal, and has a particular interest in mindfulness and burnout prevention in the health care workforce. She has dedicated her career to working with rural, underserved, Native American populations.



# Presenter Bio – Jason Ballew, MD

Jason is the Medical Director for Opioid Treatment Services at Northeastern Health System, Tahlequah, OK. He is a fellowship-trained Addiction Medicine physician. He is a PCSS approve MAT waiver trainer, and is the Medical Director for Cherokee County Health Services Council naloxone distribution. He practiced Emergency Medicine and provided Addiction Medicine education at Whiteriver Indian Hospital on the White Mountain Apache Reservation, AZ during the Covid-19 pandemic.

He was the first Emergency Medicine Boarded Physician in Tahlequah, Ok and took on leadership roles as the medical director for the Emergency Department at Northeastern Health System, Tahlequah, OK, and Medical Director for Emergency Medical Services for Northeastern Health System, Tahlequah OK, and Medical Director for Emergency Medical Services, Westville, OK. He developed a multi county system of care for patients suffering from cardiovascular injury and updated multiple EMS agency protocols to bring cutting edge prehospital care to rural Oklahoma.

He is an Oklahoma state certified child abuse medical examiner. He served as an adjunct faculty position with Oklahoma State University College of Medicine and was the liaison for Family Medicine and Internal Medicine residents during their Emergency Medicine rotations at Northeastern Health System, Tahlequah, OK. He lectures frequently on the topic of Addiction Medicine to professional colleagues and the public.



# Learning Objectives

- ✧ Describe the key psychological processes involved in addiction and its treatment
- ✧ Cite the 3 phases of addiction
- ✧ Describe how medical and behavioral interventions decrease substance use.



# TRIGGER WARNING

- ✧ The content of this presentation may create a strong emotional response in some individuals.

It's ok to ask for help!





# Addiction is a Conditioned Response



# Operant Conditioning

Specific consequences are associated with a voluntary behavior

Rewards introduced to  
increase a behavior



Punishment introduced to  
decrease a behavior

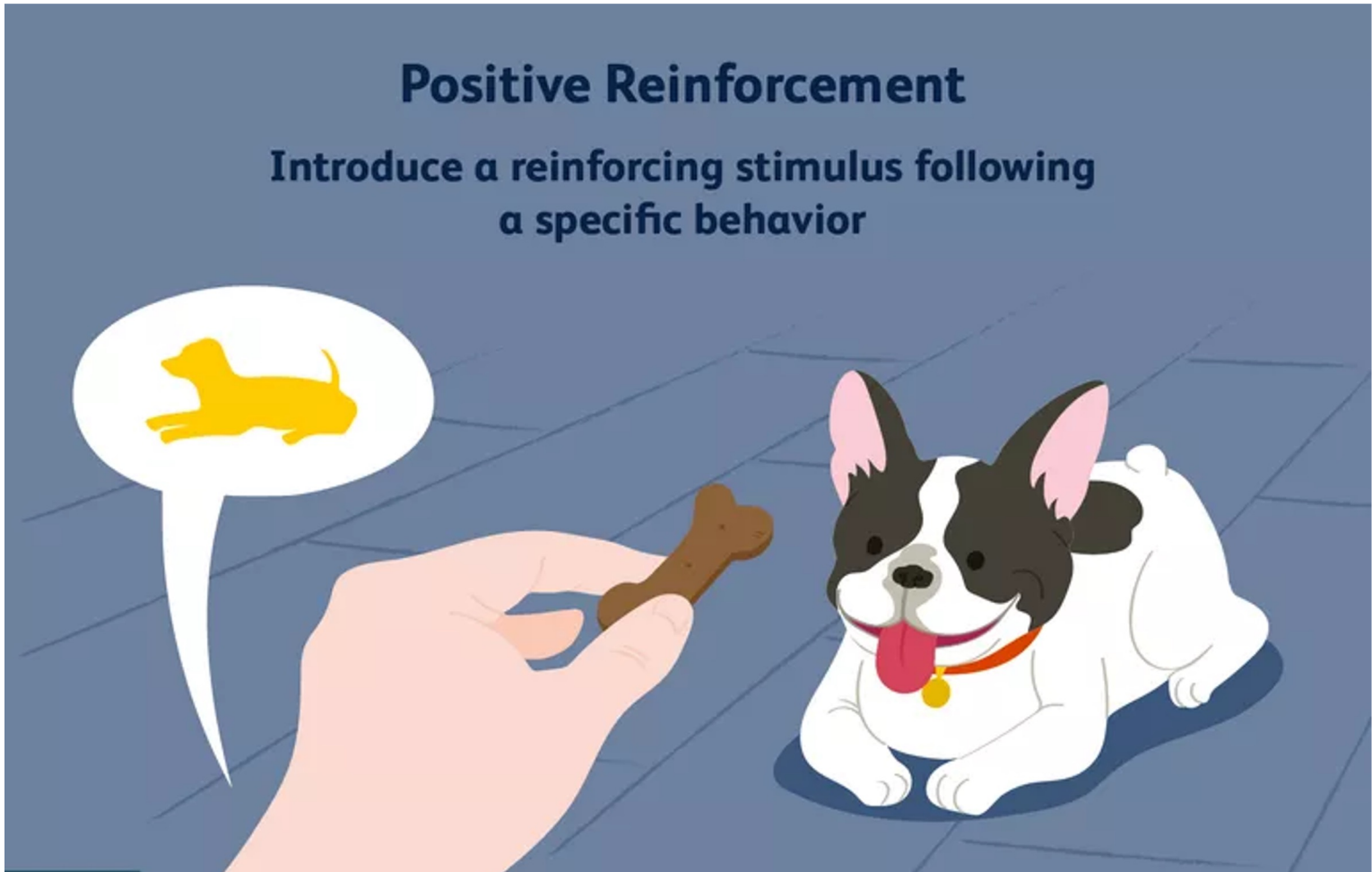


Verywell / Joshua Seong



## Positive Reinforcement

Introduce a reinforcing stimulus following  
a specific behavior







## Negative Reinforcement

Strengthen a behavior that avoids or removes a negative outcome





## Positive Punishment

Attempt to decrease an undesirable behavior  
by introducing an unfavorable outcome









# References

- ✦ Brief Interventions and Brief Therapies for Substance Abuse. Treatment Improvement Protocol (TIP) Series, No. 34. Center for Substance Abuse Treatment. Rockville (MD): [Substance Abuse and Mental Health Services Administration \(US\)](#); 1999.

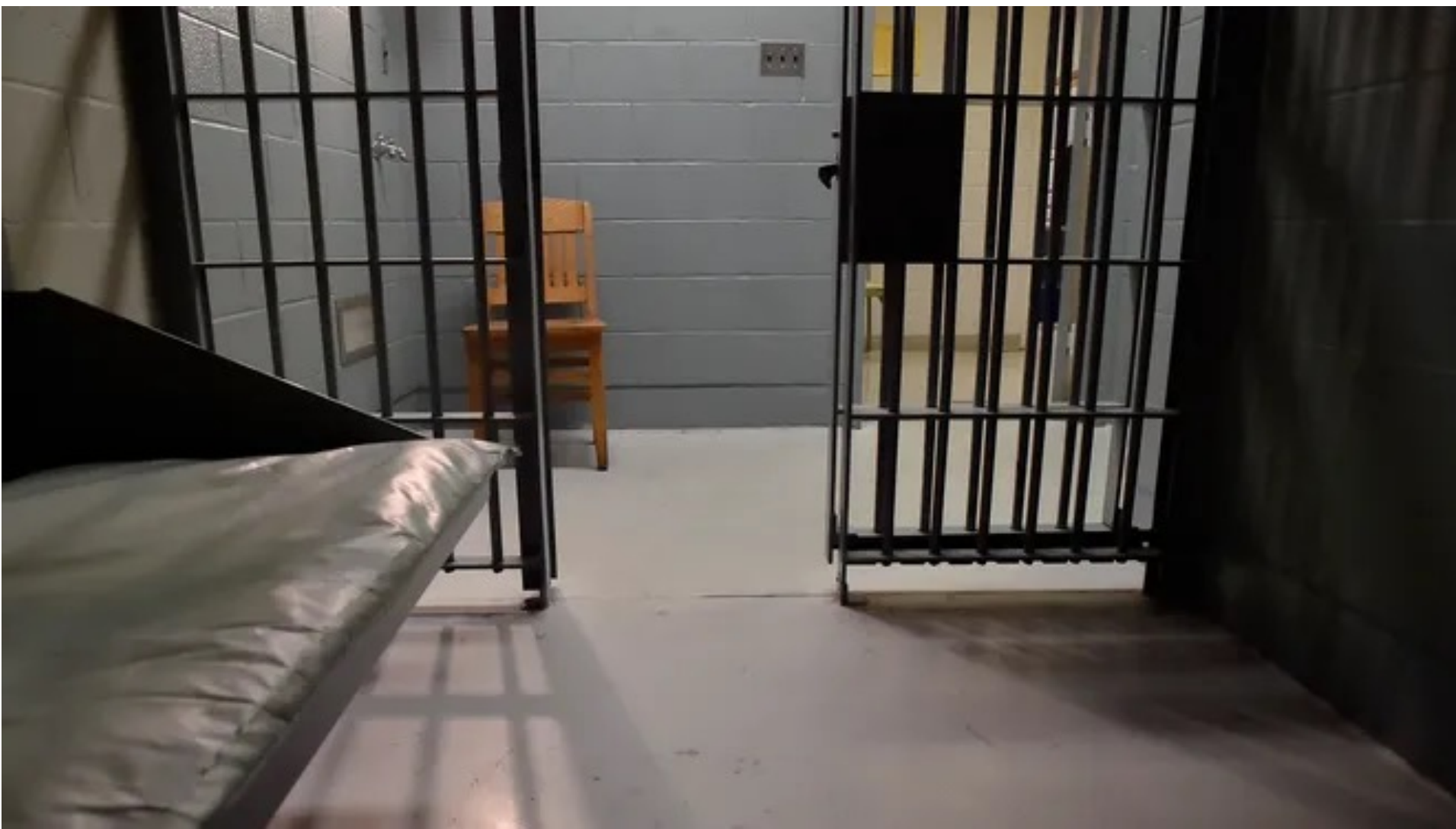


# Negative Punishment



Taking something good or desirable away to reduce the occurrence of a behavior.





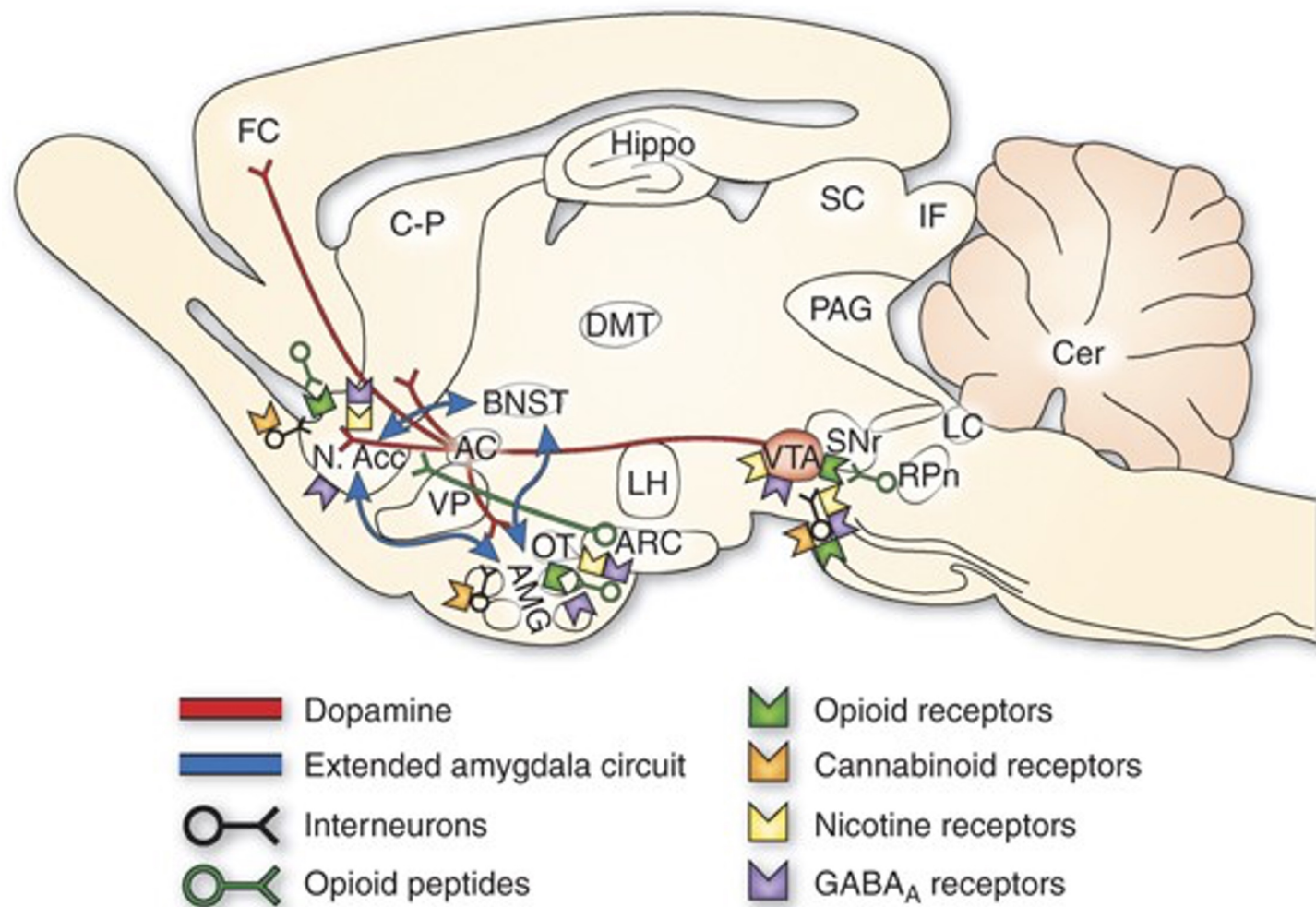
# WHAT IS ADDICTION IN THE BRAIN?

Addiction is a chronically relapsing disorder characterized by:

- Compulsion to seek and take the drug
- Loss of control in limiting intake
- Emergence of a negative emotional state when access to the drug is prevented.



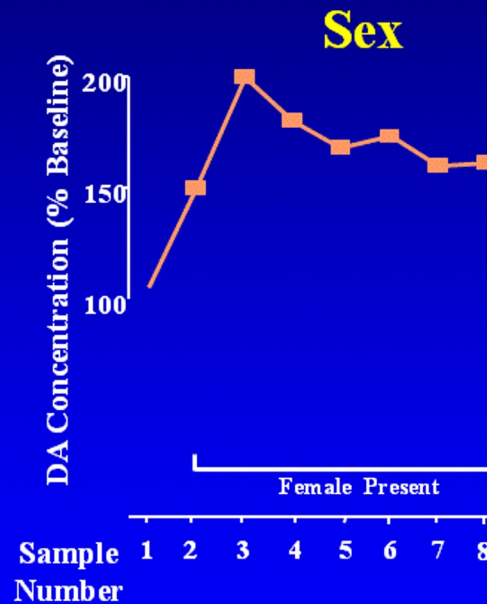
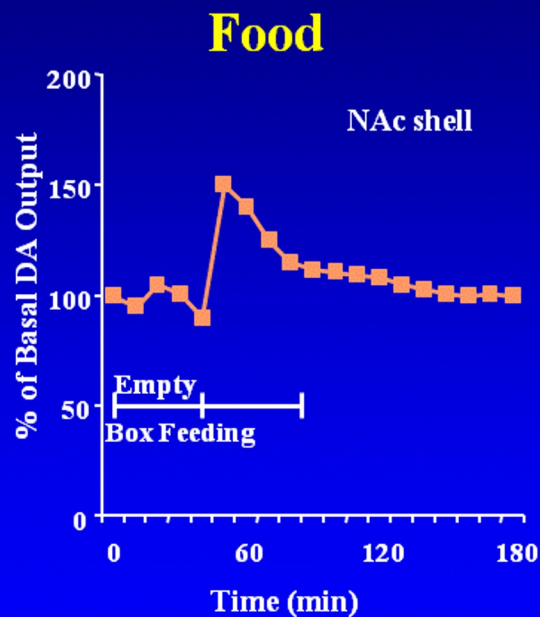
## Neurochemical neurocircuits in drug reward





**Why is dopamine  
important?**

# *Natural Rewards Elevate Dopamine Levels*



Di Chiara et al., Neuroscience, 1999., Fiorino and Phillips, J. Neuroscience, 1997.

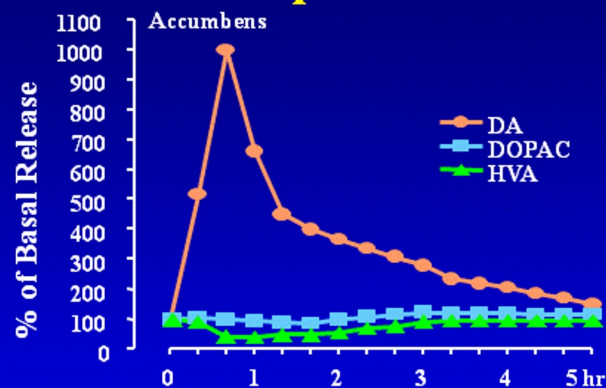
NIDA



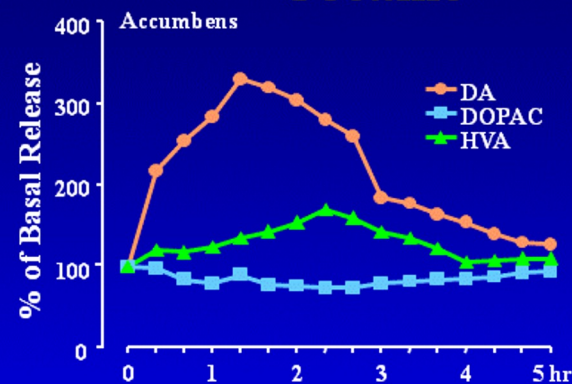


# Effects of Drugs on Dopamine Release

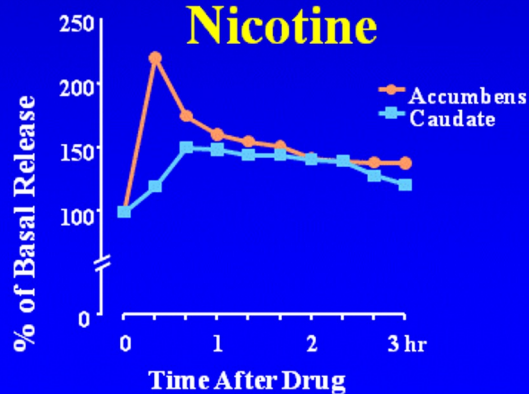
## Amphetamine



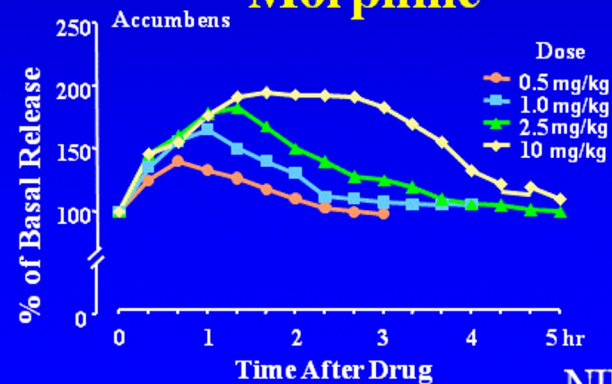
## Cocaine



## Nicotine



## Morphine



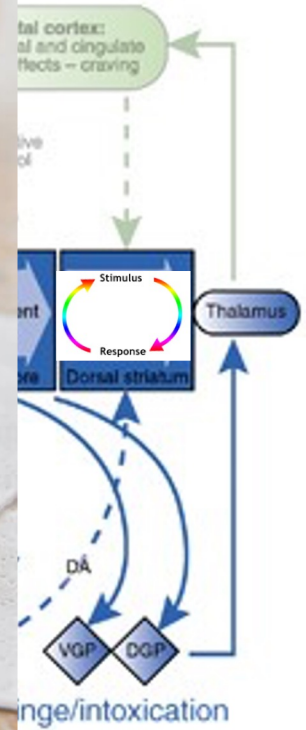
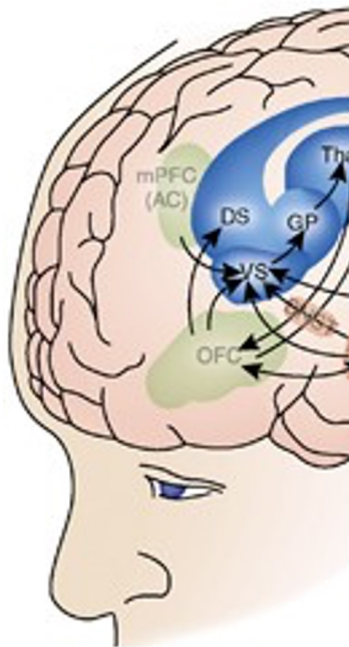
Di Chiara and Imperato, PNAS, 1988

NIDA

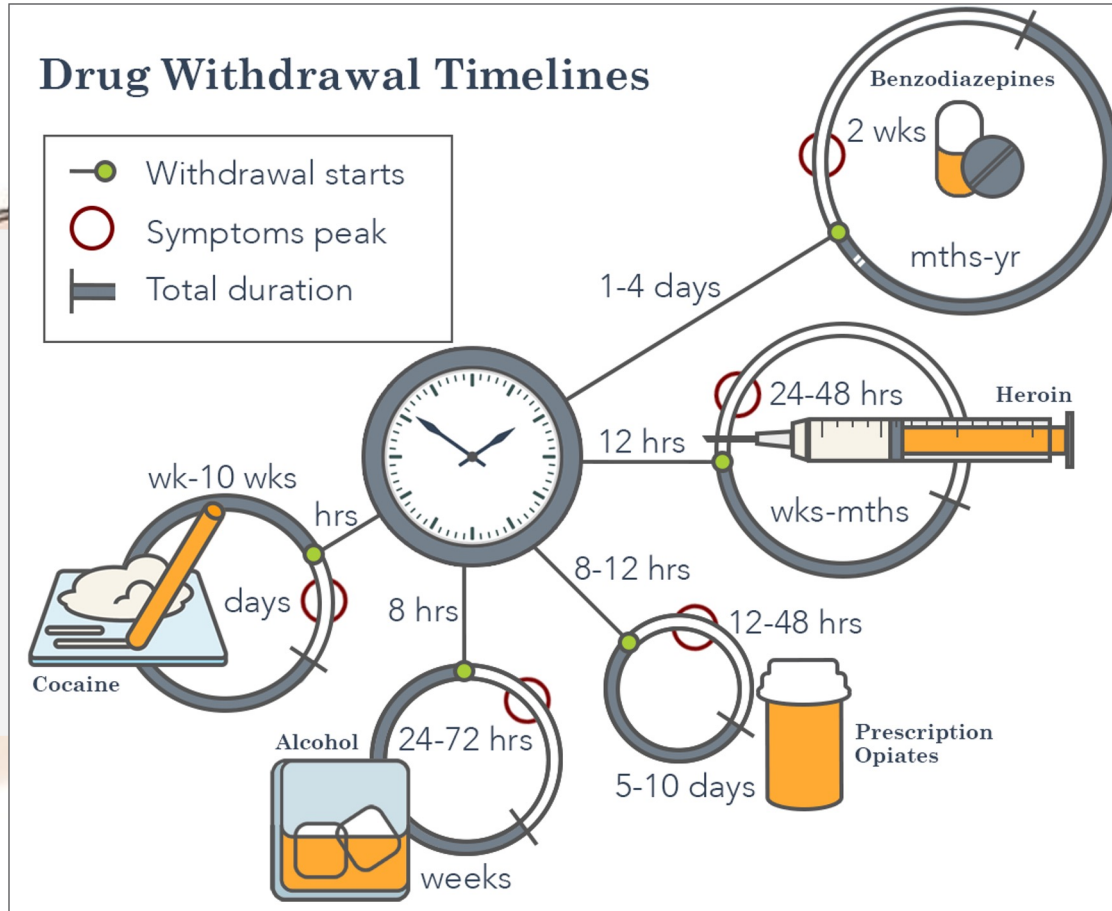




a



b





#JUULVAPORIZED

JUUL

SMOKING EVOLVED



# Interoceptive Cues





# Cue Associated Cravings

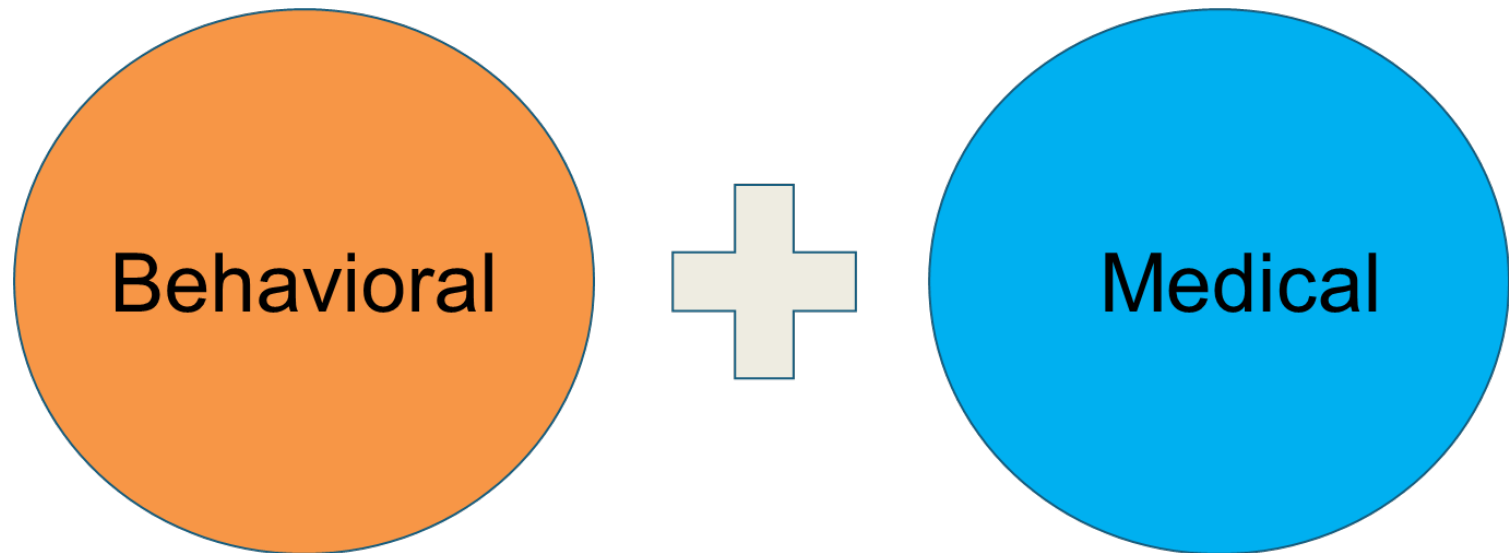


- Endogenous opioids
- May be decreased by naltrexone





# Treatment



# Primary Reinforcement Type

## Positive Reinforcement

- ✧ Cocaine
- ✧ Amphetamines
- ✧ Caffeine

## Negative Reinforcement

- ✧ Opioids
- ✧ Alcohol
- ✧ Sedative/hypnotics
- ✧ Nicotine
- ✧ Cannabis





# Positive Reinforcement

- ✧ Contingency Management
- ✧ Community Reinforcement Approach
- ✧ Community Reinforcement and Family Training (CRAFT)
- ✧ Phased treatment
- ✧ Mutual help groups (AA, NA, SMART, Celebrate Recovery, Wellbriety, etc.)
- ✧ Exercise



# Negative Reinforcement

- Social Interventions (Food, housing, etc...)
- Trauma therapy
- CBT (CP, SUD, anxiety, insomnia)
- DBT (emotional regulation)
- Mindfulness
- Acceptance and Commitment Therapy
- ✧ Buprenorphine
- ✧ Methadone
- ✧ Nicotine replacement therapy
- ✧ Varenicline
- ✧ Alpha 2 agonists
- ✧ Acamprosate



# References

- ✧ Skinner, B. F. (1963). Operant behavior. *American Psychologist*, 18(8), 503–515. <https://doi.org/10.1037/h0045185>
- ✧ Koob GF, Volkow ND. Neurocircuitry of addiction [published correction appears in *Neuropsychopharmacology*. 2010. Mar;35(4):1051]. *Neuropsychopharmacology*. 2010;35(1):217-238. doi:10.1038/npp.2009.110
- ✧ de Wit, H., & Phan, L. (2010). Positive reinforcement theories of drug use. In J. D. Kassel (Ed.), *Substance abuse and emotion* (pp. 43–60). American Psychological Association. <https://doi.org/10.1037/12067-002>
- ✧ Blume, Arthur. NEGATIVE REINFORCEMENT AND SUBSTANCE ABUSE: USING A BEHAVIORAL CONCEPTUALIZATION TO ENHANCE TREATMENT. *The Behavioral Analyst Today*. Vol 2, No. 2 (1979) P 86-90.



# Summary/Questions

- ✧ Describe the key psychological processes involved in addiction and its treatment
- ✧ Cite the 3 phases of addiction
- ✧ Describe how medical and behavioral interventions decrease substance use.



# ORN Evaluation Survey

To better improve our services at the Opioid Response Network, we respectfully request you take this brief survey about our performance.

Thank you so much for your cooperation!



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