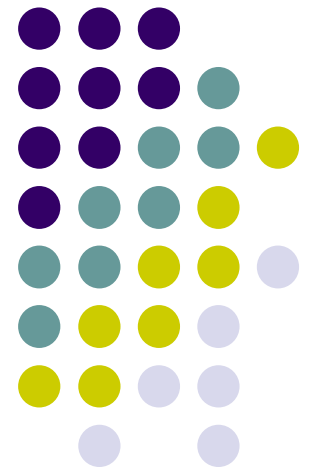


The Addicted Brain

And what you can do

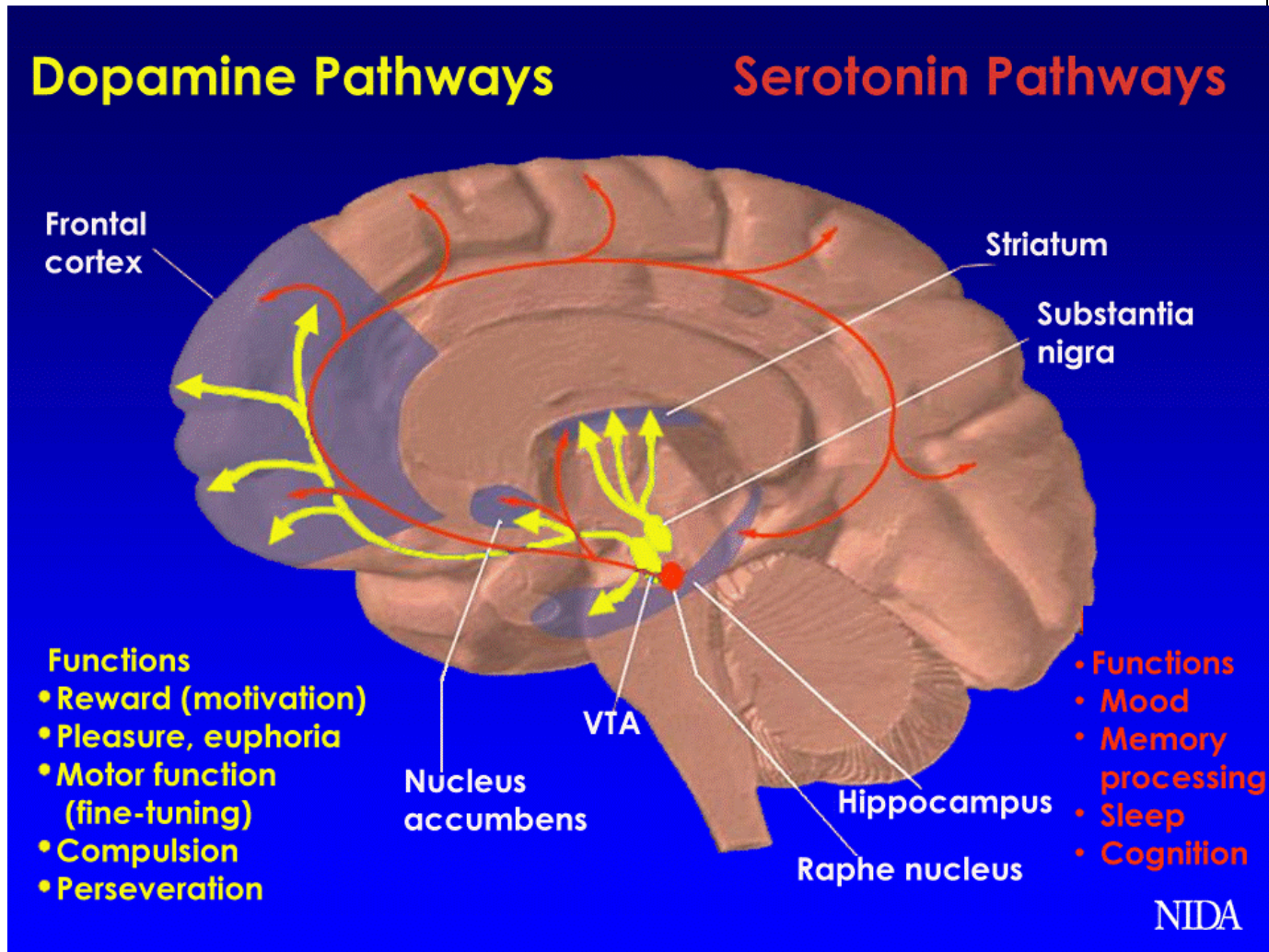


How does addiction happen?



- Addiction can happen as soon as someone uses a substance
 - The brain releases a neurotransmitter called Dopamine into the system that makes you feel happy and remembers the feeling and wants to feel that way again.
 - Each time you use the drug, your brain releases slightly less dopamine, causing you to need more of the drug each time you use it.
 - The regions in the brain that help us deal with desires and emotions are also effected, causing addicts to have no control over their need for the drug.
- http://www.youtube.com/watch?v=de_b7k9kQp0

Dopamine: Brain's reward system



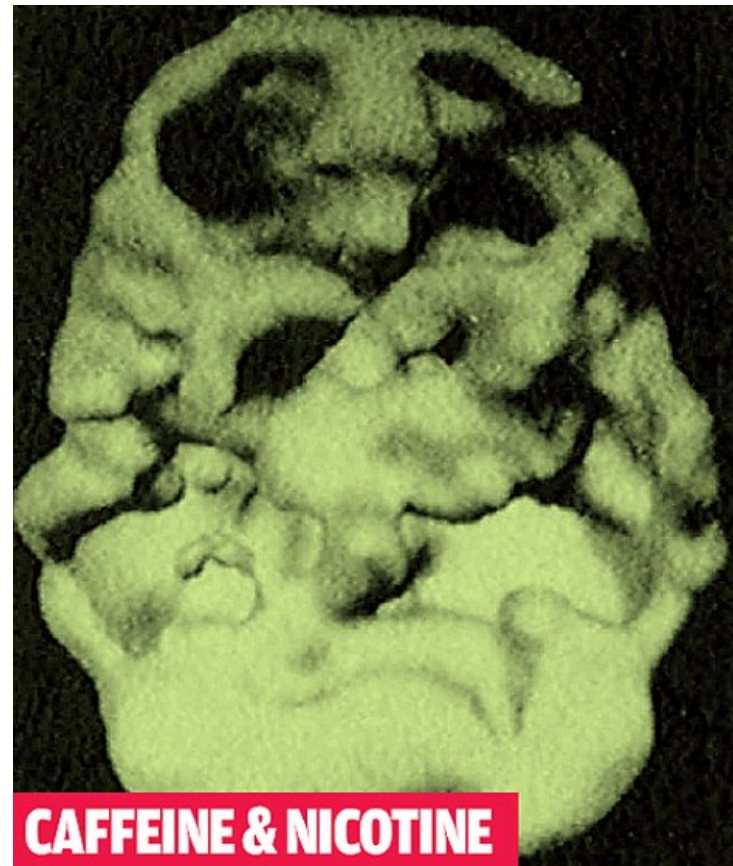
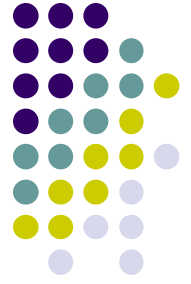


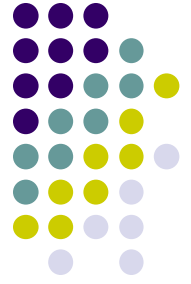
Classical Conditioning Paradigms in Substance Addiction



- Classical Conditioning-The U.S. →C.S.
- Drug paraphernalia and environmental stimuli associated
 - Proximity = brain prepares for drug which increases your want of drug
 - Problems with rehab?
 - Taste aversion therapy

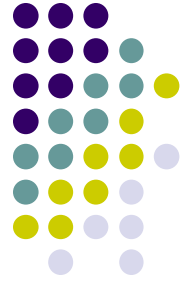
Drug Addiction





Components of Addiction

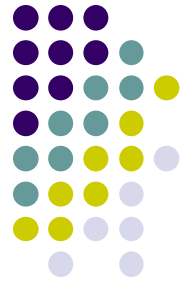
- Tolerance
 - Become less sensitive to drug, need more to get same effect
 - Change in number of receptors or rate of metabolizing
 - Usually develop tolerance to:
 - “highs” of stimulants and opiates (as well as analgesic effect)
 - Sedation of alcohol
- Sensitization
 - Enhanced drug effect with use
 - Change in number of receptors or rate of metabolizing
 - Usually develop sensitization to: Anxiety and **craving**
- Drug Withdrawal
 - Generally the opposite effects of the drug
 - Body used to presence of drug, experiences unpleasant symptoms without it
 - Tolerance is often situation-dependent



Theories of Addiction

- Two categories of theories:
 - 1. Negative reinforcement
 - Continue using to prevent withdrawal symptoms
 - Flaws of theory seen in examining physical dependence
 - Positive incentive
 - Overwhelming desire for the drug (i.e. the positive incentive).
 - Drugs act of the parts of the brain that “control” motivation.

Theories of Addiction

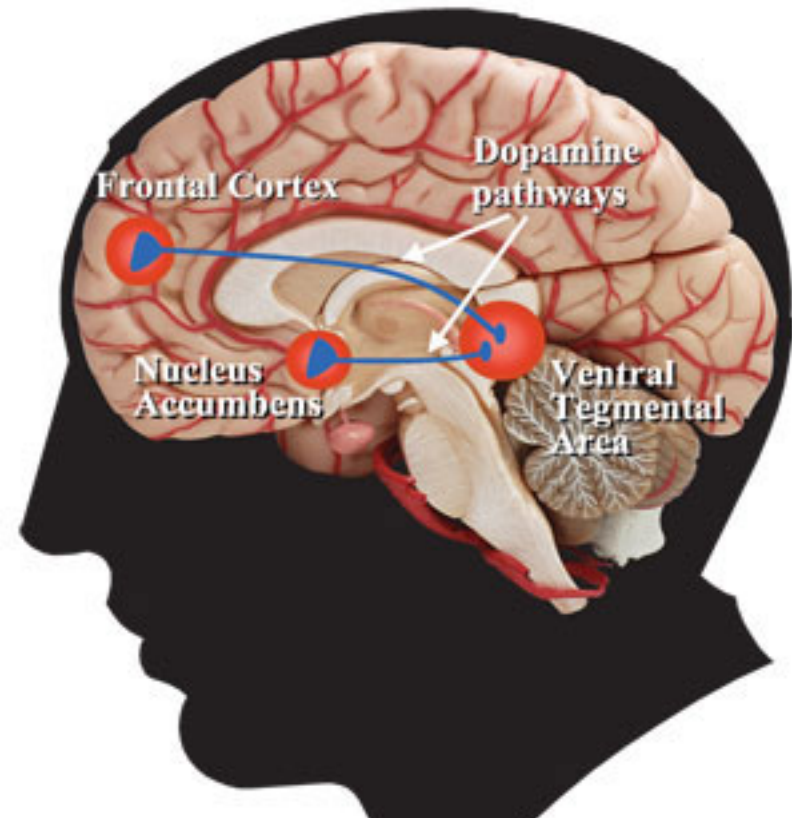


- Physical Dependence
 - Example of negative reinforcement theory; imperfect theory
 - Have acquired tolerance and experience withdrawal with cessation
 - Drugs can have no withdrawal syndrome and be very addictive (ex. Cocaine)
 - Drugs can cause physical withdrawal syndrome and not be addictive (ex. Prozac)

Theories of Addiction



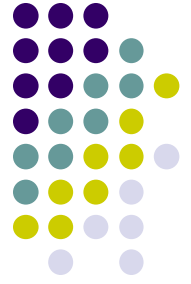
- Opponent process Theories
 - Every drug has 2 effects
 - “A” process- rewarding
 - “B” process- negative
 - With repeated use, A decreases and B increases





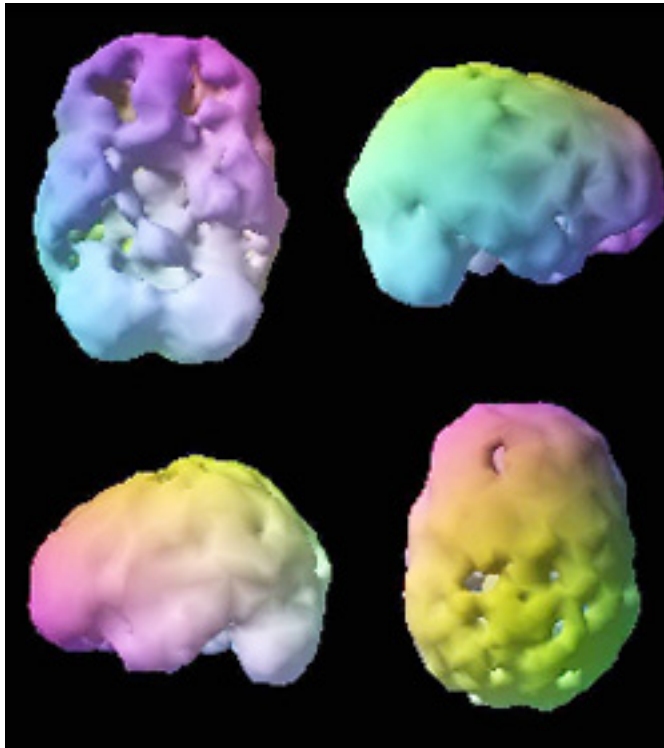
Theories of Addiction cont'd

- WHY do people keep using?
 - Incentive- sensitization theory: Dopamine system
 - VTA → mesolimbic pathway → Nucleus accumbens
 - True for reward AND punishment
 - Seems dopamine signals that something important exists in environment that organism should obtain, learn, etc; appears secretion has to do with establishing motivation
 - Theory applied: continual abuse → sensitization of pathway
 - Each use results in large dopamine secretion, which gives strong motivational value, but pleasure/ reward stays the same or decreases (“A”); meanwhile become more sensitive to the negative effects (“B”)
 - http://www.youtube.com/watch?v=ZjH8_hHtumo&feature=related

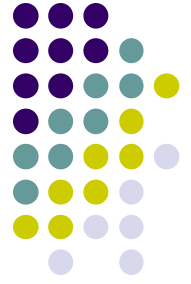


Alcohol Addiction

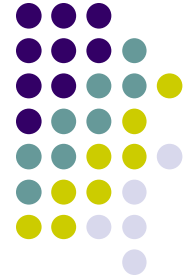
- Alcohol affects almost 12 million people in the world
 - In the U.S. about 15% of people suffer from some type of alcohol related problem



Predisposition

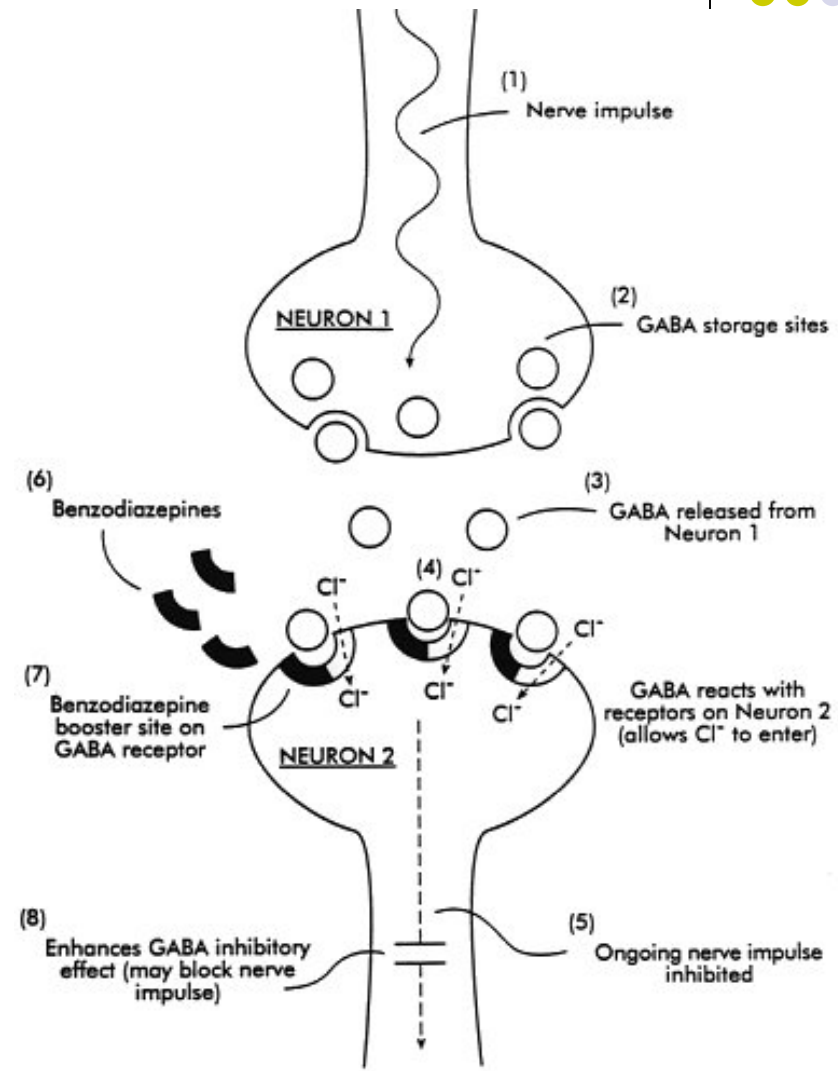


- Children of addicts are 8 times more likely to develop an addiction (i.e. there is strong evidence to support a hereditary link)
 - Ex. A child that has two parents that are alcoholics are more likely to develop the addiction (especially early) than a child whose parent's are not alcoholics
- Certain personality types can be more likely to become dependant on drugs and alcohol

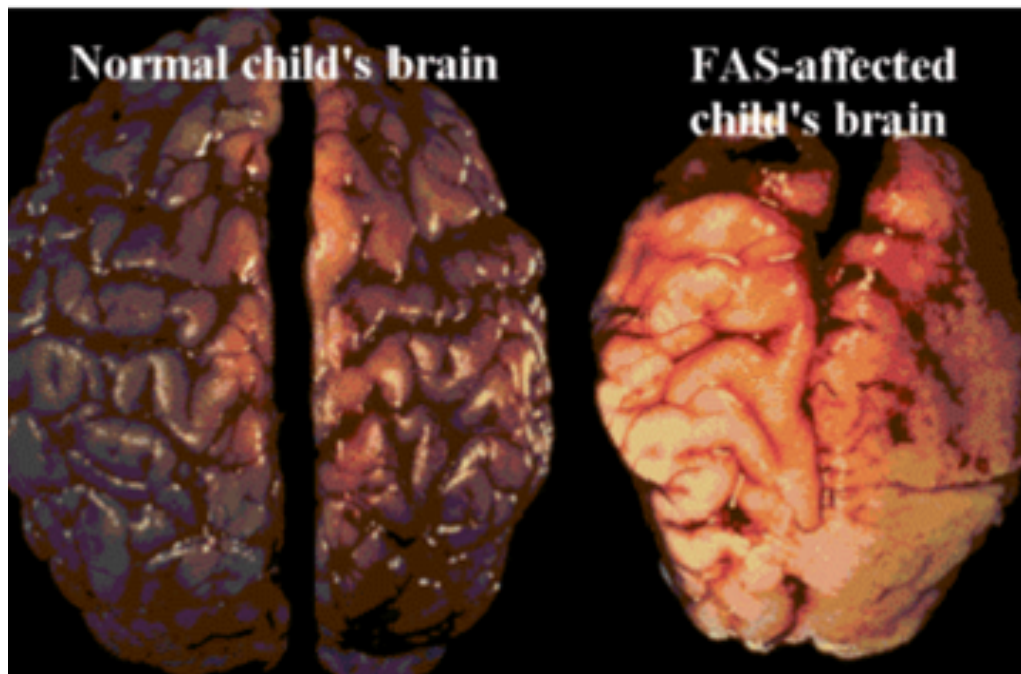


Depressants & GABA

- Alcohol is a depressant
- Depressant: slows activity of central nervous system (brain and spine)
- Causes dopamine release
- Endorphin release
- Enhances GABA activity (→ hyperpolarization)
 - GABA- main inhibitory neuron



Fetal Alcohol Syndrome



Baby with Fetal Alcohol Syndrome

FAS Facial Characteristics:

- small eye openings.....
- smooth philtrum.....
- thin upper lip.....

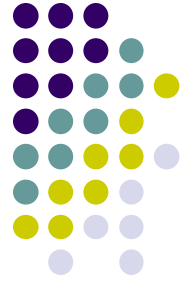


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Long Term Effects

- One of the biggest long term effects of addiction is the addiction itself. Once addicted it is really difficult to stop abusing because your brain thinks you need the substance the same way you need food and water.
- Major health problems: Infectious diseases, Hepatitis, organ failure, etc.
- Severe brain damage including memory loss due to loss of brain cells, damage to the Neural Cortex (mental functions and consciousness), transportation of serotonin (helps with sleep, appetite, learning, and emotions) is reduced



What to do?

- Rehab
 - Classic rehab, Alcoholics Anonymous (only works for about 20% of people)
 - Classical conditioning to get sick whenever the person is around the substance

National Drug Abuse Hotline 1-800-662-HELP (1-800-662-4357)

National Institute on Drug Abuse & Alcoholism 1-888-644-6432

DRUG REHAB AND ADDICTION TREATMENT CENTERS

CALL TOLL FREE

1-800-405-8409

<http://www.addictionca.com/contact2.htm?state=Oregon&city=Salem>

Resources



- <http://science.education.nih.gov/supplements/nih2/addiction/videos/act4/transcript-activity4.htm>
- http://www.morphonix.com/software/education/science/brain/game/specimens/images/wet_brain.gif
- http://www.hbo.com/addiction/understanding_addiction/12_pleasure_pathway.html
- <http://www.drug-addiction-support.org/drug-addiction-predisposition.html>