

Understanding Drug Abuse and Addiction



Basic Questions

- Why do people do drugs?
- Why can't/won't some people stop?

Realities

People like Drugs
We all like things faster
and easier

How Drugs Work

- Interact with neurochemistry
- Results:
 - Feel Good – Euphoria/reward
 - Feel Better – reduce negative feelings

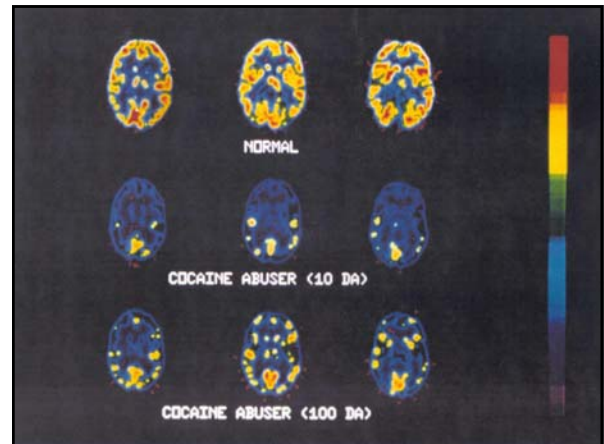
Use → Addiction

Although persons may choose whether or not to initiate the use of psychoactive substances and / or alcohol, drug dependence is an **involuntary** result.

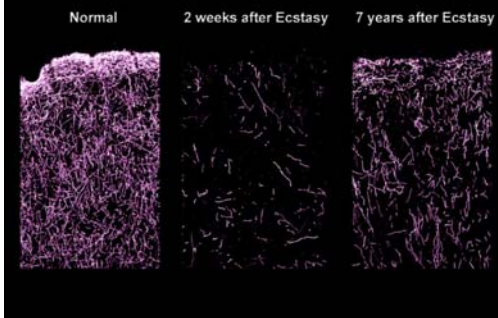


Addiction is a Brain Disease

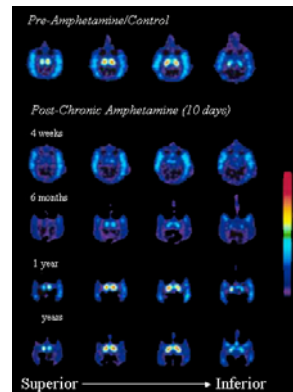
Prolonged Use Changes the brain in Fundamental and Long Lasting Ways



Serotonin Present in Cerebral Cortex Neurons



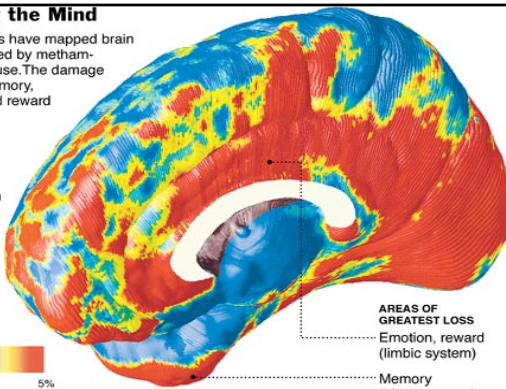
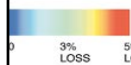
Drugs Have Long-term Consequences



Eroding the Mind

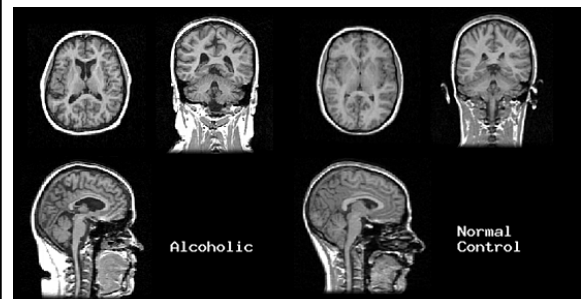
Researchers have mapped brain decay caused by methamphetamine use. The damage affected memory, emotion and reward systems.

Average difference in brain tissue volume of methamphetamine users, as compared with non-users:



Source: Dr. Paul Thompson, U.C.L.A.

Alcoholic v. Normal Brain

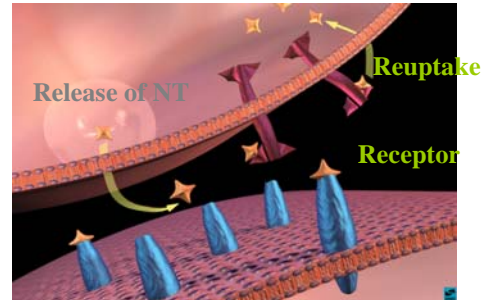


Simple Brain Structure

- Frontal Lobe (Cortex)
 - Judgement and reason
- Mid brain (Limbic)
 - Emotions and reward sites
- Hind brain (Stem)
 - Bodily functions

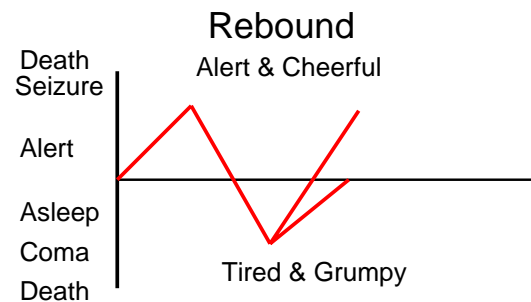


Neurotransmitter Action

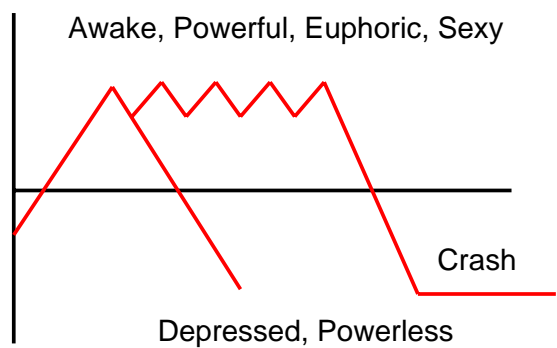
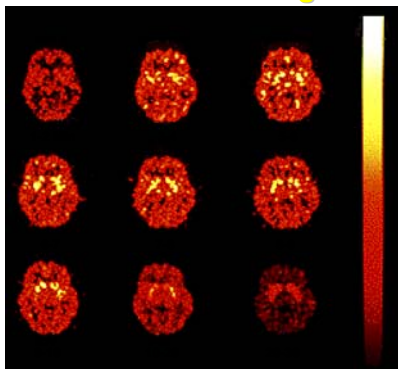


Neurotransmitters

- Acetylcholine – Memory
- Dopamine – Reward/Euphoria
- Norepinephrine – Metabolic Rate
- Serotonin – Mood, Sleep Regulation



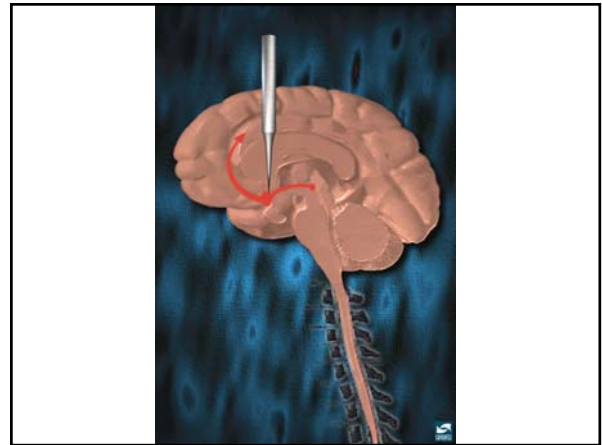
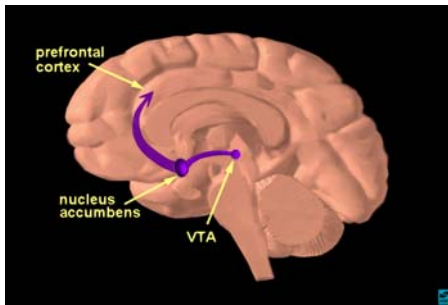
Your Brain on Drugs



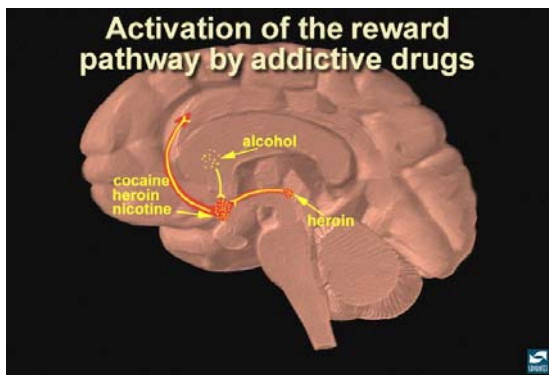
The Reward Pathway and Addiction

Natural Rewards
 Food
 Water
 Sex
 Nurturing

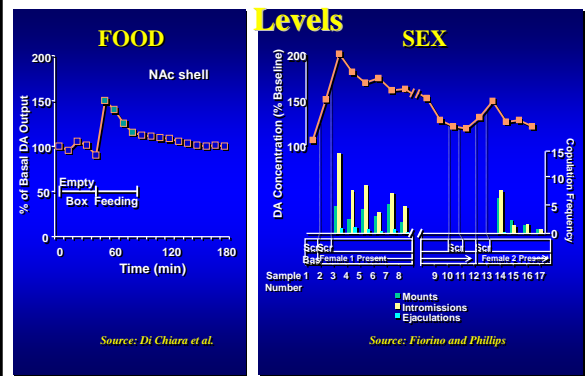
Reward Pathways



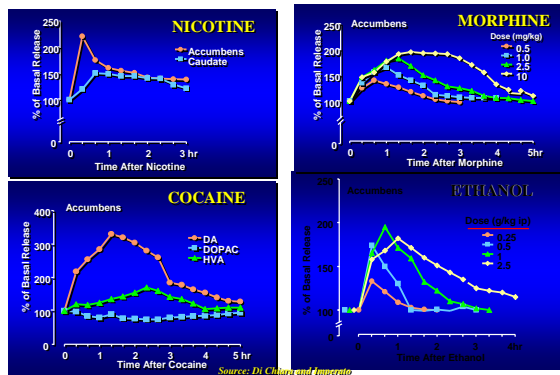
Activation of the reward pathway by addictive drugs



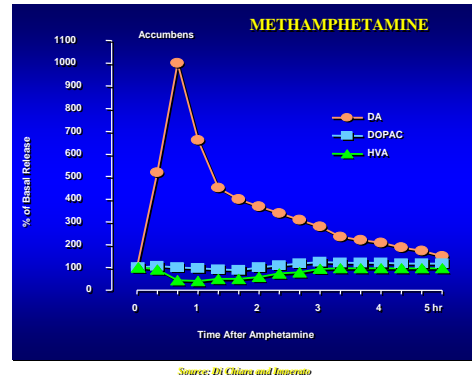
Natural Rewards Elevate Dopamine Levels



Effects of Drugs on Dopamine Levels



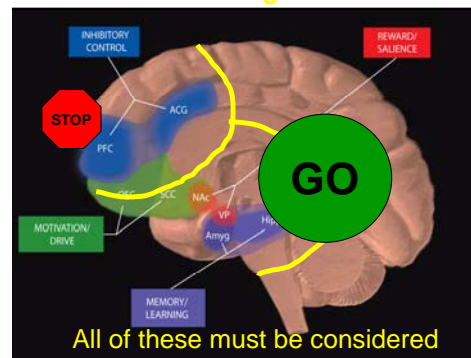
Effects of Drugs on Dopamine Levels



Behavior Pathways

- Rewarding behaviors can become routine
- “Subconscious” control of the behavior
- Difficult to extinguish behaviors because people are not always aware when they are initiated.
- Resistant to change

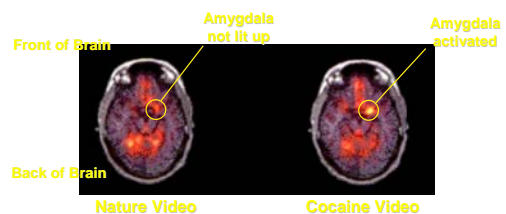
Circuits Involved In Drug Abuse and Addiction

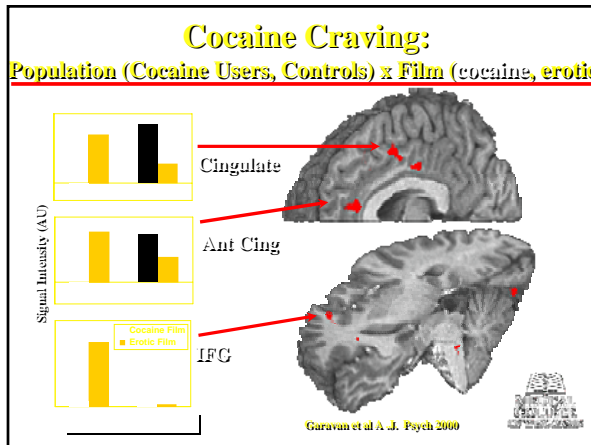
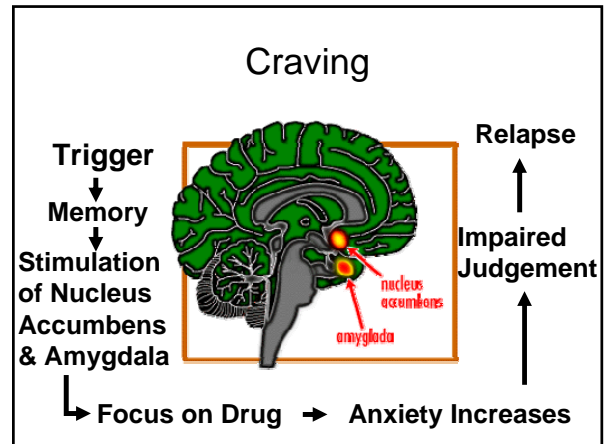
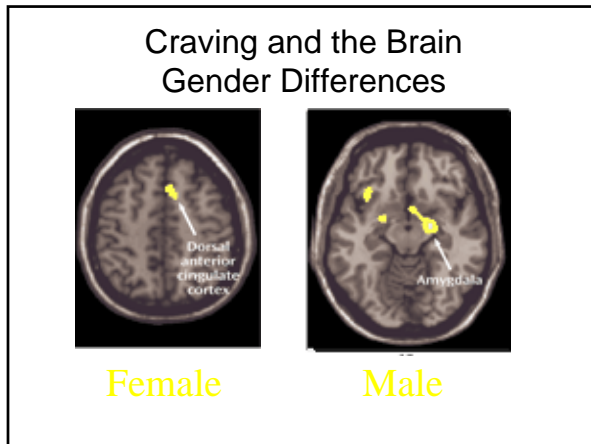


Go & Stop

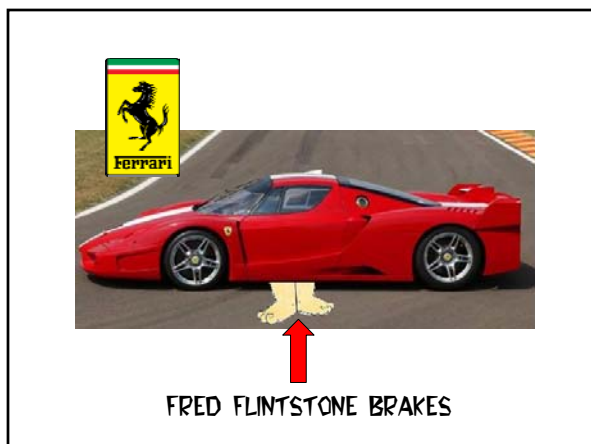
- Craving elicits **Go!!**
- Powerful
- Activity in limbic system not frontal cortex
- Feeling/reacting vs. thinking/planning
- Thinking initiates **Stop!!**
- Addicts have “bad brakes” – **Stop!**
- Hard to stop this fast moving car.

Craving and the Male Brain



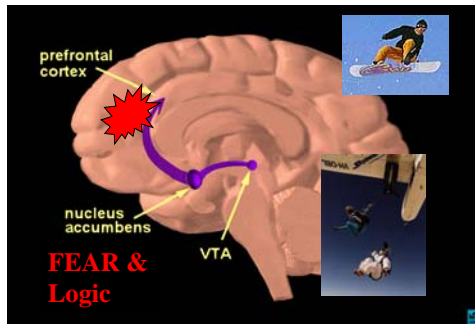


- ### Differences between Youths and Adults
- **Brain Chemistry** – Kids brains 2-3X more active.
 - **Intense experiences** - emotionally
 - **Perception of Risk** – adults scary – kids reward
 - **Thinking and feeling disconnected** – particularly in males.

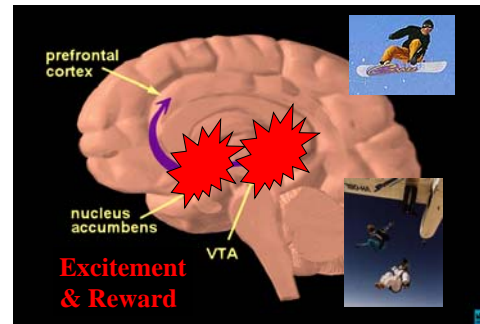


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Adult Brain and Risk



Adolescent Brain and Risk



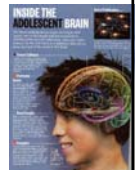
Arrested Development

- Back of brain matures before to the front of the brain...
 - sensory and physical activities favored over complex, cognitive-demanding activities
 - propensity toward risky, impulsive behaviors
 - group setting may promote risk taking
 - poor planning and judgment



Arrested Development

- Back of brain matures before to the front of the brain...
 - activities with high excitement and low effort are preferred
 - poor modulation of emotions (hot emotions more common than cold emotions)
 - heightened interest in novel stimuli



What is adolescence?



Myelination

Why it's hard to change

In the beginning the brain is like a virgin forest, filled with opportunities for development



Initially the paths are rough, and the nerve impulses travel slowly



As the activity on the path increases (learning) the pathway becomes paved, allowing faster traffic.



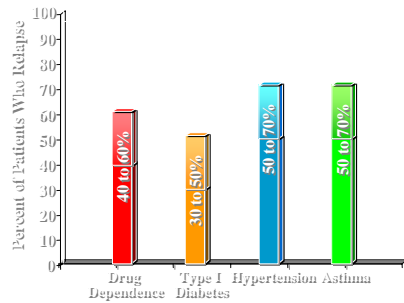
With repetition the pathways become like the Autobahn.



Chemical Dependency

- Chronic Disease Prone to Relapse
- Requires significant behavior changes
- Similar to Heart Disease, Diabetes, Asthma, Gingivitis, etc.
- Similar treatment "success"

Relapse Rates for Drug Addiction are Similar to Other Chronic Medical Conditions



Source: McLellan, A.T. et al. JAMA, Vol 284(13), October 4, 2000

Early Recovery Issues

- Loss of lifestyle
- Loss of Coping Strategy
- Withdrawal
- Cognitive deficits related to early abstinence

Cognitive Deficits

- Memory problems- short term loss
- Difficulty with abstractions
- Difficulty with impulse control
- Similar performance to those with brain damage - improves.

What is Addiction?

Introducing:

**Boomer
The Addiction Dog**



Addiction is like...

A dog with a bone



- The dog does not want to let go of the bone (addiction/ denial).
- It gets excited when it thinks its going to get its bone (craving)
- It always wants more bones (loss of control)
- Sometimes the dog takes you for a walk.

Treatment is like...

Obedience School for the Dog



- You teach the dog's owner to control the dog.
- You develop a variety of tools (relapse prevention) to help the dog be obedient.
- Some dogs are harder to train.