Neurobiology of Addiction: A Neurological Disease

Kevin Mains, lpcc, ceap, llc

Historically, the addict was thought to be

- Selfish
- Narcissistic
- Stupid
- Guilty and deserving punishment

But, now, neurobiology informs how drugs effect the brain's reward system

- Nucleus Accumbens (NA – one on each side of the brain and each the size of a pea)
- All animals have NA
- NA interacts with and is stimulated primarily by the Ventral Tegmental Area through the release of the neurotransmitter Dopamine
- NA connected to entire brain
- NA motivates and rewards behavior, and creates pleasure

Drugs over stimulate the brain's reward system

- By causing the brain's VTA to release huge levels of Dopamine, acutely stimulating the NA, and together interactively overwhelmingly rewarding the effects of drugs
- This is what is happening that gives the "high" of all mood altering drugs, be they legal, medical, or illegal

Pleasure is culturally and socially learned, and the memory is

- Stored in the hippocampus, the memory center of the brain
- The hippocampus stores memories in order of priority based on how much dopamine has been released respective to each memory

Mood altering drugs

- Not only over stimulate the brain's reward system, but also "take over" the memory center of the brain
- Together, the VTA, NA, the reward system, and the hippocampus, the memory center, form the brain's motivational system
- Motivation is communicated to, interpreted by and acted upon by the cortical regions, particularly the prefrontal cortex of the brain
- These areas of the brain work in concert to form the basis for the neurobiology of addiction

This engulfing influence on the brain

- Overrides social learning and conditioning, morals, and priorities
- Is not voluntary
- Comes from deep within the brain and involves powerful neurotransmitters, notably Dopamine
- And can become a neurological disease called addiction

The risk of becoming addicted

- Influenced by biology, environment, and development
- The more factors in play, the higher the risk

The disease, addiction is the result

- When a person's experiences change the brain's motivation and decision making systems to the extent s/he is given over to the desire for increasing levels dopamine and a loss for motivation for life
- Treatment is necessary to counter this degenerative and progressive worsening of brain activity, and return the person to a healthy and normal brain

Addiction is therefore

Not simply selfish, narcissistic, and stupid behaviors resulting from bad people making bad choices

A neurological disease that needs treatment, not punishment to reverse its effects

References

- Topics in Brief: Drugs, Brains, and Behavior: The Science of Addiction

http://www.drugabuse.gov/publications/topics-in-brief/drugs-brains-behavior-science-addiction

- The Neurobiology of Drug Addiction

http://www.drugabuse.gov/publications/teaching-packets/neurobiology-drug-addiction/section-i-introduction-to-brain