Understanding Alcohol And Other Drugs Of Abuse

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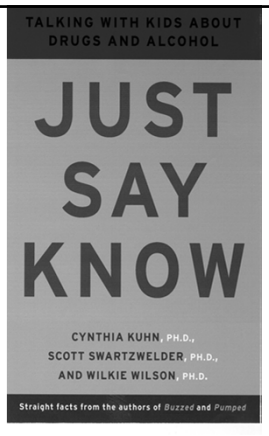


We teach people to respect their hearts…...

- **Exercise**
- **Eat good food**
- **Reduce stress**

But What Do We Teach About Respecting Our Brains?

The three F's of persuasion

- **Facts---how their brains work and how drugs alter that function**
- **Feeling---an emotional investment in brain health**
- **Following---a peer group of support**

We don't know what we don't know…..

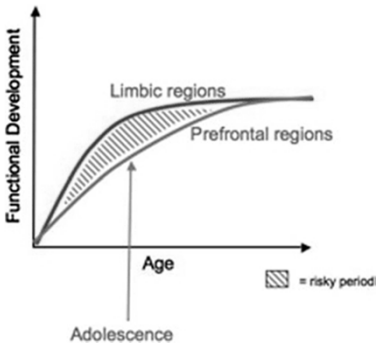
The adolescent brain...

Is "built" for learning

- **Can respond differently to drugs**
- **Is subject to permanent modification from chronic influences**

Adolescents Are Not Young Adults……

- **The human brain is not fully "wired" until about age 21.**
- **The last parts to wire are those that make us human…**
  - **Plan complex projects.**
  - **Hold several thoughts at once.**
  - **Inhibit inappropriate behaviors.**



There is epidemiological evidence that addiction begins before brain maturity, and lately some biological evidence

Addiction can rapidly develop at a time in life when a person may be virtually incapable of making wise decisions.

Drugs Change The Brain

- **The chronic presence of drugs can cause short and long-lasting changes in the nervous system**
  - **Tolerance and withdrawal**
    - **Brief changes as the brain chemistry resets itself**
  - **Dependence/Addiction**
    - **Long lasting changes in brain chemistry and wiring, like strong memories**

Addiction comes from a normal brain activity—stimulation of the brain reward system

This system is what gives us the tools to preserve the species
- **---the buzz from sex**
- **---the anticipation of good food**
- **---the joy of cooperation**
- **---the euphoria of winning**

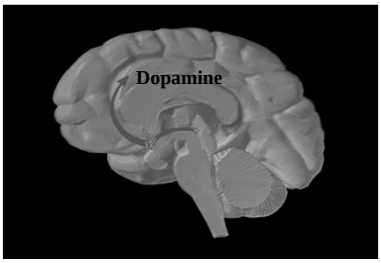
When we anticipate a reward it gives us the tools to get it…

Attention, Focus, Power, Suppression of Fear, Euphoria (The Anticipation Response)

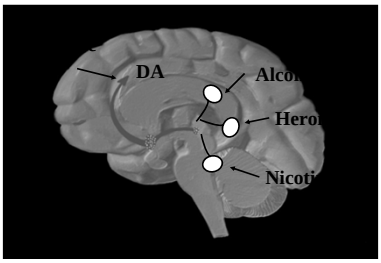
The brain chemical dopamine is released by the reward system, and…..

- **ALL addicting drugs release this brain chemical.**
- **Many release much more than natural stimuli**

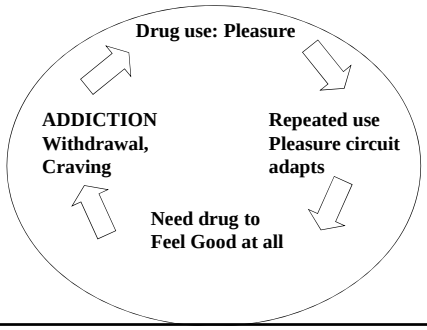
Neural Basis of Addiction



All Addictive Drugs Activate this Circuit



Repeated Stimulation Changes The Brain: The Addiction Cycle



Does The Reward/Addiction System Work Better in Adolescents? Probably

- **Adolescents are impulsive and risk-taking – risk factors for drug taking**
- **The earlier kids start smoking or drinking, the more quickly they progress to dependence**

Cocaine Increases Dopamine More in Adolescent Rats

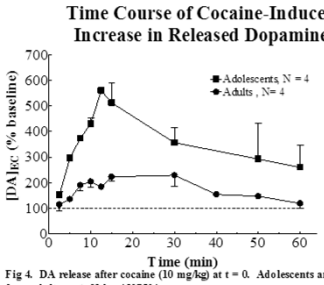


Fig 4. DA release after cocaine (10 mg/kg) at t = 0. Adolescents are different from adults, $p < .01$ by ANOVA.

Now, about alcohol and other drugs…

Understanding the basics…

Every drug has two effects….

The one you know about, and…..
The one you don't!

Know the T.R.U.T.H. About Alcohol and Other Drugs

- ***T*oxicity--Dead now, dead later, or wish you were dead**
- ***R*einforcement--The heart of addiction**
- ***U*nderstand--So what's the addict getting from this drug?**
- ***T*ime—What are the pharmacokinetics of the drug and what are the consequences of its repeated use?**

Toxic effects of alcohol

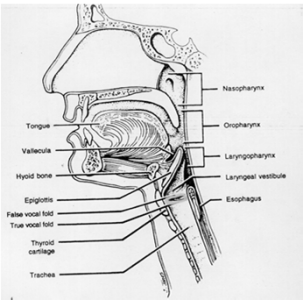
Alcohol kills (acutely) in 3 ways

- **Suppressing respiration**
- **Suppressing reflexes**
- **Producing cardiac instability**

- **People do not understand how little alcohol is required for impairment and death**
- **People need to know the lethal level for their body weight**
- **Women are more sensitive than men**

Aspiration and Alcohol

- **Alcohol paralyzes flap that closes trachea during swallowing**
- **Stomach contents enter lungs**
- **Acid and material cause inflammation**
- **Secondary infection**



Non-lethal toxicity of alcohol

- **Significant liver toxicity, especially in women**
- **? Cancer, bone loss, etc.**
- **Significant brain effects for >21 drinks/week**
- **Neuropathological effects of binge drinking**

Alcohol Tolerance

- **Regular use of any drug causes the brain to adapt.**
- **Don't be surprised if you find people functioning fairly effectively at alcohol levels that would may you or I comatose. They are tolerant.**

Does alcohol have positive health effects?

- **Yes, at low levels of consumption**
- **The National Institute of Health (NIAAA) recommends:**
- **For women, one drink per day maximum**
- **For men, two drinks per day maximum**

The T.R.U.T.H.

Reinforcement or Reward

- **We know alcohol is addicting**
- **Kids are more vulnerable to addiction—WHY?**

Have you ever heard this phrase?

- I just can't drink like I once could?

Adolescents respond differently to alcohol

- Preliminary information based on human and animal studies
- Less sleepy and sedated
- A greater "Buzz"
- More learning impairment so they cannot remember the consequences (blackouts)
- 30-50% of kids 13-15 yrs. who regularly drink will become alcoholics.

The T.R.U.T.H.

Understand how the drug affects the brain.

What is the person getting from the drug?

Is there and underlying treatable medical condition?

A critical role for treatment professionals--find the problem

- **Self medicating--for what?**
  - **Anxiety – alcohol reduces it**
  - **Stress—alcohol relieves it**
  - **Depression—alcohol treats its symptoms**
  - **Social phobia—alcohol is disinhibiting**

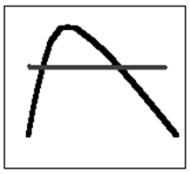
The T.R.U.T.H.

Time: How long does the drug last?

- **Most people do not understand pharmacokinetics.**
- **Do not assume the drug effect is over when the buzz is gone.**

Alcohol

- **Time**
  - **Rapid rise in levels**
  - **Slow fall--- ½ to 1 drink/hour**
  - **Performance better on rising phase**



In summary….

- **Alcohol is a toxic drug that has to be used with care**
- **It is safe and maybe healthy used minimally**
- **It has different effects in kids, making them especially vulnerable**

Marijuana

- **Toxicity-not lethal**
  - **Long-term toxicity similar to tobacco use**
  - **Possible interactions with the immune system**

Marijuana

- **Reinforcement—addicting?**
  - **Clearly some people become dependent**
  - **Because of anxiety-reducing effects, users tend to not deal with their problems, their problems get worse, they smoke more, and they get into real trouble.**

Marijuana

- **Tolerance**
  - **Yes, with repeated use some effects will diminish**
  - **Early research (our labs) shows that adults may become tolerant faster than kids**
  - **Again, kids are more vulnerable**

Marijuana

- **Understanding how it works**
  - **Reduces anxiety**
  - **Produces euphoria in some people**
  - **Impairs all kinds of learning by the brain**
    - **Academics**
    - **Music**
    - **Athletics**
    - **Social skills**

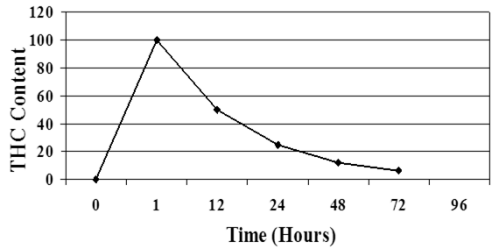
Marijuana

- **Activates the "forgetting" chemistry**
- **THC binds to receptors all over the brain**
  - **Except in life-support areas**
- **Likely has many effects we don't yet recognize on higher level functioning**
  - **Because rats can't talk!**

Marijuana

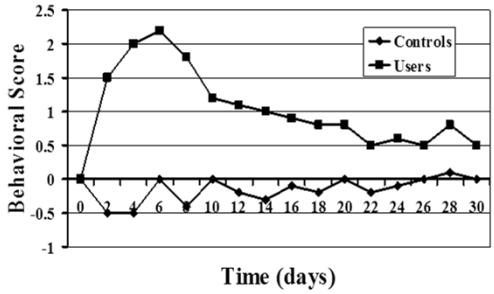
- **Time**
  - **Stays in the body for weeks—8 days to eliminate 90% of one dose**
  - **Stored in fat**
  - **Metabolized into active compounds**
  - **The brain adapts to its presence**

THC: Slow Removal from Body



Half life = 12-18 hours

Marijuana Withdrawal



From Pope et al,

A Major Problem With Marijuana

- **The adolescent brain is not mature**
- **For proper development, the brain needs learning mechanisms to work properly**
- **Marijuana is persistent and impairs learning**
- **Thus regular marijuana use ***MAY*** impair proper brain maturation**
- **Adolescent use is now associated with later mental illness (early data from other groups)**

Cocaine and Methamphetamine (Stimulants)

- **Toxicity-potentially lethal**
  - **Constricts blood vessels**
  - **Minor and major strokes**
  - **Cardiac irregularities**
  - **High doses cause seizures**
  - **With binges, direct damage to neurons**
  - **Quite safe when used medically (attention deficit disorder – Ritalin, Adderal)**

- **Reinforcement**
  - **The most highly reinforcing drugs because they elevate dopamine without sedative effects**
  - **Extremely addictive when used by inhalation or I-V**
  - **Animals will work to their death for these drugs**

- **Understanding how stimulants work**
  - **Power**
  - **Euphoria**
  - **Focus**
  - **Disinhibition**
  - **Physical stimulation**
- **With continued abuse, mental changes, including paranoia and psychosis**

- **Time**
  - **For cocaine in the nose, 30-60 minutes**
  - **For smoked crack cocaine, a few minutes**
  - **For amphetamines, hours**
- **Depression upon withdrawal**
- **Stimulant abusers can go into marked agitated and psychotic states upon withdrawal**

Opiates (Heroin and Pharmaceuticals)

- **Toxicity**
  - **Lethal from overdose by respiratory depression**
  - **Otherwise, not much damage**
  - **The distress from opiate use is economic**

- **R**einforcement
  - Highly addictive especially if used by smoking or I-V---release dopamine in the reward system
  - People can become addicted to oral agents
  - Rush Limbaugh's case--oxycontin

- **U**nderstanding how opiates work
  - Painkilling by activating the brain's natural painkilling system
  - Sedating
  - Produce euphoria
  - Withdrawal has powerful physical symptoms that inhibits abstaining
  - Methadone and other drugs suppress the physical withdrawal symptoms without providing the euphoria
- **T**ime: Hours

Club Drugs---Ecstasy, GHB, Ketamine

- ECSTASY (MDMA) is toxic acutely and over the long term to the brain's serotonin system, which regulates mood, and lots of basic body functions like appetite, temperature, etc.
- It produces a profound sense of love, empathy, and acceptance---exactly what kids seek most from their peers.

GHB (gamma-hydroxybutyrate)

- **GHB is acutely toxic**
- **A narrow range between "effective dose" and lethal dose**
- **Suppresses respiration**
- **Produces disinhibition like alcohol, but no hangover**
- **Synergistic with alcohol**
- **Profound (and sometimes lethal) withdrawal**

PCP (angel dust)

- **Induces psychosis**
- **Stimulant**
- **Pain killer**

PCP

- **Sometimes added to marijuana blunts along with, or substituting for, cocaine**
- **The drug that gave drugs a very bad reputation with police**
- **The user can be crazy, stimulated and feeling no pain**

Ketamine

- **Anesthetic agent made commercially**
- **Used for kids and animals because it produces hallucinations**
- **Does not depress the CNS as much as other anesthetics, thus relatively few deaths.**
- **Kids like it for the hallucinations**

The T.R.U.T.H.

Happiness

- **Does not come in a pill**
- **Cannot be found in a bottle**
- **Is not achieved by constantly pursuing hyper-stimulation of the reward system**

Ways to improve relationships—The Anticipation Response

- **When we anticipate a reward, we get…..**
  - **Attention, Focus, Power, Suppression of Fear, Euphoria**
- **If you want anyone to do anything, the more you can associate that with expectation of reward the more you can invoke the *anticipation response*.**
- **What does the brain like most? Novel hedonic experiences!**

Ways to improve relationships—The Anticipation Response

- **Provide unexpected pleasures enough times…**
  - **Compliments**
  - **Presents**
  - **Surprise activities**
  - **Sincere thanks**
  - **Anything that the other person finds pleasurable**
- **And that person can become "addicted" to you**

Remember…fear produces just the opposite—people respond, but they build up aversive cues to you.

So try to use rewards whenever possible

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