Understanding the Neurobiological Basis of Addiction and Applying it to Rational Therapies

Jed Magen DO MS
Associate Professor and Chair
Department of Psychiatry
College of Human Medicine
College of Osteopathic Medicine
Michigan State University
No Disclosures
transitions to chronic substance use
1) voluntary use in search of a hedonic experience
2) loss of control over this behavior
3) habitual and compulsive behavior
Rewards!

increase dopamine levels in nucleus accumbens
What causes increases in dopamine?

Any drug of abuse........

Wagner F and Anthony J. *From First Drug Use to Drug Dependence: Developmental Periods of Risk for Dependence upon Marijuana, Cocaine, and Alcohol* Neuropsychopharmacology (2002) 26 479-488
BRAIN METABOLISM

NORMAL
Immature vs mature brain vs “substance abuse” brain
Effects of Stress on Iowa Gambling Task Scores in Formerly Heroin-Dependent Patients at Different Abstinence Times

adolescents are peculiarly vulnerable to substance abuse due to particular neurobiological vulnerabilities based on immature CNS structures
• abstinent abusers have defects in judgment
• neurobiological alterations remit after some time period
• BUT when the organism is stressed, they return even after long periods of abstinence
• abusers need to be in treatment for long periods of time
• when stressed they need to recognize the need to return to treatment
Strategies that improve frontal lobe function

- dialectical behavioral therapy
- cognitive behavioral therapy
Strategies that take advantage of social hierarchy and position in primate groups

- group therapies
- family therapies
- advancing social status
Medications for:
Alcohol use
Opioid use