Genes
- Not specific (i.e., externalizing disorders)
- Novelty seeking

Environments
- Drug availability
- Alternative reinforcers
- Stress

1. Experimentation

2. Pharmacological Response
- Negative
- Positive
- Self-limited
- Repeated use

3. Addiction

Chromosomal Locations for Substance Abuse Vulnerability (rSA) Loci

- It is estimated that approximately 50% of the vulnerability to addiction is accounted for by genetics

Age at Which Marijuana Use Is First Initiated

The Adolescent Brain Is Still Undergoing Development

In Adults, Emotional Self Regulation Is Normally Implemented By A Neural Circuit Comprising Various Prefrontal Regions & Subcortical Limbic Structures
COMT Genotype and Activation With Working Memory Task

Val/Val Ss had > activation (greater inefficiency) than Val/Met Ss in dorsal prefrontal cortex. Egan et al PNAS 98: 2001

Genes:
- Non specific: Automedication
- Specific: sensitivity to reinforcers, drug metabolism

Environment:
- Drug availability
- Sensitization with stress
- Sensitization by prior drug experience
- Alternative reinforcers

1. Experimentation

2. Pharmacological Response

3. Addiction

Dopamine Neurotransmission

DA and Drug Reinforcement

DA Release In Ventral Striatum In Response To Psychological Stress In Subjects with High and Low Parental Care


Brain Dopamine System

Anatomy

DA Transporters

DA Receptors

Dopamine Cell

Metabolism
Dopamine D2 Receptors are Lower in Addiction

DA D2 Receptors in Controls and in Cocaine Abusers (NMS)

DA D2 Receptors in Controls and Cocaine Abusers ([11C] Raclopride)

DA D2 Receptors and Response to Intravenous MP in Controls

Effects of Tx with an Adenovirus Carrying a DA D2 Receptor Gene into NAc in DA D2 Receptors

Taq IA Polymorphism of D2R Affects Striatal D2R

C957T Polymorphism of D2R Affects Striatal DRD2