

# Psychoactive Drugs

## Psychology 101



Psychoactivity = ability to affect mood, thinking, perception and/or behavior

# DRUG NAMES

- Chemical (7-chloro-1,3-dihydro-1-methyl-5-phenyl-2H-1,4-benzodiazepin-2-one)
- Generic: diazepam
- Brand : Valium
- Street: No common street names for Valium



# TIME FACTORS

- Onset of action: How quickly does the drug produced it's effect?
- Duration of action: How long does the drug's effect last?
- Residual effects: After-effects, extended drug reaction, flashbacks

# METHOD OF ADMINISTRATION

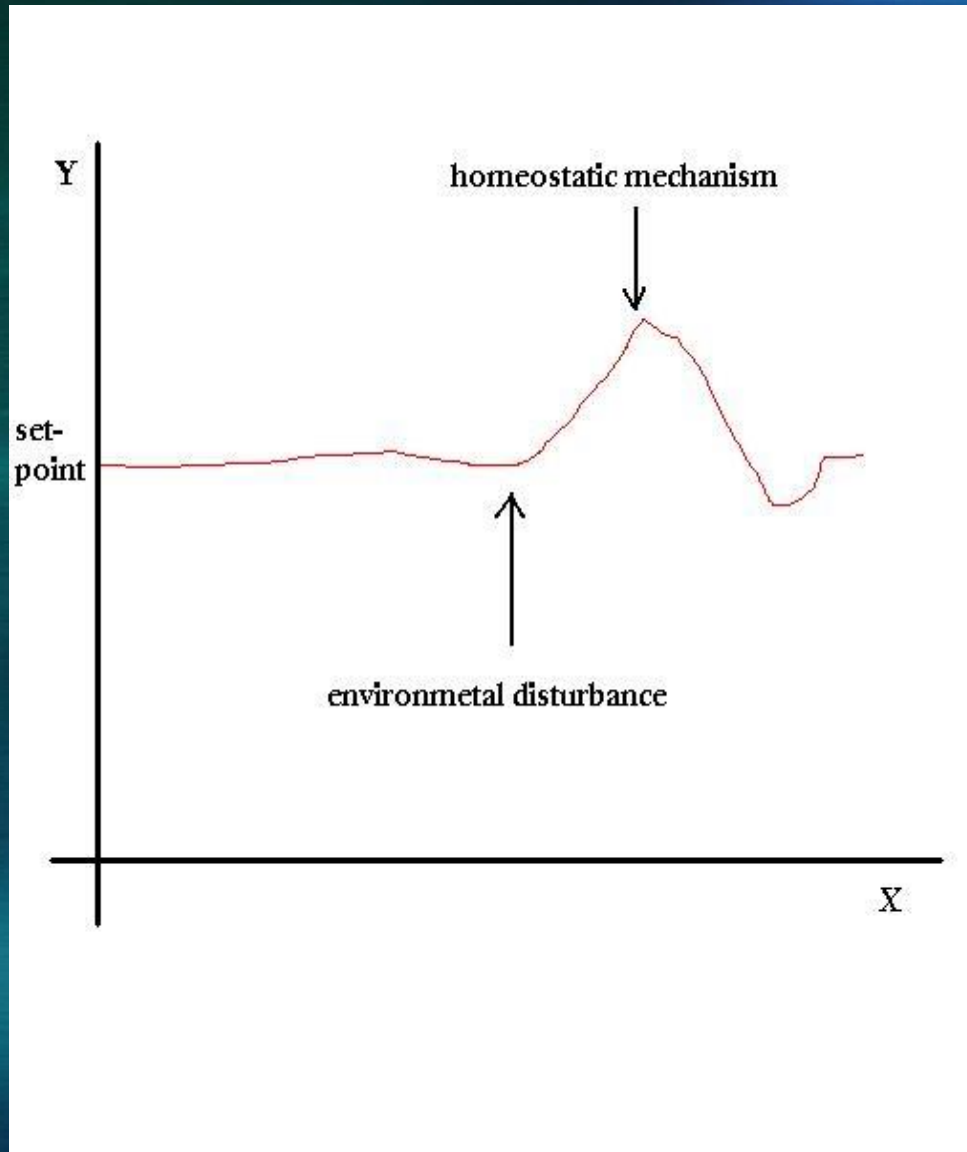
- Ingestion (oral): slower onset/longer duration
- Insufflation (sniffing/snorting): faster onset/shorter duration
- Intravenous (I.V.) Injection: faster onset (seconds)/shortest duration
- Smoking: fastest onset/shortest duration

# TOLERANCE

## Homeostasis

**The human body's natural tendency to move toward a state of equilibrium or constancy**

# SET POINT RESPONSE TO DRUG USE





# TOLERANCE

- Need to increase the dose of a drug in order to obtain the desired effect
- Decreased effect of drug after repeated administration
- Dependent on prior dosage level
- Develops in hours (cocaine), days (LSD), or weeks



# ADDICTION POTENTIAL

- What percentage of first-time users will enjoy the effect of the drug enough that they will seek it out again?
- If an individual uses the drug on a regular basis, how likely is it that s/he will become dependent on the substance?

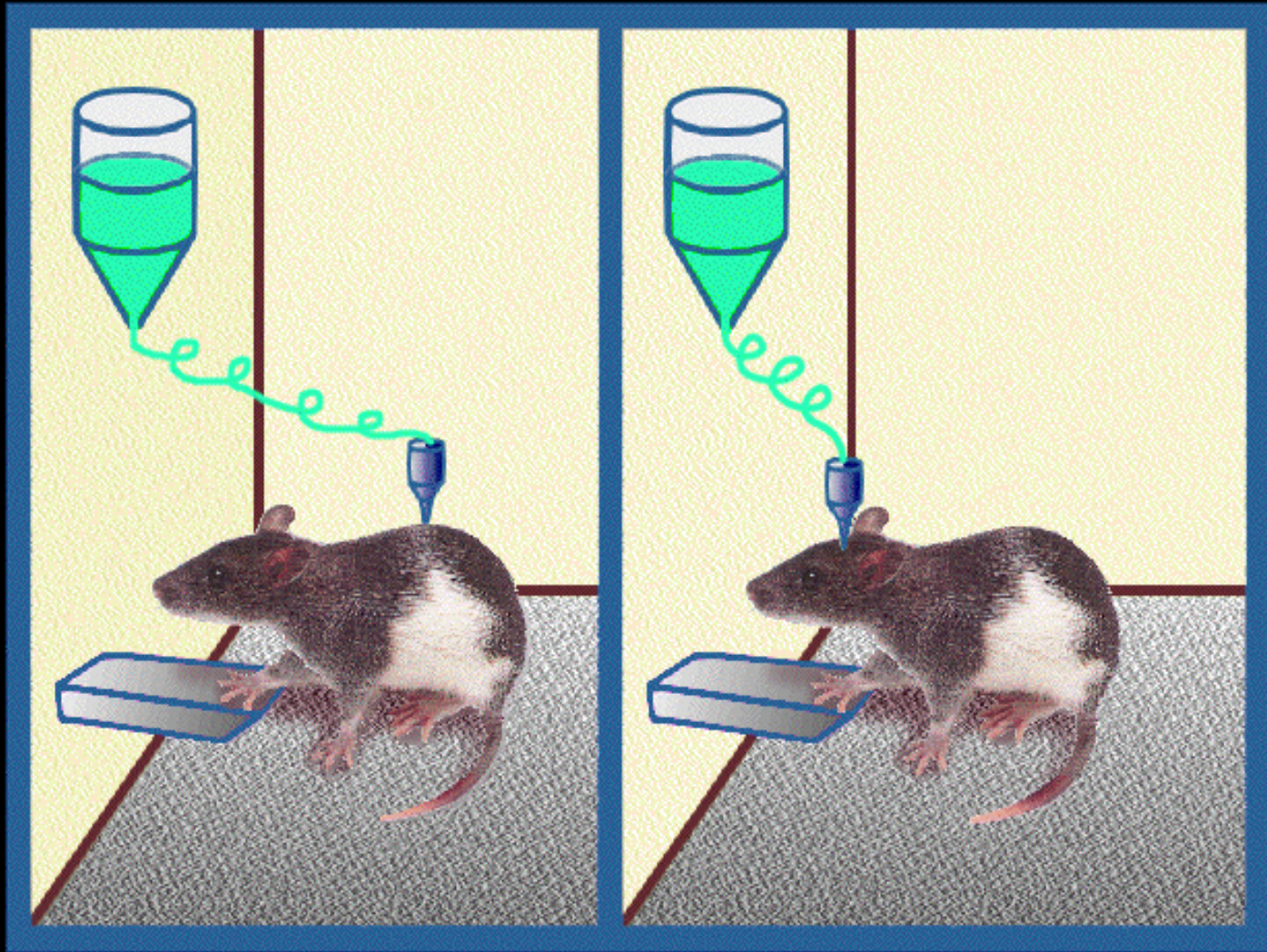
# ADDICTION POTENTIAL

- After being introduced to the drug, do sub-human animals (e.g., monkeys, rats, mice) seek out opportunities to self-administer the substance? Do they do so to the exclusion of eating, consuming water and engaging in reproductive behavior?

# ADDICTION POTENTIAL CAN BE PREDICTED IN PART BY OBSERVING ANIMAL SELF-ADMINISTRATION



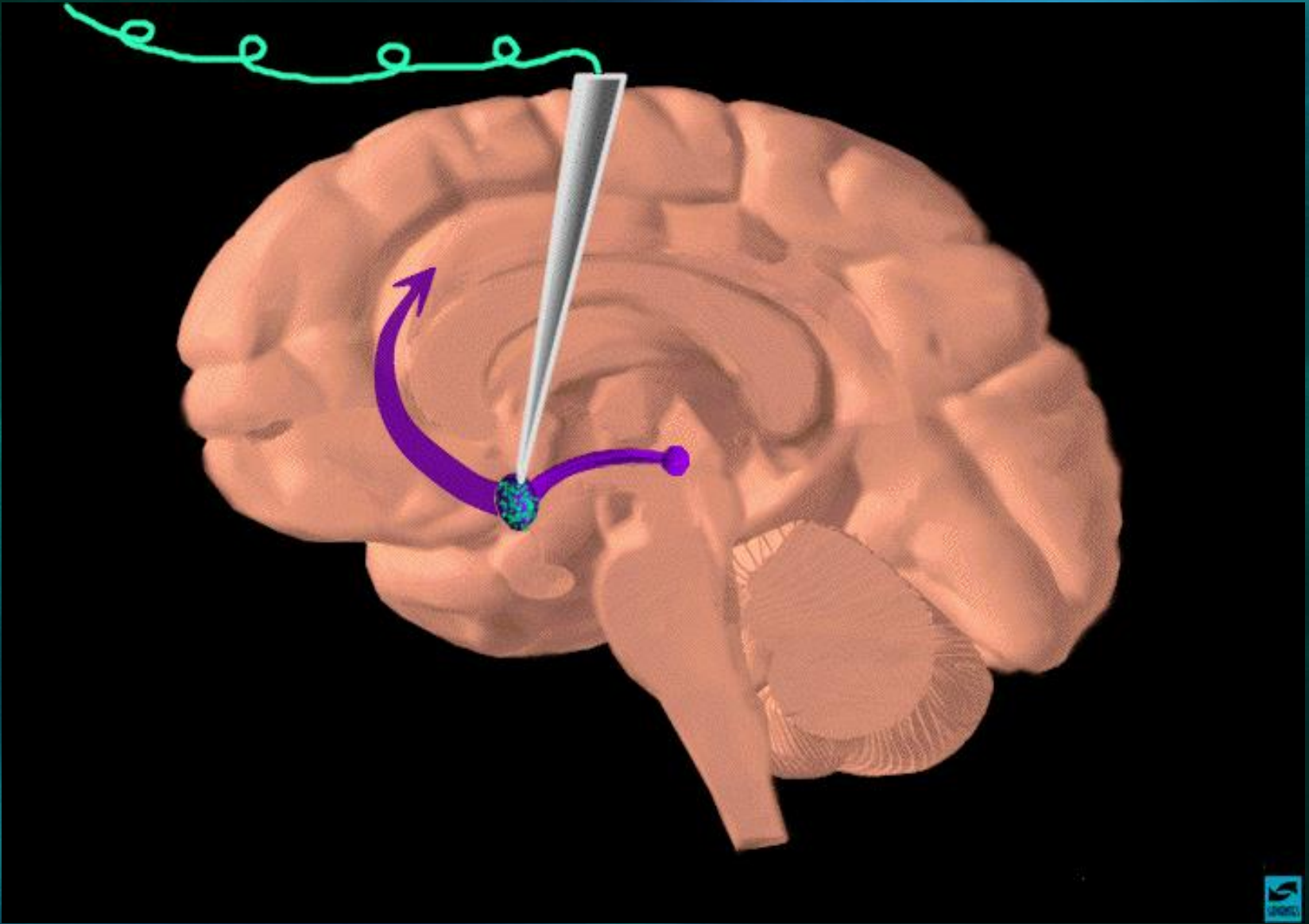


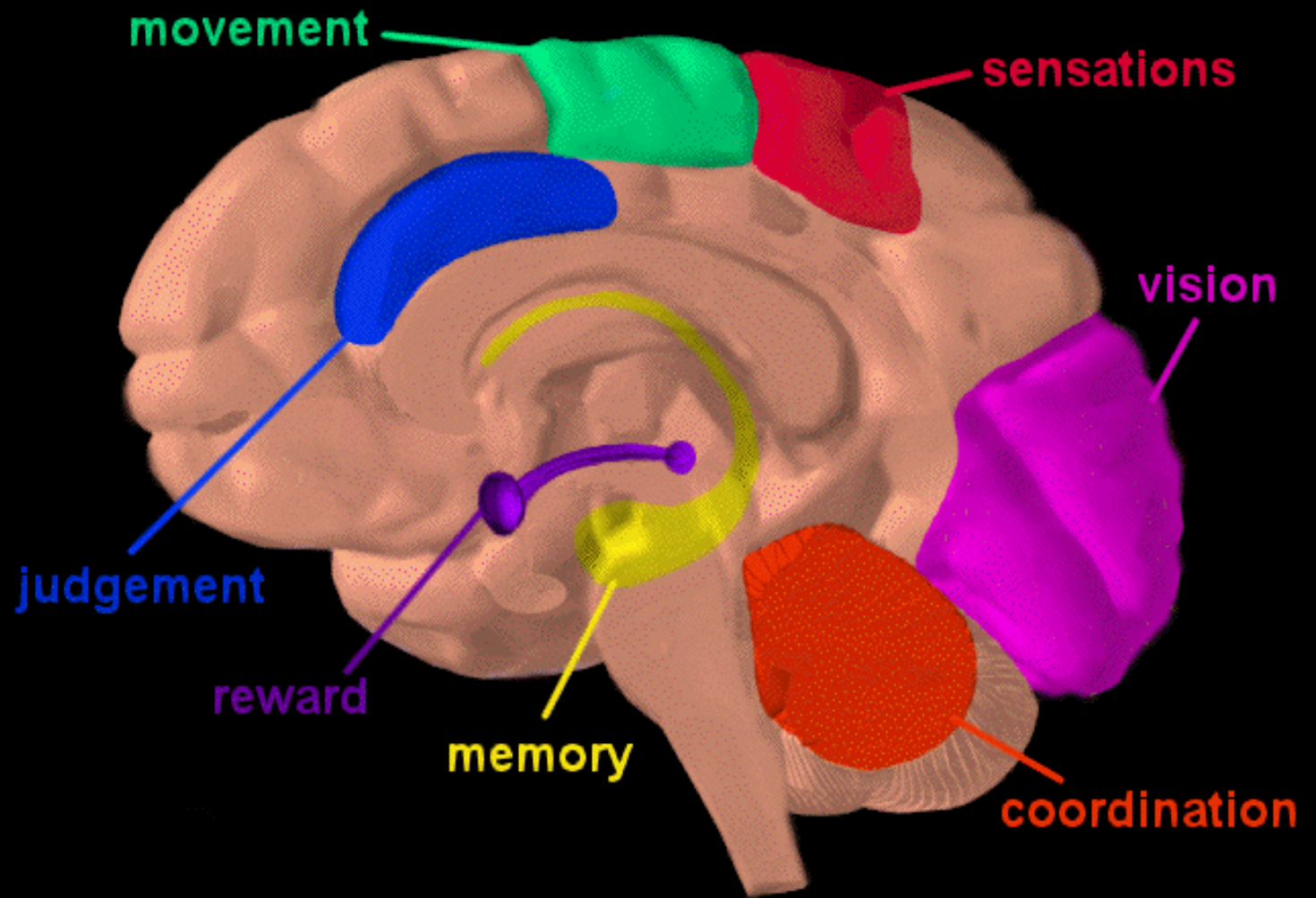




# **ADDICTION POTENTIAL**

- **Ability to stimulate the brain's reward circuits**
- **Ability to meet a individualized neurochemical need**
- **Physical dependency potential**
- **Intensity of withdrawal symptoms**



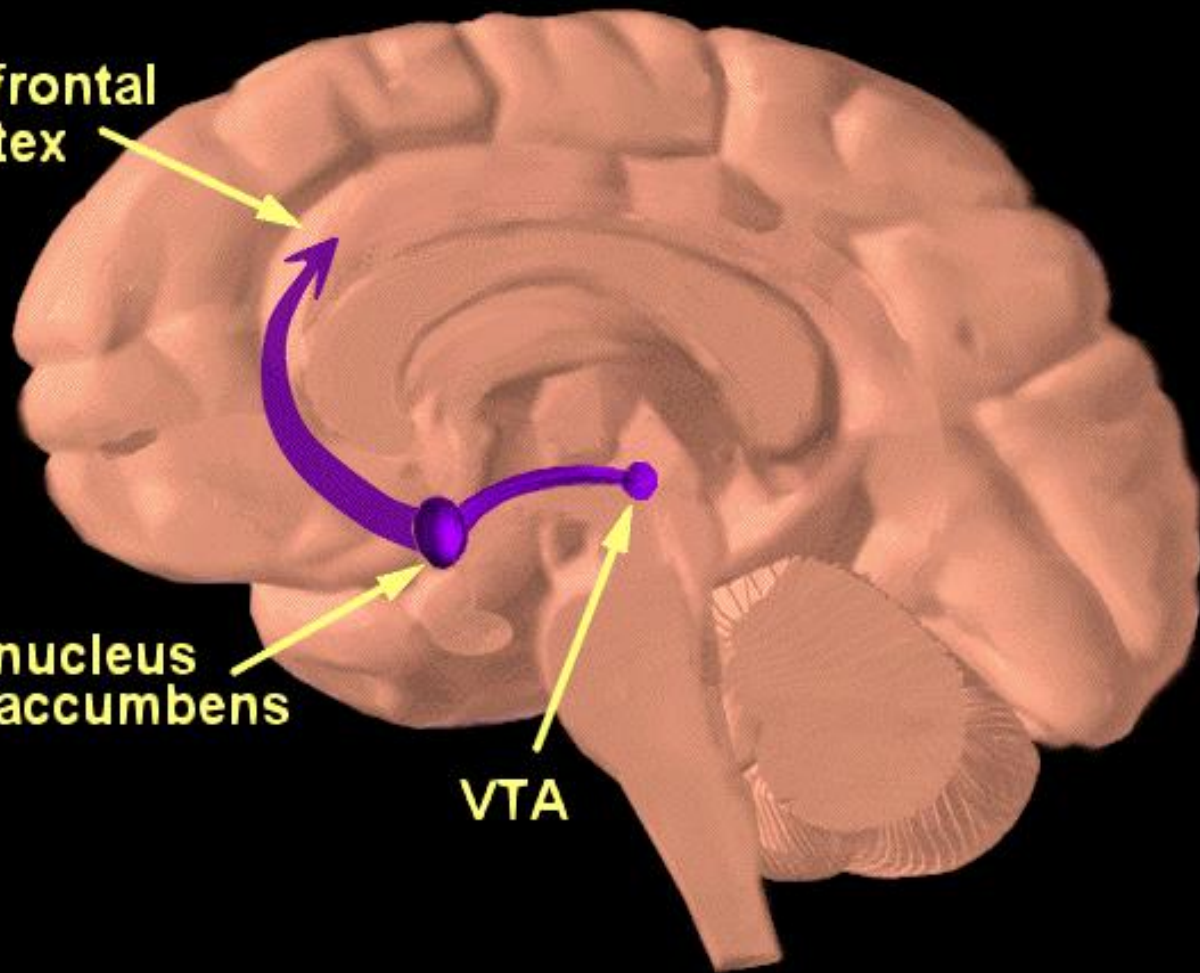




**prefrontal  
cortex**

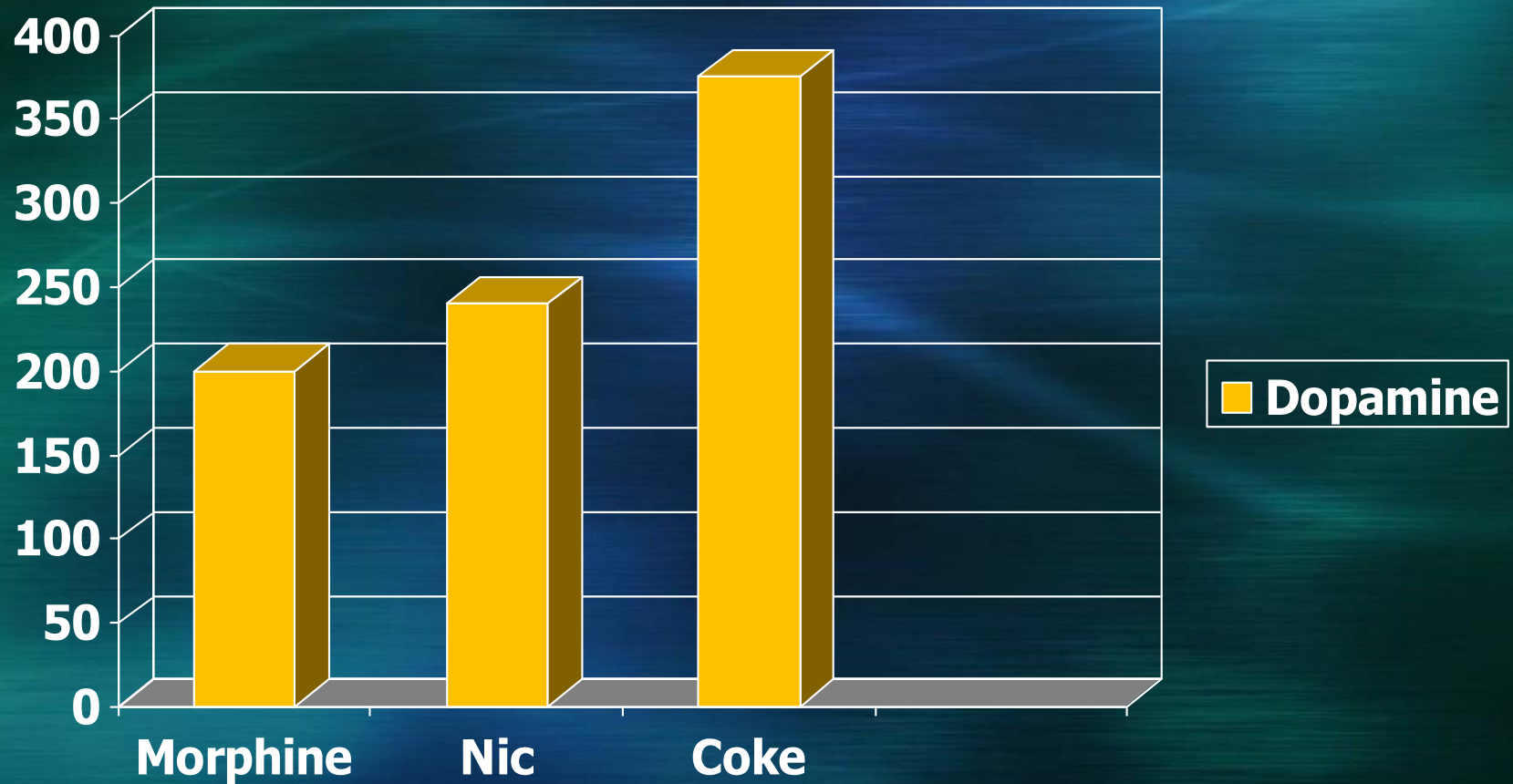
**nucleus  
accumbens**

**VTA**

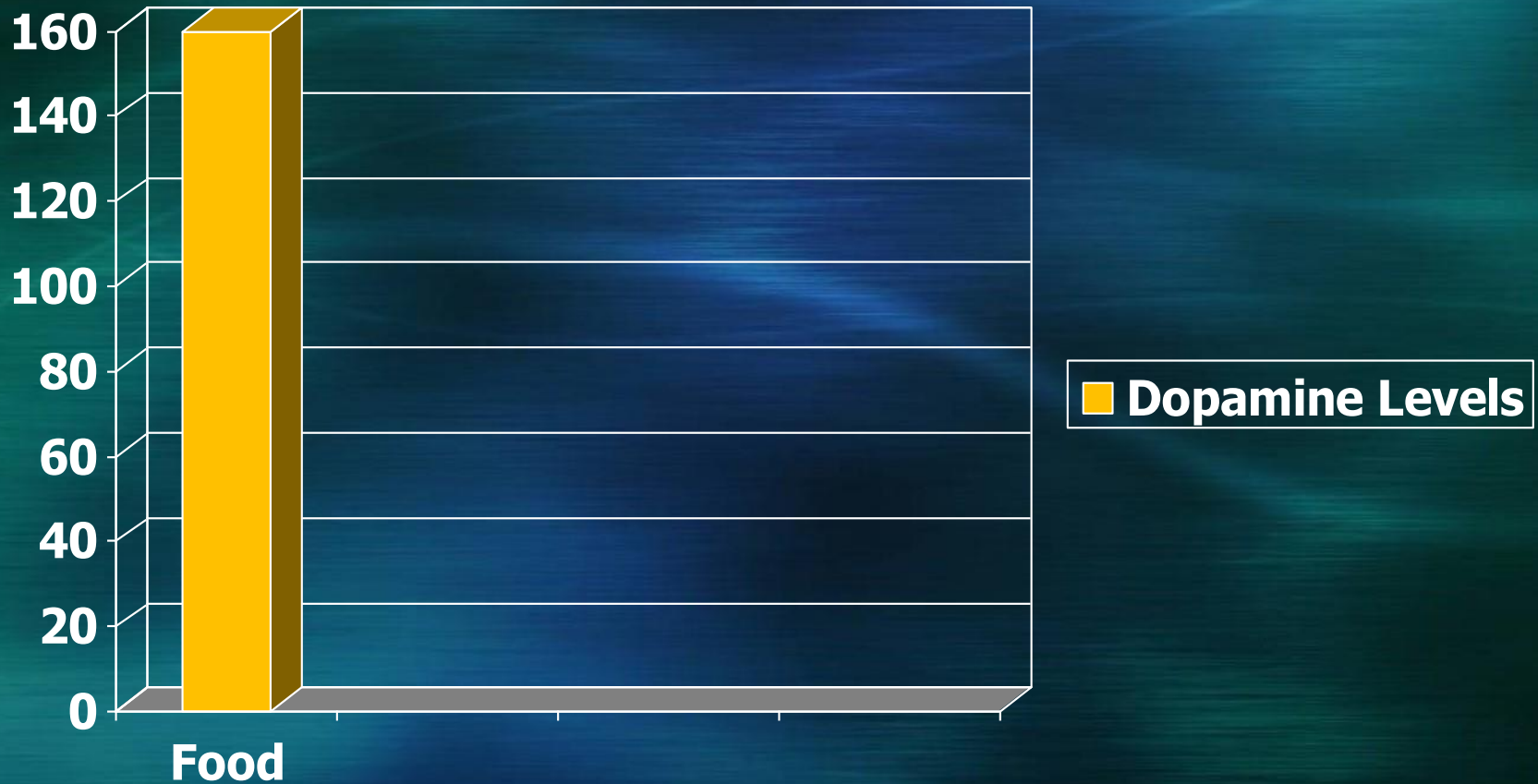




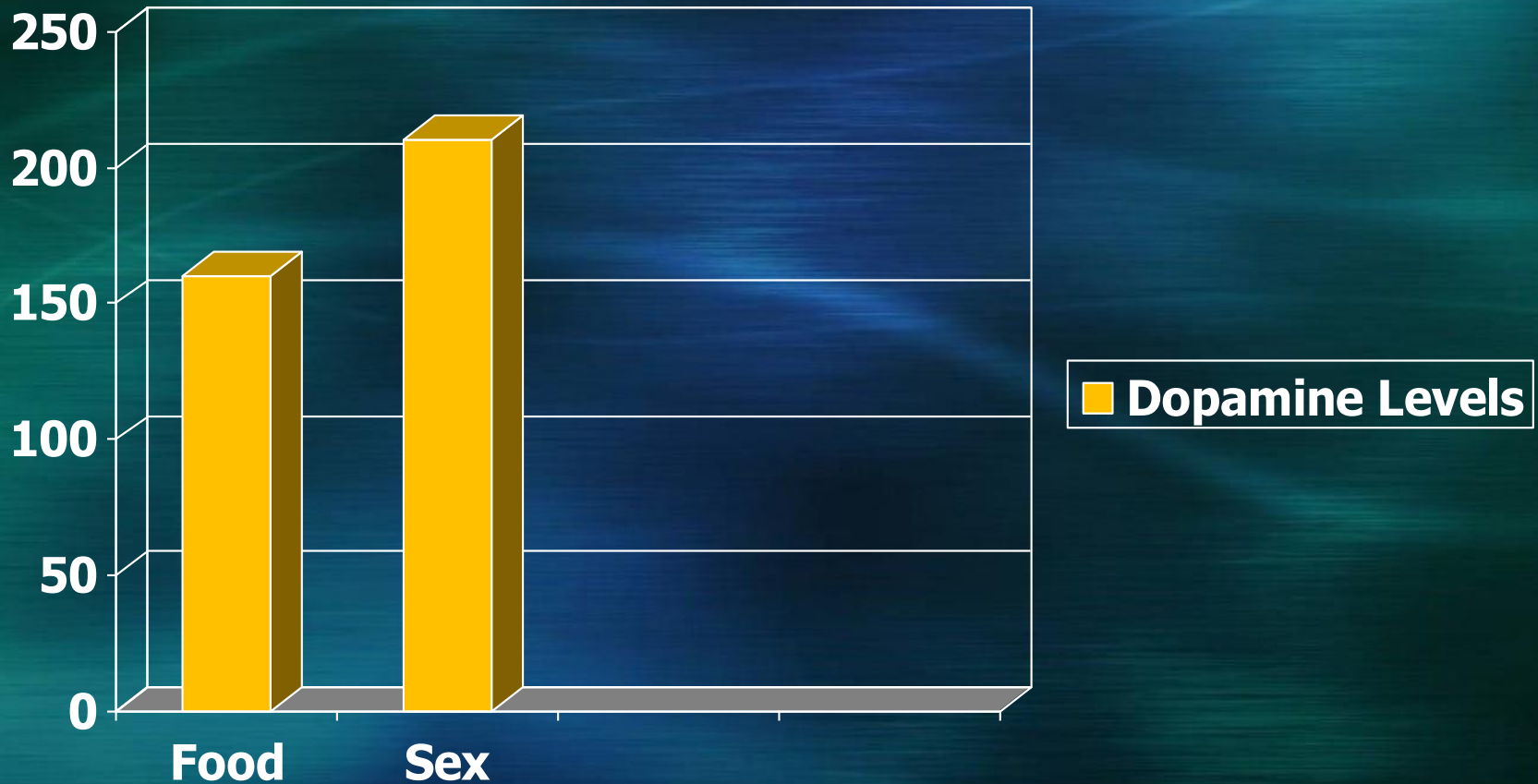
# Dopamine Levels in the Shell of the Nucleus Accumbens (% of baseline)



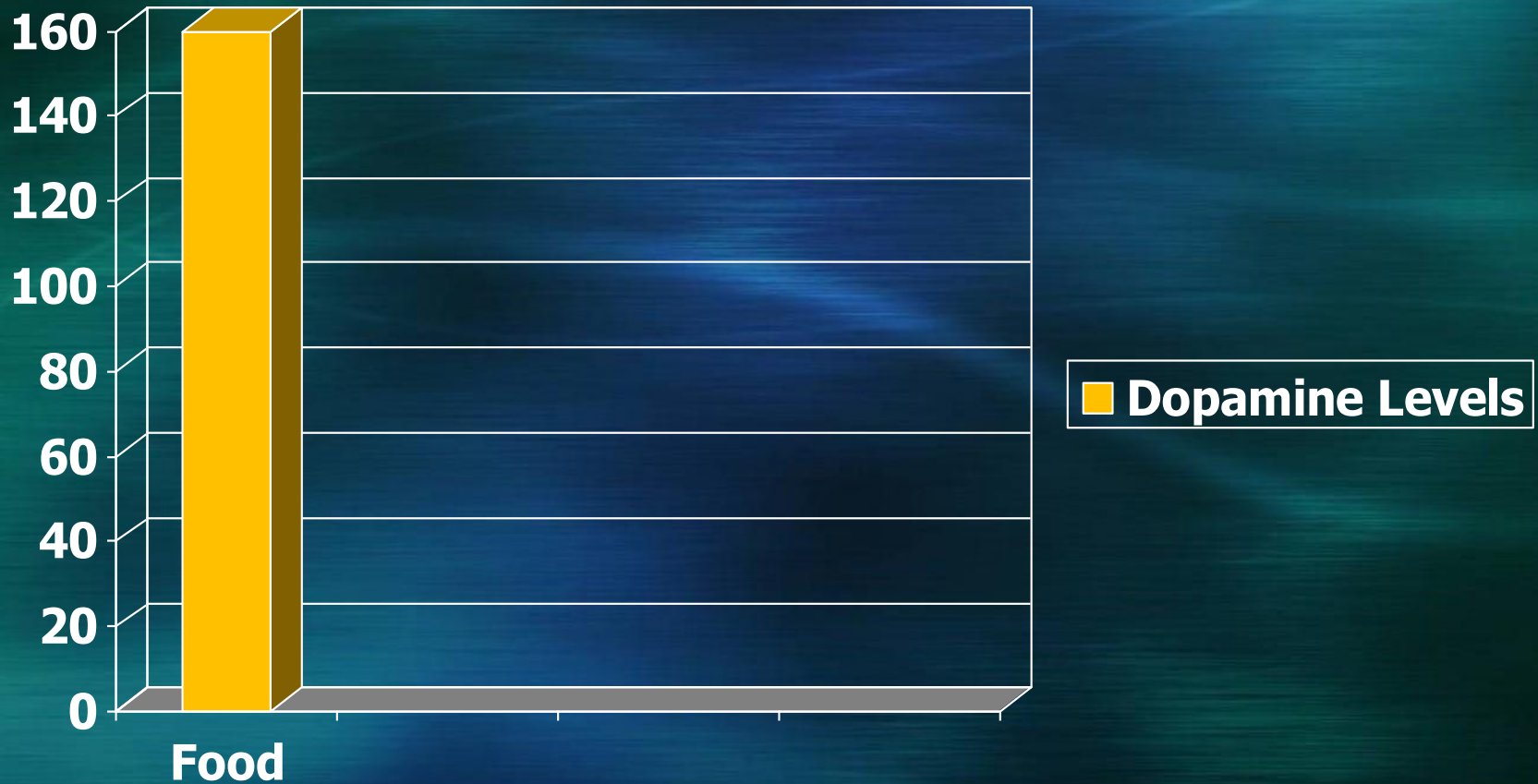
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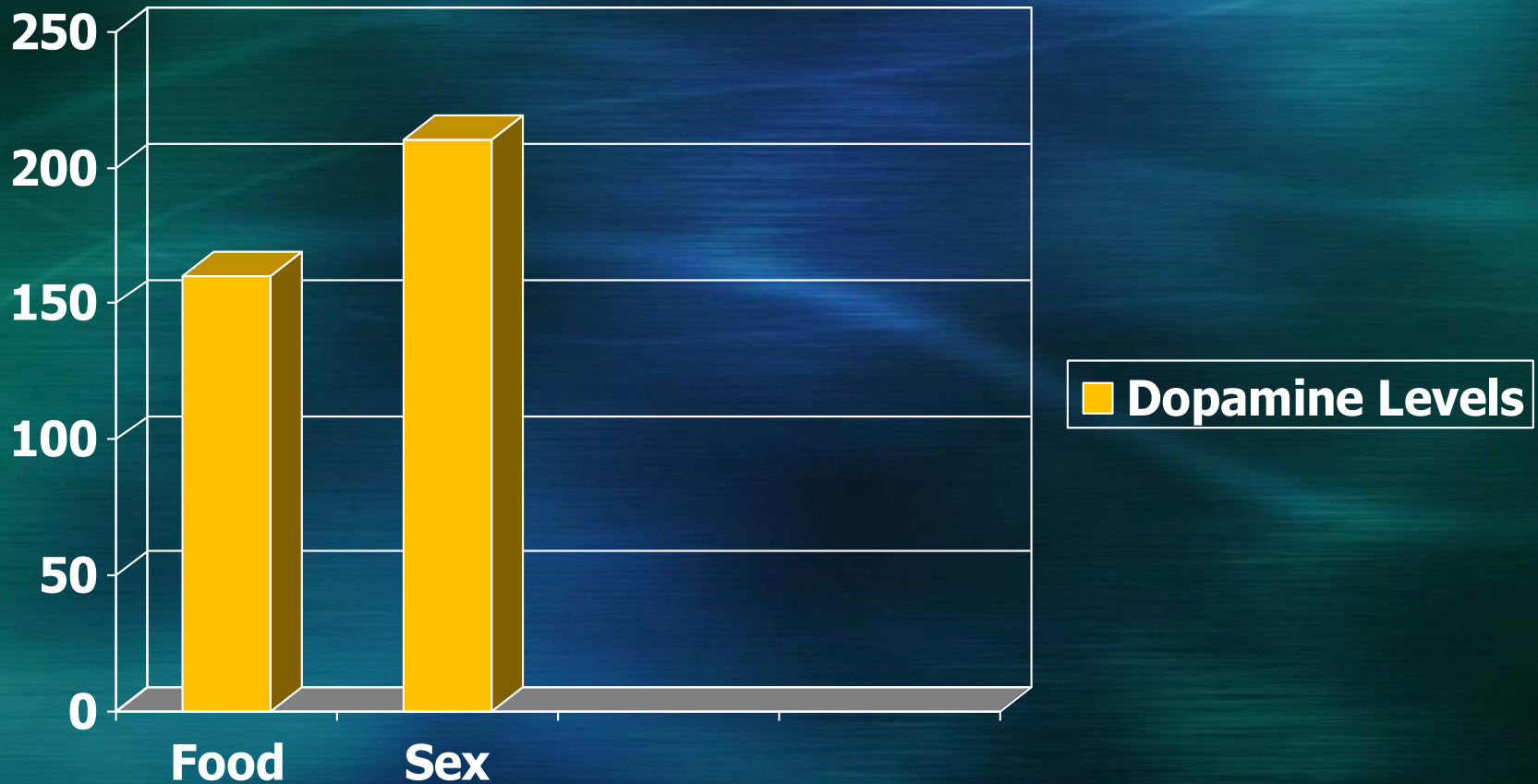


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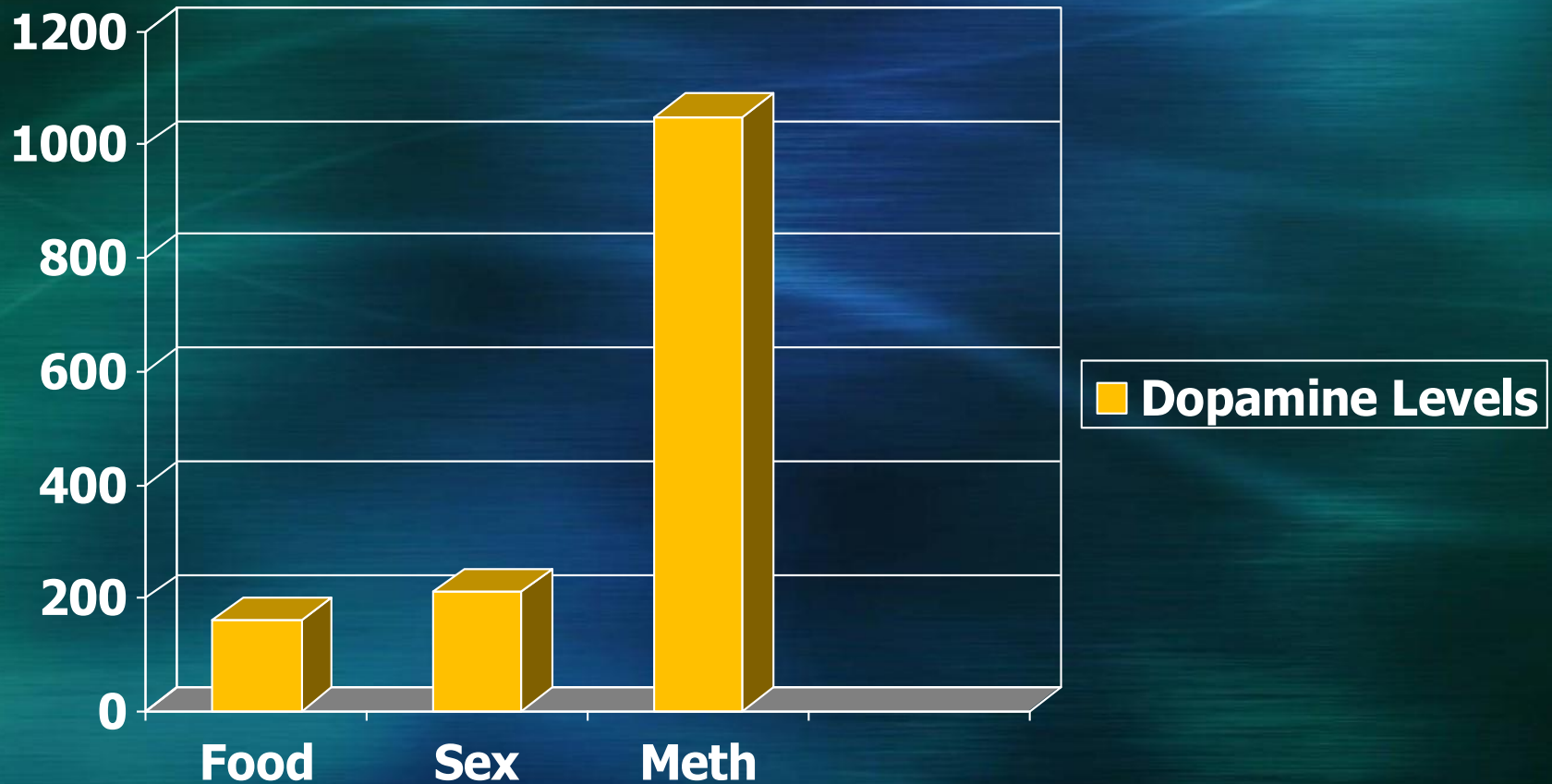




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# **ADDICTION POTENTIAL**

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# ADDICTION

- **DSM-V definition: 11 criteria (symptoms)**
  - **Compulsive drug-taking**
  - **Loss of control**
  - **Continued use despite negative consequences**
  - **Tolerance and physical dependence not required but may be part of the addiction picture**



# TOXICITY

- Ability to produce physical damage to the human body
- Long-range = months, years
- Short-range = days, weeks
- Physical vs behavioral

# PSYCHIATRIC IMPAIRMENT

- Ability of drug to produce negative changes in thinking, learning, perception, mood or behavior
- Acute vs chronic

# PSYCHIATRIC IMPAIRMENT

- **Short-term**
- **Long-term**
- **Affective Disorders**
- **Thought Disorders**



# Important “basics”

- What is the drug’s addiction potential?
- Does the drug produce tolerance?
- What are typical physical dependence withdrawal symptoms?
- What is the drug’s potential for producing immediate and long-term physical toxicity?
- Does the drug produce psychiatric impairment? Short-term? Chronic?

# Inhalants

- High risk: Volatile solvents
  - Toluene
  - Xylene
  - Trichlorethylene
  - Gasoline
- Lower risk
  - Nitrous oxide (“laughing gas”)
  - Amyl/butyl nitrite

# Inhalants

- High risk: Volatile solvents
  - Onset immediate/duration short (minutes)
  - Addiction potential low
  - Tolerance develops
  - Short- and long-term toxicity potential moderate to high
  - Behavioral toxicity potential moderate to high
  - Acute and chronic psychiatric/cognitive impairment potential moderate to high



# Inhalants: Higher Risk

- Physical toxicity
  - Overdose (death, hypoxia)
  - Neurotoxicity
  - Inflammation of the lungs
  - Liver and kidney damage
  - Cancer (Benzene and vinyl chloride)
  - “Fetal solvent syndrome”

# Inhalants

- Lower risk:
  - Onset immediate/duration short (minutes)
  - Addiction potential low
  - Tolerance develops
  - Short- and long-term toxicity potential low to moderate
  - Behavioral toxicity potential low to moderate
  - Acute and chronic psychiatric impairment potential low

# Stimulants

- Cocaine
- Amphetamine (Adderall)
- Lisdexamfetamine (Vyvanse)
- Methamphetamine
- Methylphenidate (Ritalin/Concerta)



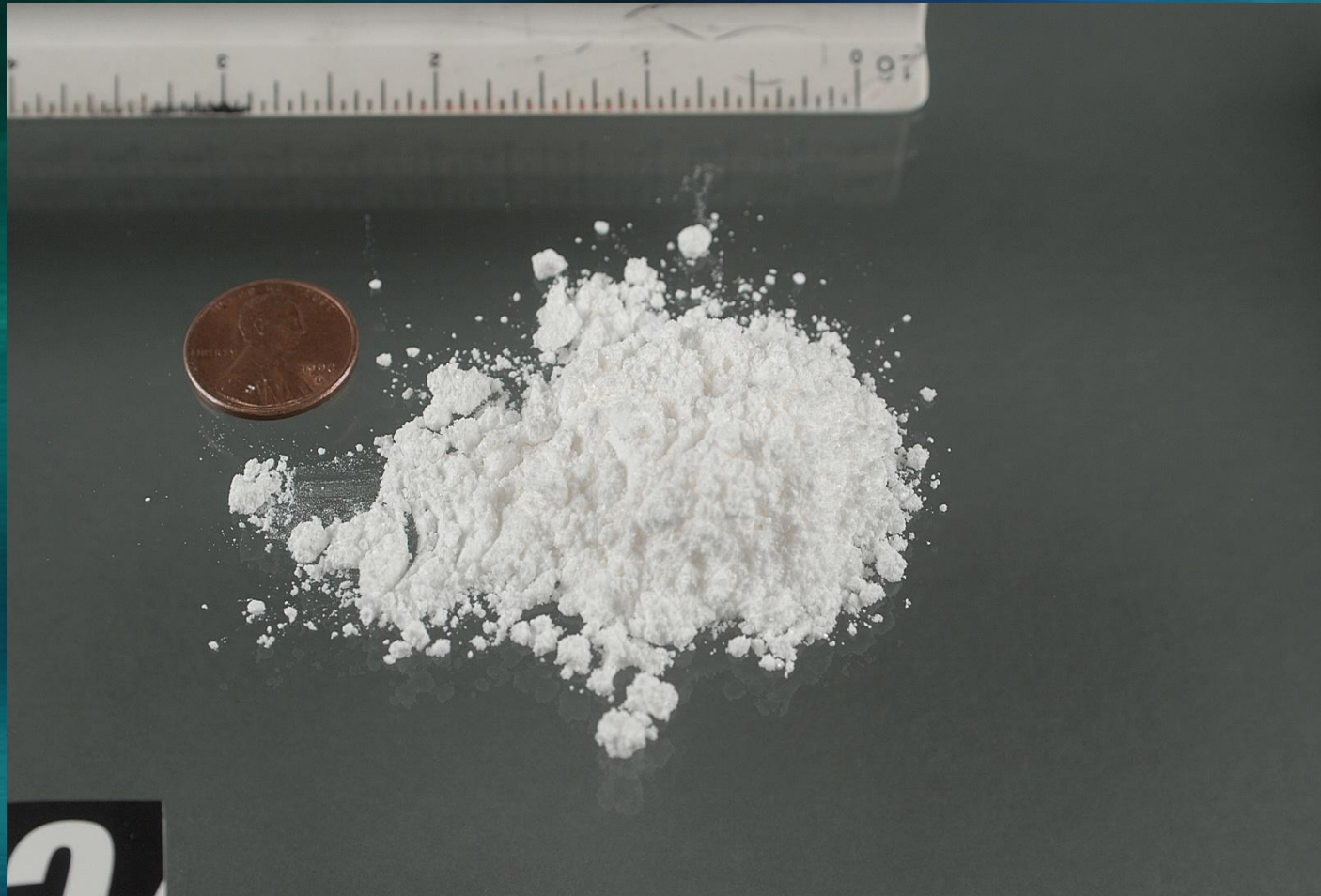
# Stimulants: Basics

- High addiction potential
- Tolerance develops
- Withdrawal symptoms minimal
- Moderate to high potential for immediate physical toxicity
- Moderate potential for long-term toxicity
- Moderate to high potential for acute psychiatric impairment
- Low to moderate potential for chronic psychiatric impairment

# CNS Stimulants (Cocaine)

- Local anesthesia
- coca (*Erythoxylum Coca*)
- cocaine hydrochloride (hcl) ("coke", "toot", "nose/nose candy", "blow", "freeze", "snow", "girl", "white lady", "la mujer blanca")
- alkaloidal cocaine ("free base", "crack", "rock/ready rock", "basuco")

# Cocaine Hcl







# VIALS OF CRACK



# MORE CRACK





# Cocaine Vs. Amphetamine

- Cocaine:
  - Short-acting drug, with a duration of 5-60 minutes.
  - Cocaine can be snorted, injected or smoked, but it is relatively ineffective when swallowed.
  - Tolerance to cocaine can develop and then disappear in a matter of hours.
  - When snorted tends to do much more severe damage to the nasal area.
  - Produces *local anesthesia*

# Stimulants

- Cocaine
- Amphetamine (Adderall)
- Lisdexamfetamine (Vyvanse)
- Methamphetamine
- Methylphenidate (Ritalin/Concerta)

# Adderall/Other ADD Medications

- Between 2003 and 2019, number of adolescents with an ADHD prescription rose 400%
- By senior year, nearly two-thirds of college students are offered Adderall or other “study drugs”, and nearly one-third have accepted



# Stimulants

- Amphetamine (Adderall)
- Lisdexamfetamine (Vyvanse)
- Methamphetamine
- Methylphenidate (Ritalin/Concerta)
- Cocaine

# Hallucinogens/Psychedelics

# Psychedelics/hallucinogens: Basics

- Addiction potential low
- Tolerance develops rapidly
- Withdrawal symptoms absent or extremely minimal
- Low potential for immediate or long-term physical toxicity
- Moderate potential for acute psychiatric impairment
- Low potential for chronic psychiatric impairment



# Hallucinogens/Psychedelics

- LSD
- Psilocybin
- Relatively safe
- NBOMe series-Not so much

# Hallucinogens

- Lower risk
  - LSD
  - Psilocybin
  - Peyote/mescaline
- Higher risk
  - Anticholinergics
  - NBOMe compounds

# Hallucinogens (Lower risk)

- Addiction potential low
- Tolerance develops rapidly
- Short- and long-term physical toxicity potential low
- Psychiatric impairment low to moderate
- Neurochemical mechanism of action:
  - Stimulation of serotonin subreceptors (5HT<sub>2A</sub>)
  - Increase in glutamate



# LSD Vs Psilocybin

- Psilocybin legal in Oregon and other locations
- Psilocybin duration shorter than LSD (4-6 hours Vs 8-12)

# Hallucinogens (Lower risk)

- Effects (desired):
  - Hallucinations
  - Perceptual distortions
  - “Morphing”
  - Synesthesia
  - Altered body image
  - Altered experience of time and space
  - Consciousness expansion
  - Mystical experiences

# Hallucinogens (Lower risk)

- Effects (side)
  - Slight increase in body temperature
  - Nausea (rare)
  - Blurred vision (rare)
  - Slightly increased/decreased blood pressure
  - Slight elevation of pulse
  - Dilated pupils



# Hallucinogens (Lower risk)

- Effects (Undesired)
  - Panic
  - Fear of insanity
  - Paranoia
  - Frightening hallucinations
  - Depersonalization
  - Derealization

# Good golly Miss Molly Who are you today?

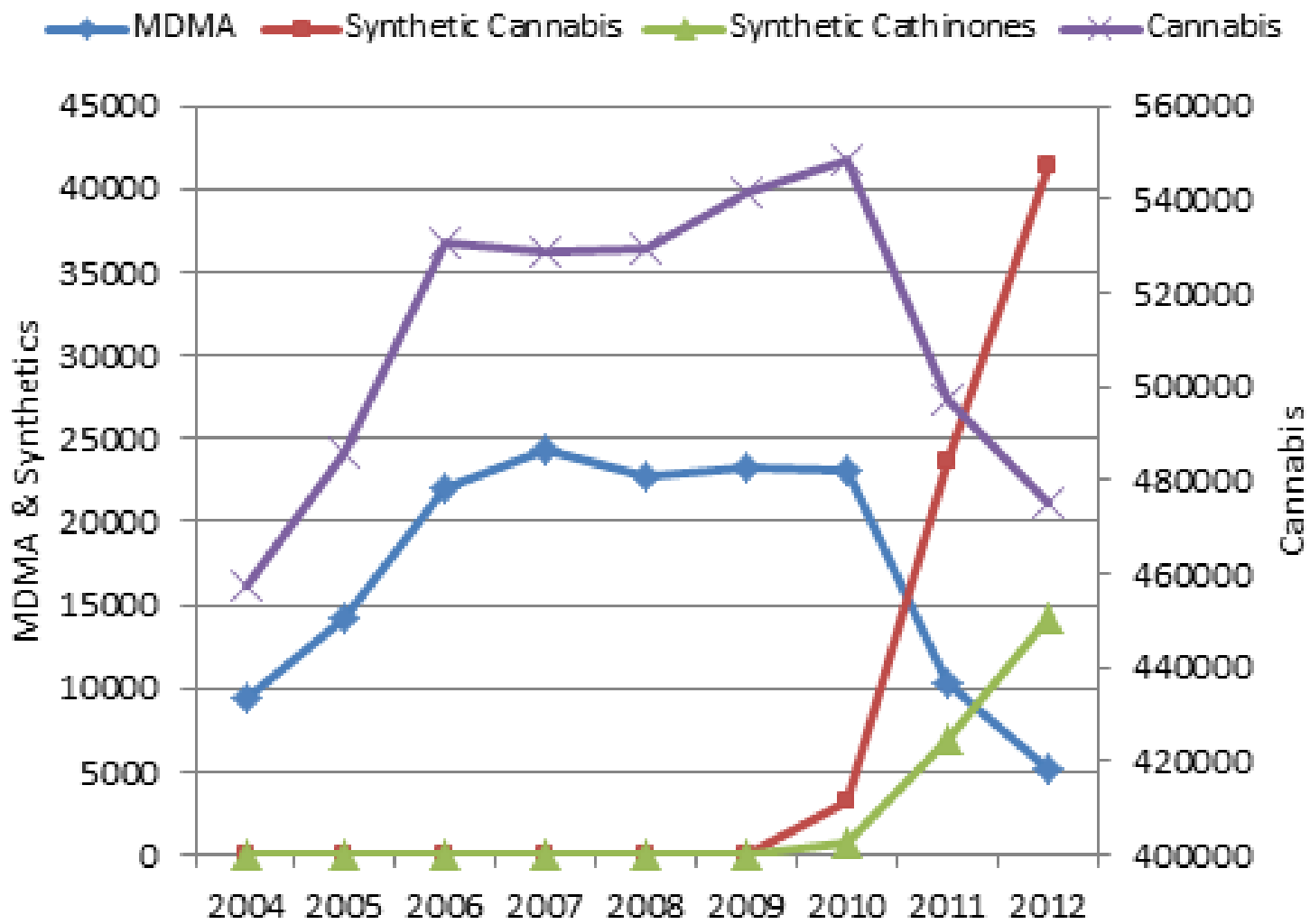
- Pop quiz: What is “Molly”?

# MDMA

- “Ecstasy”
- “Molly”
- “Flat”/”Chicago Mints” (Chicago)



## Changes in Number of Items Examined in DEA NFLIS:2004-2012



# The New York Times

## Overdoses of 'Molly' Led to Electric Zoo Deaths

By [James C. McKinley Jr.](#) September 12, 2013 6:06 pm

(One of the deceased) had taken a fatal mix of MDMA and **methyone**, a closely related stimulant that is also often sold under the name molly. Methyone is one of several stimulants and psychedelic drugs often used by drug dealers to cut MDMA, law enforcement officials said.

# The New York Times

## Overdoses of 'Molly' Led to Electric Zoo Deaths

By [James C. McKinley Jr.](#) September 12, 2013 6:06 pm

A third New Yorker died on July 15 of an **overdose of methyldone** after attending a different electronic dance music concert on Governors Island, the medical examiner's office said.





February 23, 2015

12 hospitalized due to MDMA overdose on Wesleyan campus

Dr. Mark Neavyn, chief of toxicology at Hartford Hospital: **"When we see these people in the emergency department and they claim to have taken Molly, we don't pay attention to that word anymore."**



# Dissociative anesthetics

- Phencyclidine (PCP)
- Ketamine
- Dextromethorphan (DXM)

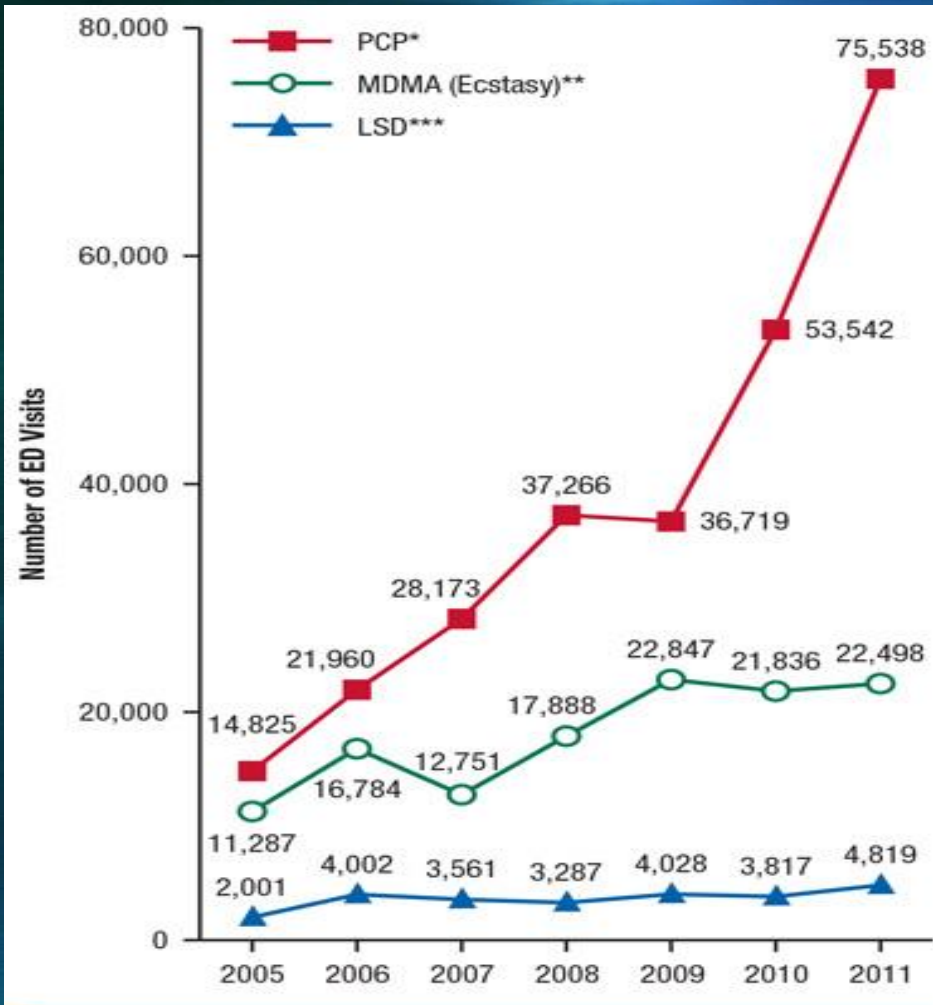
# Dissociative anesthetics: Basics

- Addiction potential low to moderate
- Tolerance develops
- Withdrawal symptoms mild
- Moderate to high potential for immediate physical toxicity
- Potential for long-term physical toxicity varies
- Potential for acute and chronic psychiatric impairment moderate to high
- NMDA/glutamate antagonist



# PCP

- Angel dust
- Sherms
- Dips
- Fry
- Embalming fluid



+500%

\* The number of visits involving PCP in 2005, 2006, 2007, 2008, 2009, and 2010 is significantly different from 2011 at the .05 level.

\*\* The number of visits involving MDMA (Ecstasy) in 2005 and 2007 is significantly different from 2011 at the .05 level.

\*\*\* The number of visits involving LSD in 2005 is significantly different from 2011 at the .05 level.

Source: 2005 to 2011 SAMHSA Drug Abuse Warning Network (DAWN).

ED visits involving PCP, LSD and MDMA: 2005-2011

# PCP

- Oral (rare)
- Intranasal
- Smoked (on marijuana, mint, parsley)
- i.v. (rare)





# PCP

- (Not used medically)
- Floating feeling
- Sedation
- Euphoria
- Confusion
- Disorientation
- Depersonalization
- Derealization
- Loss of ego boundaries
- Panic

# PCP

- Bizarre behavior
- Aggressive behavior
- Hallucinations (rare)

# PCP

- Numbness
- Ataxia
- Increased blood pressure
- Nystagmus
- Seizures



# Ketamine (Ketalar)

- “Special K”
- Intravenous anesthetic
- Post-operative pain management with an opioid
- Also used in veterinary medicine
- Many of the same effects as PCP
- Fewer negative effects
- Short-acting (20-60 minutes)

# Ketamine

- Addiction rare in U.S., More Common in Europe
- Heavy use →→→→→ Severe bladder infection/destruction

# Ketamine: Treatment of depression

- Single sub-anesthetic dose
- Provide relief for 1-2 weeks



# DXM

- Dextromethorphan
- In OTC cough medicines
- Often kept behind counter
- Robotussin DM
- Coricidin cough and cold = “Skittles”, “3-C”
- Similar to ketamine and PCP, but less intense effects except in large doses
- “Robotripping”

CANNABIS

# Cannabis

- Endocannabinoids
  - CB<sub>1</sub> CB<sub>2</sub>
- Marijuana
  - THC
  - CBD
  - Other cannabinoids
- Hashish
- Concentrates
  - Hash oil
  - Shatter
  - Wax



# Hash oil/BHO (Up to 90% THC)



# Hashish (Up to 65% THC)



# Shatter (Up to 90% THC)





# Wax (Up to 90% THC)



# Cannabis

- Effects:
  - Euphoria
  - Dreaminess
  - Introspective mood
  - Hilarity
  - Heightened perception

# Cannabis

- Effects (side):
  - Bloodshot eyes
  - Forgetfulness
  - Increased pulse
  - Dry mouth



# Cannabis

- Effects (undesired):
  - Confusion
  - Paranoia
  - Derealization
  - Depersonalization
  - Panic
  - Anxiety
  - Psychosis (rare)

# User-suggested warnings for legal marijuana

- Risk of harm to mental health and psychological functioning
- Risk of operating machinery while under the influence
- Short-term physical side effects
- Responsible use
- Long-term negative physical effects
- Dependence, addiction, or abuse.

# Cannabis

- Cannabis hyperemesis syndrome (CHS)
  - Vomiting
  - Abdominal pain
  - May be relieved by hot showers (?)



# Cannabis: Basics

- Addiction potential low to moderate
- Tolerance develops to some symptoms of intoxication
- Physical dependence withdrawal symptoms mild
- Immediate and long-term physical toxicity potential appears moderate to low
- Immediate psychiatric impairment potential low to moderate/chronic psychiatric impairment may be moderate for adolescents

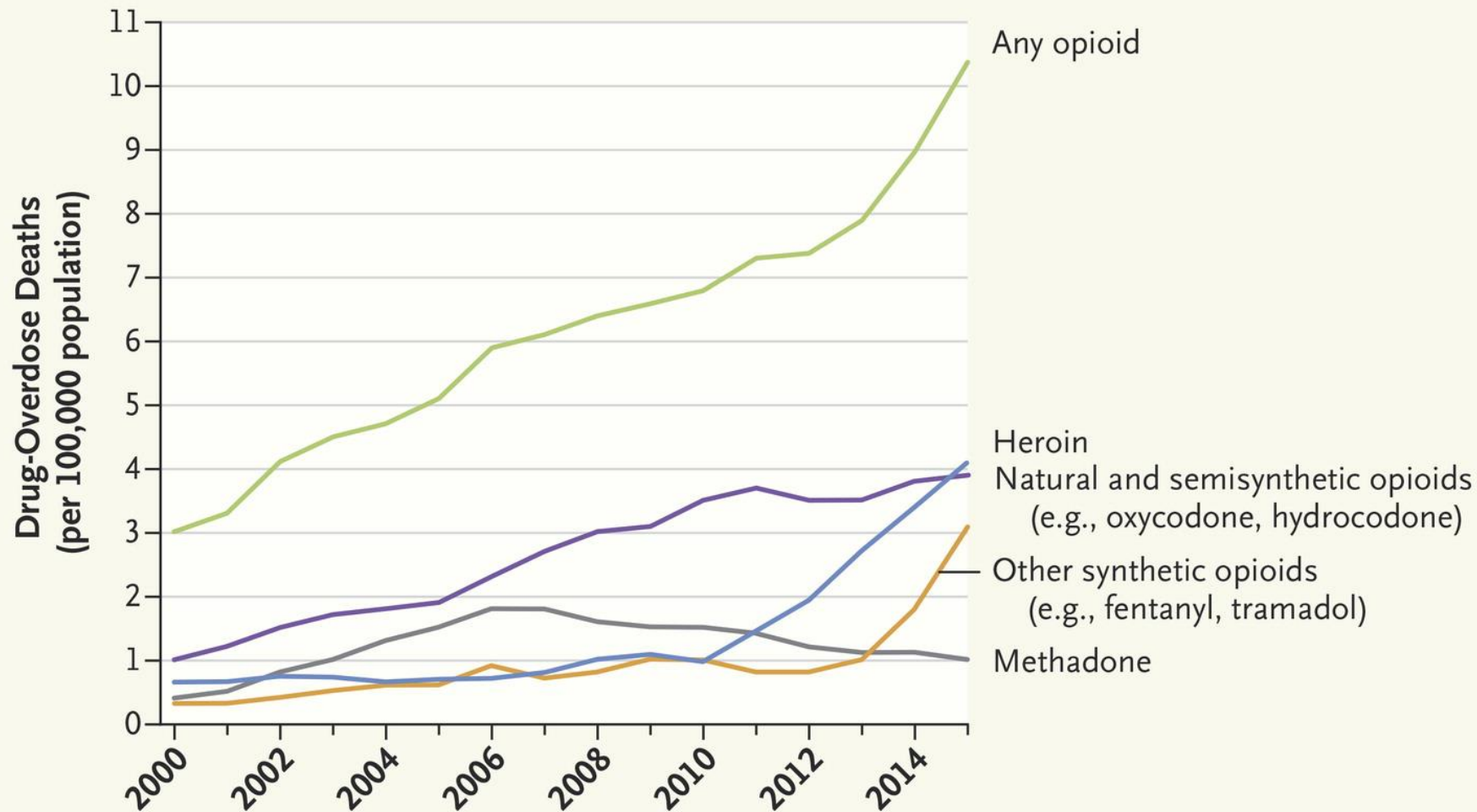
# Opioids: Basics

- Addiction potential high
- Tolerance develops
- Physical dependence withdrawal symptoms moderate to serious/not life-threatening
- Immediate physical toxicity potential (overdose) moderate to high
- Long-term physical toxicity potential low
- Acute and chronic psychiatric impairment potential low

# Opioids

- Heroin
- Hydrocodone/Vicodin/Norco
- Oxycodone (OxyContin/Percodan)
- Hydromorphone (Dilaudid)
- Oxymorphone (Opana)
- Fentanyl (Sublimaze)
- UR-47700
- Other synthetic opioids





# Opioids

- March 2016: Fentanyl found in “hydrocodone” and “oxycodone” tablets
- October 2015: Fentanyl found in fake Xanax tablets
- Prince had fake hydrocodone tablets containing fentanyl

# Opioids

- Heroin
- Hydrocodone/Vicodin/Norco
- Oxycodone (OxyContin/Percodan)
- Hydromorphone (Dilaudid)
- Oxymorphone (Opana)
- Fentanyl (Sublimaze)
- **UR-47700**
- **Other synthetic opioids (e.g., carfentanil)**



# Opioid effects

- Sedation (“nodding”)
- Euphoria
- Pain relief
- Constipation
- Constricted pupils

# Opiate Withdrawal

- Signs of w/d:
  - Drug hunger (craving)
  - Dilated pupils
  - Yawning
  - Lacrimation (eyes tear)
  - Rhinitis (runny nose)
  - Fever
  - Restlessness
  - Stomach, leg and back cramps

# Opiate Withdrawal

- Signs of w/d:
  - **Insomnia**
  - **Nausea**
  - **Diarrhea**
  - **Vomiting**
  - **Chills/cold flashes with goose bumps ("cold turkey")**
  - **Sweating**
  - **Leg spasms ("kicking the habit")**



# Opiate Withdrawal

- Signs of w/d:
  - Rapid pulse
  - Increased blood pressure
  - Anxiety
  - Depression
  - Muscle and bone pain

# CNS depressants

- Addiction potential moderate to high
- Tolerance develops
- Physical dependence withdrawal symptoms moderate to severe/life-threatening
- Physical toxicity (overdose) potential high/other immediate & long-term physical toxicity low
- Low potential for psychiatric impairment

# CNS depressants: Withdrawal symptoms

- Tremor
- Agitation
- Insomnia
- Sweating
- Elevated pulse and blood pressure
- Sensory hypersensitivity
- (Stomach cramps)
- (Nausea/vomiting)
- Seizures



# CNS depressants

- Addiction potential moderate to high
- Tolerance develops
- Physical dependence withdrawal symptoms moderate to severe/life-threatening
- Physical toxicity (overdose) potential high/other immediate & long-term physical toxicity low
- Low potential for psychiatric impairment

# Sedative-Hypnotics

- Barbiturates (Rare, but physically dangerous)
- Non-barbiturates
  - Ambien
  - Lunestra
  - (Rozeram)
  - Restoril (tenazepam)

# Benzodiazepines

- Xanax (alprazolam)
- Klonopin (clonazepam)
- Valium (diazepam)
- Ativan (lorazepam)



# Purple Drank

- Drank
- Syrup
- Sizzup
- Lean

# Purple Drank

- Codeine/promethazine cough syrup
- Mountain Dew/Sprit
- Jolly Rancher candy





# Purple Drank

- Codeine/promethazine cough syrup
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- Jolly Rancher candy

# Purple Drank



# Purple Drank

- May have originated as early as 1960s
- Popular in Texas in early 90s
- Spread through southern states, then nationwide
- Mentioned in rap and hip-hop music
- 2014: Justin Bieber



# Purple Drank

- Codeine: Opiate effect
  - Sedation
  - Pain relief
  - Euphoria
- Promethazine (Antihistamine):
  - Sedation
  - Potentiates codeine
  - May be more lethal than codeine

# Purple Drank

- Sometimes (less often) hydrocodone (Vicodin) cough syrup
- Cheaper “knock-off” version contains dextromethorphan (DXM)
  - Sedative in small doses
  - Dissociative anesthetic (like PCP) in high doses



**Sippin Syrup**





**Slow your roll**

**PURPLE DRANK**  
ima grip and sip



**WARNING!**

**THIS  
BEVERAGE  
MAY BE  
EXTREMELY  
RELAXING AND  
CALMING**



# Purple Drank

The Nutritional Supplement of Champions