COURSE REVIEW FOR FINAL
Psyhophsyiology of Addiction
Winter 2021

J. Randall Webber, MPH, CADC
JRW Behavioral Health Services
www.randallwebber.com

www.linkedin.com
Emerging Drugs of Abuse discussion group

ESSENTIAL ISSUES IN UNDERSTANDING STREET DRUG PHARMACOLOGY

- Psychoactivity
- Addiction
- Tolerance
- Toxicity
- Psychiatric Impairment
- Set and setting
- Substance misrepresentation/misidentification

CONTROLLED SUBSTANCES

- Schedules I-V
- Schedule I: High potential for abuse, tendency to produce dependence, no accepted medical use in US
- Schedules II-V: Potential for abuse, tendency to produce dependency, does have accepted medical application

DRUG NAMES

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

Potency, purity & misrepresentation of street drugs

- **potency** = strength, compared to some other drug of a similar type.
- **purity** = the major determinant of potency.
  - The more pure the drug, the more potent.
  - Street drugs are seldom pure, but are commonly misrepresented in one of three ways

DRUG MISREPRESENTATION

- **adulteration:** (to adulterate = to "step on"/"hit"/"dance on" "cut" a drug).
- **Substitution/misrepresentation-1:** None of the alleged drug is present, but another drug/drugs is/are.
- **substitution/misrepresentation -2:** None of the alleged drug is present, and neither is any other drug or active substance.

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

THE “RUSH” OR “FLASH”

A highly pleasurable sensation produced by the instantaneous effect of i. v. injection or smoking*

* If entire dose administered at once

METABOLISM AND EXCRETION

- The break-down of a drug into simpler substances
- The removal of the drug from the body

TOLERANCE

Homeostasis

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

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

TOLERANCE

- Effective dose (ED)
- Intoxicating dose (ID)
- Lethal dose (LD)

ADDICTION POTENTIAL

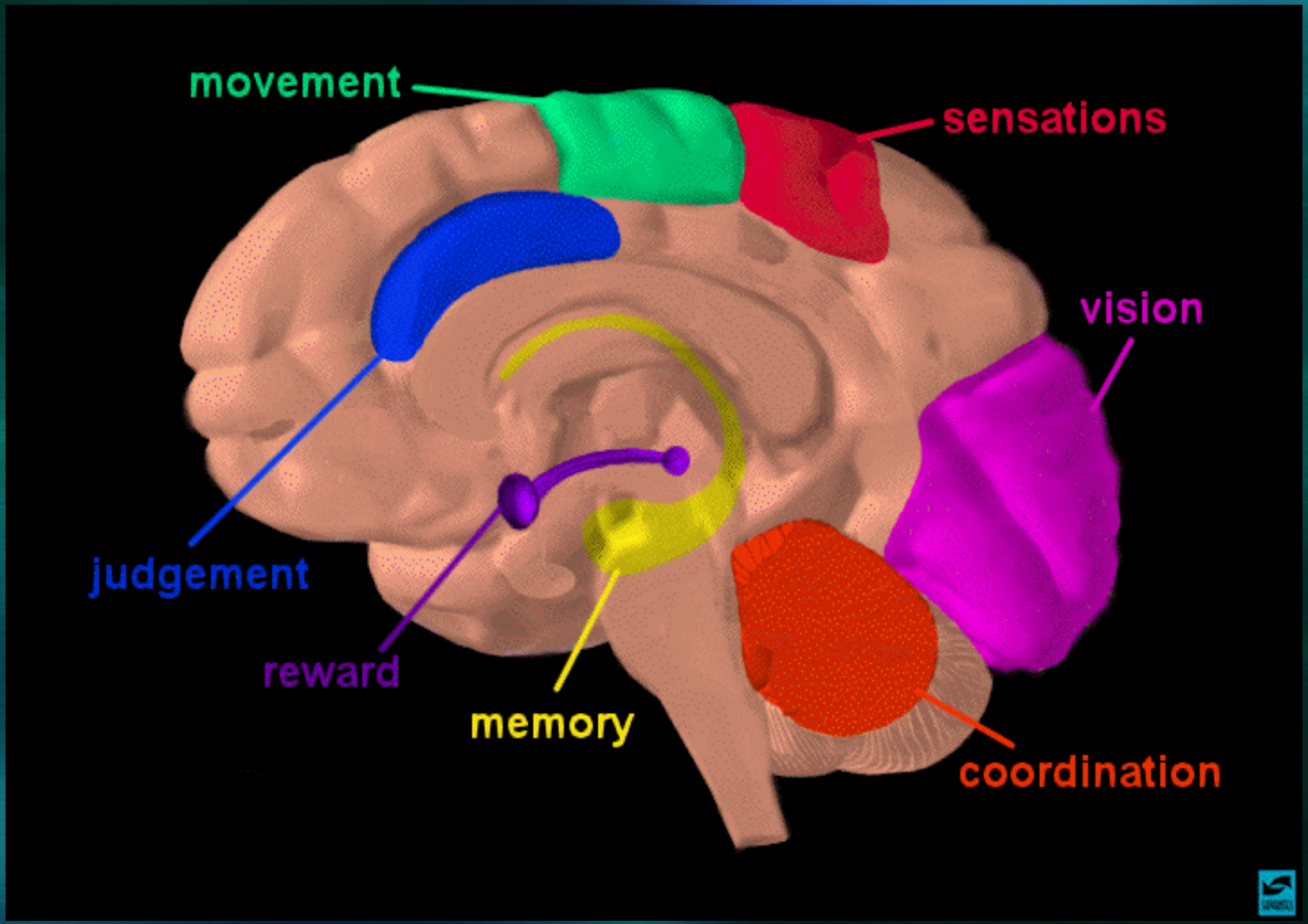
- What percentage of first-time users will enjoy the effect of the drug enough that they will seek it out again?
- If an individual uses the drug on a regular basis, how likely is it that s/he will become dependent on the substance?

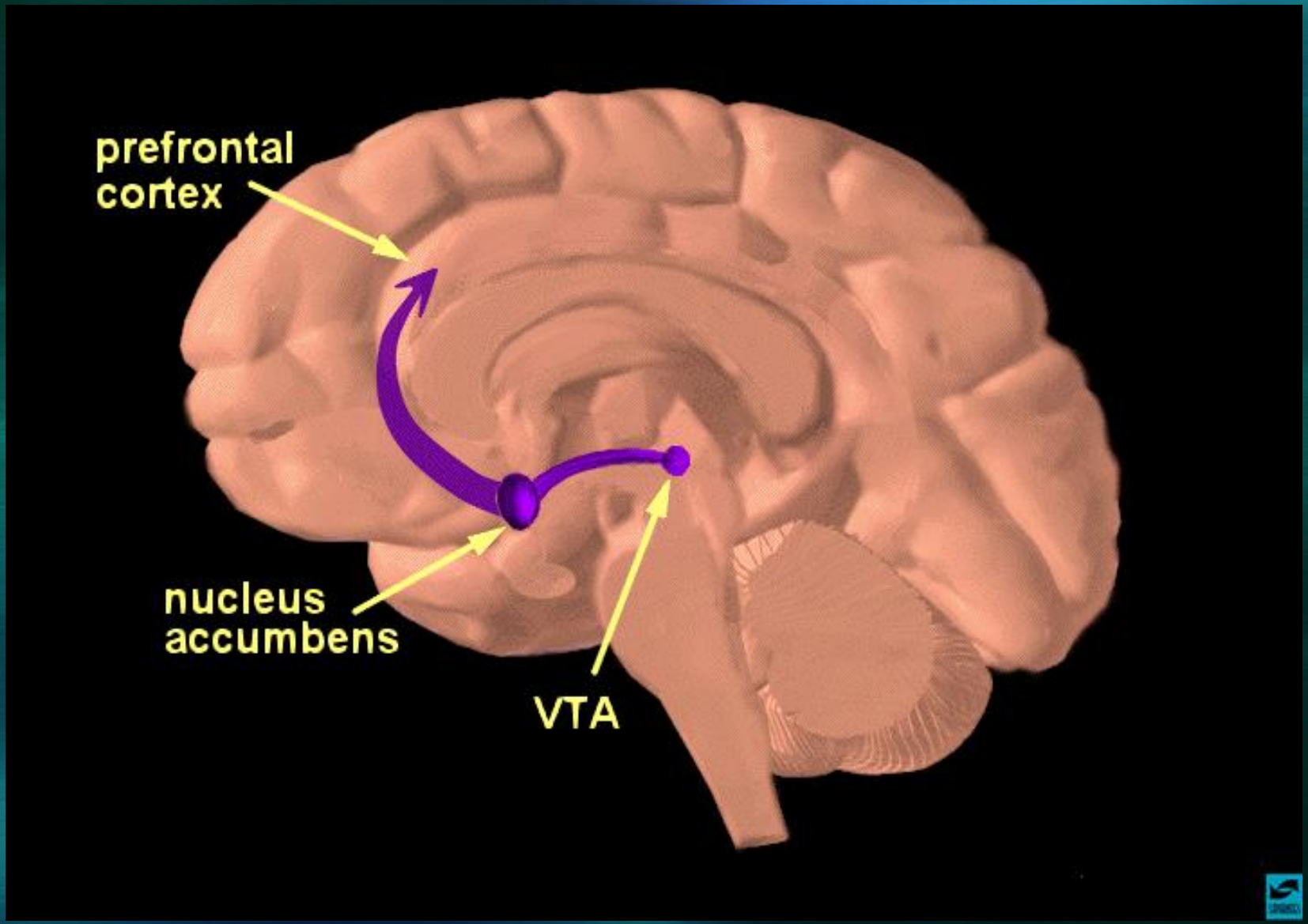
ADDICTION POTENTIAL

- 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

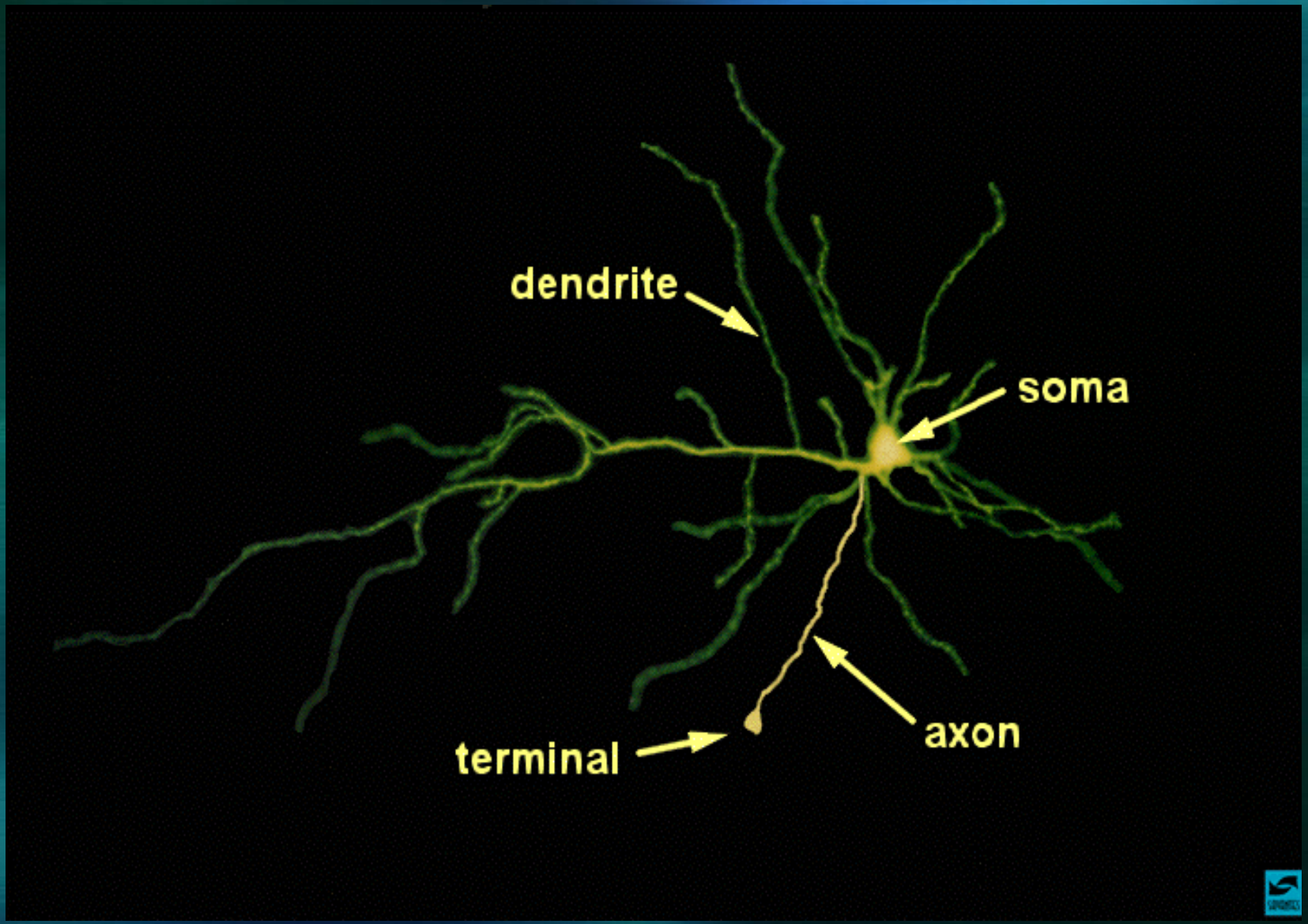
- Ability to stimulate the brain's reward circuits
- Ability to meet a individualized neurochemical need
- Physical dependency potential
- Intensity of withdrawal symptoms

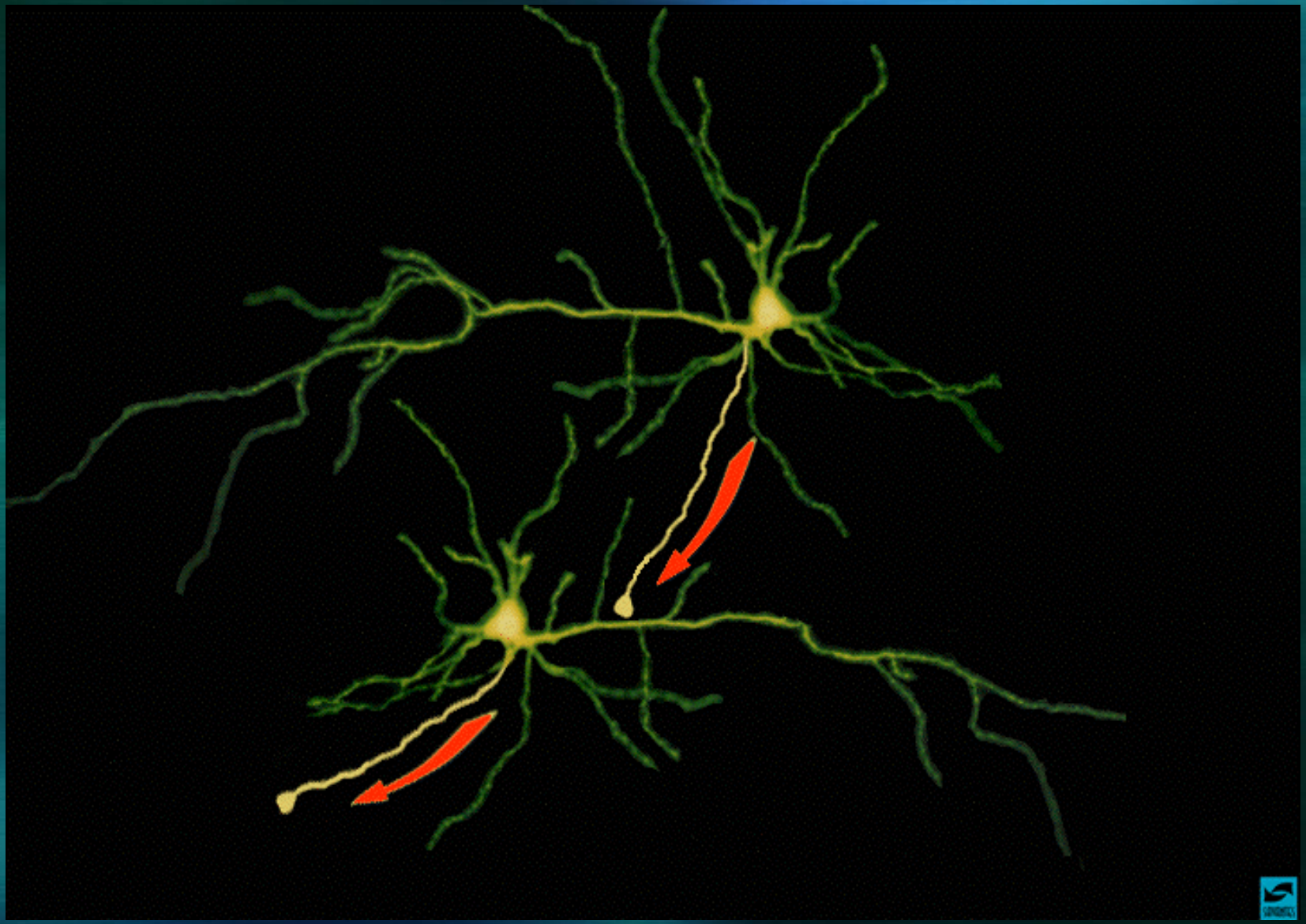

movement
sensations
vision
judgement
reward
memory
coordination

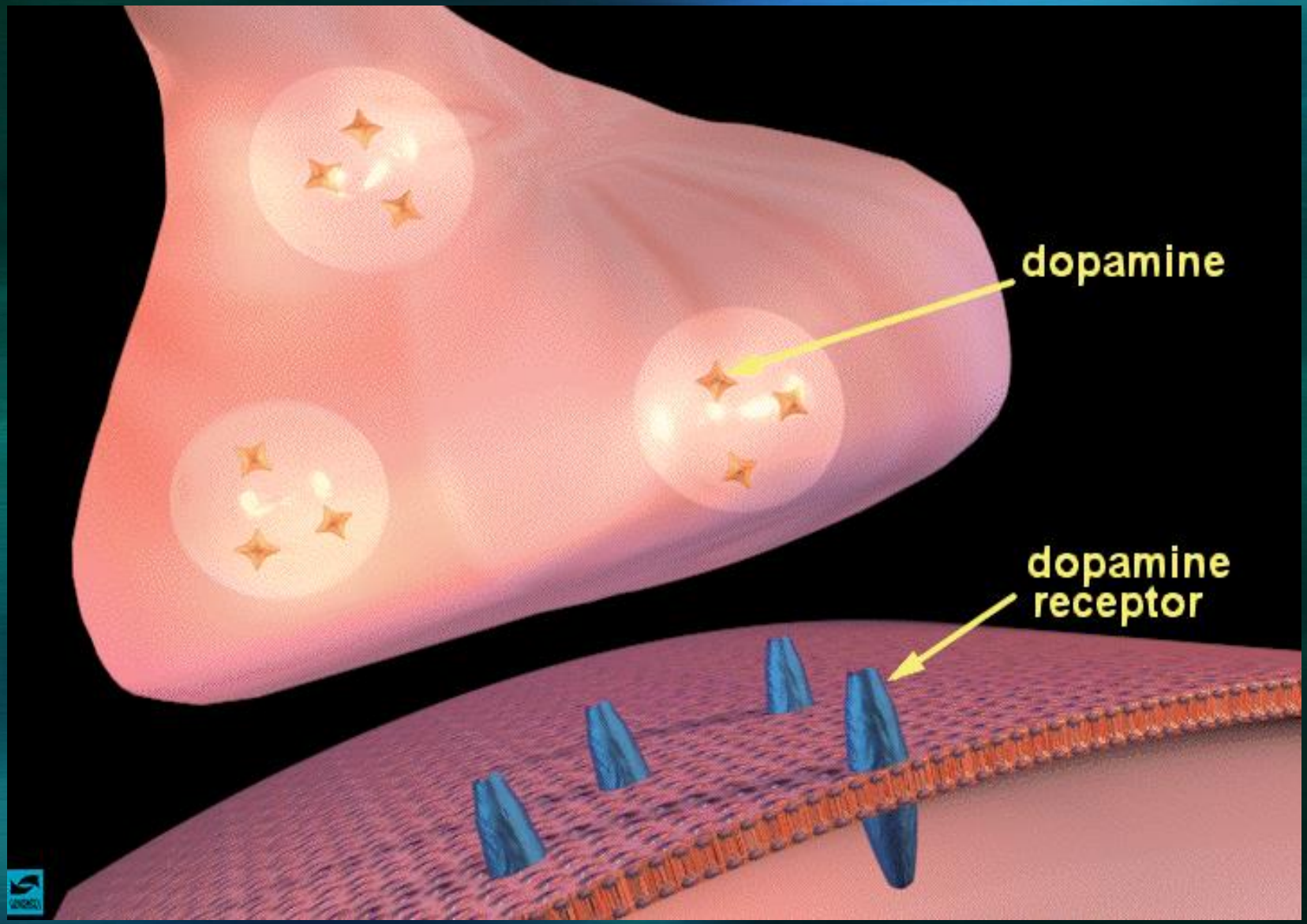

prefrontal
cortex
nucleus
accumbens
VTA

Neurotransmitters

- Serotonin (5-HT)
- Norepinephrine (NE)
- Dopamine (DA)
- Acetylcholine (Ach)
- Glutamate (GLU)
- Gamma amino butyric acid (GABA)
- N-methyl-D-aspartate (NMDA)


dendrite
soma
terminal
axon




dopamine
dopamine receptor

NEUROTRANSMITTERS

DRUG	NEUROTRANSMITTER
LSD	Serotonin
Methamphetamine	Norepinephrine
heroin	Endorphins

NEUROTRANSMITTERS

DRUG	NEUROTRANSMITTER
THC	Anandamide
PCP	Receptor site identified but not associated neurotransmitter

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

“Krokodil”:

A Media Rumor Runs Wild

A lesson in how to divert attention from real problems

Inhalants

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

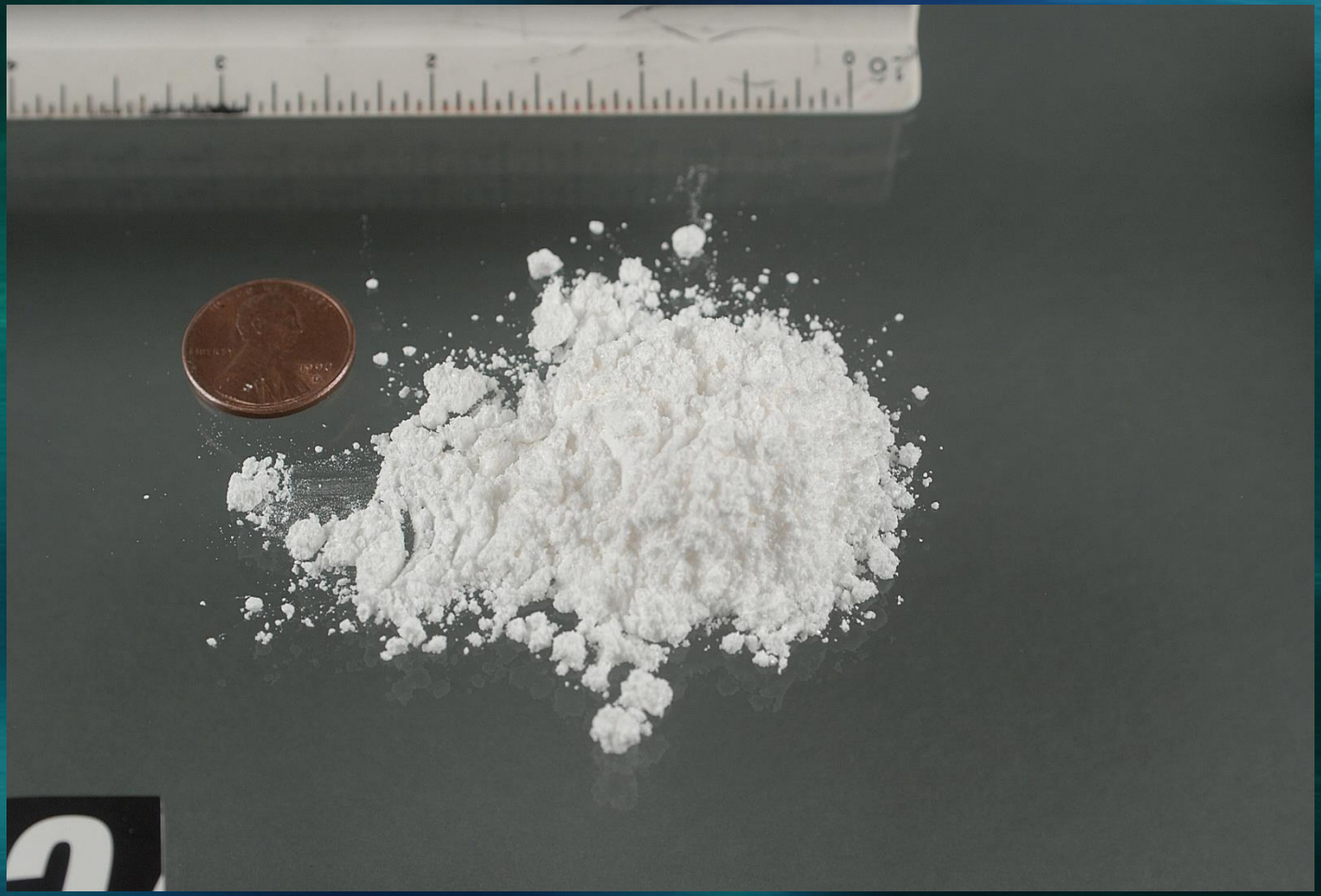
Stimulants

- 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

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*

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

Anticholinergics

Good golly Miss Molly
Who are you today?

- Pop quiz: What is “Molly”?

MDMA

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

Dissociative anesthetics

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

CANNABIS

Cannabis

- Endocannabinoids
  - CB_1 CB_2
- Marijuana
  - THC
  - CBD
  - Other cannabinoids
- Hashish
- Concentrates
  - Hash oil
  - Shatter
  - Wax

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)

Academies of Science, Medicine and Engineering Report on Cannabis

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

Cannabinoids

- Δ9-Tetrahydrocannabinol (THC)
- Endocannabinoids
- **Synthetic cannabinoids**

Synthetic Cannabinoids

“K2”, “Spice”, “herbal incense”, “synthetic marijuana”

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

Opioid effects

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

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**

Medication-Assisted Treatment

Medication-Assisted Treatment

Providing opioid agonist or partial agonist medication as an adjunct to psychosocial treatment in order to improve engagement, retention and outcomes.

Medications used to treat opiate dependency

- Methadone
- Clonidine
- Buprenorphine
- Naltrexone

Using Medication to suppport opiate dependence treatment

Methadone Misconception 1

- MAT clients are still addicted

- Truth: MAT clients will experience withdrawal symptoms if they stop taking methadone. However, withdrawal is not a diagnostic criteriuum when the client is taking opioids solely under medical supervision
- DSM-V requires at least 2 criteria out of a possible 11

Methadone Misconception 2

- Methadone is treatment

- Truth: Methadone is an adjunct to treatment ("**Medication-assisted** treatment").

Methadone Misconception 3

- Opiate dependence is a choice

- Truth: The decision to begin using opiates is a choice. Addiction is a disease.

Methadone Misconception 4

- Pregnant opiate addicts should discontinue use and detoxify via methadone taper
- Truth: Perinatologists/neonatologists recommend that pregnant addicts be maintained on methadone. Withdrawal from opiates may pose a risk to the fetus

PROFILE FOR POTENTIAL PSYCHOTHERAPEUTIC AGENT

- Effective after oral administration
- Long biological half-life (>24 hours)
- Minimal side effects during chronic administration
- Safe, no true toxic or serious adverse effects
- Efficacious for a substantial % of persons with the disorder

Medications used to treat opiate dependency

- Methadone
- Clonidine
- Buprenorphine
- Naltrexone

Reduction in death rate

Reduction of drug use

Reduction of criminal activity

Reduced spread of HIV

The methadone maintenance process

- Client is accessed for physical dependency (a requirement for methadone treatment)
- A starting dose is administered
- Client is observed for effects of starting dose
- Dose is increased if necessary
- Client participation in program is ruled out if low dose of methadone causes sedation

Methadone vs Heroin

Heroin	Methadone
Usually administered by injection of smoking	Administered by mouth
Rapid onset of action	Slow onset of action
Tolerance continuously increases	No continuing increase in tolerance levels after optimal dose is reached; relatively constant dose over time
Use is specifically for the sedating & euphoric effect	Client on stable dose rarely experiences euphoric or sedating effects

Methadone vs Heroin

Heroin

- Client
  - feels less physical pain
  - Has blunted emotions
  - Can not drive or perform daily tasks normally and safely

Methadone

- Client able to
  - Perceive pain
  - Experience have emotional reactions
  - Perform daily tasks normally and safely

Methadone vs Heroin

Heroin

- Short-acting: effect lasts 4-6 hours
- May produce medical consequences based on adulteration and method of administration

Methadone

- Long acting: prevents withdrawal for 24 hours, permitting once-a day-dosing
- At sufficient dosage, blocks euphoric effect of normal street doses of heroin
- Medically safe when used on long-term basis (10 years or more)

How is methadone better than heroin?

- Legal
- Avoids needles
- Known amount ingested
- Slow onset: no “rush”
- Long acting: can maintain “comfort” or normal brain function
- Stabilized physiology, hormones, tolerance

Summary

- Methadone:
  - is a safe medication when used properly
  - Does not cause intoxication if used appropriately
  - Is an adjunct to treatment
  - Blocks withdrawal symptoms/effects of other opiates
  - Reduces crime, death, HIV conversion & costs to society
  - Benefits the client, the community and the human services, child welfare and criminal justice system

Narcotic (Opiate) Antagonist

- A substance that has an anti-morphine effect, and that occupies but does not activate the opiate receptor site.
- Antagonists block the effects of opiates by binding to receptors without stimulating them

Types of Narcotic Antagonists

- **Full**: No agonist effect. Completely blocks opiate receptors
  - naloxone (Narcan)
  - naltrexone (Rivea)
- **Partial**: Agonist effect at low doses and an antagonist effect at higher doses.
  - Talwin (pentazocine)
  - Talwin-NX (pentozocine with naloxone)
  - Nubain (nalbuphine)
  - Buprenorphine

Buprenorphine

- Buprenorphine (Buprenex)
- Subutex® (buprenorphine sublingual tablets).
- Suboxone® (buprenorphine and naloxone sublingual tablets).
- Naloxone is not effective as an agonist unless it is injected
  - Guards against cooking and injecting Suboxone

However:
Buprenorphine is not always the best choice

- Individuals with more severe heroin habits (need methadone ≥ 100 mg)

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

Benzodiazepines

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

Kratom

Will be placed in Schedule I in November

The kratom controversy

- DEA says kratom is dangerous and should not be used by physicians in treating patients
- NIDA is studying kratom as a possible alternative to methadone
- Other researchers are also studying kratom
- All non-government research will stop when kratom is placed in Schedule I

Purple Drank

- Drank
- Syrup
- Sizzup
- Lean

Purple Drank

SALVIA:
No questions

WELCOME TO THE SCIENCE OF ALCOHOL AND ALCOHOL USE DISORDERS

ALCOHOL EQUIVALENTS

12 Oz. Beer @ 6% alcohol =

4 oz wine @ 12% alcohol =

1.25 oz spirits @ 80 proof (40%) alcohol =

1 oz spirits @ 100 proof (50%) alcohol

Absorption of alcohol

- small amounts of alcohol absorbed by the mouth
- most alcohol enters bloodstream from stomach, small intestine and colon
- rate of absorption dependent on gastric emptying time

Absorption of alcohol

- absorption delayed by presence of food in the small intestine

Metabolism of alcohol

- occurs primarily in the liver
- Proportionate to body weight
- A small amount of alcohol is detoxified by the microsomal enzyme oxidation system

Metabolism of alcohol

Alcohol

alcohol dehydrogenase (ADH)

Acetaldehyde-

acetaldehyde dehydrogenase (ALD-H)

Acetic acid (acetate)

CO_2 & H_2O

Metabolism of alcohol

- In heavy alcohol drinkers, liver enzymes will show an increase, especially:
  - SGOT (serum oxaloacetic tranaminase)
  - SGPT (serum glutamic pyruvic tranaminase)

Alcohol Flush Reaction

- facial flushing
- vasodilation
- tachycardia
- headache

Alcohol Flush Reaction

- nausea
- vomiting
- edema (fluid build-up/”water weight”)
- hypotension

Blood alcohol level (BAL)/Blood alcohol concentration (BAC) & Behavior

BAL	Behavior
0.05%	Relaxation, decreased inhibitions & alertness, possible personality change
0.08	Legal level in Illinois for DUI

Blood alcohol level (BAL)/Blood alcohol concentration (BAC) & Behavior

BAL	Behavior
0.10	Slowed reaction time, impaired judgment, personality changes
0.15	Large, consistent in reaction time, increasing intoxication, mood/personality changes

Blood alcohol level (BAL)/Blood alcohol concentration (BAC) & Behavior

BAL	Behavior
0.20	Significant impairment of sensory and motor functions, marked intoxication
0.25	Severe motor and sensory disturbance, staggering gait, marked intoxication

Blood alcohol level (BAL)/Blood alcohol concentration (BAC) & Behavior

BAL	Behavior
.30	Semi-stupor, marked decrease in awareness and breathing rate, blackouts
.35	Surgical anesthesia, level of LD_1, minimal level normally required to cause death

Blood alcohol level (BAL)/Blood alcohol concentration (BAC) & Behavior

BAL	Behavior
0.40	LD_{50}

- On average, fifty percent of drinkers with a blood alcohol level of 0.40 will die of alcohol poisoning.

“HE IS……”

WHAT ABOUT “SHE”?

SEX DIFFERENCES AND ALCOHOL INTOXICATION

IN GENERAL, AT THE SAME LEVEL OF ALCOHOL COSUMPTION, WOMEN ACHIEVE A HIGHER BAC THAN MEN

GASTROINTESTINAL (G.I.) SYSTEM: THE G.I. TRACT

- mouth
- esophagus
- stomach
- small intestine
- large intestine (colon)
- rectum
- anus

GATROINTESTINAL (G.I.) SYSTEM : ACCESSORY ORGANS

- salivary glands
- pancreas
- liver
- gallbladder

EFFECT OF ALCOHOL ON THE GASTROINTESTINAL SYSTEM

Responsible for:

- ingestion, digestion, absorption of food
- ingestion, absorption, and breakdown of some drugs
- the elimination of solid wastes.

EFFECT OF ALCOHOL ON THE GASTROINTESTINAL SYSTEM

- Esophagitis
- Peptic Ulcer Disease
- Hemorrhagic pancreatitis
- Uric acid elevation--- Gout
- Hyperglycemia
- Alcoholic hepatitis
- Gastritis
- Pancreatitis
- Pancreatic insufficiency
- Hypoglycemia
- Alcoholic fatty liver (hepatosis)
- Cirrhosis

ALCOHOL AND LIVER DISEASE

- Alcohol-induced liver disease (ALD) is a major cause of illness and death in the United States.
- Alcoholic fatty liver (hepatosis), the most common form of ALD, is reversible with abstinence.

EFFECT OF ALCOHOL ON THE RESPIRATORY SYSTEM

- Paralysis of cilia
- Fluid accumulates in the nose, pharynx, larynx, and vocal chords ("whiskey voice"/hoarseness)
- Lung/esophageal cancer

EFFECT OF ALCOHOLISM ON THE NERVOUS SYSTEM

- Compared to non-alcoholics, the brains of alcoholics:
  - contain fewer nerve cells, fewer connections among cells, less white and grey matter, and larger ventricles.
- This "cerebral atrophy" is associated with impairment of intellect.
- The underlying mechanism of brain damage appears to be a direct toxic action of alcohol on nerve cells

EFFECT OF ALCOHOLISM ON THE NERVOUS SYSTEM

Wernicke Korsakoff Syndrome

- Results from thiamin deficiency
- Disorientation
- Confusion
- Apathy
- Inattentivenss
- Nystagmus
- Gaze paralysis
- Retrobulbar neuropathy
  - transient blindness/spots in visual field

EFFECT OF ALCOHOLISM ON THE NERVOUS SYSTEM

Wernicke Korsakoff Syndrome

- Ataxia
- Korsakoff: Severe memory problems (retrograde and antegrade)
- Confabulation

ALCOHOL AND CANCER

- Mechanisms
  - irritation of cells
  - liver damage
  - nutritional deficiencies
  - carcinogenic congeners
  - interaction with tobacco (effect on lungs and inhibition of salivation)

ALCOHOL AND PREGNANCY

- **Women who consume two or more drinks per week while pregnant have a higher risk of spontaneous abortion.**
- **Most spontaneous abortions occur during the second trimester.**

Source: Harlap & Shiono (1980)

ALCOHOL AND PREGNANCY

- Drinking while pregnant increases the risk of stillbirth.
- Stillbirths can occur after heavy drinking in the last trimester.

FETAL ALCOHOL SYNDROME & FETAL ALCOHOL EFFECT

- Prenatal alcohol exposure is one of the leading known causes of mental retardation in the Western World
- Prenatal and/or postnatal growth retardation (weight and/or length below the 10th percentile);

STAGES OF ALCOHOL WITHDRAWAL:
Stage 1:

- Anxiety
- Agitation
- Hypertension
- Eating Disturbances (e.g., anorexia)
- Paroxysmal Sweats
- Tachycardia
- Hyperreflexia

STAGES OF ALCOHOL WITHDRAWAL:
Stage 1:

- Sleep Disturbances (e.g., insomnia/poor quality of sleep)
- Sensorium clouded (disorientation)
- Hyperthermia/Hyperpyrexia
- Tremor ("the shakes")

STAGES OF ALCOHOL WITHDRAWAL: Stage 2

- All of the signs of stage 1, but increased severity
- Begins within 48 hours of last drink
- Distinguishing feature is appearance of hallucinations
  - **Auditory, but may be visual**
  - **Usually non threatening**
  - **Patient/client usually has insight into their benign nature**

STAGES OF ALCOHOL WITHDRAWAL: Stage 3: Delirium Tremens ("DT's")

- An acute, reversible organic psychosis
- Usually begins after ~72 hours after the last drink
- Duration: two to six days
- All signs and symptoms listed in Stage 1, but greatly increased severity
- Hallucinations: may now include olfactory and/or tactile manifestations
  - **Hallucinations may be fused**
  - **Patient/client lacks insight into benign nature of hallucinations**

STAGES OF ALCOHOL WITHDRAWAL: Stage 3: Delirium Tremens ("DT's")

- Disorientation (person, place, time)
- Misidentification common
- Emotional Lability
- Anxious, fearful
- Depressed, apathetic
- Angry
- Euphoric
- Agitation often becomes more pronounced after sunset

USE OF MEDICATION TO TREAT WITHDRAWAL

- Administration of thiamin (100 mg/day) to avoid Wernicke Korsakoff syndrome
- Many patients/clients will need little or no additional medication during withdrawal
- Medication of withdrawal should not begin while the patient is at 0.15 BAL or above

USE OF MEDICATION TO TREAT WITHDRAWAL: Pharmaceutical Agents

- Alcohol is cross-reactive and cross tolerant with most commonly used, non-neuroleptic sedatives (tranquilizers and hypnotics). These include:
  - All of the benzodiazepines (Ativan, Xanax, Valium, etc.)
  - All barbiturates (phenobarbital, secobarbital/Seconal, etc.)
  - Most non barbiturate hypnotics (Dalmane, Placidyl, Doriden)

USE OF MEDICATION TO TREAT WITHDRAWAL: Pharmaceutical Agents

- Long acting benzodiazepines (chlordiazepoxide/Librium) are drug of choice
- Depends on patient characteristics:
  - Liver disease
  - Nausea and vomiting
  - Known potential for seizures
  - Pregnancy
  - Advanced age

The Genetics of Alcoholism

Rates of alcoholism among the relatives of alcoholics are significantly higher than among the relatives of non-alcoholics, with children of alcoholics showing a 3-4X greater risk of developing the disorder.

The Genetics of Alcoholism

- Cloninger and his associates have identified two types of alcoholism based on:
  - the biological parents' pattern of alcohol abuse
  - the degree to which postnatal environmental factors affect the inheritance of a susceptibility to alcoholism

Cloninger's Typology: Milieu-Limited (Type 1)

- predominates among female alcoholics and their male relatives
- characterized by:
  - loss of control over drinking after the age of 25
  - pronounced environmental reactivity to drinking

Cloninger's Typology: Milieu-Limited (Type 1)

- minimal criminality
- "passive-aggressive" traits
- high degrees of harm avoidance, reward dependence;
- low levels of novelty-seeking

Cloninger's Typology: Male-Limited (Type 2)

- predominates among male alcoholics and their male relatives
- less dependency on environmental factors
- more associated criminality
- personality traits are the opposite of the milieu-limited alcoholic

PRINCIPLES OF ADDICTION

The Public Health Triad

- Agent
- Host
- Environment

Principle of Homeostasis

The human body operates within certain physiological limits which act to maximize the potential for both immediate and long survival

Principle of Access:

For a substance to display psychoactive properties, it must be capable of crossing the blood-brain barrier and interacting with the human neurotransmitter system.

Principle of Adaptation

The relationship between a person and a psychoactive drug evolves dynamically as the body and the psyche change to incorporate the drug's presence or absence

Specification Principle

All drug-person interactions are potentially idiosyncratic

Risk Principles

- Drug experimentation decisions are influenced by the ratio between the potential benefits of using a drug and the potential risks of taking a drug.

Risk Amplification:

Combining drug consumption risk factors dramatically increases the potential for harm to self and others.

Dose-response Principle I

It is not possible to predict the effects of a particular drug without first defining the dosage of the drug that is to be ingested

Dose-response Principle II

The quantity of a drug consumed within a specified time is directly related to the magnitude of the drug response

Categories of Dosage

- Packaged dose
- Event dose
- Cumulative dose
- ED (effective dose)

Categories of Dosage

- ED (effective dose)
  - ED_1, ED_{50}, Etc.
- LD (lethal dose)
  - LD_1, LD_{50}, Etc.

Priming Dose

The quantity of a drug sufficient to move a particular person from sustained non-problematic to sustained problematic drug use

Principles of Purity and Adulteration

The untoward effects of a particular drug containing multiple and complex ingredients may be related, not to the drug's primary psychoactive ingredient, but to secondary ingredients or additives.

Principles of Purity and Adulteration

The risk associated with drug-taking can be either increased or decreased when the purity of the substance is altered

Potency Principle I

Throughout American history, our understanding of particular drugs has been confounded by the appearance of new and more potent forms of drugs with altered effects and addiction potential.

Potency Principle II

Any change in the potency of a known drug may require a parallel reevaluation of the drug's effects and addiction potential.

Drug Form Principle I

Changing the form of a drug can, by influencing dose, rapidity of onset, and duration of action, increase or decrease the drug's abuse potential

Drug Form Principle III: Analogues

Minor changes in the molecular structure of a drug can provoke devastatingly different effects

Speed of Onset Principle

Drugs with a rapid onset of action tend to have a higher risk of misuse than drugs with a slower onset of action

Duration of Effect Principle II

Short-acting drugs (Xanax, heroin) have the potential for more severe but shorter withdrawal than long-acting drugs (Librium, methadone, phenobarbital)

Speed of Elimination Principle

The risks of drug use are influenced by the length of time require to metabolize and eliminate the drug from the body

Method of Administration Principle I

Any alteration in a drug's method of administration may require a redefinition of the risks associated with use of the drug, including its addiction potential.

Method of Administration Principle II

In some cases, the route of administration is a potentially riskier factor than the effect of the substance being administered

Drug Interaction Principle I

Risks of untoward consequences from drug use arise in the transition from single drug use to multiple drug use

Drug Interaction: Planned Synergism I

The planned administration of two or more drugs to achieve an effect different than and greater than their independent effects

Drug Interaction: Planned Synergism II

The effects produced by combining psychoactive drug administration with a non-chemical but rewarding behavior may also require the re-evaluation of the drug's addiction potential

Drug Substitution Principle

Lack of access to one drug often results in drug substitution: the replacement of the preferred drug with a drug whose effects are similar.

Drug Prices Principle I

Any significant price reduction of a drug may increase its potential for misuse by engaging more vulnerable populations and by increasing dose per episode of use and dose per lifetime.

Drug Withdrawal Principle

Withdrawal symptoms associated with discontinuation of a particular drug are often the opposite of the signs exhibited during the period of intoxication.

Universality of Drug Effect

Although most drugs of abuse have idiosyncratatic actions, they also either directly or indirectly produce their effects through their interaction with a single brain pathway, the *mesolimbic reward system*

Principles Governing the Person-Drug Relationship: The Person (Host)

Species Effect Principle

The effects of psychoactive drugs differ significantly across species

Specification Principle

The effect of a psychoactive drug can not be specified without taking into account:

- Age of onset
- Gender
- Unique vulnerability

Intent Principle

One's motivation for using a drug shapes and defines the drug experience.

Developmental Windows of Vulnerability Principle II

Drugs cannot be defined in terms of their relative safety or abuse potential until their effects have been tested across the human life cycle

Adam's Rib Principle

All statements regarding drug effects and drug addiction need to be checked for gender validity

Principle of Addition

Personal vulnerability to the powers of psychoactive drugs increase when the individual discovers that the drug can add something (pleasure, energy, confidence, tranquility, people) to themselves or their life that is missing

Principle of Subtraction

Personal vulnerability to the powers of psychoactive drugs increase when the individual discovers that the drug can either hide or take away something (pain, boredom, shyness) that is undesirable

Principle of Initiating and Sustaining Factors

The factors that operate to sustain addiction are often quite different than the factors that contributed to the initiation of drug use

Set Vulnerability

The risk of a particular psychoactive drug cannot be calculated without reference to the beliefs, attitudes, and expectations the user brings to the drug experience

Set as a Control Mechanism

The use of a drug within a culturally-defined and established ritual is less likely to result in abuse and dependency, than use outside such sanctioned rituals

Principles Governing the Person-Drug Relationship: The Environment

Setting Vulnerability

The risk of a particular psychoactive drug cannot be calculated without reference to the physical and social environment within which the drug is to be used

Cultural Response

No culture is neutral about the psychoactive drugs in its environment. Cultures generally place psychoactive drugs in one of four categories

Cultural Categories

- Celebrated
- Tolerated
- Instrumental
- Prohibited

Cultural Response: Shifts in Categories

The movement of drugs from one category to another reflect not only changing knowledge about the drug but also changing cultural values

Cultural Vulnerability

Drug-related problems tend to rise within cultures whose norms are in rapid flux.

Drugs as Symbols

The culture that surrounds the drug may be more powerful than the drug itself.

Dormance, Emergence & Hibernation

A drug can lie dormant within a culture for generations before it breaks into the open as a favored intoxicant

Dormance, Emergence & Hibernation

Once they emerge, drugs may move through a stage of popularity into a period of sustained hibernation, only to re-emerge again as a major drug of abuse.

Drugs and War

Wartime conditions can spawn increased psychoactive drug consumption by

- bringing large numbers of adolescents and young adults into intimate social contact.

Drugs as Weapons

Intoxicants have a long role as weapons of interpersonal, political and economic exploitation

Technology and Drug Use

Technological innovation can spark changes in patterns of drug use and force a re-evaluation of the risks associated with use of a particular drug or class of drugs

Addiction as Iatrogenic Illness

Medicine has played a significant role in the spread of addiction in America. Nearly every drug of abuse, during its early introduction, was prescribed--in some cases indiscriminately--as a medical remedy.

Normalization Principle

One of the ways to introduce or expand drug consumption is to expand the range of benign places where the drug may be purchased and sold.

Image Manipulation

A drug's value can be enhanced with different groups by declaring it to be either a "natural" or "organic" drug with one group or a "synthetic" or "designer" drug with another

Trojan Horse

Drugs purported to cure or treat addiction often emerge later as drugs of abuse

Stages of a Drug Epidemic

- Most drug epidemics don't go away. They transform themselves into something else.
- Periods of excessive stimulant use are often followed by periods of excessive depressant use

The Red Herring

The use of exotic and illicit drugs that garner great public attention may mask fundamental changes that are occurring in the use of socially approved drugs

Myths that Kill

Initial reports of drug effects are notoriously unreliable and often embed myths within the culture that generate their own harmful effects

Backlash Effect

If certain risks of a particular drug as conveyed by mainstream institutions are not confirmed by experiences with the drug, then all risks portrayed for the substance are discounted

Popular Image of the Addict

There is often great incongruence between the popular image of the addict and the true profile of those who are addicted

Popular Image of the Addict

Our views about addiction are influenced primarily by our view of who's addicted.

Race, Social Class and Problem Definition

Racism, classism and sexism exert a powerful influence on the definition and enforcement of drug control policy