

OTHER CLASSES OF DRUGS

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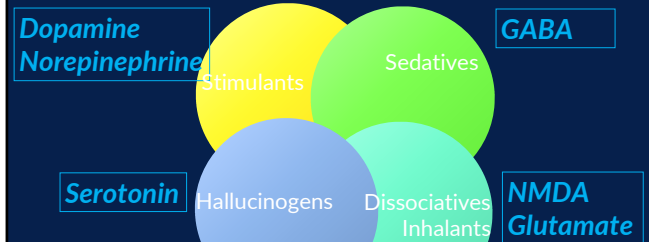
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Outline

- Hallucinogens
- Dissociatives
- Inhalants
- Anabolic-Androgenic steroids



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HALLUCINOGENS

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LSD and psilocybin are:

- A. Serotonin 5HT-2A receptor agonists
- B. Dopamine transporter reuptake inhibitors
- C. NMDA receptor antagonists
- D. Opioid mu-receptor agonists
- E. Cathinone derivatives

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Definition

- Produce alterations in thought, mood and perception
- Produce minimal autonomic side effects or craving
- Fail to produce excessive stupor or central stimulation



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"Illusionogen"

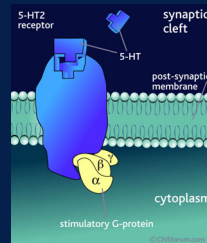
- Illusions = alteration or enhancement of existing sensory perception
- May be more accurate term
 - Reality testing is generally intact
 - Effect varies greatly with expectations and environment



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Classical Hallucinogens (Serotonergic Hallucinogens)

- 5HT_{2A} agonists or partial agonists
- 2 subclasses of arylalkylamines
 - Indolealkylamines (serotonin analogs)
 - Bind at multiple receptors (5HT_{2A}, 5HT_{2B}, 5HT_{2C}, 5HT_{1A})
 - Phenylalkylamines (norepinephrine analogs)
 - Fairly selective for 5HT_{2A}
- Not all arylalkylamines are hallucinogenic
 - Stimulants
 - Empathogens



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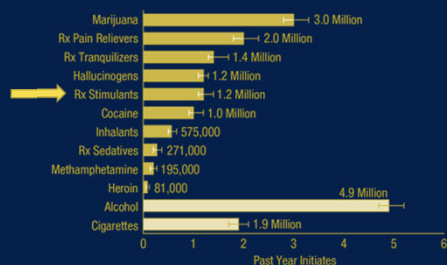
Effects of Hallucinogens

- Altered shapes and colors
- Synesthesia
- Alterations in mood (can be tension and anxiety)
- Distorted sense of time
- Difficulty expressing thoughts
- Depersonalization
- Dreamlike feeling
- Somatic
 - Dizziness
 - Weakness
 - Tremors
 - Nausea
 - Drowsiness
 - Paresthesias
 - Blurred Vision



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Numbers of Past Year Initiates of Substances among People Aged 12 or Older: 2017 NSDUH



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DMT

- DMT (N,N-Dimethyltryptamine)
- Prototype of this subclass of indolealkylamines
- Naturally occurring (plants, toad)
- Rapid onset (<5 min), short duration of action (30 min)
 - Inhalation (smoking) or injection (rare)
 - Can be taken orally, but requires MAOI



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Ayahuasca

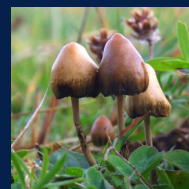
- Brew containing DMT, MAOIs, and other hallucinogens
- Used ceremonially in parts of the Amazon and in some Native American religions
- Legalized for religious use among Native Americans in the US



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Psilocybin

- Psilocybin → psilocin
- Found as naturally occurring tryptamine in certain varieties of mushrooms (shrooms, shrooming)
- Detachment from reality
 - Inability to discern fantasy from reality
 - Can lead to panic attacks, psychosis
- Rapid tolerance to effects
- Cross tolerance with LSD



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Psilocybin

- Reported mystical-like experiences
 - Inner peace, patience, optimism, self-confidence
- Adverse Effects
 - Nausea, vomiting, anxiety
 - May interact with MAOI
- Duration: 4-6 hours



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Lysergic acid diethylamide (LSD)

- Water soluble, clear white odorless crystals
- Thin blotter paper with dried solution of LSD
- Breath mints/sugar cubes ("dropping" acid), pressed into pills or thin gelatin squares
- Onset: 30-60 min, Peak: 2-4 hours, Duration: 8-12 hours
- Effects
 - Altered shapes and colors, heightened sense of hearing
 - Depersonalization, visual hallucinations, alterations in mood



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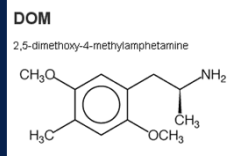
Mescaline/Peyote

- Use legalized within Native American Church
- Buttons from top (crown) of peyote cactus
 - 6-10 buttons for intoxication
- Slow onset (30-60 min)
 - First hour: minor perceptual changes, increased resp rate, nausea
 - Next several hours (5-10)
 - Visual illusions/hallucinations
 - Synesthesias



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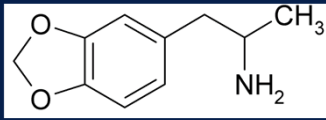
DOM



- Results from structural modification of mescaline-like substances
- Extremely potent
- Used as model hallucinogen in drug discrimination studies

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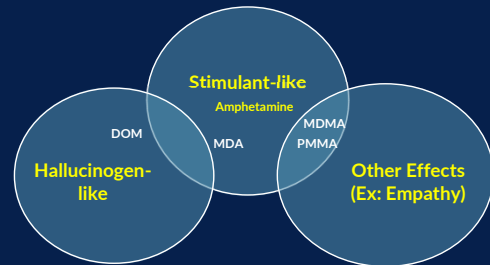
MDA



- Produces stimulant and hallucinogenic effects
 - Similar to combined effects of cocaine and LSD
- Can be modified to MDMA (ecstasy)
 - Stimulant effects
 - Empathogenic
- Has been represented and sold as MDMA

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Classification by Effect



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Salvia

- Herb found in southern Mexico and South America, used in healing rituals
 - Traditionally ingested by chewing / drinking juice
 - Sometimes smoked when used as drug of abuse
- Active ingredient in Salvia is salvinorin A, a kappa opioid agonist
- Varied legal status: Banned in 29 states



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Salvia Effects

- Intense and short-lived
 - Onset < 1 minute
 - Duration < 30 minutes
- Changes in visual perception
- Increased sense of well-being (or not)
- Feelings of detachment
- Modified perception of external reality and the self
 - decreased ability to interact with surroundings



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Summary: Hallucinogen Intoxication

- Clear Sensorium
- Intact Memory
- Hyperalert
 - EEG = arousal
- Intact reality testing
 - Can sometimes be reasoned with or calmed by talking
- Visual Hallucinations >> Auditory

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Hallucinogen Persisting Perception Disorder (HPPD)

- Re-experiencing of perceptual symptoms experienced while intoxicated following cessation of use = flashbacks
- Unrelated to dose or number of exposures
- Usually resolves within 1-2 years of last use
- Can be triggered by other substance use



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DISSOCIATIVES

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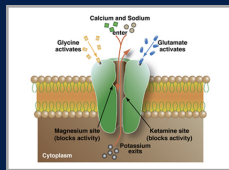
PCP and Ketamine are:

- A. Serotonin 5HT-2A receptor agonists
- B. Dopamine transporter reuptake inhibitors
- C. NMDA receptor antagonists
- D. Opioid mu-receptor agonists
- E. Cathinone derivatives

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Definition

- NMDA receptor antagonists
 - Glutamate activates NMDA receptors to filter sensory stimuli
 - Dissociatives noncompetitively block NMDA receptors → sensory overflow



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Members of the Class

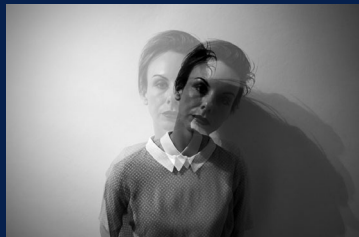
- Arylcyclohexylamines
 - PCP
 - Ketamine
- Dextromethorphan (DXM)
- Nitrous Oxide



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Effects

- Dissociation
- Sensory isolation
- Mental distortions
- Increased HR, BP, Temp



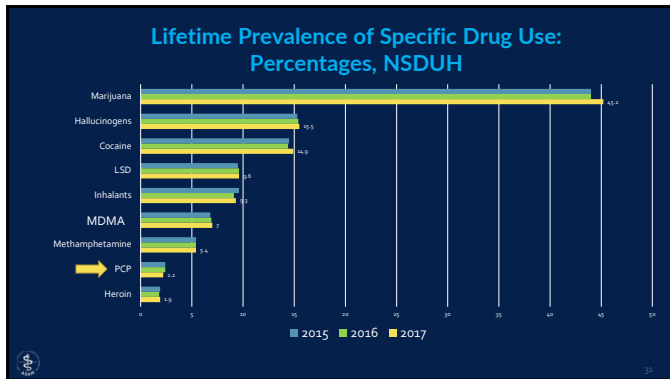
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Epidemiology

- Men > Women
- More common in large urban areas
- Often used in combination with alcohol or other illicit substances



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Phencyclidine (PCP, angel dust)

- Developed as IV anesthetic
- No longer FDA-approved; now Schedule I
 - Associated with prolonged delirium
- Risk of seizures or death
- Available as powder, tablets, liquid, and sprayed onto plant leaves and then smoked

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PCP Effects

- Vary widely with dose
 - Confusion, delirium, psychosis
 - ↓
 - Semi-coma and coma (less common)
 - ↓
 - Coma with seizures (rare)

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PCP

- Psychotomimetic = model of psychosis
 - Positive Symptoms (Delusions, hallucinations)
 - Negative Symptoms (Blunted affect, asociality)
- PCP Intoxication
 - Nystagmus (rotary, vertical, horizontal)
 - Hyperreflexia
 - HTN
 - Feelings of invulnerability
 - Management: low stimulus environment, benzos/antipsychotics as indicated

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Ketamine (K, Special K)

- FDA-approved for general anesthesia in animals and humans
- Schedule III
- Administered as IV or IM in medical settings
- Abused by inhalation, smoking, or oral administration
- Less potent, shorter-acting than PCP



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Effects of Ketamine

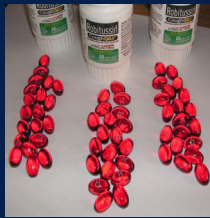


- Analgesia / numbness
- Spacey feeling ("K-hole")
- Amnesia
- Delirium (higher doses)
- Nystagmus (vertical and/or horizontal)
- CV + renal complications
- Long-term
- Dysphoria, memory impairment, apathy, irritability

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Dextromethorphan (DXM)

- OTC cough medicines
 - Capsules, tablets, lozenges, syrup
- aka "skittles"
- Anti-tussive dose: <120mg daily; recommended dose 10-20mg q4hours
- 300-1800mg produces PCP-like effects



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Effects of DXM

- Euphoria and hallucinations (increasing w/ higher dose)
- Drowsiness, dizziness, blurred vision, slurred speech
- N/V, hypertension, diaphoresis
- Significant serotonergic properties
 - ↑ serotonin synthesis and release
 - ↓ reuptake
- Deaths have been reported with large doses (200x dose)
 - CNS & respiratory depression, seizure, arrhythmias



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Summary:

Dissociative Intoxication & Overdose

- PCP included on most screening panels
 - Need special testing (GC-MS) for ketamine, DXM
- Increased serum CPK & urine myoglobin
- Rarely see dilated pupils
 - Different from stimulant or hallucinogen intox, opioid withdrawal
- Visual hallucinations relatively rare

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INHALANTS

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Many abused inhalants produce an intoxication that most closely resembles which of the following?

- A. Alcohol
- B. Cocaine
- C. Cannabis
- D. LSD
- E. Heroin

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Inhalants

- Breathable chemicals that can be self-administered
- Also known as
 - Whippets
 - Poppers
 - Huff
 - Bang
 - Kick
 - Sniff



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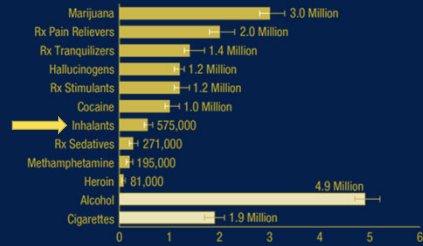
Terminology

- Sniffing = inhaling from an open container
- Huffing = holding fabric soaked in substance to the nose or mouth and inhaling
- Bagging = concentrating vapors in a bag and inhaling



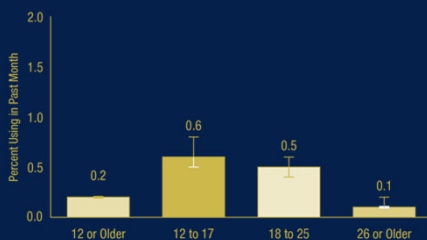
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Numbers of Past Year Initiates of Substances among People Aged 12 or Older: 2017 NSDUH



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Past Month Inhalant Use among People Aged 12 or Older, by Age Group: Percentages, 2017 NSDUH



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Sources of Inhalants

PRODUCT

- Air freshener
- Lighter fluid
- Household cleaners
- Gasoline
- Hair spray
- Mothballs
- Nail polish remover
- Paint thinner
- Markers
- Refrigerant
- Rubber cement
- Spray paint
- Video head cleaner
- Whipped cream canisters

POSSIBLE CONTENTS

- Amyl, butyl, cyclohexyl nitrite; butane
- Butane
- n-Hexane, tetrachloroethylene, xylene
- Benzene, toluene, xylene, (lead)
- Butane, propane
- Naphthalene, paradichlorobenzene
- Acetone, toluene
- Toluene, trichloroethylene, xylene
- Xylene
- Freon
- Acetone, benzene, n-Hexane, toluene
- Butane, propane, toluene
- Amyl, butyl, cyclohexyl nitrite
- Nitrous oxide



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Abuse Liability

- Number of factors increase abuse potential
 - Free or low cost
 - Readily available
 - Difficult to test for
 - Perceived as low risk
- Inquire about inhalant use, especially when working with adolescent population
- Provide education regarding consequences of use

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Inhalant Pharmacology

- Highly lipophilic
 - Rapidly absorbed through the lungs
 - Crosses blood-brain barrier
 - Accumulates in brain, liver and fatty tissue
- Rapid onset, short duration
- Synergistic effect: alcohol, benzos

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Effects of Inhalants

- Acute Effects
 - Euphoria
 - Disinhibition
 - Dizziness / lightheadedness
 - Slurred speech
 - Ataxia
- Toxic Effects & Overdose
 - Respiratory depression
 - Arrhythmias
 - Asphyxia, cardiac arrest and death can occur



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Chronic Effects of Inhalants

- Cardiac
 - arrhythmia
 - cardiomyopathy
- Pulmonary
 - emphysema
 - hypoxia
 - aspiration pneumonia
- Dermatological
 - perioral infection
 - Rash
- Gastrointestinal
 - hepatorenal failure
- Genitourinary
 - glomerulonephritis
 - hypokalemia
- Hematopoietic
 - aplastic anemia
 - leukemia
 - bone marrow suppression
- Musculoskeletal
 - Rhabdomyolysis
- Neurological
 - peripheral neuropathy
 - delirium/dementia
 - cerebellar atrophy
 - irreversible white matter changes



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Treatment Considerations

- User may experience prolonged residual effects because chemicals are stored in fatty tissue
- Neurological impairment is often present
 - Cognition should be continually re-assessed
 - Talk therapy / group therapy may not be appropriate



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STERIODS



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Which of the following is NOT a side effect of anabolic steroid use in women?

- A. Facial hair growth and male pattern baldness
- B. Voice deepening
- C. Breast atrophy
- D. Subfertility and menstrual disturbances
- E. Weight loss



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Anabolic - Androgenic Steroids (AAS)

- Anabolic = skeletal muscle-building
- Androgenic = masculinizing
- Includes testosterone and >100 related synthetic substances
- Schedule III as of 1990
- Can be legally prescribed
 - Steroid hormone deficiency
 - Loss of lean muscle mass (cancer, HIV)



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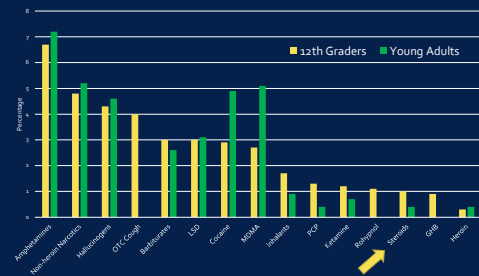
Misuse

- Enhance performance and/or improve physical appearance
 - May be taken at 10-100x the intended dose
- Routes of Administration
 - Oral
 - IM



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Annual Prevalence of Various Drugs for 12th Graders and Young Adults (18-25) by % using



2016
Monitoring
the Future

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Epidemiology

- 3 most common populations
 - Athletes
 - Performance enhancement
 - Aesthetes
 - Improve physical appearance (often adolescents)
 - Fighting Elite
 - Increase aggression and/or job performance (security, law enforcement)

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Steroid Side Effects

- Acne
- Liver damage
- ↑LDL, ↓HDL
- Complications of Injections
- Aggressive / violent behavior ("Roid Rage")
- Hypomania or Mania
- Paranoia
- Extreme irritability
- Women: Deepening of voice, facial hair, Menstrual changes, Male-pattern baldness, Genital hypertrophy
- Men: Testicular atrophy, Prostatic Hypertrophy, Gynecomastia, Baldness, Infertility

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Associated Syndromes & Treatment

- Steroid Withdrawal-Associated Depression
 - Can be responsive to SSRIs
- Comorbid SUD, especially opioids
- Body Dysmorphic Disorder / Muscle Dysmorphia
- Rarely seek treatment
 - Not euphorogenic; no immediate high
 - Goal is long-term reward associated with physical changes
 - May be seen as socially acceptable or positive

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Summary

- Diverse group of substances with relatively low prevalence, but high abuse liability
- Varied but significant effects from use and misuse, including long-term consequences

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THANK YOU
&
GOOD LUCK!



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