Psychoactive Substances
Student Interests
General Organization

- About
- Forms
- Availability
- Effects
- Overdose
- Withdrawal
- Tolerance
- Dependence

Henningfield & Benowitz Data
Resources

- Alcohol/Drug Help Line: 206-722-3700
- Alcohol Drug Teen Help Line: 206-722-4222
- Crisis Clinic (24-hour mental health crisis hotline): 206-461-3222
Methamphetamine
About Methamphetamine

- Stimulant
- Limited medical use: ADD, weight control, narcolepsy
- DEA: Schedule II drug
Methamphetamine Availability

- Historically existed as independent laboratories
- DEA: In 2001: 12,715 incidents reported; in 2012: 11,210
  - Clandestine Laboratory Incidents
  - National Clandestine Laboratory Register
- Reduction due to 2005 U.S. restrictions on OTC cold medications, Mexico restrictions
  - Production thought to be increasing as cooks find ways around the regulations (smurfing), some Mexico operations moving to U.S.
- ~$30-60/gram, depending on purity ("pure gram" price significantly higher)
- Purity has been reduced, perhaps due to regulation
Methamphetamine Forms

- Snorted, smoked, orally ingested, injected
Methamphetamine Acute Effects

- Intense high/euphoria
  - May last up to 12 hours (longer than cocaine)
  - Meth known for its dopamine-related effects (Meth Inside and Out clip)

- Comparison: meth vs cocaine (Brookhaven National Laboratory, 2008)

- Increased blood pressure

- Increased sensation of energy, alertness

- Higher dopamine levels than cocaine
Methamphetamine Chronic Effects

- Chronic users may experience hallucinations, rage, paranoia, heart inflammation, sores from "crank bugs"; body wasting, "meth mouth;" brain cell death; damage to dopamine-, serotonin-containing nerve cells.

- Flap’s Blog: video clip showing methamphetamine dental damage
- Video: World’s Most Dangerous Drug (National Geographic, via YouTube)
- Dopamine damage may result in similar symptoms seen in Parkinson’s disease
- Damage may at least partially return to normal, when meth use halted
- NIDA: Dopamine transporter number and time required for tasks
Methamphetamine Chronic Effects

Before & After Photos
Before and After Photos

3 Years and 5 months after starting meth

Meth Awareness Prevention Project: http://www.mappsdc.org/Faces%20of%20Meth.htm
Before and After

17 months after starting meth

Meth Awareness Prevention Project: http://www.mappsd.org/Faces%20of%20Meth.htm
Before and After

3 months later

Meth Awareness Prevention Project: http://www.mappsdo.org/Faces%20of%20Meth.htm
More Before and After Photos
Methamphetamine Overdose

- Dangerous increase in blood pressure
- Sweating
- Seeing spots (increased pressure in eye)
- Convulsions
- Heart attack
- Stroke

In 2008, hospitals reporting “stimulant”-mentioned (meth, amphetamine) ER cases: 107,575  
Source: DAWN
Methamphetamine Hospitalizations, 2002

Rates per 100,000 population:

- Boston: 15
- Atlanta: 23
- St. Louis: 24
- Denver: 29
- Los Angeles: 39
- Seattle: 46
- Phoenix: 65
- San Francisco: 91

Source: Drug Abuse Warning Network
Methamphetamine Tolerance, Dependence

- **Tolerance**
  - With chronic use, tolerance develops
  - Higher dose
    - Up to several 100 times greater than original dose *(Source: Merck)*
  - Increased frequency
  - Different administration

- **Dependence typically develops**
Methamphetamine Withdrawal

- Depression
- Fatigue
- Anxiety
- Paranoia
- Craving
- Process takes ~48 hours, extremely uncomfortable

- Uncovering Meth’s History and Spread
  - Portland, OR
  - Effects seen in law enforcement
  - Familial effects
  - Use trends
Which Substance is the Most Addictive?

- Depends on who you ask

- In 1990’s three researchers identified substance addictiveness ratings
  - Dr. Jack E. Henningfield
  - Dr. Neal L. Benowitz
  - Dr. Daniel M. Perrine

- Chart of Findings Source: druglibrary.org

- Henningfield-Benowitz Substance Comparison Charts (Editor B’s blog)
LSD
About LSD

- Hallucinogen
- Synthesized in 1930’s; derived from a fungus
- Very small amounts are very potent
  - Dose measured in micrograms
- Schedule I
About LSD

Albert Hoffman: “Last Friday, April 16, 1943, I was forced to interrupt my work in the laboratory in the middle of the afternoon and proceed home, being affected by a remarkable restlessness, combined with a slight dizziness. At home I lay down and sank into a not unpleasant intoxicated-like condition, characterized by an extremely stimulated imagination. In a dreamlike state, with eyes closed (I found the daylight to be unpleasantly glaring), I perceived an uninterrupted stream of fantastic pictures, extraordinary shapes with intense, kaleidoscopic play of colors. After some two hours this condition faded away.”
LSD Availability

- Available in all states
  - Typically, metropolitan/urban areas

- Produced in the US
  - Chemists vs independent producers
  - Recipes available
  - Infrequent production cycles (USDOJ)
    - Few labs are discovered and seized
    - Kansas, 2000 (decommissioned silo)

- Distribution highly confidential
- **Nick Sand** (National Geographic)
LSD Effects

- Increased heart rate, blood pressure, sweating
- Possible anxiety/panic
- Visual hallucinations (images, color, light)
- Altered perception of senses
  - “Seeing sounds, hearing colors”
  - Sound
  - Touch
  - Color, size of objects
- Altered perception of time, depth
LSD Forms

- Crystal can be crushed, mixed with other materials into tablets: microdots
- Gelatin squares
- Converted to liquid paper
  - Dosed onto sugar cubes
  - Placed on candy (gummy bears - Lake Tahoe, 2011, e.g.)
- Usually taken orally
  - Can be inhaled, injected, applied transdermally
LSD Acute Effects

- Extreme mood changes
- Nausea
- Impaired judgment
- Experiences can vary widely
  - Expectations, surroundings, pre-existing mental conditions, presence of other substances

**LSD experimentation on British soldiers**  
*Source: Youtube.com*

- LSD mechanism
  - Serotonin – sometimes serotonin receptors excited, sometimes inhibited
LSD Long-Term Effects

- Flashbacks (days/months after dose)
  - Cause unknown; may be due to use of other substances
  - Hallucinogen Persisting Perception Disorder
- Psychotic states among those with psychological disorders
- Apathy
LSD Overdose

- Possible
- No reported deaths
- LSD implicated in accidental deaths, suicides, murders, self-inflicted wounds
- In 2010: 3,817 emergency department cases (DAWN)
LSD Tolerance, Dependence, Withdrawal

- Tolerance
  - Tolerance does develop
  - Can abate after a few days of disuse

- Withdrawal: No evidence

- Dependence: While physical dependence is unlikely, psychological dependence can occur
Bath Salts
About Bath Salts

- Bath salts consist of a group of drugs with similar properties
- Drugs reportedly (DEA) originally derived from khat plant
- Synthetic
- Hallucinogenic and stimulant properties
  - Comparisons made with ecstasy, methamphetanime
- Fairly inexpensive vs other substances
- Schedule I – emergency basis, 10/11, at least one year
Availability of Bath Salts

- Currently popular in the US
  - Convenience stores
  - "Head shops"
  - Internet

- Bath salts have also increasingly been used in European Union

- Often manufactured in Asia
Acute Effects of Bath Salts

- Increased heart rate, blood pressure
- Agitation/irritability
- Paranoia
- Hallucinations
- Nausea/vomiting
- Dizziness
- Seizure
- Panic attack
Bath Salts: Forms

- Powder or crystal form, sold in plastic or foil packets, or bottles, tins, or similar containers
- Usually sniffed/snorted
- Can also be orally ingested, smoked, mixed with as a solution and injected
Bath Salts: Overdose

- (WA) State Places Emergency Ban on Bath Salts (KOMO video, October 3, 2011)

- At least 42 states have ban on cathinones (National Conference of State Legislatures, “Substituted Cathinones (a.k.a. “Bath Salts”) Enactments, 9/17/2012)

- Hallucinations can trigger bizarre behaviors
  - Pulling of body areas (hair off eyelashes, eyebrows) (NPR Staff, NPR, June 30, 2012)

- Huffington Post (2/20/12) – Intervention episode (ad)
Bath Salts: Tolerance, Withdrawal, Dependence

- An individual can become psychologically dependent on bath salts
- Information on tolerance and withdrawal is
Ecstasy
About Ecstasy

- Hallucinogen
  - Ecstasy also has stimulant properties
  - “Designer drug”
- MDMA synthesized in early 1900’s
- Popular at raves
- Schedule I
  - Multidisciplinary Association of Psychedelic Studies currently studying MDMA for PTSD
  - ABC report on PTSD treatment
Ecstasy Availability

- Ecstasy is manufactured across the world
- According to United Nations World Drug Report 2009, 72-137 metric tons were made for 12-24 million users
- Trafficked into US via organized crime
  - Major gateways include Miami, NY, LA
- World Drug Report: Netherlands, Australia, USA, Canada accounted for over 75% of world MDMA seizures
- Use of Ecstasy in 2008 (UNODC via flickr)
Ecstasy Effects

- Changes in mood
- Changes in perception (music)
- Fosters feelings of empathy, intimacy
- Increased heart rate, blood pressure, temperature
- Anxiety
Ecstasy Effects

- Confusion
- Depression
- Sleeplessness

Long-term effects:
- Mood disturbances
- Memory impairment
- Increased stroke risk
Ecstasy Effects
Source: www.eprom.pitt.edu/UL_media%5C686070483.ppt
Ecstasy Forms

- Most often available in pill form
- Capsule form
- Powdered
  - Dissolved in liquid, ingested directly, snorted, injected
Ecstasy Overdose

- May occur, especially when paired with rave environment
  - Physical activity
  - Heated room
  - Dehydration
  - Other psychoactive substances used

- Deaths have been reported

- Over 12,748 ED hospitalizations in 2007 (*DAWN*)
Ecstasy Tolerance, Dependence, Withdrawal

- **Tolerance:**
  - Research suggests tolerance quickly develops

- **Dependence:**
  - With increasing dose, positive effects decline
  - For some, MDMA may be physically addictive
  - Baboons and rhesus monkeys have been shown to self-administer *(Drugs and Human Behavior)*
  - Psychological dependence possible

- **Withdrawal:**
  - May include depression, anxiety, craving
Ecstasy in the Media

- HBO’s America Undercover: Small Town Ecstasy
- Available via YouTube in ten parts
Small Town Ecstasy

- **Part 1** (0-1:10, 6-7:45)
- **Part 2** (7:00-9:30)
- **Part 3** (7:02-9:50)
- **Part 4** (12:05-13:15)
- **Part 5** (4:30-6:15, 12:07-14:34)
- **Part 6** (Start-3:12)
GHB
Gamma Hydroxybutyric Acid
About GHB

- Depressant
  - Effects similar to Rohypnol; hallucinations also occur
  - “Date rape drug”
- Schedule I (prescription form is Schedule III)
Availability of GHB

- Found in human body (central nervous system) in small quantities
- Manufactured in clandestine labs in US and abroad
  - Contents can vary dramatically
- Can be used to treat narcolepsy
  - Reportedly, GHB helps muscle weakness associated with the condition
    - Xyrem is FDA-approved prescription medication
Acute Effects of GHB

- Euphoria
- Drowsiness
- Dizziness
- Nausea/vomiting
- Respiration depression
- Amnesia
- Loss of consciousness, especially when mixed with alcohol
- Anabolic effects (bodybuilder use)
- Possible weight loss
GHB: Forms

- Clear liquid
- Powder
- Tablet
GHB: Overdose

- Loss of consciousness
- Respiratory arrest
- Coma
- Death
GHB: Tolerance, Withdrawal, Dependence

- Withdrawal: insomnia, tremors, increased heart rate & blood pressure, anxiety

- Individuals who take GHB regularly (“round the clock”) can suffer from serious withdrawal symptoms

- Tolerance can develop

- Psychological dependence can develop


Cannabis
About Cannabis

- Cannabis sativa
  - Different subspecies/varietals used for clothing vs drug use
- DEA: Schedule I substance
- Despite state regulations, marijuana possession is federally illegal
About Cannabis

- State governments approving medical marijuana: 18
- Alaska (98)  Montana (04)
- Arizona (10)  Nevada (00)
- California (96)  New Jersey (10)
- Colorado (00)  New Mexico (07)
- Delaware (11)  Oregon (98)
- Hawaii (00)  Rhode Island (06)
- Maine (99)  Vermont (04)
- Michigan (08)  Washington (98)
- Washington, DC (10)

- Colorado & Washington state approved recreational marijuana in 2012

Source: procon.org
Cannabis Availability

- Everywhere
- Mexico & Canada significant suppliers
- Top cultivators: Afghanistan (CNN)
- 660kg seized in US during 2008 (highest since at least ‘86)
Cannabis Effects

- Euphoria (acts on dopamine)
- Relaxation
- Appetite changes
- Memory, concentration challenges (hippocampus)
- Altered coordination, reflexes
- 1960’s research (film clip from, “Grass,” via YouTube)
- Chronic effects include respiratory distress, mood swings, impaired memory and cognitive abilities esp. among young people (hippocampus damage)
- 2011 NIMH/NIDA study: daily marijuana use may reduce brain receptor number, though receptors regenerated after cessation
Cannabis Forms

- Marijuana
  - Flowers, stems, seeds, leaves of cannabis shredded and smoked
- Hashish - made from resin in glands of cannabis
  - Hashish oil - concentrated THC, derived from hashish
Cannabis Overdose

- Difficult to overdose on cannabis
  - Amount required to cause death very large
  - Smoking too much - sleepiness
  - Eating too much - nausea, vomiting

- **Humor** - Q13 Fox News

- Cannabis mentioned in 2008 ER visits: 290, 563
  - Mostly due to unexpected reactions *Source: DAWN*
Cannabis Tolerance, Dependence, Withdrawal

- Tolerance: can develop
- Withdrawal: Insomnia, restlessness, irritability among long-term users
- Dependence: Generally thought to be psychological
  - 1997 SAMHSA data re dependence
About PCP

- PCP manufactured in clandestine labs
- PCP intended to be produced as an anesthetic, but not approved for humans due to psychological effects
- PCP was popular in the 1970s
  - The drug associated with people jumping out of windows to their deaths
- Extraordinarily large PCP bust in L.A., CA area, 2012
- Schedule II
Availability of PCP
PCP: Acute Effects

- Sense of detachment from self
- Auditory hallucinations
- Mood changes
- Coordination impairment
- Involuntary changes in eye movements
PCP Forms

- Smoked
- Injected
- Oral administration
- Snorted/sniffed
- Added to marijuana (“wet”)
PCP: Overdose

- Hallucinations are more intense, longer in duration
- Erratic behavior/disturbances of the peace
  - YouTube video clip – arrest of “Steve”
- Psychotic behavior
  - Camden, NJ, 2012
  - Death of 6-year old boy (September)
  - Mother kills two-year old child (August)
- Death
- 37,266 emergency department visits in 2008 (Drug Abuse Warning Network)
PCP: Tolerance, Withdrawal, Dependence

- According to Center for Substance Abuse Research (CESAR), there is little human research conducted to determine tolerance
- Withdrawal may develop (little research)
- Psychological dependence may occur
Heroin
Cocaine
Cocaine

- Extracted from coca plant
- Meeting Cocaine Farmers (BBC)
- Stimulant
- Schedule II drug
About Cocaine: Some History

- In late 1800’s was prescribed by US physicians

- **Coca-Cola** had cocaine removed in early 1900’s

- Cocaine **wine** was available

Image is in the public domain
Cocaine Forms

- Powdered form
  - Snorted
  - Dissolved in water, injected
- Processed in rock form
- Generally, the faster a drug can enter the brain, the more it will be abused
Cocaine Availability

- According to DEA, second most commonly used illegal substance
  - In WA, 604 kg of cocaine were seized in 2005
  - Marijuana: 9873kg, heroin 8.2kg, meth 74.4kg

- South America is primary production source
  - Other countries involved with transportation
  - UNODC: [Global Cocaine Production](#) (Figure 21; p. 66)
  - UNODC: Map 6; page 70

- Most cocaine enters US via Mexico
Cocaine Availability - Price

- Price depends on purity (50-70%), form of cocaine, amount purchased, region, $10-200 (crack vs cocaine, wholesale vs retail)

- UNODC: [Table 9, page 71](#)
Cocaine Effects

- Increased heart rate, blood pressure, temperature
- Improved mood, well-being
  - Short-lived (few minutes to few hours)
- Increased sensation of energy
- Chronic users may experience bloody noses (damage to septum), brain adaptations to cocaine-induced dopamine effects, compromised immunity
- **Brain changes**, even after halting use (Univ. of Utah; scroll to mouse)
- Lesions and clots in brain blood vessels
- Relationship between cognition & therapy dropout
Cocaine Overdose

- Seizures
- Heart attack
- Stroke
- Kidney failure
- Death

- In 2010, cocaine-mentioned ER cases: 488,101  
  Source: DAWN
Cocaine Withdrawal

- Apathy
- Fatigue
- Depression/mood swings
- Cravings for drug
- Not as intense as withdrawal from heroin, alcohol
- Post acute withdrawal syndrome (PAWS)
Cocaine Tolerance, Dependence

- Tolerance may occur quickly
- Emphasis appears to be on psychological rather than physical dependence
- Rats and self-\textit{administration} (reinforcement)
Hallucinogenic Mushrooms
About Mushrooms

- Psilocybin/psilocin are two active psychoactive substances found in “magic mushrooms”
  - Couple dozen species
- Recognized for centuries
  - Probably used in religious rites
- Hallucinogen
- Schedule I
Availability of Mushrooms

- Available across US, though primarily western and central states
- Independent growers may cultivate mushrooms from kits
Mushrooms: Forms

- Psyilocybin/psilocyn mushrooms pictured
- Other hallucinogenic mushrooms
- Oral ingestion
Effects of Mushrooms

- Relaxation
- Provides an altered perception of reality (typically shorter “trip” than LSD)
- Altered perception of time
- Sense of connection to others/universe
- Visual hallucinations (images, color, light)
Effects of Mushrooms

- Anxiety, mild increases in heart rate, blood pressure & breathing
- Thought to act on serotonin receptors
- Experiences can vary widely
  - Expectations, surroundings, pre-existing mental conditions, presence of other substances
- The wrong mushroom can be toxic (death caps)
  - "All mushrooms are edible, but some only once." -- Croatian Proverb
Long-Term Effects of Mushrooms

- Since hallucinogenic usage usually not frequent, long-term effects seldom occur
  - May cause anxiety/panic attacks
  - Paranoid delusions
- Psychosis among those with pre-existing psychological disorders
Mushrooms: Overdose, Tolerance, Dependence, Withdrawal

- **Overdose**: No known reports
  - Among “miscellaneous” hallucinogen emergency room reports: 4,839 in 2007 *(DAWN)*

- **Tolerance**:  
  - Tolerance does develop  
  - Can abate after a few days of disuse

- **Dependence**: physical dependence unlikely; psychological dependence can occur
OxyContin
About OxyContin

- Brand name for drug oxycodone
- Narcotic
  - Pain (moderate-serious) reliever
  - Released over time (so effects last longer)
  - Tablet should not be chewed, else time release is lost, risking overdose
- Schedule II
OxyContin Availability

- In the last several years, availability has declined due to distribution control
- Prescription drug
- “Doctor shipping”
- According to 2004 federal government “Pulse Check,” Seattle among 15 of 25 cities where OxyContin has become a problem
- $5-12 for 10mg, $60-100 for 160mg
OxyContin Effects

- Pain relief
- Euphoria
- Drowsiness
OxyContin Forms

- OxyContin found in pill form

- Pill can also be crushed, snorted, injected
  - Increases risk for overdose
OxyContin Overdose

- Severe respiratory depression (slowing)
- Death
- In 2004, 36,559 OxyContin emergency room references
OxyContin Tolerance, Dependence, Withdrawal

- Tolerance: Tolerance does develop
- Withdrawal: OxyContin dose needs to be reduced gradually
  - Restlessness
  - Muscle pain
- Dependence: Physical and psychological addiction can develop
Gamma Hydroxybutyrate (GHB)
About GHB

- GHB used to be legal
- Developed because of sedative properties, but no analgesic effects
- Used to be sold in “health food” stores to help with fat loss, muscle gain
- When negative reports appeared, FDA declared GHB as unsafe, ~1990
- Depressant
- Often referred to as a “date rape” drug
- Schedule I drug
GHB Availability

- Reports across states differ: low to high availability
- Manufactured in the U.S., other countries in clandestine laboratories (DOE Higher Education Center for Alcohol, Drug Abuse and Violence Prevention)
GHB Effects

- Drowsiness/sleepiness
- Euphoria
- Memory impairment
- Muscle relaxation
- Confusion
- Loss of balance
GHB Forms

- Ingestion: clear liquid, or powder dissolved in liquid
GHB Overdose

- Nausea, vomiting; loss of consciousness; hallucinations; amnesia
- Since the threshold between the dose required to create high and dose causing loss of consciousness is small, overdose risk is high
- Concentrations can vary
- 2,207 ED visits in 2007 (*DAWN*)
GHB: Tolerance, Dependence, Withdrawal

- According to Center for Substance Abuse Research (CESAR), tolerance can develop with continued use
- Traditional physical withdrawal symptoms: anxiety, shaking, confusion
- Psychological dependence can occur; according to CESAR, may be unexpected
Dextroamphetamine (Adderall)
About Adderall

- Stimulant
- Works on dopamine and norepinephrine
- Used as prescription for ADHD, narcolepsy
- Some abuse Adderall for its performance-related effects
- 60 Minutes program, April 2010
- Schedule II
Adderall Availability

- Readily available across U.S.
- $5-10 per pill
Adderall Prescriptions, by Year (U.S. Department of Justice)
Adderall Effects

- Increased alertness
- Euphoria
- Self-assuredness
- Increased heart rate, blood pressure
- Emotional changes
- Weight loss
- Stomach discomfort (nausea, cramps)
- Long-term effects are not yet known
Adderall Forms

- Tablet (5-30mg)
- Time release capsule (10-25mg)
Adderall Overdose

- According to Dailymed (*National Library of Medicine*), traditional symptoms can develop: anxiety, confusion, restlessness
Adderall: Tolerance, Dependence, Withdrawal

- Tolerance may develop
- Physical withdrawal symptoms typical (anxiety, fatigue, mood changes)
- Detoxifying from the drug should occur gradually
- Psychological dependence (craving) can develop
About Heroin

- Narcotic
- Synthesized from morphine in late 1800’s
  - Morphine synthesized from opium poppy
  - Heroin 10x more powerful than morphine
  - Was thought to be less addictive
  - After many people became addicted, heroin was outlawed in 1920’s
- Drug Ads (wings.buffalo.edu)

- Schedule I
Heroin Availability

- Produced largely in Burma/Myanmar, Afghanistan, Mexico, Colombia
  - 5,644 metric tons from Afghanistan in 2006 (WA Post)
- Routes, methods of transportation depend on origin
- US heroin increasingly obtained from South America, Mexico
  - CIA map
- Costs vary across US (Asian vs Mexican heroin)
  - $15K-$250K per kilogram
Heroin Availability

- DEA reports most heroin in US comes from Mexico
- At left, estimates of heroin production in Mexico, metric tons (USDOJ)
Heroin Forms

- Pure heroin is white
- Most is darker
  - Additives
  - Impurities
- Injection, smoking, snorting
Heroin Effects

- Euphoria
- Slow, shallow respiration
- Analgesia
- Stupor
- Long-term effects: collapsed veins, respiratory problems
Heroin Overdose

- Frequently occurs when mixing with other substances
- In 2008, heroin-mentioned ER cases: 189,780 Source: DAWN
Heroin Tolerance, Dependence, Withdrawal

- With regular use, tolerance develops
- Dependence is both physical and psychological
- Withdrawal symptoms can be severe
  - Craving
  - Restlessness, insomnia
  - Pain
  - Diarrhea
  - Vomiting
  - Can be fatal among heavy users
- Methadone can be used to treat withdrawal
Formaldehyde

Embalming Fluid
Embalming Fluid Availability

- Can be purchased online
- Available on the street; according to NY Senate website, $20 per dipped cigarette
Formaldehyde Forms

- Liquid form
- Cigarettes, marijuana dipped into embalming fluid
- PCP may also be added
Formaldehyde Effects

- 2010 New York legislation after vehicular accident causing injured person to lose leg

- Southern Fried Stings
Formaldehyde: Tolerance, Dependence, Withdrawal
Rohypnol
About Rohypnol

- Depressant
- ‘Low-cost’
  - $5/tablet
- “Date Rape” drug
- Legally available as a sedative in many countries (not US)
- Schedule IV
Rohypnol Effects

- Oral ingestion, snorting, injection
- Frequently combined with alcohol
- Muscle relaxation
- Drowsiness/loss of consciousness
- Memory impairment/amnesia
- Nightmares
- Confusion
- In 2004, Rohypnol attributed to 473 emergency room visits
Rohypnol Tolerance, Dependence, Withdrawal

- Tolerance: can develop, though lower levels compared to other depressants
- Dependence: less euphoria, so dependence is less likely; dependence, however, can happen
- Withdrawal: anxiety, numbness, sensitivity to bright lights; gradual reduction in dosage
Other “date rape” drugs…
GHB

- Depressant
- Manufactured in clandestine labs in US
  - Contents can vary dramatically
- Ingestion: powder dissolved in liquid
- Effects similar to Rohypnol; hallucinations also occur
- Anabolic effects (bodybuilder use)
- Schedule I
Ketamine

- Hallucinogen
- Tranquilizer used in veterinary clinics
- Can be mixed in drinks, smoked, injected
- $25 per dose
- Changes in perception; dissociative effects; loss of coordination; numbness; analgesic
- Schedule III
Ketamine, GHB

Ketamine

In 2004, ketamine attributed to 227 emergency room visits
http://www.whitehousedrugpolicy.gov/drugfact/club/index.html

GHB

In 2004, GHB attributed to 2,340 emergency room visits
http://www.whitehousedrugpolicy.gov/drugfact/club/index.html
Peyote
About Peyote

- A hallucinogen
- Peyote is a cactus containing the drug mescaline
- Evidence peyote was available several thousand years ago
  - Natives to Mexico, South America
  - Used in ceremonies/religious rites
- Schedule I
Peyote Availability

- Typically found in Mexico, southwestern United States
Peyote Effects

- Similar to LSD
- Visual hallucinations
  - Bright lights
  - Geometric patterns
- Change in perceptions
  - Time alteration
  - Detachment from surroundings
- Change in mood
- Increased heart rate, blood pressure, dilated pupils
Peyote Forms

- Peyote is ingested
  - Peyote buttons are eaten
    - Taste bitter
  - Peyote may be dried, soaked in a liquid to drink
  - Peyote may be ground and placed into capsules
  - Smoked
  - Rarely injected
Peyote Overdose

- In large doses, hallucinations of color and movement can be very vivid
- Nausea and vomiting
  - True overdose rare, especially due to likely vomiting
- Slowed breathing
- Among “miscellaneous” hallucinogens leading to 3,445 emergency room visits
Peyote Tolerance, Dependence, Withdrawal

- **Tolerance:** May build rapidly at first, then fades with abstinence.

- **Dependence:** Most sources indicate peyote does not create physical dependence, though psychological dependence may develop.

- **Withdrawal:** Most sources indicate no withdrawal symptoms; “flashbacks” may occur, though may happen long after peyote has been used.
Mescaline
About Mescaline

- Mescaline is retrieved from cactus species, usually peyote
  - Isolated in the late 1800’s
  - Named after Mescalero Apache tribe
- Schedule I
Mescaline Availability

- Found in peyote cactus in southwestern U.S., Mexico
- Also found in some Peruvian cacti
Mescaline Effects

- Effects are like those from peyote (hallucinogenic)
- Mescaline may also have stimulant effects
  - Increased heart rate, blood pressure, temperature, blood sugar
Mescaline Forms

- Usually taken orally
  - Powder, tablet, capsule, liquid
  - Bitter taste
  - Taken with milk, tea, juice, soft drink
- Rarely injected
Mescaline Overdose

- Hallucinogenic experiences can be severe
- Nausea, vomiting Among “miscellaneous” hallucinogens leading to 3,445 emergency room visits
Mescaline Tolerance, Dependence, Withdrawal

- Tolerance: May build rapidly at first, then fades with abstinence
- Dependence: Most sources indicate peyote does not create physical dependence, though psychological dependence may develop
- Withdrawal: Most sources indicate no withdrawal symptoms; “flashbacks” may occur, though may happen long after peyote has been used
Selective Serotonin Reuptake Inhibitors (SSRI’s)

Differences
SSRI’s

- Prozac
- Paxil
- Zoloft
- Celexa
- Lexapro
- Luvox
SSRI’s

- Serotonin = neurotransmitter related to mood
- Reuptake (recycle) is blocked, so more serotonin can continue to bind to dendrites
- More serotonin available = improved mood

Image: toxipedia.org
Related Meds

- SNRI’s
  - In addition to blocking reuptake of serotonin, meds block reuptake of norepinephrine (e.g. Cymbalta)

- Tricyclics
  - Similar to SNRI’s but they also block certain receptors triggering side effects:
    - Heart rate, blood pressure changes, dizziness, blurred vision, constipation, drowsiness
SNRI’s and Tricyclics

Source: pharmacology.com
Similar Meds Request

- **Abilify & Xanax**
  - **Abilify**
    - Treatment for bipolar disorder, schizophrenia for action on dopamine receptors
    - Also partial treatment for depression for action on serotonin receptors
  - **Xanax**
    - Benzodiazepine
    - Treatment for anxiety for enhancing activity of GABA neurotransmitter
    - GABA - inhibits some brain activity (anxiety may be due to increased brain activity)
Other Mood Meds

- Bupropion (Wellbutrin)
  - Norepinephrine and dopamine reuptake inhibitor

- Monoamine Oxidase (MAO) Inhibitors
  - Older class of medications
  - Usually prescribed if others do not work
  - Specific dietary restrictions (cheese, wine, nuts)
  - MAO can break down neurotransmitters, so inhibition of MAO can reduce this tendency
  - Side effects (drowsiness, fatigue, sleep problems, GI distress, others)
  - Drug interactions

- Stimulants
  - May be prescribed with others, may work faster
Dimethyltryptamine

- Chemical structure
- Hallucinogenic ingredient
- Present in a variety of plants
- Schedule I substance

*Image source: Wikimedia Commons*
Dimethyltryptamine

- Often consumed via beverage: ayahuasca tea
  - Requires MAO-I (specific vine)
  - Ceremonial purposes
  - Ashland, OR Brazilian church lawsuit
- Can be injected, inhaled, smoked
Dimethyltryptamine Effects

- Nausea, vomiting
- Hallucinogenic visualizations
- Muscle twitching, coordination difficulties
- Dissociation
- Shorter-lasting effects than other hallucinogens (“businessman’s trip” per DEA)

- Video Clip - The Spirit Molecule, Part 1 (YouTube)