



# THE ALCOHOL AND DRUG PRIMER

**NYS Office of Alcoholism and  
Substance Abuse Services**

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# ALCOHOL

- **DESIRED EFFECTS OF USE**
  - Euphoria
  - Decreased social anxiety
  - Decreased sexual inhibition
  - Sedation



# ALCOHOL INTOXICATION

## SIGNS AND SYMPTOMS SEEN WITH VARIOUS LEVELS OF BLOOD ALCOHOL CONCENTRATION (BAC)

- **20 - 99 mg%:** loss of muscular coordination
- **100 - 199 mg%:** neurological impairment, ataxia (impaired gait), prolonged reaction time, mental impairment, poor/impaired coordination
- **200 - 299 mg%:** nausea, vomiting, ataxia
- **300 - 399 mg%:** hypothermia, dysarthria (disturbance of speech), amnesia, stupor
- **400 - > mg%:** coma

\* Degree of impairment can depend on an individual's degree of tolerance

\*\*BAC greater than 150 mg% if not showing signs of intoxication or any time BAC is > 300 mg% equals a diagnosis of **ALCOHOL DEPENDENCE**



# ALCOHOL METABOLISM RATES

Alcohol is metabolized at a rate of:

- 1/3 ounce alcohol per hour, which is equal to a drop of .015 BAC per hour.

**[3 Beers consumed in one hour =  
BAC of 50 mg% (.05)]**

\* Zero order metabolism - the rate of alcohol metabolism (breakdown) does not change as the BAC increases

\*\* Urine is 1.3 x's concentration of the blood alcohol concentration (BAC)



# MINOR WITHDRAWAL

- **TIME**
  - STARTS IN 6 - 60 HOURS AFTER THE LAST USE OF ALCOHOL
- **SYMPTOMS**
  - Tremulous
  - Insomnia
  - Nausea
  - Anorexia
  - Anxiety
  - Weakness



# MINOR WITHDRAWAL

- **SIGNS**
  - Action tremor (tremor with movement of extremity)
  - Inattention
  - Easy startle
  - Plethora (fullness or excess of body fluid)
  - Conjunctival (white part of eye) injection (redness)
  - Increased reflexes
- **TREATMENT**
  - Pharmacologic substitute – usually a benzodiazepine
- **PROGNOSIS**
  - Excellent



# EARLY WITHDRAWAL

- ILLUSIONS AND HALLUCINATIONS
  - ILLUSIONS ARE MISINTERPRETATIONS
    - Most common (25% of patients)
  - VISUAL AND AUDITORY HALLUCINATIONS
    - Perception of something that does not exist
    - Less common is tactile and olfactory hallucinations
  - SENSORIUM IS RELATIVELY CLEAR
    - The patient is alert and oriented



# EARLY WITHDRAWAL

- SEIZURES ( “RUM FITS” )
  - Usually generalized major motor (grand mal)
  - 25% are multiple
  - 2 - 3% go onto status epilepticus (one seizure succeeds another with little or no interruption)
  - Heightened sensitivity to photic (light) stimulation during period of seizure vulnerability
  - 30% of patients having withdrawal seizures go onto DT's

\* When a patient in withdrawal has a seizure, other causes of seizures, such as head injuries, should be ruled out before the diagnosis of withdrawal seizures is made.



# EARLY WITHDRAWAL

- TREATMENT

- Watch for DT's (delirium tremens – agitation, tremors, hallucinations – see next slide)
- Evaluate for other illnesses and injuries
- Light sedation with benzodiazepines
- Thiamine
- Electrolyte balance (abnormalities of sodium, potassium, chloride in the blood)
- Patients must understand that they need to go onto further treatment



# LATE WITHDRAWAL

- DELIRIUM TREMENS
  - High risk for DT's if blood alcohol level is greater than 300 mg% (BAC > .30) and/or accompanied by withdrawal seizures
  - Profound confusion and misperceptions
  - Disorientation
  - Hallucinations
  - Paranoid delusions
  - Motor hyperactivity
    - Tremor, restless, agitated, increased reflexes
  - Autonomic hyperactivity
    - Tachycardia (increased heart rate), profuse sweating, dilated pupils
  - Mortality is 10 - 15% if untreated, 1 -2% if treated



# PERSISTENT MILD WITHDRAWAL

- Lasts for weeks to months
- Sleep disturbances are common
- Mild action tremor
- Anxiety
- Depression



# MISCELLANEOUS

- **METHANOL\* OVERDOSE**
  - Toxicity due to conversion of methanol into formaldehyde and formic acid
  - Lethargy, confusion, visual symptoms including blindness, significant increase in respiratory rate
  - Seek immediate medical assistance

\* METHANOL (a colorless, volatile, poisonous, water - soluble liquid that is used as a solvent, fuel and antifreeze for motor vehicles)



# SEDATIVE/HYPNOTICS

BARBITURATES and BENZODIAZEPINES are the two major categories of sedative-hypnotics. The drugs in each of these groups are similar in chemical structure or effect. Some well – known barbiturates are secobarbital (Seconal) and pentobarbital (Nembutal). Well- known benzodiazepines include: diazepam (Valium), chlordiazepoxide (Librium), alprazolam (Xanax), and chlorazepate (Tranxene). A few sedative-hypnotics do not fit either category. These include: methaqualone (Quaalude), ethchlorvynol (Placidyl), choral hydrate (Noctec) and mebrobamate (Miltown).

- **DESIRED EFFECTS WHEN USED**
  - Decrease anxiety
  - Induce sleep
  - Offset effects of other drug classes



# SEDATIVE/HYPNOTICS

- INTOXICATION
  - Decrease in anxiety
  - Sedation
  - Occasional elation secondary to depression of inhibitions and judgment
  - Pupils are midpoint and slowly reactive except for Glutethimide where pupils are enlarged
  - Hiccups can be seen in long term benzodiazepine use



# SEDATIVE/HYPNOTICS

- **BENZODIAZEPINE OVERDOSE**
  - Sedation with decrease in level of consciousness
  - Decrease in respiratory rate
  - Hypotension (low blood pressure)
  - Decrease in temperature
  - Gastric (stomach) paralysis
  - Respiratory compromise
  - Pulmonary edema (fluid in the lungs)



# SEDATIVE/HYPNOTICS

- CLASSIC SIGNS OF OVERDOSE IN OLDER SEDATIVES
  - Methaqualone
    - Hyperreflexia (increase in reflexes), hypertonia (increase in muscle tone), seizures, rhabdomyolysis (breakdown of muscle cells)
  - Meprobamate
    - Severe hypotension, GI bezoars (hair, vegetable or food ball formed in the stomach)
  - Glutethimide
    - Cyclic coma
  - Barbiturates
    - Skin blisters in 6%
  - Cloral hydrate
    - Gastritis
  - Ethchlorvynol
    - Prolonged coma especially if liver disease is present



# SEDATIVE/HYPNOTICS

- **BENZODIAZEPINE OVERDOSE TREATMENT**
  - There is a medications that can be used to reverse a benzodiazepine overdose. This medication is Flumazenil and can be given intravenously. However, it can cause:
    - Seizures
    - Cardiac arrhythmias
    - Panic attacks
  - Activated charcoal can also be used by the medical team in an emergency setting.
    - Be aware of concretions (aggregation or formation of solid material) in the gut due to slower gut motility with sedative use. Patient must have a positive gag reflex to use charcoal.



# SEDATIVE/HYPNOTICS

- **BENZODIAZEPINE WITHDRAWAL**
  - Can last 3 - 5 weeks
  - Very much like acute alcohol withdrawal
  - Time course and severity depend on
    - Dose of benzodiazepine
    - Duration of use (does not worsen after one year of use)
    - Duration of the specific drug's actions
    - Age (prolonged in the elderly)



# SEDATIVE/HYPNOTICS

- **BENZODIAZEPINE AND BARBITURATE WITHDRAWAL IS LIKELY**
  - If therapeutic dose is used everyday for 4 - 6 months
  - If 2 - 3 times the therapeutic dose is used everyday for 2 - 3 months
  - In barbiturate use, 50% have severe withdrawal if 600mg of Phenobarbital or equivalent is used everyday for 50 or more days
  - In barbiturate use, 100% have severe withdrawal if 900 - 1200mg of Phenobarbital or equivalent is used everyday for 50 or more days



# SEDATIVE/HYPNOTICS

- **BENZODIAZEPINE & BARBITURATE WITHDRAWAL**
  - More likely to be severe if
    - Rapidly eliminated drug is used
    - Highly potent drug (Ativan, Xanax)
    - Abrupt discontinuation of drug
    - High doses used
    - Schedule of use not fixed
    - History of dependency
    - History of concurrent alcohol use
    - History of panic attacks



# SEDATIVE/HYPNOTICS

- **BENZODIAZEPINE WITHDRAWAL**
  - Mood changes
    - Negative, dysphoria (anxious, depressed), ruminative
  - Sleep changes
    - Insomnia, alterations of sleep - wake cycle
  - Physical changes
    - Increase in pulse rate and in blood pressure, increase reflexes, tremors, restless, nausea, ataxia, seizures, postural hypotension, pupils are dilated, exaggerated blink reflex (especially barbiturates), metallic taste
  - Perception changes
    - Illusions, hallucinations, depersonalization, sensory hyperactivity (lights brighter, noise louder, etc.)



# SEDATIVE/HYPNOTICS

- PROTRACTED WITHDRAWAL
  - Can last for months
    - No definitive signs or symptoms
    - Waxing and waning of the following symptoms
      - Depression
      - Anxiety
      - Panic
      - Tinnitus (ringing or other noises in the ears)
      - Headaches
      - Dizziness
  - Increase risk of protracted withdrawal if family history of alcoholism, daily use of alcohol or other sedatives



# SEDATIVE/HYPNOTICS

- ONE TREATMENT PROTOCOL FOR OUTPATIENT WITHDRAWAL
  - The sedative – hypnotic can be decreased by 10% of the starting dose per week. For the final 20%, decrease by 1/2 of the initial doses per week
  - Inderal for increased Blood pressure and tremors



# SEDATIVE/HYPNOTICS

## Special Cases

- ROHYPNOL
  - One of the first “date rape” drugs
  - Benzodiazepine class
  - Dissolves easily in carbonated drinks
  - Significant amnesia for up to 12 hours when used



# SEDATIVE/HYPNOTICS

## Special Cases

- GHB
  - Gamma – hydroxybutyrate
  - Clear liquid, white powder, or tablet
  - Initially sold to body builders to release growth hormone
  - Fast acting - 20 minutes for sedative effect
  - Lasts only 4 hours
  - Another “date rape” drug

\*GBL (gamma butyrolactone) marketed as an industrial solvent used to clean circuit boards and degrease engines is metabolized to GHB



# OPIATES

- **DESIRED EFFECTS OF USE**
  - “The Rush”
  - Sedation
  - Euphoria
  - Analgesia



# OPIATES

- OPIUM COMES FROM THE POPPY PLANT PAPAVER SOMNIFERUM
  - An erect herbaceous annual or bi-annual
  - 50 - 150 cm tall
  - Stems are slightly branched
  - Leaves are large, erect, and oblong
  - Petals are 4 - 8 cm in length
  - Petal colors are white, pink, purple and violet





**Papaver somniferum**

Photo by Eric Clausen, © 2000 Erowid.org





**Papaver somniferum**

Photo by Eric Clausen, © 2000 Erowid.org





Opium Poppies in Northern Thailand  
photo by John W. Allen



# Papaver somniferum (opium poppy)

- After flowering, the petals drop in a few days leaving bulbous green capsules atop the stalks. These are the pods.



Papaver somniferum Pod

Photo by Eric Clausen, © 2000 Erowid.org



# CONTENTS OF POPPY POD FLUID

Morphine 4 - 21 %

Codeine 1 - 25%

\*There are at least 20 other alkaloids (organic pharmacological agents) in the fluid

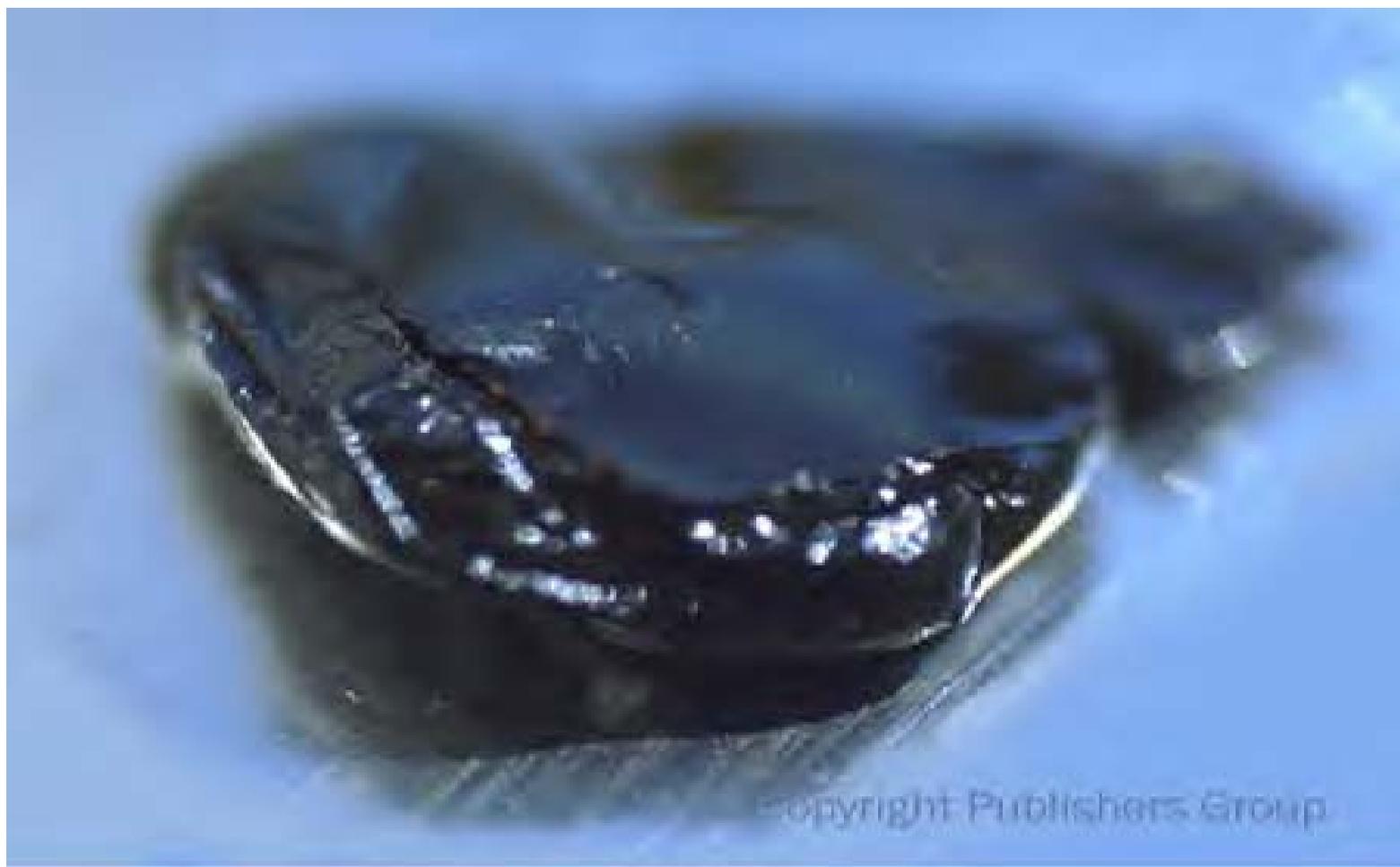


# Papaver somniferum



- Incisions are made in the pods and the milky fluid that oozes out is air dried. This must be done before the seeds are discharged.





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Opium  
by the Publisher Group



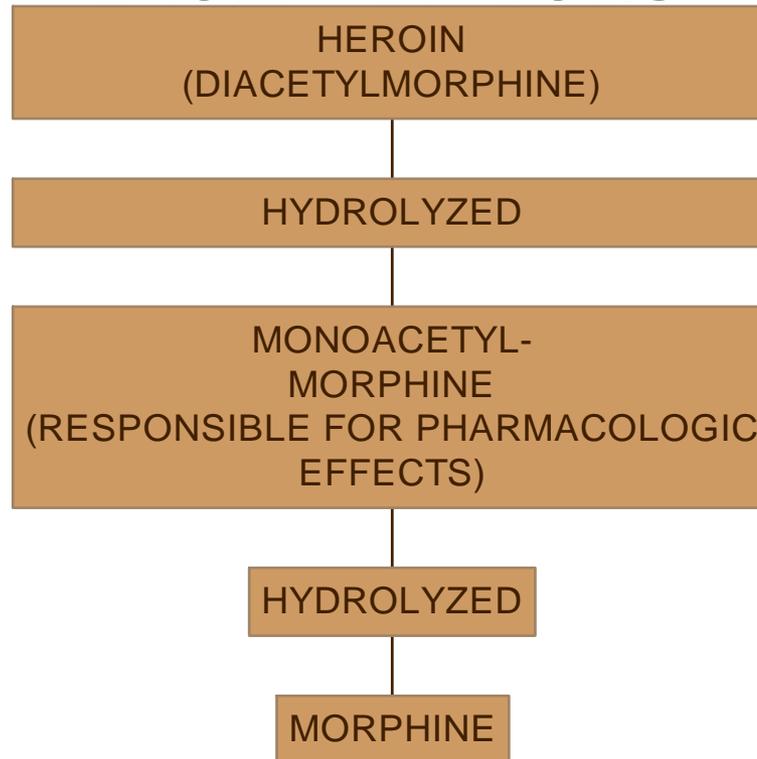
# OPIATES

- MORPHINE – a naturally occurring opiate
- HEROIN
  - Heroin does not occur naturally, but is a semi - synthetic opiate
    - Morphine is isolated from the crude opium and then reacted with acetic anhydride, a chemical also used in the production of aspirin. The purity of the extracted morphine determines in large part the quality of the resulting heroin. Most black market heroin is highly impure due to contaminants left after refinement of opium into morphine when then remain in the final product.



# OPIATES

## HEROIN METABOLISM



\*see next slide for urine drug screen effects which result from heroin being made from morphine.



# OPIATES

- HEROIN USE - URINE DRUG SCREEN SHOWS
  - Free morphine
  - Morphine Glucuronide
  - Free codeine
  - 6 - Monoacetylmorphine
    - Only seen with heroin use
- POPPY SEEDS IF EATEN IN QUANTITY CAN SHOW UP AS A POSITIVE URINE DRUG SCREEN FOR MORPHINE AND CODEINE





**Papaver somniferum (opium poppy) seeds**

Image by Erowid, © 2000 Erowid.org



**Prickly Poppy**  
(*Argemone glauca*)



**Organically Grown Seeds**  
(*Papaver somniferum*)



**California Poppy**  
(*Eschscholzia californica*)



**Commercial Poppy Seeds**  
(*Papaver somniferum*)

**4 Types of Poppy Seeds**  
Photo by Erowid, © 2000 Erowid.org



# THEORIES OF NARCOTIC ADDICTION IMPLICATIONS OF METHADONE MAINTENANCE

Methadone prevents the *“off and on”* switch of fluctuating opioid blood levels that lead to euphoria alternating with cravings...

Continuous occupation of the endogenous ligand- opioid receptor system allow interacting physiological and behavior systems to become normal.

The patient is functionally normal.

Dole, Vincent P.  
JAMA,  
Nov 25, 1988  
Vol.260, No. 20



# METHADONE

- Synthetic narcotic
- Developed in Germany - WWII
- 1963 : Drs. Dole and Nyswander treated the addict so as to control craving
- 1972 : FDA approved use for treatment of narcotic addiction



# RATIONALE FOR OPIOID AGONIST MEDICATIONS

- OPIOID AGONIST TREATMENT
  - The most effective treatment for opioid dependence
  - Controlled studies have shown significant
    - Decreases in illicit opioid use
    - Decreases in other drug use
    - Decreases in criminal activity
    - Decreases in needle sharing
    - Improvements in prosocial activities
    - Improvements in mental health



# METHADONE

- MEETS THE CRITERIA DEFINING ITS USE AS A MEDICATION NOT A “DRUG”
  - Manufactured by a pharmaceutical company
  - It must be prescribed by a licensed MD
  - It is dispensed by a registered nurse
  - Doses are appropriate and individualized per patient
  - Quality control and monitoring is carried out by state and federal agencies



# METHADONE

- METHADONE BLOOD LEVELS (P= 2 hours after administration of methadone; T = before medication)
  - Increase Methadone dose if P/T ratio  $< 2.5$  and trough less than 200
  - Maintain dose if trough 200- 480 with P/T  $< 2.5$
  - Decrease dose if trough  $> 480$  and P/T  $< 2.5$
  - Split dose if P/T  $> 2.5$
  - Split and increase if trough  $< 200$  and P/T  $> 2.5$
  - Split and decrease if peak  $> 960$  and P/T  $> 2.5$
  - (If split give 100% in AM and 50% PM first day, then 50% BID next days)



# METHADONE DRUG INTERACTIONS

- METHADONE LEVELS GO DOWN WITH USE OF:
  - Carbamazepine
  - Alcohol
  - Pentazocine
  - Phenobarbital
  - Dilantin
  - Rifampin
  - Rifabutin
- METHADONE LEVELS GO UP WITH USE OF:
  - Tagamet
  - Ketoconazole
  - Erthyromycin



# METHADONE

A frequent question asked in a general hospital is:

- if a patient is unable to take food or liquids orally – post surgery for example) and that patient is maintained on Methadone – how can the methadone be given and what dose is appropriate?
  - Give 80% of Methadone daily dose intramuscularly with half in the morning and half in the evening



# LAAM

- 1 - Alpha - Acetylmethadol Acetate
- Long acting, orally active analog of Methadone
- Approved for use by the FDA in 1993
- LAAM dose is 1.2 – 1.3 the dose of Methadone



# LAAM

- **ADVANTAGES OVER METHADONE**

- Slower onset
- Longer duration of action
  - Administer 3 times /week so diversion may be less likely
  - 1.2 - 1.3 times the patient's usual methadone dose

- **DISADVANTAGES**

- **ROXANNE/FDA ISSUED BLACK BOX WARNING AS THERE IS THE POTENTIAL FOR CARDIAC ARRHYTHMIAS (TORSADES de POINTES)**
- **Manufacturing of this product has ceased.**



# BUPRENORPHINE

- A Thebaine (opium alkaloid) derivative
  - Makes this legally classified as an opiate
- Partial opioid agonist (a substance that binds to a receptor and triggers a response in the cell)
- Can be prescribed out of a physician's office if he/she has a DEA "X" number (in addition to the normal DEA registration number) and NYS authorization
- Will not and should not take the place of Methadone, useful for:
  - Special populations (adolescents)
  - Underserved areas (such as geographically isolated regions where methadone is not accessible)



# BUPRENORPHINE

- PARTIAL OPIOID AGONIST
  - At low dose behaves as an agonist
  - At high doses as either an agonist or antagonist (blocks effects of agonists)
    - Partial agonist at the opiate mu receptor
  - Very high affinity for mu receptor
    - Will displace Morphine, Methadone from the receptor, thus if given to someone maintained on Methadone or using opiates, it can cause significant withdrawal
  - Desirable properties
    - Low abuse potential
    - Lower level of physical dependence
    - Safety if ingested in overdose quantities
    - Weak opioid effect as compared to Methadone



# BUPRENORPHINE

- PHARMACOLOGIC USES
  - Potent analgesic
    - Available in many countries as a sublingual tablet (0.3 - 0.4 mg) called **Temgesic**
    - Available in the U.S. As an parenteral (IV, IM) form called **Buprenex**
  - Poor oral bioavailability
    - Sublingual with absorption through the oral mucosa
  - Slow dissociation rate
    - Prolonged therapeutic effect - so can be given every other or every third day
  - Treatment of addictions\*
    - In the U.S. manufactured and distributed by Reckitt Benckiser
      - Subutex®
      - Suboxone®

\*2/96 available in France for office based treatment - 50,000 patients



# BUPRENORPHINE

- **SUBUTEX®**
  - 2 & 8 mg sublingual white tablets
  - Schedule III under the Controlled Substance Act
- **SUBOXONE®**
  - Hexagonal orange sublingual tablets in 2 strengths
    - 2 mg Buprenorphine with 0.5 mg Naloxone
    - 8 mg Buprenorphine with 2 mg Naloxone
  - Schedule III
  - Use of Naloxone is to prevent IV use (diversion)
    - Buprenorphine is absorbed sublingual and IV, but if used as a combination with Naloxone, the Naloxone IV can cause withdrawal. Naloxone is not absorbed sublingual.



# HEROIN INTOXICATION

- **MOST COMMON**
  - Miosis (contraction of the pupil) - except Demerol which causes paralysis of the ciliary body and pupils dilate
  - Nodding
  - Hypotension
  - Depressed respiration
  - Bradycardia (low heart rate)
  - Euphoria
  - Floating feeling



# OPIATE OVERDOSE

- Classic triad seen in overdose
  - Miosis (small pupils)
  - Coma
  - Respiratory depression
- Pulmonary edema
- Seizures
  - Demerol, Darvon, Talwin



# HEROIN WITHDRAWAL - EARLY PHASE

- Lacrimation (eyes water)
- Yawning
- Rhinorrhea (runny nose)
- Sweating



# HEROIN WITHDRAWAL - MIDDLE PHASE

- Restless sleep
- Dilated pupils
- Anorexia
- Gooseflesh
- Irritability
- Tremor



# HEROIN WITHDRAWAL - LATE PHASE

- Increase in all previous signs and symptoms
- Increase in heart rate
- Increase in blood pressure
- Nausea and vomiting
- Diarrhea
- Abdominal cramps
- Labile mood
- Depression
- Muscle spasm
- Weakness
- Bone pain



# HEROIN WITHDRAWAL - TIME FRAME

- 1/2 life is 2 - 3 hours
- Onset after last dose is 8 - 12 hours
- Peak is 48 hours
- Duration is 5 - 10 days



# PROTRACTED HEROIN WITHDRAWAL

- LASTS UP TO 9 MONTHS
  - Weight gain
  - Increase in basal metabolic rate (rate at which a person consumes oxygen while awake but at rest)
  - Decrease in temperature
  - Increase in respiratory rate
  - Increase in blood pressure
  - Menstrual irregularities (secondary to increased prolactin)



# HEROIN WITHDRAWAL TREATMENT

- **AMBULATORY OR INPATIENT POSSIBLE MEDICATIONS INCLUDE:**
  - Clonidine
  - Naltrexone concurrently
  - Methadone (use only by licensed programs)
  - Buprenorphine
  - PRN's
    - Oxazepam (15-30 mg q 6 hours) or other benzodiazepine
    - Motrin
    - Tigan
    - Mom
    - Kaopectate
    - Bentyl



# OPIATE OVERDOSE TREATMENT

- NARCAN (naloxone)
  - Narcan is injected, usually initially intravenously for fastest action. The drug acts after about two minutes and its effects may last about 20 - 45 minutes.
  - Narcan has been distributed as part of emergency kits to heroin addicts and has been shown to reduce death rates from overdose (caused by depression of the central nervous system and respiratory system).
  - The Narcan effect is short lived and may have to be repeated or the patient will lapse back into overdose symptoms



# OPIATES

- MANY OF THE COMPLICATIONS OF OPIATES ARE DUE TO THE ROUTE OF USE AND NOT THE DRUG
  - Neurologic
    - Toxic amblyopia (toxic loss of sight)
    - Mononeuropathy (one nerve involved)
    - Polyneuropathy (several nerves involved)
    - Meningitis
    - Brain abscess
    - Leukoencephalopathy (encephalopathy seen with smoking heroin)



# OPIATES

- MANY OF THE COMPLICATIONS OF OPIATES ARE DUE TO THE ROUTE OF USE AND NOT THE DRUG
  - Dermatologic
    - Abscess
    - Tracks
    - Lymphangitis (inflammation of the lymph system)



# OPIATES

- MANY OF THE COMPLICATIONS OF OPIATES ARE DUE TO THE ROUTE OF USE AND NOT THE DRUG
  - Pulmonary
    - Aspiration
    - Pneumonia
    - Lung abscess
    - Pulmonary emboli (blood clot to the lung)
    - Pulmonary fibrosis (thickening and scarring of connective tissue in the lung)
    - Noncardiogenic pulmonary edema (water in the lungs not due to a dysfunction in the heart as seen in cardiogenic pulmonary edema or congestive heart failure)



# OPIATES

- MANY OF THE COMPLICATIONS OF OPIATES ARE DUE TO THE ROUTE OF USE AND NOT THE DRUG
  - Hepatic
    - Hepatitis B
    - Hepatitis C
    - Hepatitis D
    - Hepatitis E
    - Hepatitis G



# OPIATES – Special Case

- Meperidine analog (MPPP) – not used in clinical practice, but is illegally manufactured as a drug of abuse.
  - MPPP can be synthesized incorrectly into MPTP which leads to a Parkinson-like syndrome
- Meperidine metabolite, normeperidine, is toxic especially if given with an MAO inhibitor. One can see
  - Seizures, tremor, confusion, increased reflexes, startle

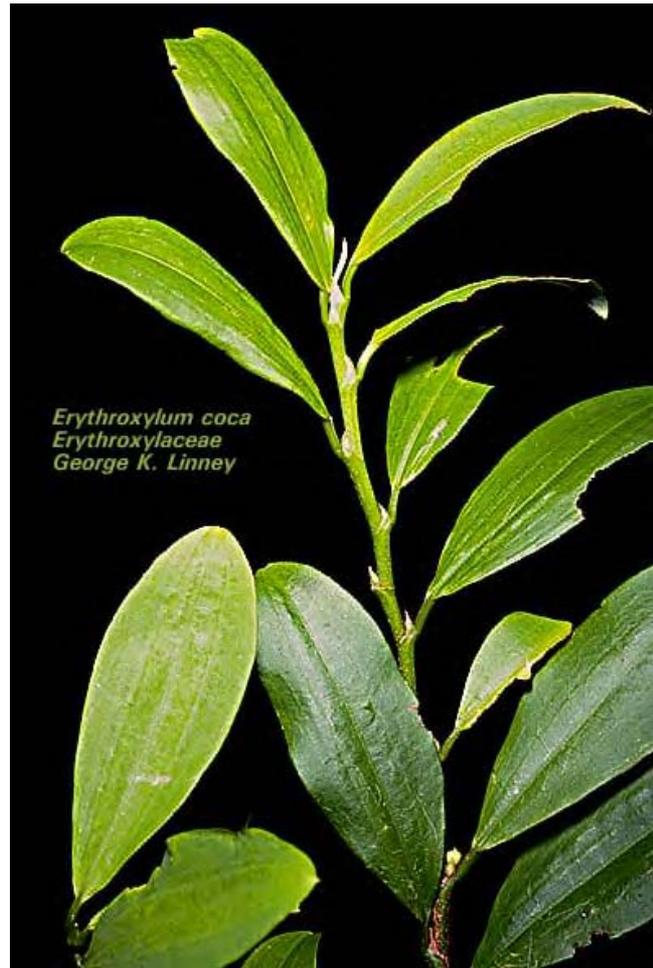


# STIMULANTS

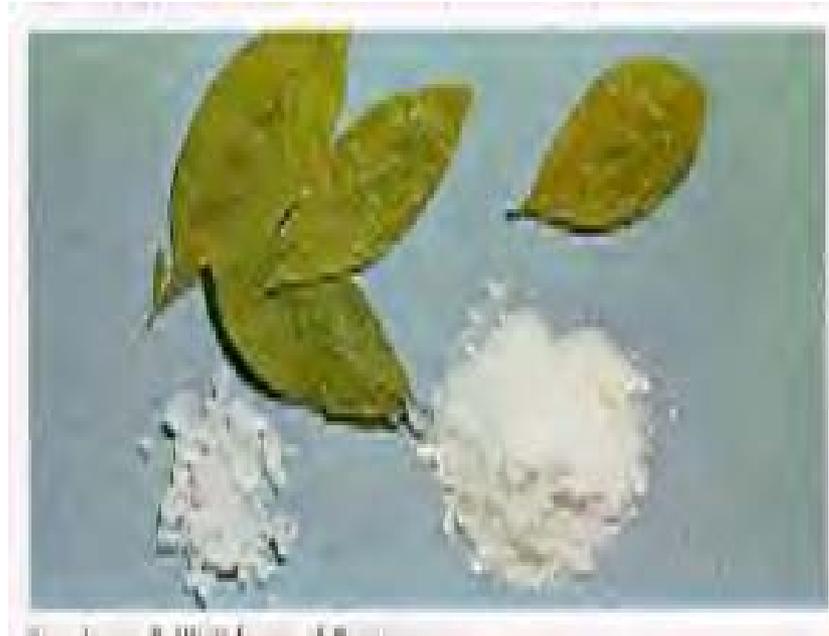
- **DESIRED EFFECTS**
  - Increased alertness
  - Feeling of well being
  - Euphoria
  - Increased energy
  - Decrease in appetite/weight loss
  - Heightened sexuality



# STIMULANTS



# STIMULANTS



COCAINE LEAVES AND POWDER



# STIMULANTS

- INTOXICATION
  - Pupils dilated
  - Increase in heart rate (30-50%)
  - Increase in blood pressure (15-20%)
  - Nausea / vomiting
  - Confusion
  - Tremors
  - Weight loss
  - Chest pain / arrhythmia
  - Electrocardiogram abnormalities (QRS and QT intervals are prolonged)



# STIMULANTS



CRACK VIAL AND ROCKS



# STIMULANTS

- **INTOXICATION**

- Headache (most common neurologic complaint)
- Seizures (can occur after only one use of cocaine, usually need more than one time use for amphetamines to cause seizures)
- Priapism (painful penile erection)
- Renal failure secondary to rhabdomyolysis and myoglobinuria (muscle cells in the urine)



# STIMULANTS

- OVERDOSE
  - All of the signs and symptoms of intoxication only worse
  - Myocardial infarction (heart attack)
  - Stroke
  - Severe prognosis if hyperthermia (abnormally high body temperature) present



# STIMULANTS

- **CHRONIC AMPHETAMINE ABUSE**
  - Constipation
  - Urinary retention
  - Jerky movements during sleep
  - Bruxism (clenching of the teeth)
  - Nausea/vomiting
  - Headaches
  - Increase in pulse rate with decrease in blood pressure
  - Psychosis which can last for months
  - Vessels in the brain are effected and can become inflamed or bleed (Cerebral vasculitis, necrotizing angiitis, and cerebral hemorrhage)



# STIMULANTS

- MISCELLANEOUS

- Cocaine and alcohol form a compound, Cocaethylene
  - Causes an increase in platelet aggregation, thus an increase in blood clots can be seen in the body's vascular system with significant consequences such as strokes
- Tricyclic antidepressants used to treat cocaine craving can cause an increase in cardiovascular events if cocaine is used concurrently



# STIMULANTS

- WITHDRAWAL
  - Dysphoria
  - Fatigue
  - Unpleasant dreams
  - Insomnia
  - Hypersomnia (extreme sleepiness)
  - Increased appetite
  - Psychomotor retardation
  - Agitation



# STIMULANTS

- TREATMENT OF WITHDRAWAL AND DEPENDENCY
  - No medication regimen has been proven totally effective for stimulant dependence treatment
  - In amphetamine overdose
    - Acidify urine
    - Never use chlorpromazine (worsens hyperpyrexia and increases possibility of seizures)
  - To lower blood pressure can use benzodiazepines, phentolamine, sodium nitroprusside. Inderal and calcium channel blockers may cause increase in cardiovascular toxicity



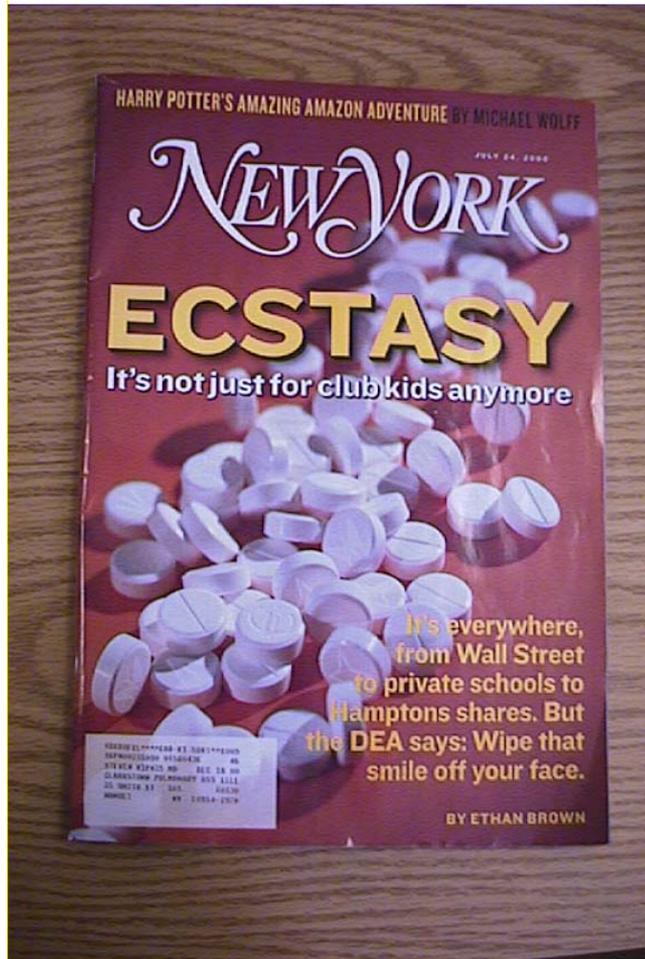
# STIMULANTS - MDMA

- Methylendioxyamphetamine
- Developed as an appetite depressant
- “Ecstasy”
- Damages serotonin transmission sites

\* Ecstasy is in the methamphetamine class of drugs – many of the features detailed in the next slides pertain to methamphetamines in general.



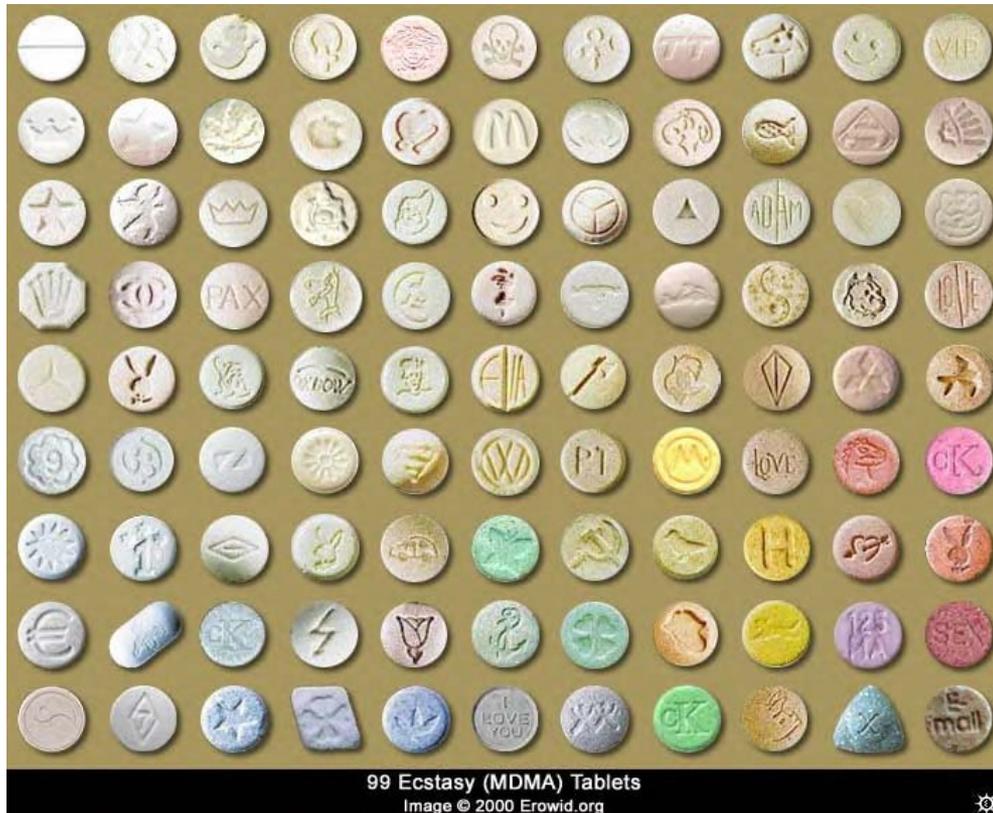
# STIMULANTS



Ecstasy use has been featured in the news.



# STIMULANTS



Ecstasy tablets come in all colors and shapes, leading to counterfeit tablets being sold.



# STIMULANTS - MDMA

- Users report
  - Nausea
  - Jaw clenching and teeth grinding
  - Increase in pulse rate
  - Tremors
  - Blurred vision
  - Anxiety
  - Altered time perception
  - Decreased libido
  - Increase in social interactions
  - Tics
  - Decrease in sleep
  - Paranoia



# STIMULANTS - MDMA

- Emergency during intoxication if these develop
  - Hyperthermia
  - Seizures
  - Arrhythmia
  - Disseminated intravascular coagulation (inability to clot)
  - Acute renal failure
  - Rhabdomyolysis (severe muscle breakdown)

\* IV fluids and dantrolene are used to treat toxicity (malignant hyperthermia)

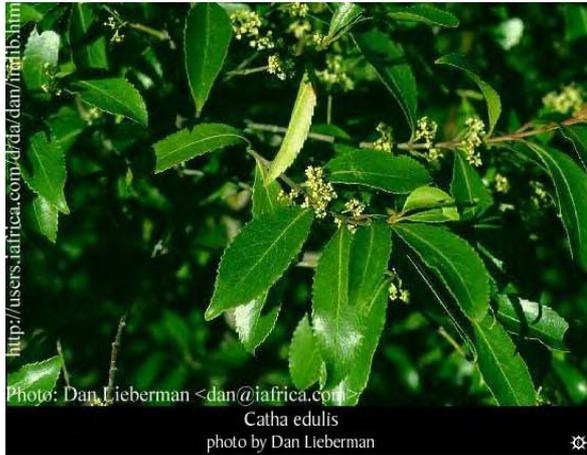


# STIMULANTS - MDMA

- Next day hangover after use
  - Insomnia
  - Drowsiness
  - Fatigue
  - Sore jaw muscles
  - Headaches
  - Loss of balance



# KHAT



- “Khat (pronounced cot”) is a natural stimulant from the *Catha edulis* plant, found in the flowering evergreen tree or large shrub which grows in East Africa and Southern Arabia. It reaches heights from 10 feet to 20 feet and its scrawny leaves resemble withered basil.



# STIMULANTS - KHAT

- Methcathinone
- Combination of drug effects
- Cathinone is an intermediate of ephedrine
- Effects
  - Increase blood pressure
  - Increase temperature
  - Increase pulse rate
  - Increase reaction time
  - Dry mouth
  - Urge to urinate
  - Increase in sexual desire



# STIMULANTS - KHAT

- Effects
  - Decrease appetite with massive weight loss
  - Anxiety
  - Confusion
  - Paranoia - extreme
  - Hallucinations
  - Tremor
  - Twitches
  - Flush
  - Grandiosity
  - Increase or decrease sleep
  - Increase in pupil size
  - Seizures
  - Affects pituitary with frequency of urination and thirst



# STIMULANTS – MACE and NUTMEG

- Contain Amphetamine (MDA)
- With use see
  - Projectile vomiting
  - Blinding headaches
  - Localized and persistent kidney pain
  - Localized and persistent joint pain



# HALLUCINOGENS

- LSD
- Mescaline found in peyote cactus
  - Lophophoria williamsii
  - Anhalonia lewinii
- Psilocybin found in mushrooms



# HALLUCINOGENS

The subjective experience of hallucinogen intoxication is heavily determined by the set (expectations for the experience and personality of the user) and setting of the user.



# HALLUCINOGENS



## MORNING GLORY- LSD DERIVATIVES

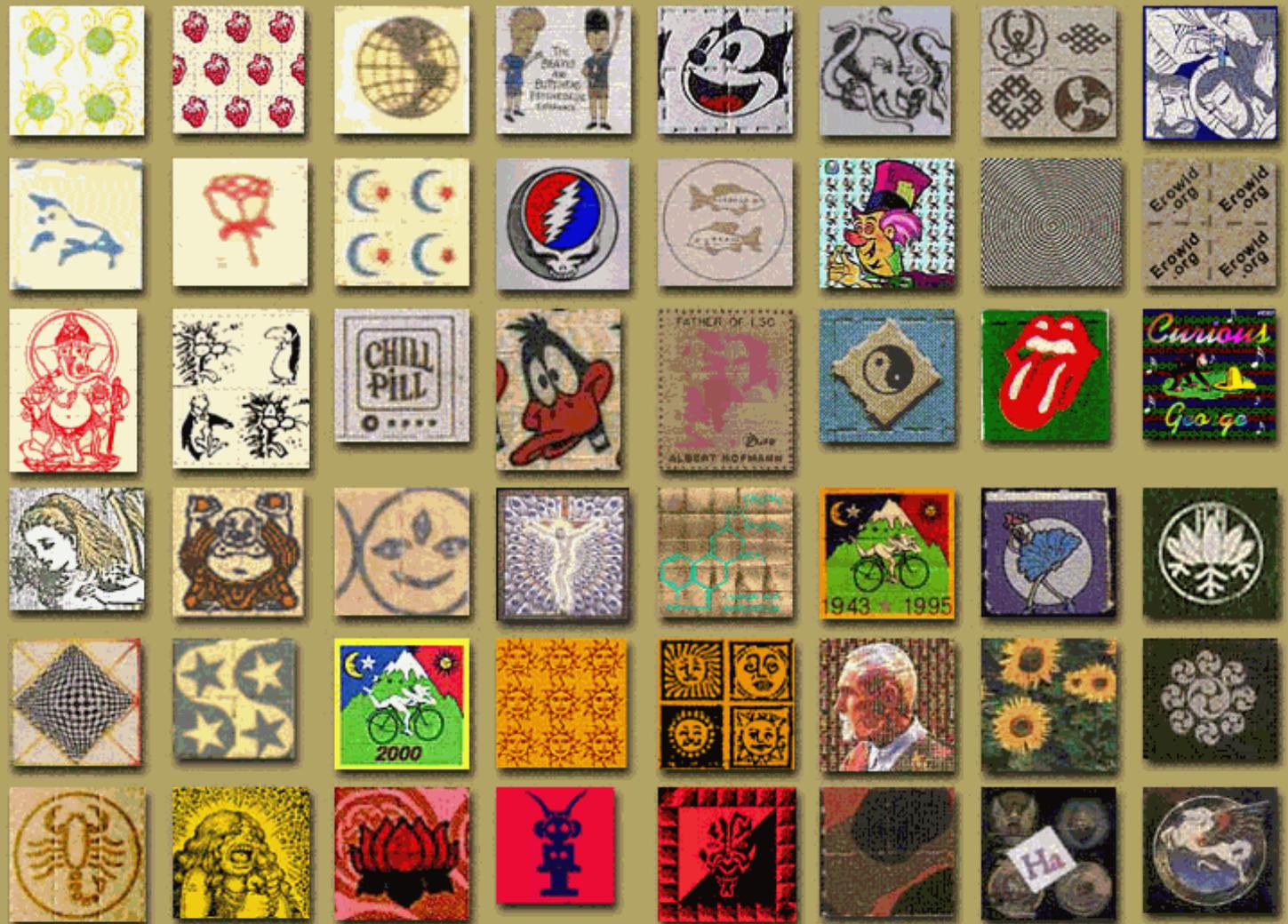


# HALLUCINOGENS



LSD DERIVATIVES –  
CAUSE OF THE SALEM WITCH TRIALS?





**48 LSD Blotter Designs**  
 Image by Erowid, © 2000 Erowid.org





**Lophophora williamsii (peyote)**

Photo by Christopher B., © 2000 Erowid.org



# MUSHROOMS

- **EFFECTS OF USE**
  - Hypersalivation (increase saliva)
  - Bronchorrhea (increase lung mucous production)
  - Bronchospasm (constriction of air passages)
  - Urination
  - Defecation
  - Neuromuscular failure
  - Lacrimation (excessive tears)





**Psilocybe cyanescens**

Photo by Georg Mueller, © 2000 Erowid.org



# HALLUCINOGENS

- Desired Effects
  - Modification of perception
  - Hallucinations
  - Distortions (trails)
  - Insight
  - **Synesthesia** (cross over or mixing of the senses “smell a sound”)
  - Onset in 60 minutes with peak in 2 - 4 hours



# HALLUCINOGENS

- Common Problems
  - Rapid tolerance ( 3 - 4 days for LSD )
  - Depersonalization
  - Confusion
  - Acute anxiety and panic
  - Depression
  - Flashbacks
  - Temporary psychosis
  - Loss of coordination
  - Increase in pulse rate and temperature
  - Dilated pupils
  - Nausea and vomiting 30 - 120 minutes after mescaline use
  - Increase in cortisol and prolactin hormone levels



# HALLUCINOGENS

- Common Problems (continued)
  - Flashbacks
    - See with marijuana, LSD, psilocybin, mescaline, PCP and MDMA use
    - 15 - 77% of users report brief flashbacks
    - Taper off over time
    - Benzodiazepines can be used (better than Haldol) to treat problematic flashbacks
  - Psychosis
    - Psychiatric diagnosis most commonly seen with LSD use is paranoid schizophrenia like syndrome ( the patient usually reports auditory and not visual hallucinations as seen in schizophrenia)
    - Post LSD psychosis - one can see schizoaffective disorders



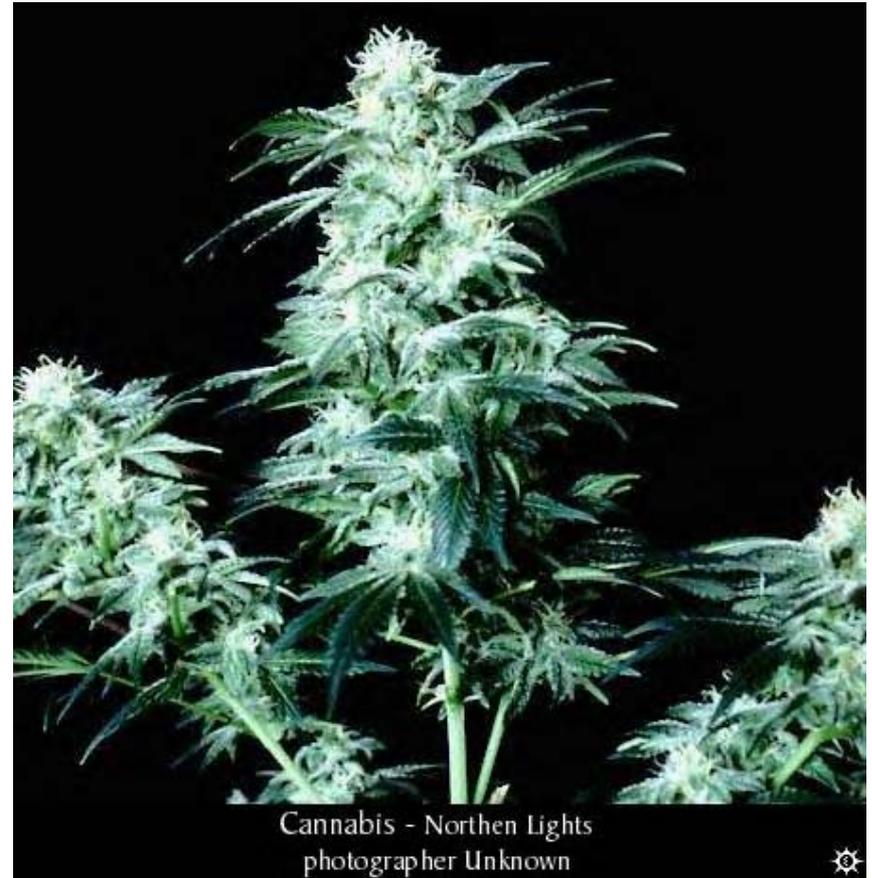
# HALLUCINOGENS

- Miscellaneous
  - DMT (N,N-dimethyltryptamine)
    - “Businessman’s LSD”
      - Quick in and out (one hour duration)
      - Snort, smoke or IV
        - Since it is not taken by mouth, the effects come on suddenly and can be overwhelming. Thoughts and visions crowd in at great speed; a sense of leaving or transcending time and a feeling that objects have lost all form and dissolved into a play of vibrations are characteristic



# CANNABINOIDS

- Work in the hippocampus
- Highly correlated with alcohol use in the adolescent



Cannabis - Northern Lights  
photographer Unknown



# CANNABINOIDS

- Desired Effects
  - Sense of well being
  - Euphoria
  - Modified level of consciousness
  - Altered perceptions
  - Altered time sense
  - Sexual disinhibition



# CANNABINOIDS

- Common Problems
  - Decrease vigilance
  - Decrease motor coordination
  - Decrease strength
  - Increase pulse rate (not blood pressure or temperature)
  - Galactorrhea (breast milk production) in 20% of female users
  - Decrease testosterone
    - Decrease in sperm count and motility
  - Decrease in helper t cells
  - Interference with macrophage antigen processing (killer cells are unable to process foreign bodies – impaired immune system)



# CANNABINOIDS

- Common Problems (continued)
  - Inability to learn
  - Acute panic
  - Delirium
  - Depersonalization
  - Paranoia
  - Hallucinations
  - Flashbacks



# CANNABINOIDS

- Withdrawal
  - 10 hours after use
    - Tremor of the tongue and extremities
    - Insomnia
    - Sweats
    - Lateral gaze nystagmus (rhythmic oscillation of the eyeball on lateral gaze)
    - Exaggerated deep tendon reflexes



# DISSOCIATIVE ANESTHETICS

- PHENCYCLIDINE (PCP)
  - Arylcyclohexylamine group of dissociative anesthetics
  - Antagonist of the NMDA receptor in the brain
  - Anticholinergic properties (impact on the part of the nervous system that controls the heartrate, blood pressure and other responses to stress)
  - Stimulant properties



# DISSOCIATIVE ANESTHETICS - PCP

- Desired effects
  - Visual illusions
  - Hallucinations
  - Distortion of body image
  - Feelings of strength
  - Special insight



# DISSOCIATIVE ANESTHETICS - PCP

- Common problems
  - Anxiety
  - Feelings of doom
  - Outbursts of hostility
  - Violence (#1 cause of death in users)
  - Incoordination
  - Nystagmus
  - Paranoia
  - Vomiting
  - Fever



# DISSOCIATIVE ANESTHETICS - PCP

- Intoxication
  - Low dose
    - Dreamy
    - Mood elevation
    - Panic
    - Impaired judgment
  - Moderate dose
    - Inebriated like state
    - Dissociated
    - Ataxia
    - Confused
    - Decrease in pain
    - Amnesia



# DISSOCIATIVE ANESTHETICS - PCP

- Intoxication
  - High dose
    - All of the previous
    - Hallucinations
    - Catatonia
    - Blank stare
    - Drooling
    - Delirium
    - Psychotic behavior
    - Hypertensive crisis



# DISSOCIATIVE ANESTHETICS - PCP

- INTOXICATION
  - EASY TO REMEMBER
    - Rage
    - Erythema
    - Dilated pupils
  
    - Delirium
    - Amnesia
    - Nystagmus
    - Excitation
    - Skin Dry



# DISSOCIATIVE ANESTHETICS - PCP

- Treatment
  - Disruption of sensory input by PCP causes unpredictable, exaggerated, distorted and violent reactions to environmental stimuli.
  - The cornerstone of treatment is therefore minimization of sensory input for the PCP intoxicated patient. Treat in as quiet and isolated an environment as possible with precautionary physical restraints recommended by some authorities, knowing the risk of rhabdomyolysis ( the breakdown of muscle fibers resulting in the release of muscle fiber content into the circulation. Some of these are toxic to the kidney and frequently result in kidney damage) and hyperthermia.



# DISSOCIATIVE ANESTHETICS - PCP

- Treatment
  - Acidify the urine to increase excretion
  - Narcan can treat the decrease in respiratory rate
  - Valium can treat the muscle rigidity
  - Withdrawal\*
    - Depression
    - Craving
    - Increased appetite
    - Increased sleep

\*Similar to cocaine withdrawal



# DISSOCIATIVE ANESTHETICS

## KETAMINE (Club drug: “K”, “Special K”, “Vitamin K”)

- FDA class III
- Shorter acting than PCP
- Oral or IV and hard to smoke
- The effects of a ketamine “high” usually last an hour but it can last for 4 – 6 hours and 24 – 48 hours are generally required before the user will feel completely “normal” again. Effects of chronic use of ketamine may take from several months to two years to wear off completely. Low doses (25 – 100mg) produce psychedelic effects quickly. Large doses can produce vomiting and convulsions and may lead to oxygen starvation to the brain and muscles; one gram can cause death. Flashbacks may even occur one year after use.



# INHALANTS/SOLVENTS

- DESIRED EFFECTS OF USE
  - Euphoria
  - Excitement
  - Altered perceptions
  - “A cheap high”



# INHALANTS/SOLVENTS

- INDICATIONS OF USE
  - Chemical odor
  - Paint stains
  - Hidden containers (whiteout, glue)
  - Drunk
  - Dizzy
  - Gait impairment
  - Slurred speech
  - Red running nose and eyes



# INHALANTS/SOLVENTS



# INHALANTS/SOLVENTS

- COMMON PROBLEMS
  - Nervous system
    - Ototoxicity (impaired hearing) - dimethyl benzene (toluene)
    - Peripheral neuropathy - hexane (glue), ketones and toluene
    - Multiple sclerosis like syndrome - nitrous oxide
    - Slowly reversible trigeminal neuropathy - trichloroethylene
    - Vertical nystagmus
    - Slurred speech
    - Ataxia
    - Impaired judgment
    - Lack of coordination



# INHALANTS/SOLVENTS

- COMMON PROBLEMS
  - Renal (related to the kidney)
    - Distal type tubular acidosis (difficulty with handling acids)
    - Decrease in potassium
    - Decrease in calcium
    - Hyperchloremic acidosis
    - Acute tubular necrosis (death of kidney tissue)
    - Chronic renal failure



# INHALANTS/SOLVENTS

- COMMON PROBLEMS

- Other systems

- Hepatic (Liver)

- Cancer

- Pulmonary (Lung)

- Pulmonary hypertension

- Bronchospasm

- Cardiac

- “Sudden sniffing death”

- Cardiac arrhythmias

- Dilated cardiomyopathy (trichloroethylene)

- Hematologic (Blood)

- Methemoglobinemia ( impacts on oxygen transport by the red blood cells seen in amyl nitrite use)



# INHALANTS/SOLVENTS

- COMMON PROBLEMS
  - Miscellaneous
    - Lead poisoning in gasoline inhalers
    - Pigmented hands and face in volatile hydrocarbon inhalers
    - Weight loss
    - Muscle weakness
    - Impulsive behavior



# ANABOLIC STEROIDS

- **FDA CLASS III**
  - Approved for
    - Metastatic breast cancer
    - Stimulate bone marrow in anemia
    - Decrease symptoms of hereditary angioedema
    - Stimulate sexual development in presence of testicular dysfunction
- **Over the Counter Medications**
  - DHEA (dehydroepiandrostenone)
  - Androstenedione (“Andro”)



# ANABOLIC STEROIDS

- PREPUBERTAL USE
  - Early closure of the growth plates
  - Decreased stature
  - Increased hirsutism (abnormal and increased hair growth)
  - Increased skin pigmentation
  - Increased penis size



# ANABOLIC STEROIDS

- “BODY BUILDERS”
  - Cycling
    - Pyramids - build up to a top dose and then taper down
    - Stacking - combine IV and oral preparations (up to 8 different drugs at one time)
      - Injectables have a low association with liver toxicity unlike oral
  - Adjuvants
    - HCG to reduce suppression of androgens (limit decrease in testicle size)
    - Diuretics to decrease water retention



# ANABOLIC STEROIDS

- **EFFECTS**
  - Behavior
    - Euphoria
    - Aggression
    - Increased motivation
    - Impaired judgment



# ANABOLIC STEROIDS

- EFFECTS (continued)
  - Males and females
    - Hair loss
    - Mood swings
    - Acne
    - Difficulty urinating
    - Swelling of the hands and feet
    - Weight gain
    - Adenomas (benign tumors) in the liver (similar to the adenomas that birth control pills can cause)
    - Peliosis hepatitis ( blood filled cysts in the liver)



# ANABOLIC STEROIDS

- EFFECTS (continued)
  - Males
    - Testicular atrophy
    - Decrease in sperm count
    - Infertility
    - Baldness
    - Increased breast tissue
    - Increase risk of prostate cancer



# ANABOLIC STEROIDS

- EFFECTS (continued)
  - Females
    - Facial hair
    - Changes in menstrual cycle
    - Increase size of clitoris
    - Male pattern baldness
    - Deeper voice

\*SIDE EFFECTS IN WOMEN ARE USUALLY IRREVERSIBLE



# ANABOLIC STEROIDS

- **EFFECTS (continued)**
  - Laboratory data
    - Increase in hemoglobin/hematocrit
    - Increase in LD cholesterol
    - Increase or decrease in testosterone
    - Increase in liver functions
  - Thromboembolic (clot formation) disorder secondary to increase in hemoglobin; increase in BP and increase in platelet stickiness causing platelet clumps

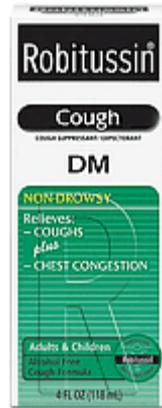
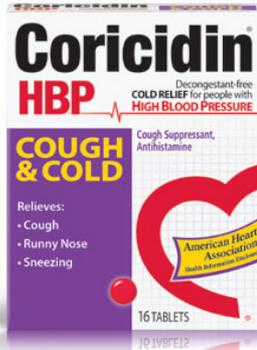


# ANABOLIC STEROIDS

- WITHDRAWAL
  - Craving
  - Fatigue
  - Depression, if severe can lead to suicide attempts
  - Restless
  - Anorexia
  - Insomnia
  - Decrease in libido
  - Headaches



# DXM - DEXTROMETHORPHAN



- ROBITUSSIN, CORICIDIN COUGH & COLD
  - Accessible and cheap
  - Drunk, high and tripping at the same time
  - Mega –dosing
    - Drink entire bottle or ingest 10 – 40 pills
    - Risk of acetaminophen (Tylenol) toxicity
    - Risk of NMDA toxicity
      - Olney’s Brain lesions
      - Learning and memory impairment
      - Visual perception impairment

