

Drug Abuse

lecture from Toxicology

12. 1. 2021

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Drug Abuse

- improper or excessive use
- psychological dependency (habituation)
 - drug necessary to maintain user's sense of well-being
- physical dependency
 - physical symptoms if intake reduced
- compulsive drug use
 - preoccupation with obtaining drug
 - rituals of preparing, using drug as important as drug effects
- tolerance
 - increasing doses needed to obtain drug effect

Drugs

I. Cannabis drugs

II. Opiates

III. Stimulants

IV. Hallucinogens and delirogens

V. Psychotropic drugs/barbiturates, benzodiazepines/

Cannabis Drugs

- *Cannabis sativa* var. *indica*
- δ -9-tetrahydrocannabinol (THC)
 - mean content 1–2 %

Cannabis herbal form – marijuana

- dry, shredded mix of flowers, stems, seeds and leaves of the hemp plant *Cannabis sativa*
- usually smoked as a cigarette or in a pipe
- the most commonly abused illegal drug

Hashish

- resin
- smoking in pipes with tobacco or peroral use
- euphoria, impairment in perception of time and reality, dyspnoea, tachycardia, hypertension
- optic hallucinations, psychotic disorders, memory impairment



Marijuana



- abusing marijuana can result in problems with memory, learning and social behavior
- interfere with family, school, work and other activities
- scientific studies are underway to test the safety and usefulness of cannabis for treating certain medical conditions
- glaucoma
- multiple sclerosis
- Alzheimer's disease
- cancer pain
- neurogenic pain

Opiates



- depressant alkaloids from raw opium poppy plant
- incising of poppy head and collecting a latex from the opium poppy *Papaver somniferum album*
 - Golden triangle (Barma, Thailand, Laos)
 - Golden crescent (Iran, Afganistan, Pakistan)
- euphory, later apathy, smooth muscle hypomotility (constipation, urine retention, sterility)
- **classical trias**: coma, breathing inhibition, small pupils (miosis)
- **heroin (diacetylmorphine)**
 - brown heroin (brown sugar) – adding of acid, smoking
 - white heroin (white powder) – intravenous application
- **braun (hydrocodone)**
- antidote: **naloxone**



Painkillers Abuse

- codein
- oxycodone (Oxycontin)
- hydrocodone (Vicodin)
- meperidine (Demerol)

Stimulants

- sometimes prescribed to treat obesity and attention-deficit hyperactivity disorder
- cocaine
- amphetamines
 - benzedrine (bennies)
 - dexedrine (dexies, copilots)
 - methamphetamine (ice, black beauties)
- ephedrine
- caffeine
- methylphenidate (Ritalin)

Stimulants

- euphoria
- hyperactivity
- alertness
- sense of enhanced energy
- anorexia

Overdose signs/symptoms

- euphoria, restlessness, agitation, anxiety
- paranoia, irritability, delirium, psychosis
- muscle tremors, rigidity
- seizures, coma
- nausea, vomiting, chills, sweating, headache
- elevated body temperature
- tachycardia, hypertension
- ventricular arrhythmias

Stimulants

Overdose complications

- hyperthermia, heat stroke
- hypertensive crisis
- acute myocardial infarction
- intestinal infarctions
- rhabdomyolysis
- acute renal failure

Chronic effects

- weight loss
- cardiomyopathy
- paranoia
- psychosis
- stereotypic behavior: picking at skin (“cocaine bugs”)

Stimulants

Cocaine

- bush Coca /*Erythroxylon coca*/
 - Peru, Bolivia, Equador, Columbia
- crack (cocaine-hydrochloride)
 - snuffing, application to the mucous membranes
 - smoking of free base
- biphasic effect: intense euphoria, psychomotoric activation, low appetite, aphrodisiac, later depression
- heart and brain stroke, lung toxicity, rhabdomyolysis, psychotic disorders



Stimulants

Amphetamine

Pervitin (methamphetamine)

Ecstasy

(3,4-methylenedioxymethamphetamine,
MDMA)

- euphoria, intensified sensation, tachycardia, hypertension, tremor, nystagmus
- hyperthermia, hypertension, arrhythmia, sweating, trismus and bruxism, convulsions, rhabdomyolysis, acute respiratory failure, disseminated intravascular coagulation
- anticonvulsive therapy, rehydration, active cooling



Stimulants

Khat

- chewing of leaves
/Catha edulis/
- smoking, powder in milk
- cathinone



Betel

- */Piper betle/*
- areca nuts */Areca catechu/*
are wrapped into the leaves
- arecoline



Hallucinogens

- produce altered/enhanced sensation
- effects highly variable depending on patient
- increased dose does not intensify effect
- toxic overdose virtually impossible

- some patients may experience “bad trips”
- depends on surroundings and emotional state
- paranoia, fearfulness, combativeness
- anxiety, excitement
- nausea, vomiting
- tachycardia, tachypnea
- tearfulness
- bizarre reasoning

Hallucinogens

Moderate Intoxication

- tachycardia
- mydriasis
- excessive sweating
- short attention span
- tremor
- hypertension
- fever

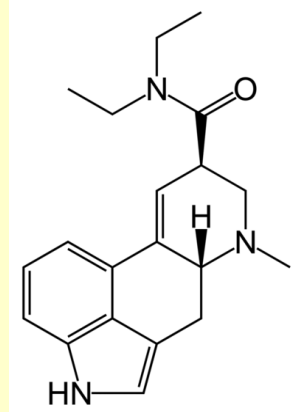
Life-threatening toxicity (rare)

- seizures
- severe hyperthermia
- hypertension, arrhythmias
- untreated hyperthermia can lead to hypotension, coagulopathy, rhabdomyolysis and multiple organ failure

Hallucinogens

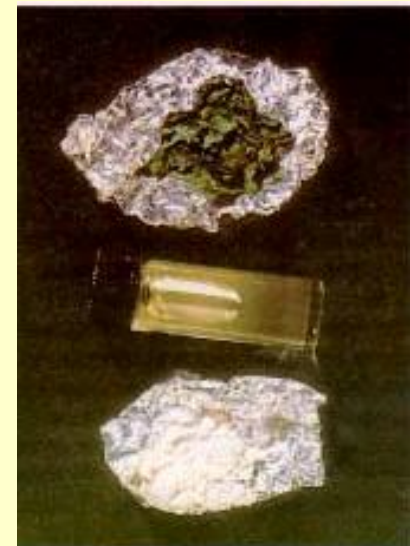
LSD (Lysergid)

- diethylamid of lysergic acid
- synthesized in 1938 by Dr. A. Hoffmann
- impregnated papers, cca 5x5 mm, so called **trips**
- ilusions, depersonalisation, derealisation, changes in perception of time and space
- excitation, high blood pressure, tachycardia



Phencyclidine (PCP)

- „angel dust“
- antagonist of NMDA receptor
- serious psychotic episodes with paranoid delusions and aggressive behaviour
- tachycardia, convulsions, hyperthermia, coma



Hallucinogens

Liberty cap

/Psilocybe semilanceata/ bohémica/

- psilocybin
 - genera Stropharia, Psilocybe, Conocybe
- consumption of fresh, pickled or dried mushrooms
- variable content of active substance
!!!



Golden toad */Bufo periglenes/*

- bufotenine

Harmal */Peganum harmale/*

- harmine



Halucinogens

Fly amanita

Amanita muscaria/

– ibotenic acid, muscimol



Panther cap

Amanita pantherina/

– muscarine



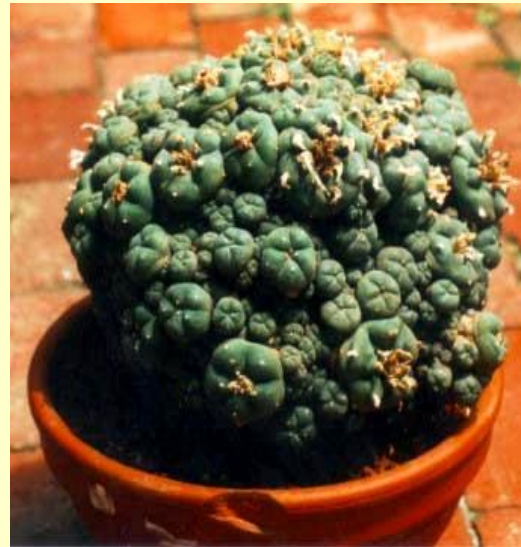
Hallucinogens

Peyote

/Lophophora williamsii/

– mescaline

- cactus pulp – oil



Jimson weed

/Datura stramonium/



Mandrake

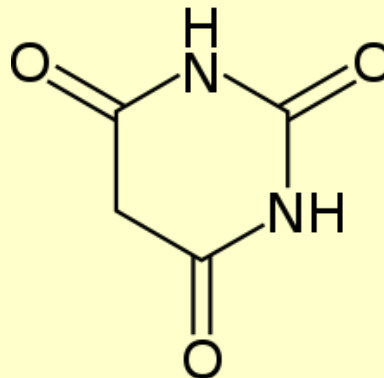
/Mandragora officinarum/

– hyoscyamine, atropine,
scopolamine



CNS Depressants Barbiturates

- introduced in 1903
 - anxiolytics, sedatives and anticonvulsants
 - quickly became major health problem
 - in 1950's-60's barbiturates were implicated in overdoses; were responsible for majority of drug-related suicides
- phenobarbital (Luminal)
 - pentobarbital
 - amobarbital (Amytal)
 - secobarbital (Seconal)



Barbiturates

Initial overdose presentation

- slurred speech
- ataxia
- lethargy
- nystagmus
- headache
- confusion

As overdose progresses

- depth of coma increases
- respiratory depression occurs
- peripheral vasodilation occurs
 - hypotension, shock
 - hypothermia
- blisters (bullae) form on skin

Barbiturates

Withdrawal signs/symptoms

- anxiety
- trembling
- diarrhea
- nausea
- vomiting
- seizures

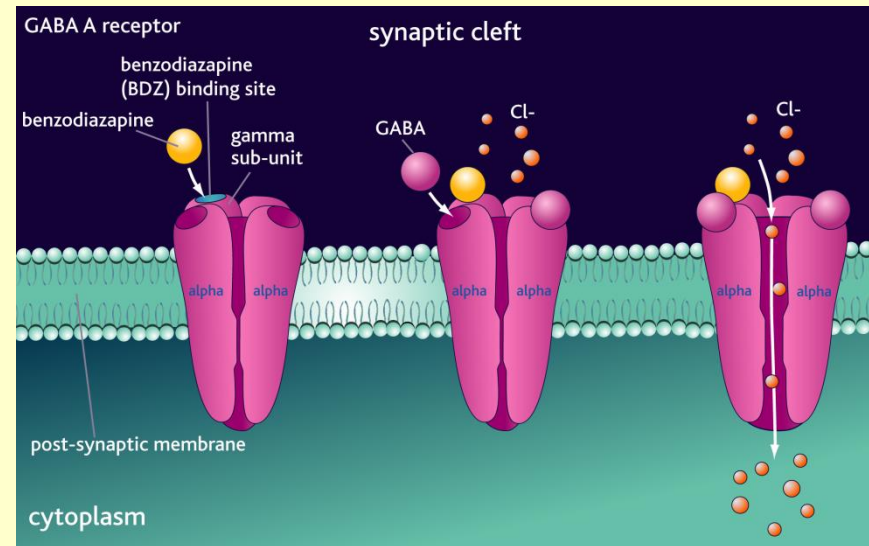
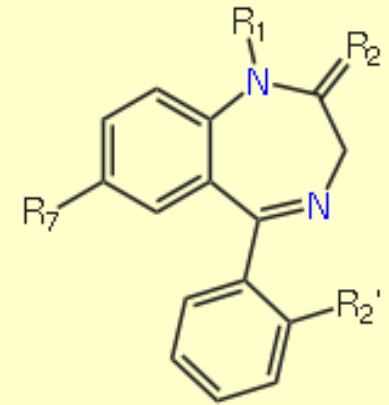


Barbiturates

- early deaths
 - respiratory arrest
 - cardiovascular collapse
- delayed deaths
 - acute renal failure
 - pneumonia
 - pulmonary edema
 - cerebral edema

CNS Depressants Benzodiazepines

- used to treat anxiety disorders
- sometimes for the short-term treatment of insomnia
- diazepam (Valium)
- lorazepam (Ativan)
- midazolam (Versed)
- chlorodiazepoxide (Librium)
- flunitrazepam (Rohypnol)
- triazolam (Halcion)
- clonazepam (Rivotril)



Benzodiazepines

Adverse Effects

- weakness
- headache
- blurred vision
- vertigo
- nausea
- diarrhea
- chest pain

Overdoses

- relatively safe taken by themselves, even in overdose
- can be lethal with other CNS depressants especially alcohol
- antidote is flumazenil
- produce withdrawal syndrome similar to barbiturate withdrawal