

## DRUGS I



What drug is  
associated  
with this  
image?

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marijuana

Drug?

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Opium



Drug?

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LSD

According to 2013 stats, 4 people in Canada are killed each day in car crash including driver under influence of drugs, alcohol or both

- 369 (15.2%) - driver under the influence of alcohol,
  - 683 (28.1%) - driver under the influence of drugs other than alcohol.
  - 399 (16.4%) - driver under the influence of drugs and alcohol.
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Hospitalization costs of substance abuse increased between 2006 and 2011 :

- Alcohol - \$118M > \$145M (45-60 year olds)
  - Opioids - \$9M > \$15M (25-44 year olds)
  - Cannabis - \$9M > \$14M (15-24 year olds)
  - Cocaine decreased to \$13M
- 

Canadian Legislation : The controlled Drugs and Substances Act and related sections of the Criminal code provide Canadian Drug Legislation.

### **What is a Drug – narcotics**

- ➔ A drug is a natural or synthetic substance that is used to produce physiological or psychological effects in humans or other higher order animals.
- ➔ Narcotic drugs are analgesics, meaning they relieve pain by depressing the central nervous system response. This effects : blood pressure, pulse rate and breathing rate.
- ➔ regular use : physical dependence
- ➔ most common : opium, from poppies

### **Opiates**

- Morphine is readily extracted from opium and is used to synthesize heroin.
- Addicts frequently dissolve heroin in water by heating it in a spoon, and then use this for injection.
- Heroin produces a “high” that is accompanied by drowsiness and a sense of well-being that generally lasts for three to four hours.
- Codeine is also present in opium, but it is usually prepared synthetically from morphine : it feels like world collapses and comes out new when this is taken. It is synthesized and then used in painkillers.



The latex thing when dries becomes opium. Morphine is like 10-18% of these compounds.

### Other Opiates

- OxyContin, with the active ingredient oxycodone, is not derived from opium or morphine, but does have the same physiological effects on the body as do opium narcotics.
- Methadone, which is pharmacologically related to heroin, appears to eliminate the addict's desire for heroin while producing minimal side effects.

### Fentanyl : best pain-killer

- Fentanyl patches are on the World Health Organization's List of Essential Medicines, the most effective and safe medicines needed in a health system.
- Fentanyl – 75 times stronger than morphine with stronger derivatives, e.g. carfentanil – illegally made and mixed with heroin or cocaine
- Fentanyl causes thousands of deaths each year due to overdoses • Narrow therapeutic index (the difference between a therapeutic dose and a toxic dose is not large
- Manslaughter charges are now being laid against some dealers in Ontario • requires a specific set of circumstances
- Recognize and temporarily reverse an opioid overdose
  - Naloxone can temporarily reverse an opioid (e.g. fentanyl) overdose. – anti drug for opium

### Fentanyl and Forensics

Drug identification – forensic chemistry, toxicology ◦ Fentanyl Test: Neogen Corporation's Fentanyl ELISA (Enzyme-Linked ImmunoSorbent Assay) test kit

- "Rapid detection of fentanyl, fentanyl analogues, and opioids for on-site or laboratory based drug seizure screening using thermal desorption DART-MS and ion mobility spectrometry" Sisco et al 2017 Forensic Chemistry 4: 108-115

➔ Fentanyl even if said as the best pain killer is very very dangerous.



The amount of substances in these bottles is the amount that is need in a person's body to get killed. Carfetanyl is so dangerous that even when to three small particles of it, and the person is dead.

## Hallucinogens

- Another class of drugs is hallucinogens; marijuana is the most well-known member of this class.
- Hallucinogens cause marked changes in normal thought processes, perceptions, and moods.
- Marijuana is the most controversial drug in this class because its long-term effects on health are still largely unknown.

## Marijuana

- Marijuana refers to a preparation derived from the plant Cannabis.
- The chemical substance largely responsible for the hallucinogenic properties of marijuana is known as tetrahydrocannabinol, or THC.
- The THC content of Cannabis varies in different parts of the plant, generally decreasing in the following sequence: resin, flowers, leaves, with little THC in the stem, roots or seeds.
- The THC-rich resin is known as hashish.
- Marijuana does not cause physical dependency, but the risk of harm is in heavy, long-term use

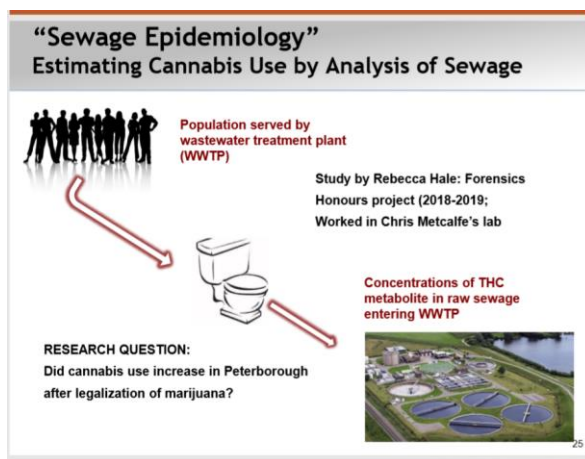
### Marijuana: Newer Forms of Consumption

- shatter, wax, errl, oil, live resin, or dabs
- distillates

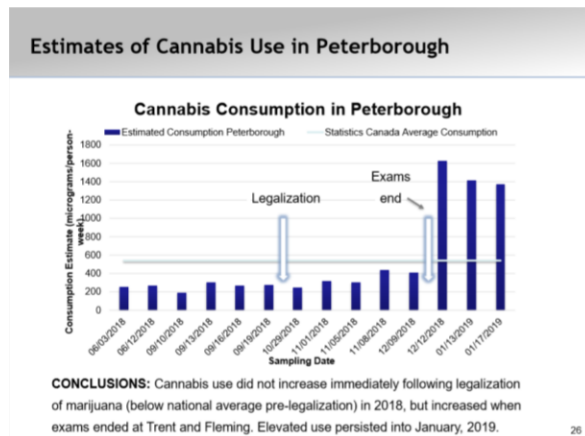



## Impact of legalization – Forensics

- Impaired driving
- Road-side assessments – standardized field sobriety test
- Saliva tests – Dräger drug test 5000 • Not accurate at low temperatures, false positives
- Testing a newer device from Abbott called ‘Sotaxa’
- Answer in 5 minutes not impacted by cold
- Blood tests
- Forensic Science involved in correct identification and tracking to source
- Chemistry, toxicology and DNA analysis
- Most crops are clones – specific clones have been linked to organized crime



The substance we consume, ultimately gets out of our body into these sewage. So that's how people come to know who takes it.



There was this test started before the legalization when they realised that they could measure the consumption of drugs by the amount found in sewage. They realised that there was not much variations in the consumption but the consumption levels increased rapidly after exams ended at Trent and Fleming.

## Other Hallucinogens

➔ Other hallucinogens include LSD, mescaline, PCP, psilocybin, and MDMA (Ecstasy). LSD is synthesized from lysergic acid and can cause hallucinations that can last for 12 hours.

➔ Phencyclidine, or PCP, is often synthesized in clandestine laboratories and is often smoked, ingested, sniffed.

➔ Phencyclidine is often mixed with other drugs, such as LSD, or amphetamine, and is sold as a powder ("angel dust"), capsule, or tablet.

➔ Oral intake of PCP first leads to feelings of strength and invulnerability, which may turn to depression, tendencies toward violence, and suicide.

## St Anthony's Fire

Ergotism, long term ergot poisoning usually from eating rye or other cereals infected with *Claviceps purpurea* or ergoline (ergot alkaloid) drugs

Historically associated with bewitchment – 15th century Germany, Salem witch trials

## Ergotism

## **Convulsive Symptoms**

- Convulsive symptoms include painful seizures and spasms, diarrhea, paresthesias (tingling), itching, mental effects including mania or psychosis, headaches, nausea and vomiting.
- Usually the gastrointestinal effects precede central nervous system effects.
- Hallucinations resembling those produced by LSD although ergot's hallucinations more strongly resemble a delirious and psychotic state.

## **Gangrenous symptoms**

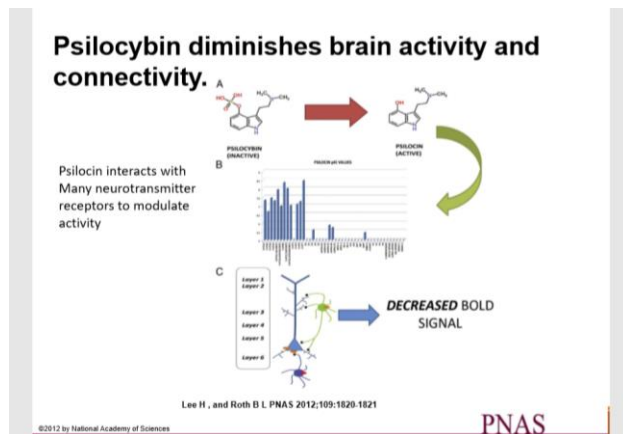
- The dry gangrene is a result of vasoconstriction induced by the ergotamine-ergocristine alkaloids of the fungus.
  - Affects more poorly vascularized extremities - fingers and toes.
  - Symptoms include desquamation or peeling, weak peripheral pulses, loss of peripheral sensation, edema and ultimately the death and loss of affected tissues.
- <http://en.wikipedia.org/wiki/Ergotism> Several drugs have been derived from ergot chemicals

## **Psilocybin**

Psilocybin is produced by over 200 fungal species, most potent are members of the genus *Psilocybe* (*P. azurescens*, *P. semilanceata*, and *P. cyanescens*)

Psilocybin is a prodrug that is converted to psilocin, which has mind-altering effects similar (in some aspects) to those of LSD, mescaline, and DMT.

The effects include euphoria, visual and mental hallucinations, changes in perception, a distorted sense of time, and spiritual experiences, and can include possible adverse reactions such as nausea and panic attacks.



## Depressants

Depressants are class of drugs that depress the functions of the central nervous system.

Depressants calm irritability and anxiety and may induce sleep.

These include alcohol (ethanol), barbiturates, tranquilizers, and various substances that can be sniffed, such as airplane glue, model cement, or aerosol gas propellants such as freon

## ALCOHOL

Alcohol (ethyl alcohol) enters the body's bloodstream and quickly travels to the brain, where it acts to suppress the brain's control of thought processes and muscle coordination.

Barbiturates, or "downers," are normally taken orally and create a feeling of well-being, relax the body, and produce sleep.

Tranquilizers, unlike barbiturates, produce a relaxing tranquility without impairment of high-thinking faculties or inducing sleep.

Sniffing has immediate effects such as exhilaration, but impairs judgment and may cause liver, heart, and brain damage, or even death.

## Stimulants

The drug classification of stimulants includes amphetamines, sometimes known as "uppers" or "speed," and cocaine, which in its free-base form is known as crack.

Stimulants are substances taken to increase alertness or activity, followed by a decrease in fatigue and a loss of appetite.



Amphetamine and methamphetamine, often injected intravenously, cause an initial “rush,” followed by an intense feeling of pleasure.

This is followed by a period of exhaustion and a prolonged period of depression.

Cocaine, extracted from the leaves of *Erythroxylon coca*, causes increased alertness and vigor, accompanied by the suppression of hunger, fatigue, and boredom.

**Crack** is cocaine mixed with baking soda and water, then heated.

**Crack** is often smoked in glass pipes, and like cocaine stimulates the brain’s pleasure center

## **Club Drugs**

The term club drugs refers to synthetic drugs that are used at nightclubs, bars, and raves (all-night dance parties).

Substances that are often used as club drugs include, but are not limited to, MDMA (Ecstasy), GHB (gamma hydroxybutyrate), Rohypnol (“Roofies”), ketamine, and methamphetamine.

GHB and Rohypnol are central nervous system depressants that are often connected with drugfacilitated sexual assault, rape, and robbery.

Methylenedioxymethamphetamine, also known as MDMA or Ecstasy, is a synthetic mind-altering drug that exhibits many hallucinogenic and amphetamine-like effects.

Ecstasy enhances self-awareness and decreases inhibitions, however, seizures, muscle breakdown, stroke, kidney failure, and cardiovascular system failure often accompany chronic abuse.

Ketamine is primarily used as a veterinary animal anesthetic that in humans causes euphoria and hallucinations.

Ketamine can also cause impaired motor functions, high blood pressure, amnesia, and mild respiratory depression.

## **Anabolic Steroids**

Yet another category of drugs is the anabolic steroids.

These are synthetic compounds that are chemically related to the male sex hormone testosterone.

Anabolic steroids are often abused by individuals who are interested in accelerating muscle growth.

Side effects include unpredictable effects on mood and personality, depression, diminished sex drive, halting bone growth, and liver cancer.