

Unit-4: Narcotics, Drugs and Psychotropic Substances

[Definition of narcotics, drugs and psychotropic substances. Broad classification – Narcotics, stimulants, depressants and hallucinogens. General characteristics and common example of each classification. Natural, synthetic and semi-synthetic narcotics, drugs and psychotropic substances. Designer drugs. Tolerance, addiction and withdrawal symptoms of narcotics, drugs and psychotropic substance]

DRUG According to “WHO” can be defined as **“A Drug is any substance that is used or proposed to be used to modify or explore physiological structures or pathological states for the benefit of the recipient.”** Eg: paracetamol, ciprofloxacin, sal-butamol, or it can be said that

A **drug** is a stuff which may have medicinal, intoxicating, performance augmenting or other effects, when taken or inserted into a human/animal body and which is not considered a food or a food supplement.

Classification of Drugs

On the basis of the purpose of their use, different drugs can be classified into followings:

- Therapeutic Drugs
- Psychoactive Drugs

Although both of these categories; often overlap. Due to the specific usage and wide range, psychoactive drugs are treated as a distinct class.

Therapeutic Drugs

A Therapeutic drug is a substance that has healing or preventive properties in relation to certain diseases, or is administered to enable a medical diagnosis.

The drugs in common therapeutic use that may be classified chiefly into following four categories:

1. **Analgesics and Antipyretics.** An analgesic is a type of drug that relieves pain. Eg. Aspirin and Paracetamol.
2. **Antihistaminics.** These are the drugs which antagonize the action of histamine. These are commonly used in allergic disorders and other conditions like common cold. Eg. Chlorcyclizine
3. **Antidepressants.** These are the drugs which are generally used in psychiatric disorders to treat the endogenous depression. These drugs have an initial sedative effect which is followed by an antidepressant effect within a week or more. Commonly used antidepressant drugs are: Imipramine, Amitriptyline, etc.
4. **Tranquilizers.** These are the drugs that produce a general tranquility without the impairment of high- thinking facilities or the inducement of a sleep. To reduce tension and anxiety of mental patients Tranquilizers like reserpine and chlorpromazine are useful.

Psychoactive Drugs

A **psychoactive drug**, **psycho-pharmaceutical** or **psychotropic drug** is a chemical substance that acts principally upon the central nervous system where it affects brain function, resulting in modification in perception, mood, consciousness, cognition and behaviour.

Classification

Generally used psychoactive drugs are:-

Narcotics, stimulants, Hallucinogens, Depressants

Narcotics	<ul style="list-style-type: none">• Opium• Morphine• Heroin
Depressants	<ul style="list-style-type: none">• Barbiturates• Tranquilizers
Stimulants	<ul style="list-style-type: none">• Amphetamine• Cocaine
Hallucinogens	<ul style="list-style-type: none">• LSD• Charas, Ganja• Mescaline

Fig 1. Classification of psychoactive drugs and their examples

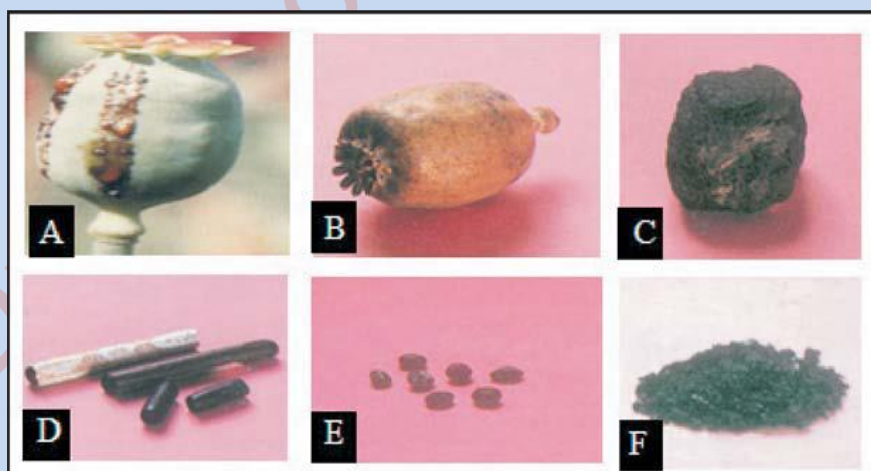


Fig. 2 Common narcotic drugs and psychotropic substances A. Opium pod showing dried opium. B. Dried opium pod. C. Curde opium. D. Opium sticks. E. Opium pellets. F. Burnt opium powder after smoking.

1) **Narcotics:** The term is originated from Greek word *narkotikos* that means ‘a state of lethargy’. This group comprises of substances that act on the CNS and bring relief from discomfort and produce sleep. The origin of most narcotics is opium, a sticky milky juice obtained from the unripe pod of poppy. Example: Opium, morphine, heroin, codeine, synthetic opiates, etc.

- **Morphine** is obtained from raw opium. It is normally administered by injection. It results in a euphoric state, with sleepy and relaxed appearance of the user. It is generally 3 to 5 times stronger than opium.
- **Heroin** (diacetylmorphine) is a white crystalline powder, which is derivative by adding two acetyl groups to the morphine, found in the opium. Heroin in impure form is known as Brown Sugar. It is 10-15 times more effective than morphine. It may be either injected or sniffed to cause similar effects as that of opium and heroin but with higher magnitude.
- **Codeine** is also a byproduct of morphine but is less effective as analgesic. It acts as a base in many pain relievers and cough remedies.



Fig. 3 Common narcotic drugs and psychotropic substances A. Morphine powder, ranges in colour from offwhite to dark brown. B. Crude morphine C. Morphine tablets. D. Morphine ampoules.

Signs and symptoms of Narcotic abuse

- Respiratory depression (shallow breathing),
- Small pupils, bloodshot eyes
- Nausea, vomiting
- Itching skin, flushed skin
- Constipation
- Poor judgment
- Confusion

2) **Stimulants** ("uppers"): Stimulants consist of substances that, stimulates the mind, wakes one up and euphoria (a feeling of well-being), but do not affect perception. These drugs are also referred in the terminology of "speed".

Examples: Amphetamines, methamphetamines, caffeine, nicotine, cocaine, etc.

- **Amphetamine** or its derivative methamphetamine may be injected direct into the blood stream through intravenous injection. The desire for a more intense experience is the chief motive behind this route of administration.
- Another type of amphetamine is **methamphetamine** called "speed" because of its rapid stimulation of central nervous system.

- **Cocaine** is also a potent stimulant that produces similar effects as that of amphetamines- namely, increased alertness, accompanied by suppression of hunger and fatigue. It is generally sniffed and is absorbed into the body by the mucous membrane of the nose.
- One other form of cocaine which is quite popular is “**crack**”. It is manufactured by heating the mixture of cocaine, baking soda and water. It is also snorted and produces similar effects like cocaine.



Fig.4 Amphetamine in powder, tablet and capsule forms

3) **Hallucinogens**: It includes psychedelics, dissociatives and delirants. This category comprises all those substances that produce distinct alterations in normal thought processes, perceptions and mood. There are a number of substances with varying chemical compositions that have hallucinogenic properties.

Examples: LSD (lysergic acid diethylamide), PCP (phencyclidine), DMT (dimethyltryptamine), mescaline, psilocybin, etc.

- **LSD** is synthesized from lysergic acid, a substance derived from ergot, which is a type of fungus that attacks certain type of grains. This is a very potent drug, only 25 mg is sufficient to start clear visual hallucinations in the mind that may last for about 12 hours. This drug produces noticeable changes in mood, leading to laughing and crying at the slightest provocation. Feeling of anxiety and tension always accompanied LSD use.
- On the other hand, **PCP** is synthesized by quite a simple chemical process, thus is much more easily available. PCP is frequently mixed with other drugs like amphetamine or LSD, and is sold as a Powder (“Angel Dust”), capsules or tablets, or as a liquid. The drug is smoked, ingested or sniffed.
- **Marijuana** is an example of a psychoactive drug that combines properties of each of these groups.
- **Cannabis plant** (charas, bhaang, ganja & hashish)

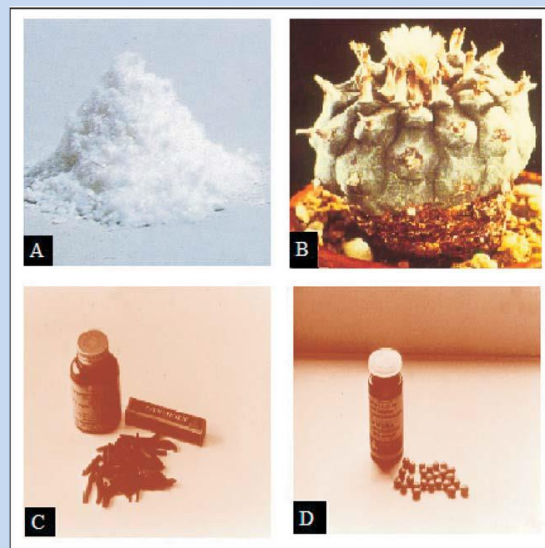


Fig. 5 A. Pure cocaine. B. Peyote Cactus (active compound mescaline). C. Lysergic Acid Diethylamide (LSD 25). D. L.S.D in the form of pills.

- 4) **Depressants** ("downers"), including sedatives, hypnotics, and narcotics. This category consist of all of the sleep inducing, calmative, anxiety-reducing, anesthetizing substances, which induces perceptual changes like dream sequences, and also often bring to the mind the feelings of euphoria.

Examples: Alcoholic beverages (ethanol), barbiturates, benzodiazepines, etc.

Like alcohol, **barbiturates** act on central nervous system to suppress its vital functions so relax, create a feeling of well being and produces sleep.

Barbiturates are usually administered by mouth. The average sedative dose is about 10-70 milligrams. There are about 25 barbiturate derivatives.

Some barbiturates are absorbed more slowly than others and are generally termed as **"Long acting barbiturates"** like Phenobarbital. On the other part, some barbiturates are absorbed rather quickly and are termed as **"Short acting barbiturates"** like Pentobarbital, Sec barbital, etc. Apparently, abusers prefer the faster acting ones.

Table 1: Common narcotic drugs and psychotropic substances and their symptoms (Read "Effect of Overdose" as "Tolerance")

Drug RUG	Trade or Other Names	Nature	Mode of Administration	Effect of Overdose	Symptoms	Mode of Action
Morphine	Morphia	Colourless crystalline substance	Oral and/or injection	75 mg.	Respiratory depression, hypotension, circulatory failure, coma, convulsions, renal failure	Analgesic/Ant i-diarrheal and euphorogenic with potential for addiction
Heroin	Diacetylm orphine/ smack/ brown sugar/gard	Colourless crystalline substance	Injection/smoking/inhalation/ sniffing	200– 500mg.	Coma, delirium, disorientation, drowsiness, muscle spasticity	Analgesic and euphorogenic with high potential for addiction
Cocaine	Crack	White crystalline powder	Oral/injection/ sniffing/ smoking	1.2g.	Dryness of mouth and throat, cramps in stomach, convulsions, death by respiratory failure	Stimulant with potential for addiction

Methaqualone	Mandrax/ Nidra	White powder	Orally in the form of tablet	3g.	Restlessness, insomnia, tremors, hallucinations, confusion, seizures	Euphoric action in the beginning causes addiction
Diazepam	Calmpose	White crystalline powder	Oral/Injection	100 – 500mg.	Bluish-colored lips and fingernails, blurred vision, confusion, depression, dizziness	Develops weakness, ataxia, drowsiness, respiratory depression
Barbiturate	Veronal, Luminal, Nembutal	White crystalline powder	Oral/Injection	3–5g.	Altered level of consciousness. Difficulty in thinking. Drowsiness or coma.	Depressant, death occurs from respiratory failure

Natural, synthetic and semi-synthetic narcotics

1. Natural sources

A crude drug is any naturally occurring, unrefined substance derived from organic (e.g. plant, animal, bacteria, fungi, lichens, organs, whole organisms) or inorganic (e.g. minerals, rocks kaoline, bentonite) sources intended for use in the diagnosis, cure, mitigation, treatment, prevention of disease or used to otherwise enhance physical or mental well-being in humans or animals. Crude drugs are the natural therapeutic products of biological and mineral origin and have not been advanced in value or improved in condition after harvest by any process or treatment except that necessary for proper preservation and packing.

Plant source: Plant source is the oldest source of drugs. Most of the drugs in ancient times were derived from plants. Almost all parts of the plants are used i.e. leaves, stem, bark, fruits and roots.

- Leaves: Tobacco leaves give nicotine.
- Flowers: Poppy papaver somniferum gives morphine.
- Fruits: Sennapodgives anthracine, which is a purgative.
- Seeds: Seeds of NuxVomicagive strychnine, which is a CNS stimulant.

Animal sources: Drugs obtained from animals sources are (i) whole animals, (ii) their organs, and (iii) glandular products (thyroid organ) and extract (liver), etc. Animal's

products and extracts include venoms and toxins from snakes, spiders, scorpions, insects, etc. are polypeptides (a-bungarotoxin from cobras) or non-peptide toxins (tetrodotoxin from the puffer fish). They have been used as lead compounds in the development of novel drugs, e.g., teprotide, a peptide from the Brazilian viper, was the lead compound for the development of the antihypertensive.

2. Semi-synthetic sources

In semi-synthetic drugs, the nucleus of drug obtained from natural source is retained but the chemical structure is altered. Sometimes semi-synthetic processes are used to prepare drugs when the natural sources may yield impure compounds or when the synthesis of drugs (complex molecules) may be difficult, expensive, and commercially unviable. Some examples are semi-synthetic human insulin and 6-aminopenicillanic acid derivatives.

3. Synthetic sources

When the nucleus of the drug from natural source as well as its chemical structure is altered, we call it synthetic. Most of the synthetic drugs are prepared synthetically, i.e., by chemical process (reaction) with the help of the knowledge of phytochemical investigation. Advantages of synthetic drugs include their chemical purity, simple and cost-effective method of preparation and high quality. Since the pharmacological activity of a drug depends on its chemical structure and physical properties, more effective and safer drugs can be prepared by modifying the chemical structure of the prototype drug. • Examples include aspirin, oral antidiabetics, antihistamines, amphetamine, chloroquine, chlorpromazine, general and local anesthetics, paracetamol.

Designer drugs

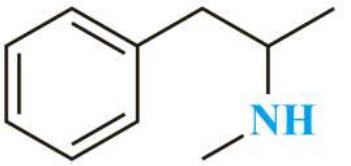
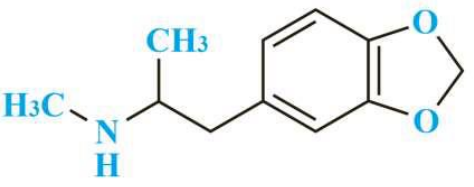
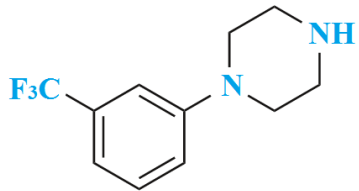
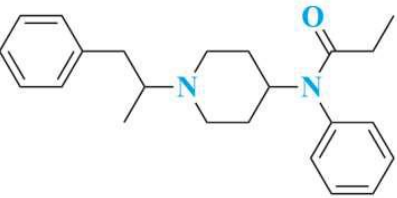
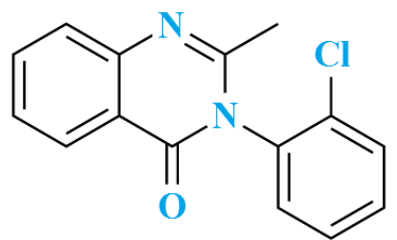
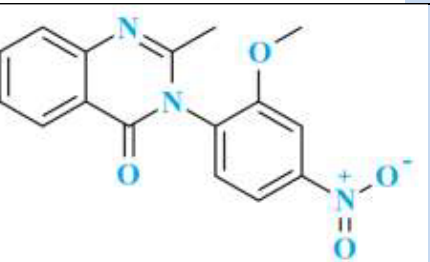
Designer drugs are produced in laboratories, the majority resembling drugs legally restricted for distribution and possession. They share one common trait, producing Psychoactive Effects that can range from cannabis like, psychomotor stimulation, dissociative anaesthesia to hallucinogenic. Examples include mephedrone, methylone, MDPV, ethylphenidate etc.

They are retailed economically as bulk powders, and are deceptively labelled as *Research Chemicals*, *Bath Salts*, *Plant Food*, *Incense*, *food*, or by other names and labelled as “not for human consumption”.

Classification of Designer Drugs

- **Cathinones Designer Drugs:** The drugs most found in “bath salts” are substituted Cathinones
- **Cannabinoid Designer Drugs:** All designer cannabinoids mimic the psychoactive effects of marijuana, with some considerably more potent than marijuana. Their metabolites may differ biologically from marijuana.
- **Hallucinogens Designer Drugs**

Some Notable Designer Drugs

Name	Structure
Methamphetamine	
Methylenedioxymethamphetamine (MDMA)	
Trifluoromethylphenylpiperazine (TFMPP)	
α- Methylfentanyl	
Mecloqualone	
Nitromethaqualone	
Phencyclidine	