

SOURCES OF CRUDE DRUGS

Sources of Crude drugs

- ▶ 5 sources
 - ▶ PLANT SOURCES
 - ▶ ANIMAL SOURCES
 - ▶ MARINE SOURCES
 - ▶ MINERAL SOURCES
 - ▶ MICROBIAL SOURCES

PLANT SOURCES

- ▶ A number of plants have medicinal qualities and have been used for centuries as drugs or drug sources.
- ▶ Although the earliest plant source for drugs was the leaf, other parts of plants (e.g., barks, fruits, roots, stem, wood, seeds, blossoms, bulb etc.) were also later exploited for drug extraction.
- ▶ Where the product is used without further processing e.g., ground leaves or bark, boiled concoctions or powdered sap, the substance is called crude drug.
- ▶ The table below shows some pharmacologically active principles or drugs derived from various parts of a plant

NAME OF THE DRUG	SOURCE	USES
1. Vinca (Vinblastine)	Leaves of <i>Catharanthus roseus</i> , Apocynaceae	Anticancer agent
2. Rauwolfia (Reserpine)	Roots of <i>Rauwolfia serpentina</i> , Apocynaceae	Antihypertensive agent
3. Cinchona (Quinine)	Barks of <i>Cinchona sps</i> , Rubiaceae	Antimalarial agent
4. Ashwagandha (withanine)	Roots of <i>Withnia somnifera</i> , Solanaceae	Sedative, Antirheumatic
5. Datura(Scopolamine)	Leaves of <i>Datura stramonium</i> , Solanaceae	Anti-cholinergic, treats duodenal ulcers
6. Momordica (Momordicin,charantin)	Fruits of <i>Momordica charantia</i> , Cucurbitaceae	Hypoglycemic agent
7. Henna (Lawsonia)	Leaves of <i>Lawsonia inermis</i> , Lythraceae	Antifungal agent

NAME OF THE DRUG	SOURCE	USES
8. Aloes (Barbaloin)	Juice of leaves of <i>Aloe barbadensis</i> , Liliaceae	Purgative
9. Vanilla (Vanillin)	Unripened fruits of <i>Vanilla planifolia</i> , Orchidaceae	Flavouring agent
10. Chirata(gentiopicrin)	Entire plant of <i>Swertia chirata</i> , Gentianaceae	Stomachic, Anti-pyretic
11. Black pepper(piperine)	Fruits of <i>Piper nigrum</i> , Piperaceae	Aromatic, Stimulant
12. Coriander (coriandrol)	Fruits of <i>Coriandrum sativum</i> , Umbelliferae	Aromatic, Flavouring agent, Carminative
13. Tulsi (Eugenol)	Leaves of <i>Ocimum sanctum</i> , Labiatae	Anti-bacterial, Insecticidal, immunomodulatory agent, stimulant
14. Sandal wood oil (Santalol)	Wood of <i>Santalum album</i> , Santalaceae	Used in perfumes, treatment of dysurea

ANIMAL SOURCES

NAME OF THE DRUG	SCIENTIFIC NAME (SOURCE)	USES
1.Honey	<i>Apis mellifera</i> (honey bees), Apidae	Demulcent, nutrient, sweetening agent
2.Cantharides	Dried beetles, <i>Cantharis vasicatoria</i> , Meloidae	Counter irritant, rubefacient
3.Mylabris	Female insects of <i>Mylabris pustulata</i>	Counter irritant, rubefacient
4. Cod liver oil	Extracted from the livers of <i>Gadus morrhua</i> , Gadidae	Source of vitamins,Used in treatment of rickets & TB
5. Shark liver oil	Extracted from the livers of <i>Hypoprion brevirostris</i>	Used in Vit. A deficiency, used in sunburn ointments
6. Spermaceti	Special cavity in the head of sperm whale, <i>Physeter macrocephalus</i> , Physeteridae	Preparation of cosmetic creams
7. Lard	Abdominal fat of <i>Sus scrofa</i> , Suidae	Ointment base

ANIMAL SOURCES

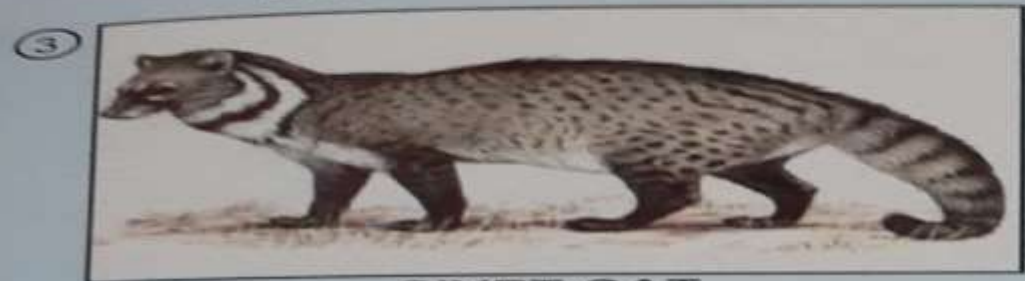
NAME OF THE DRUG	SCIENTIFIC NAME (SOURCE)	USES
8. Suet	Abdominal fat of <i>Ovis aries</i> (Sheep), Bovidae	Ointment base
9. Lanolin	Fat from the wool of <i>Ovis aries</i> (Sheep), Bovidae	Absorbable Ointment base
10. Gelatin	Skin, ligaments, tendons and bones of animals	Hard and soft gelatin capsules
11. Hirudin	<i>Secretions</i> <i>Hirudo medicinalis</i> (leech), Hirudinidae	Anti-coagulant
12. Cobra venom	Secretions of poisonous glands of <i>Naga naga</i> , Colubridae	Local haemostatic
13. Civet	Specialised scent glands of <i>Viverra zibetha</i> (civet cat), Viverridae	Fixative of flavours
14. Musk (Kasturi)	Prenuptial follicles of <i>Moschus moschiferus</i> , Cervidae	Treats hysteria, perfumery



CANTHARIDE
Cantharis vesicatoria



CASTOREUM
Castor canadensis



CIVET CAT
Viverra zibetha



COBRA
Naja naja



COCHINEAL
Coccus cacti



CODFISH
Gadus morrhua



HONEY BEE
Apis mellifera



HOG (PIG)
Sus scrofa

9



LAC INSECT
Lacifer lacca

11



MUSK DEER
Moschus moschiferous

13



SHARK FISH
Hypoprion brevirostris

15



SILK WORM
Bombyx mori

10



LEECHES
Hirudo medicinalis

12



MYLABRIS
Mylabris cichorii

14



SHEEP (MARINO)
Ovis aries

16



SPERM WHALE FISH
Physeter microcephalus

Microbial sources

- ▶ A large number of natural products from microbial sources are used as pharmaceutical excipients and others are used as important drugs or as nutritional supplements. Several life-saving drugs have been historically derived from microorganisms
- ▶ Bacteria, fungi and moulds are important microbial sources
- ▶ Following are some of the examples of drugs from microbial sources
- ▶ **Bacitracin** from *Bacillus subtilis*
- ▶ **Chloramphenicol** from *Streptomyces venezuelae*
- ▶ **Streptomycin** from *Streptomyces griseus*
- ▶ **Neomycin** from *Streptomyces fradiae*
- ▶ **Penicillin** from *Penicillium notatum*
- ▶ **Griseofulvin** from *Penicillium griseofullivum*
- ▶ **Gentamicin** (Aminoglycosides) obtained from *Micromonospora* sps
- ▶ **Amphotericin B** from *Streptomyces nodosus*
- ▶ **Tetracyclin** from *Streptomyces aureofaceins*

- ▶ **Tobramycin** obtained from *Streptomyces tenebrarius*
- ▶ **Polymyxin** from *Bacillus polymyxa*
- ▶ **2. Enzymes from microbial sources**

Microbial sources	Enzymes	Uses
<i>E-coli</i>	L- asparginase	treats acute lymphocytic leukemia
<i>Serratia</i>	Serratio-peptidase	Anti-inflammatory, especially enhance anti-biotic effects
<i>Bacillus subtilis</i>	Sutilains	Used in the treatment of burns

- ▶ From *Saccharomyces cerevisiae*, **Yeast** is obtained, mostly used in baking and brewing industries
- ▶ **3. Pharmaceutical excipients from microbial sources**
- ▶ **Xanthan** (polysaccharide gum) secreted by *Xanthomonas campestris*
- ▶ **Dextran** (polysaccharide of glucose synthesized by lactic acid bacteria) *Leuconostoc mesenteroides*
Streptococcus mutans, Lactobacillus brevis)
- ▶ **Curdian** (β -1,3-glucan polymer) product of *Agrobacterium*

MINERAL SOURCES

- ▶ Drugs from mineral source include both metallic and non-metallic substances like kaolin, chalk, diatomite kieselgurh, bentonite talc, borax etc
- ▶ Minerals or their salts are useful pharmacotherapeutic agents against different ailments
- ▶ E.gs: Ferrous sulfate in iron deficiency anemia
- ▶ Magnesium sulfate as purgative
- ▶ Magnesium trisilicate, aluminum hydroxide and sodium bicarbonate as antacids
- ▶ Zinc oxide ointment as skin protectant, in wounds and eczema
- ▶ Gold salts (solganal, auranofin) as anti-inflammatory and in rheumatoid arthritis
- ▶ Selenium as anti-dandruff
- ▶ Radioactive isotopes of iodine, phosphorus, gold, etc. are employed for the diagnosis/treatment of diseases, particularly malignant conditions

MINERAL SOURCES

NAME OF THE DRUG	MAIN CONSTITUENT	USES
1. Asbestos	Calcium & magnesium silicates	Bacterial filters, fireproof gloves and clothing
2. Bentonite	Zinc oxide and ferric oxide	Suspending agent, emulsifier
3. Calamine	Zinc oxide and ferric oxide	Skin protectant, astringent
4. Fueller's earth	Aluminium magnesium silicate	Dusting powder for decoloring of oils, filter
5. Kaolin (porcelain clay)	Hydrated aluminium silicate	Adsorbent, as filter aid

MINERAL SOURCES

NAME OF THE DRUG	MAIN CONSTITUENT	USES
6. Kieselguhr(diatomaceous-earth)	Aluminium silicate	Filter aid for clarifying liquids
7.Mica	Aluminium silicate	Insulator
8.Paraffins	Saturated hydrocarbons	Ointment bases
9.Prepared chalk	Calcium carbonate	Antacid, preparation of tooth powder & dusting powders
10.Shilajit	Herbomineral	Aphrodisiac
11.Talc	Hydrated magnesium silicate	Lubricant, dusting powder, filter aid

MARINE SOURCES

- ▶ Coral, sponges, fish, and marine microorganisms produce biologically potent chemicals with interesting anti-inflammatory, anti-viral, and anticancer activity
- ▶ E.gs: Curacin A from marine cyanobacterium (*Lyngbya majuscula*)
- ▶ Eleutherobin from coral (*Eleutherobia sp*)
- ▶ Discodermolide from marine sponge (*Discodermia dissolute*)
- ▶ Bryostatins from marine animal (*Bugula neritina*)
- ▶ Dolostatins from marine gastropod mollusk (*Dolabella auricularia*)

MARINE SOURCES

NAME OF THE DRUG	SOURCE	USES
1. Palythoxin	<i>Palythoa sps</i>	Vasoconstriction
2. Halitoxin	<i>Haliclona viridis</i> (sponges)	Antitumour
3. Cytosine arabinoside	<i>Caribbean sponges</i>	Human acute Leukemia
4. Holothurins	<i>Holothurians</i> (sea cucumbers)	Cardiotonic, Haemolytic & antifungal properties
5. Laminine	<i>Laminaria aungustata</i> (<i>Marine algae</i>)	Hypotensive agent
6. Saxitoxin	<i>Saxidomus giganteus</i>	Hypotensive agent
7. Spongosine	<i>Cryptothia crypta</i> (Caribbean sponges)	Reduces heart rate

MARINE SOURCES

NAME OF THE DRUG	SOURCE	USES
8. Manolide	Sponges	Anti-inflammatory
9. Tholpin	Annelida	Anti-microbial agent
10. Flexibilide	Soft coral	Anti-inflammatory
11. Holotoxin	Sea cucumbers	Anti-microbial agent
12. Tetrodotoxin	Liver and ovaries of puffer fishes	Anti-spasmodic agent
13. Cycloeuodesmol	Red algae	Anti-biotic agent
14. Agar	<i>Gelidium amansii</i> (Red algae)	Laxative, Bacteriological culture