

## Lab 1

### Introduction to pharmacognosy

#### Objectives:

The aim of this lecture is to understand

- General introduction and terms used in pharmacognosy and their clinical uses and differences between Pharmacognosy & Pharmacology.
- Definitions & Basic Principles of Pharmacognosy.
- Classification of drugs vegetable.
- Classification of drugs.
- General understanding the main characteristics of herbal medicines.

#### We need to distinguish between 2 terms

##### Pharmacology:

- Deals with drugs in general regardless they are synthesized or natural.
- Deals with pharmacokinetics & Pharmacodynamics.

**Pharmacognosy** (derived from Greek pharmakon, '**Drug or Medicine**', and, gnosy '**knowledge**'). Is the study of chemical physical and biological properties of **drugs from natural sources**.

##### Pharmacognosy science related with:

- Natural Sources such as Plants, Animals, Microorganisms and Fungi
- Taxonomy of plants & the natural sources of drugs.
- Distribution of natural products in the world.
- Description of plants such as: Tree (Salix), Shrub (Catharanthus) Perennial ( Peppermint ) .
- Identification of natural resources
- The active compound or active groups. like: (Glycosides, Alkaloids, Volatile Oils, Tannins, etc ) .
- The biosynthesis with in natural resources & storage places of the active constituents in organisms (Plants, animals ....etc).
- The used part from the natural sources in medicine and pharmacy as : Leaf ( Mint , Digitalis ) , Roots ( Liquorice ) , Seeds ( Coffee bean ) , Bark ( Cinnamon ) .

- Collection & Storage of the part used.
- Physical, Chemical & Biological properties of the scribed for a limited duration active constituent.
- The Correct prescription of natural drug in the treatment of the disease.

## Definitions & Basic Principles

**Pharmacopoeia:** BP (British Pharmacopoeia) is a book containing directions for the identification of samples and the preparation of compound medicines and publishing by the authority of a government or medical or pharmaceutical society.

**Drug:** is a natural or synthetic substance used in the treatment, cure, prevention, or diagnosis of disease or used to otherwise enhance physical or mental wellbeing. Drugs may be prescribed for a limited duration, or on a regular basis for chronic disorders. The drug should be included in the official pharmacopoeia.

**Crude Drugs:** Are drugs originated from plant, animal kingdom, minerals they contain more amount of active constituent. Crude means mixture of compounds not pure. The medical action of crude extracts might be due to interaction of active compounds. Or due to one active compound. Crude drugs obtained from natural sources such as plants, animals, fungi, microorganisms, Marin and minerals. Crude drugs are used as it is with no processing.

**Extract:** Is a substance made by extracting part of a raw material, often by using a solvent such as Ethanol or Water. Extracts may be solid as tinctures or in powder form. (The aromatic principles of many spices, nuts, herbs, fruits, etc., and some flowers, are marketed as extracts, among the best known of true extracts being almond, cinnamon, cloves, ginger, lemon, nutmeg, peppermint, pistachio, rose, spearmint, vanilla, violet, and wintergreen.)

**Extractives (derivatives):** This term deals with the principle constituents that found in natural substances by many methods like (Extraction, distillation .....etc.) this methods are responsible for the medicinal importance of natural substances and crude with notified these extractives are found whether a. single or mixture constituents.

Ex:

The plant Mint is a (Natural herb), the leaf of this plant (also natural substance), after drying, dried leaf (also natural substance). The dried leaf is considered crude when expressed to drying process is stilled as found in nature (There are no changes have been made to their molecular structure). Dried leaves are considered as crude drug when they used to treatment the disease (like stomach inflation pain).

Dried leaf when exposed to extraction process, extractives like Menthone (this is one of the principle constituents in the dried leaf).

Natural products/compounds: are small or medium molecular weight organic compounds of natural origin: plants, microbes (fungi and bacteria), marine organisms and even frog skins and insects.

In pharmacognosy, natural products were studied for their biological origin, extraction, pharmacology, clinical use and role in drug discovery (may be modified chemically).

### **Classification of drugs**

The classification of drugs for study: vegetable drugs are usually arranged for study in one or other of the following five ways:

- 1- Alphabetical: using either Latin or English names
- 2- Taxonomic: families, genera and species
- 3- Morphological: either organized drugs (leaves, flowers, seed, herbs.....etc) or unorganized (extracts, gums, resins, oils ...etc.)
- 4- Pharmacological or therapeutic uses
- 5- Chemical e.g. alkaloids, glycosides, volatile oils .....etc

### **Botanical Nomenclature**

In the 18th century, Latin was universal language of scientists. Carlos Linnaeus (1707-1778) was a botanist and compulsive organizer. He was the founder of the botanical nomenclature system. Nomenclature system may include plants place of origin, leaf, bud, branch of flower description, special characteristics or even named after a person. The botanical nomenclature system is still worldwide used till now with many new plants discovered and many changes. His ideas in classification have influenced generations of biologists during and after his own life time. In his nomenclature the first Latin word spelled with capital letter indicated the genus. The second name not capitalized pinpoints the species. Then plant family with capital letter.

E.g. Belladonna ست الحسن

Botanical name: Atropa belladonna (family: Solanac)

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There are a number of cards or sheets you have to recognize the botanical name; family name local name part used active compound, basic structure, dosage form and therapeutic use.

### 1- Cinchona

Botanical name: *Cinchona succirubra*

family name: Rubiaceae

Local name: الكينينة

Active compound: Alkaloid quinine

Dosage form: tablets

Therapeutic use: malaria



### 2-DIGITALIS

Botanical name: *Digitalis lanata*

family name: Scrophulariaceae

Part used: Dried leaves

Local name: الكشتبان زهرة

Active compound: Cardio tonic glycoside

Dosage form: tab., drops, injection.

Therapeutic use: cardio tonic glycoside (increase the tone of heart muscle)



### 3- FENNEL

Botanical name:

Family name: Umbelliferae

Part used: Fruit, seeds

Local name: حبة حلوة

Active compound: Volatile oil

Dosage form: syrup

Therapeutic use: Flavoring agent and carminative



### 4- BLACK PEPPER

Botanical name: *Piper nigrum*

Family name: Piperaceae

Part used: unripe fruit



Local name: الفلفل الاسود

Active compound: Volatile oil

Dosage form: powder, ointment

Therapeutic use: stimulant, irritation and febrifuge

### **5- GLYCYRRHIZA**

Botanical name: Glycyrrhiza glabra

family name: Leguminosae

Part used: ROOT

Local name: السوس

Active compound: saponin glycoside (glycyrrhizin)

Therapeutic use: demulcent, expectorant, laxative



### **6-COFFEE**

Botanical name: Coffea arabica

Family name: Rubiaceae

Part used: seeds

Local name: القهوة

Active compound: caffeine

Therapeutic use: CNS stimulant



### **7-cinnamon**

Botanical name: Cinnamomum zeylanicum

family name: Lauraceae

Part used: bark

Local name: الدارسين

Active compound: aldehyde Volatile oil

Dosage form: solution and ointment

Therapeutic use: carminative



**8- SENNA**

Botanical name: *Cassia acutifolia*

Family name: leguminosae

Part used: leaf and pods

Local name: السنامكي Active

compound: Anthraquinone glycoside

Dosage form: tablet

Therapeutic use: cathartic or laxative

**9- Cascara**

Botanical name: *Cascara sagrada*

family name: Rhamnaceae

Part use: bark

Active compound: Anthraquinone glycoside

Dosage form: liquid extract, tab.

Therapeutic use: laxative

**10-Papaver**

Botanical name: *Papaver somniferum*

Family name: Papaveraceae

Part used: ripe capsules

Local name: الخشخاش

Active compound: alkaloid e.g. morphine, papaverine, codeine

Dosage form: tab, syrup.

Therapeutic use: narcotic, analgesic, antitussive and antispasmodic

**11-Ephedra**

Botanical name: *Ephedra sinica*

Family name: Gentaceae

Part used: entire plant or overgrown portion

Local name: عسل النند

Active compound: alkaloidal amine

Dosage form: cap., Inj., Tab. And syrup



Therapeutic use: bronchodilator, mydriatic

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### 12-MENTHA

Botanical name: *Mentha piperita*

Family name: Labiatae

Part used: leaves

Local name: النعناع

Active compound: Volatile oil

Dosage form: ointment, syrup.

Therapeutic use: flavor, carminative, counter irritant

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### 13-CARAWAY

Botanical name: *Carum carvi*

Family name: Umbelliferae

Part used: Fruit

Local name: كراوية

Active compound: Volatile oil

Dosage form: solution

Therapeutic use: carminative, antacids, digestive, antispasmodic

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### 14-Belladonna

Botanical name: *Atropa belladonna*

Family name: Solanaceae

Part used: leaves

Local name: ست الحسن

Active compound: atropine, hyosine, hyoscyamine

Dosage form: tab., Inj., drops, syrup.

Therapeutic use: antispasmodic, mydriatic





**15-ERGOT**

Scientific name: *Claviceps purpurea*

Family name: Claviceptaceae

Part used: dried sclerotium

Local name: الممهاز

Active compound: indole alkaloid

Dosage form: tab., Inj.

Therapeutic use: oxytocic, migraine treatment

**16- RAUWOLFIA**

Botanical name: *Rauwolfia serpentina*

Family name: Apocynaceae

Part used: ROOT

Local name: راؤلفية

Active compound: indole alkaloid

Dosage form: tab.

Therapeutic use: hypotensive, sedative

**17- HAMAMELIS (WILCH HAZEL)**

Botanical name: *Hamamelis virginiana*

Family name: Hamamelidaceae

Part used: leaves

Active compound: tannins

Dosage form: decoction or infusion

Therapeutic use: astringent, homeostatic

**18- NUX VOMICA**

Botanical name: *Strychnos nuxvomica*

Family name: Loganiaceae

Part used: dried ripe seed

Local name: جوز القي

Active compound: alkaloid

Therapeutic use: central stimulant in physiology and neuroanatomical research.



### **Use of Herbal Medicine**

The use of herbal extracts is common to all forms of indigenous systems of medicine and most of the world's population still relies on plants for the majority of their healthcare requirements. The use of these remedies is extensive, increasing, and complex. In several surveys 20–33% of the UK population claimed to regularly use Complementary and Alternative Medicine CAM alone or in addition to orthodox or conventional medicine and treatments. In the UK, usage is particularly frequent amongst those who are over-the-counter medicines-users.

In the United States, an estimate showed that 24% of the general population regularly take herbal products. In 2006, about 63% of US residents over 50 used CAM (and 77% did NOT discuss it with their doctor!)

The use is increasing..

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