220 PHG

Lecture 1
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## The Assessment Tasks During the Semester

<table>
<thead>
<tr>
<th>Assessment task</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major exam I</td>
<td>20</td>
</tr>
<tr>
<td>Major exam II</td>
<td>20</td>
</tr>
<tr>
<td>Homework</td>
<td>10 (5+5)</td>
</tr>
<tr>
<td>Biweekly quiz</td>
<td>10 (2.5 each)</td>
</tr>
<tr>
<td>Final exam</td>
<td>40</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
Study of the structural, physical, chemical character of the drugs
• Originated from vegetables, animals and minerals.
• Along with their History, cultivation of the medicinal plants.
• Collection and other particulars related to the treatment and preparation to the market.

Pharmacognosy = Pharmacon (Drug)
= Gignosco (To know) first coined by Johann Adam Schmidt (1811).
-Seydler 1815
The ancient Egyptians 3000 B.C. were experts in using drugs for curing diseases.

The healing of the sick was undertaken by priest doctor and pharmacist "Son" who prescribed and prepared medicines.

Crude drugs of vegetable origin used included Aloes, Gum, Myrrh, Poppy, Pomegranate, Colocynth, Linseed, Squill, Coriander, Onion, Anise, Melon, Castor, etc...
The first recorded prescriptions were found in Egyptian tombs. These were the **Hieratic papyri**, **Ebers papyrus**, the **Gynecologic papyrus**.
The Babylonian medicine was known (Laws of Hamorabi 772 B.C.).

the drugs used were mainly of vegetable origin.

The drugs used include 250 materials of plant, and 180 materials of animal source. Many of these drugs were known to the ancient Egyptians.
The "Riveda" and Ayurveda, contained the sacred medicinal plants.

The collection of plant materials was done only by an innocent, pure, religious person.

The fresh plants were considered to be the most effective.

The most celebrated Indian drugs were; Sandal wood, Clove, Pepper, Cardamom, Caraway, Ginger, Benzoin, Cannabis, Castor oil, Sesame oil, Aloes, etc...
Beside the famous **acupuncture**, the Chinese medicine is very acknowledged for the herbal medicine.

The **Pen Ts'ao Kang Moa** 1000 B.C. contained an incredible number of medicinal plants and drugs of animal origin.

Their book includes many recipes for every disease. Among the plants and minerals highly esteemed for its magic health including power were; Ginseng, Rhubarb, Ephedra, Star Anise, Pomegranate, Aconite…. Opium is a very old Chinese drug for diarrhea and dysentery.
Pythagoras (560 B.C.) used drugs as Mustard and Squill, etc.

Hippocrates (466 B.C.) was familiar with numerous drugs, and wrote "Corpus Hipocraticum 460 B.C.".

The Greek Empire was followed by that of the Romans Dioscorides who was a Greek by birth he was the first to describe drugs and his work "Greek Herbal of Dioscorides" included 5000 medicinal plants in addition to animal and mineral drugs.
• **Pliny** who lived about the same time as Dioscorides, was also an eminent author of natural history.

• **Galen** (134- 200 A.C.) was a pharmacist and to him is ascribed the use of "Galenical preparations".
In Islamic writings were found the first beginnings of chemistry, the name of which is derived from an Arabic word "Kemia"; as were also such familiar words alcohol and alkali.

The Arabs added numerous new plants and medicaments to those already known to the Greeks and Romans.

In their days, pharmacy attained its highest reputation and became an independent branch of medicine.

It is interesting to note that the first dispensary was opened in Baghdad, the center of trade in those days.
The dispensary was made of Sandal wood and named "Sandalia".

Rhazey (850-932 A.C.) who was born at Rai in Persia was the director of Baghdad hospital in the days of El-Mansour.

He published a famous book "Alhawi Kabeer".
Abu Al Hosayn Ibn-Sina (980-1037 A.C.) whose name was latinised to Avicenna. He was one of the most eminent and gifted Arabian physicians.

His "Canoon Fi Elteb" has been described as the most famous medical text ever written and as having dominated the medical schools of Europe and Asia and served as the chief source of medical knowledge for 5 centuries, till the 15th century.
Ibn Al-Baitar (1197-1248 A.C.) was the best Arabian pharmacognosist and botanist and ranked with Dioscorides in that respect. His book "Jame-ul-Muffradat" contains description of 2000 drugs.

Sheikh Dawood El-Antaki wrote a book named "Tazkaret Uli Al-Albab", now known as "Tazkaret Dawood Alantaki" which describes several hundred herbs besides drugs of animal and mineral origin.
THE 18TH CENTURY, PHARMACOGNOSY

- Johann Adam (1759-1809)
- Linnaeus (naming and classifying plants)
THE ERA OF PURE COMPOUNDS
(IN 1803, A NEW ERA IN THE HISTORY OF MEDICINE)

- Isolation of morphine from opium
- Strychnine (1817)
- Quinine and caffeine (1820)
- Nicotine (1828)
- Atropine (1833)
- Cocaine (1855)
In the 19th century, the chemical structures of many of the isolated compounds were determined.

In the 20th century, the discovery of important drugs from the animal kingdom, particularly hormones and vitamins.

Microorganisms have become a very important source of drugs.
It is used for those natural products such as plants or part of plants, extracts and exudates which are not pure compounds
Types of Drugs Derived from Nature

1- Entire plants or animals:
Mentha, Lobelia, Cantharidis, Cochineal.

2- Entire organs of plants
Senna, Clove, Fennel, Linseed, Quassia, Cinchona, Liquorice.
3- Natural products or compounds isolated from nature (unorganized): opium, aloes, tragacanth, resins, musk, beeswax, gelatin.

4- Nutraceuticals, or “functional foods”: garlic, spices
There are two origins for each drug; the natural or biological, as well as, the geographical origin.

The commercial origin is also of interest in case of certain drugs.
The natural origin of a drug is the plant or animal yielding it, if a plant, botanical origin or botanical source and if an animal, zoological origin or source.
Is due to Swedish biologist Linnaeus, in this system the first name, which is always spelt with Capital letter, denotes the genus.

whilst the second name denotes the species. It is however, still equally correct to use capital where the species is named after a person.

Thus the species of Cinchona named after Charles Ledger, who brought its seed from Brazil 1865, is known as Cinchona Ledgeriana.
The specific name is usually chosen to indicate:

1- Some striking characteristics of the plant:

a- *Conium maculatum* (maculate = spotted) (stem with reddish, spotted patches).

b- *Glycyrrhiza glabra* (glabrous = smooth). Refers to the fruit of this species which is a smooth pod.


d- *Atropa belladonna* (bella = beautiful, donna = lady) the juice of the berry placed in the eyes causes dilatation of the pupils, thus giving a striking appearance).
2- A characteristic colour:

a- *Piper nigrum* (= black)

b- *Veratrum viride* (= green)

c- *Citrus aurantium* (= golden yellow)

d- *Digitalis purpurea* (= purple)

e- *Digitalis lutea* (= yellow)

3- An aromatic plant or certain aroma:

a- *Myritaceae fragrans* (having a fragrant, nice aroma)

b- *Caryophyllus aromaticus* (refers to the aroma)
4- A geographical source or history of a drug:
   a- *Cannabis indica* (growing in India)
   b- *Tamarinds indica* (India)

5- A Pharmaceutical activity or an active constituents:
   a- *Papaver somniferum* (sleep inducing)
   b- *Strychnos nux vomica* (from two latin words, nut causing vomiting)
   c- *Ipomoea purga* (laxative).

6- A general meaning or a special indication
   a- *Allium sativum* (= cultivated)
   b- *Triticum vulgare* (= wild)
The generic name may also allude to certain characters of the plant:

*Atropa*, from Atropos, meaning flexile, the name of the Greek fate who cuts the thread of life, alluding to the poisonous characters of the drugs.

*Glycyrrhiza* is from glucose= sweet, riza = root.
• The geographical source or Habitat is the region in which the plant or animal yielding the drug grows.

• Plants growing in their native countries are said to be indigenous to these regions, e.g. *Aconitum napellus* of the mountainous regions of Europe, *Hyoscyamus muticus* of Egypt, *Cannabis sativa* of India.

• Plants are said to be naturalized when they grow in a foreign land or in locality other than their native home.
The commercial origin of a drug refers to its production and its channels of trade.
FOR DETAILED DESCRIPTION OF EACH INDIVIDUAL DRUG THE FOLLOWING POINTS ARE TO BE CONSIDERED

1- **Origin**: including biological and geographical sources, a knowledge of the history and name of the drug.

2- **Cultivation and preparation**: including details of cultivation of the medicinal plants, methods of collection, drying, packing and other treatment of the drug during its preparation for the market.
3- **Characters**: including the physical characters such as dimensions, surface characters, fracture and the sensory characters such as colour, odour and taste. The histological characters which help in the identification of the drug in powdered form, are of fundamental importance.
4- **Constituents and tests:** constituents include both the reputed active constituents and also other constituents and reserve food materials. Chemical identity tests are based on the nature of constituents.

5- **Adulterants:** including materials added fraudulently and matter which has become associated with the drug owing to carelessness in handling during collection, preparation, packing and transport.

6- **Evaluation** of the physical and chemical characters of the drug.

7- **Uses** and application of the drug in medicine.
It provides guideline for the manufacturing, quality control, packaging, storage, dose regimen, indication, contraindication etc of different natural products/medicine

- **USP** – United States Pharmacopoeia
- **BP** – British Pharmacopoeia
- **German Commission E monographs**
- **ESCOP**- European Scientific cooperative for phytotherapy.
- **AHP**- American Herbal Pharmacopoeia
- **WHO**- World health organization
Monograph

The descriptive material pertaining to any drug, therapeutic agent included in the pharmacopoeia is known as the monogram.

The monogram of a drug includes the following information on the drug:

official title, synonyms, definition, description, collection or preparation, identity tests, tests for adulterants, method of assay, storage, uses and doses.
Compounds from natural sources play four significant roles in modern medicine:

1. They provide a number of extremely useful drugs that are difficult, if not impossible, to produce commercially by synthetic means.

2. Natural sources also supply basic compounds that may be modified slightly to render them more effective or less toxic.
IMPORTANCE OF NATURAL PRODUCTS

3. Their utility as prototypes or models for synthetic drugs possessing physiologic activities similar to the originals.

4. Some natural products contain compounds that demonstrate little or no activity themselves but which can be modified by chemical or biological methods to produce potent drugs not easily obtained by other methods.
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<thead>
<tr>
<th>Active constituents</th>
<th>Plants</th>
<th>Pharmacological activity</th>
</tr>
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<tbody>
<tr>
<td>Caffeine</td>
<td><em>Camellia sinensis</em></td>
<td>CNS stimulant</td>
</tr>
<tr>
<td>Cocaine</td>
<td><em>Erythroxylum coca</em></td>
<td>Anaesthetic</td>
</tr>
<tr>
<td>Ephedrine</td>
<td><em>Ephedra sp.</em></td>
<td>Sympathomimetic</td>
</tr>
<tr>
<td>Pilocarpine</td>
<td><em>Pilocarpus jaborandi</em></td>
<td>Parasympathomimetic</td>
</tr>
<tr>
<td>Ergometrine</td>
<td><em>Claviceps purpurea</em></td>
<td>Oxytocic</td>
</tr>
<tr>
<td>Ergotamine</td>
<td></td>
<td>Vasoconstrictor</td>
</tr>
<tr>
<td>Ergotoxine</td>
<td></td>
<td>Vasodilator</td>
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