

Pharmacognosy

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1. Introduction to Pharmacognosy

DEFINITION

- **Pharmacognosy** is the study of medicines derived from natural sources.
- The term pharmacognosy was introduced by Seydler in 1815.
- It is derived from the two Greek words: (i) *Pharmakon*, which means a **drug** and (ii) *gnosis*, which means to **acquire knowledge of**.

SCOPE OF PHARMACOGNOSY

- Pharmacognosy gives a sound knowledge of the vegetable drugs under botany and animal drugs under zoology which includes plant taxonomy, plant breeding, plant pathology, and plant genetics.

Historical Development of Pharmacognosy

<i>Contributors</i>	<i>Milestone</i>
Sumerian clay slab	The ancient evidence (approximately 5000 years old) of natural plants for medical preparation has been found on a Sumerian clay slab in Nagpur. It comprised 12 recipes for preparation referring to over 250 plants and some alkaloids, such as poppy and henbane
Shen Nung (2500 BC)	The emperor taught China to cultivate hemp as a fiber and later on for food and oil and wrote Chinese book on roots and grasses "Pen Ts'ao which consists of dried parts as 365 drugs, such as the great yellow gentian, ginseng, Jimson weed, cinnamon bark, and ephedra
Babylonians (about 3000 BC)	Illustrated medical treatment of plants with their properties
Pen Ts'ao Kang Mu (3000–2730 BC)	He has written Chinese Pharmacopoeia including recipes and therapeutic uses of many Chinese traditional medicines
Egyptian contributors (1550 BC)	Ebers Papyrus is the most important medical papyri of ancient Egypt known as Papyrus Ebers which is a collection of 800 prescriptions referring to 700 plant species. It provides good knowledge of human anatomy and medicinal uses of hundreds of plants which made them capable of embalming dead bodies for making mummies, e.g. henbane, mandrake, opium, pomegranate, castor oil, aloe, onion, fig, willow and coriander
Charaka (300 BC)	Charaka wrote famous Ayurvedic treatise Charaka Samhita. It includes a rational approach to the causation and cure of disease with introduction of objective methods of clinical examination
Sushruta (600 BC)	Sushruta Samhita contains 184 chapters and description of 1120 illnesses, 700 medicinal plants, a detailed study on anatomy, 64 preparations from mineral sources and 57 preparations based on animal sources
Hippocrates (460–377 BC)	He is regarded as the Father of medicine for his contribution to human anatomy, physiology and development of medicinal plants. He classified medicinal plants on the basis of physiological action. His literature consists of 300 medicinal plants, like garlic against intestine parasites, opium, henbane, and deadly nightshade were used as narcotics, oak and pomegranate as astringents
Aristotle (384–322 BC)	He described medicinal importance of about 500 plants with their description and uses
Theophrastus (371–287 BC)	He is known as father of botany, founded botanical science with his books "De Causis Plantarum"—Plant Etiology and "De Historia Plantarum"—Plant History. He classified more than 500 medicinal plants, like cinnamon, mint, pomegranate and cardamom
Aulus cornelius celsus (25 BC–50 AD)	In his work "De medica", he quoted approximately 250 medicinal plants, such as aloe, henbane, flax, poppy, pepper, cinnamon, cardamom
Dioscorides (1st century AD)	The Greek physician also known as "The Father of Pharmacognosy," published five volumes of a book, entitled 'De Materia Medica' in 78 AD, which offers plenty of data on collection, storage and uses of 944 drugs, 600 are of plant origin, with descriptions of the outward appearance, locality, mode of collection, making of the medicinal preparations, and their therapeutic effect.



Contributors	Milestone
Pliny the Elder (23–79 AD)	He wrote about approximately 1000 medicinal plants in his book “Historia naturalis”.
Galen (130–200 AD)	The most distinguished Greek pharmacist cum physician, described methods of preparing pharmaceutical formulations containing plant and animal drugs. He compiled the first list of drugs with similar or identical action (parallel drugs), which are interchangeable and introduced several new plant drugs in therapy that Dioscorides had not described, for instance, <i>Uvae ursi folium</i> , used as an uroantiseptic and a mild diuretic
Charles the great (742–814 AD)	He quoted 100 plants such as sage, sea onion, iris, mint, common centaury, poppy, marsh mallow
Paracelsus (1493–1541)	He was a Swiss physician and firm believer of astrologically, supported Signatura doctrinae that is continuously emphasizing belief in observations. According to this belief, God designated his own sign on the healing substances, which indicated their application for certain diseases. For example, <i>Hypericum perforatum</i> L. would be beneficial for treatment of wounds and stings as plant leaves appears as if they had been stung. On the basis of his idea that the body was a chemical system which had to be balanced not only internally, but which also had to be in harmony with its environment, he introduced new chemical substances into medicine, like use of the metal mercury for the treatment of syphilis
Linnaeus (1707–1788)	He was a Swedish botanist considered as father of modern botany. He was first naturalist to classify plants and initiated two Latin names the identifying genus, with an initial capital letter, and species to classify all plants with an initial small letter. For the naming, a polynomial system was employed where the first word denoted the genus while the remaining polynomial phrase explained other features of the plant, e.g. the willow clusius was named <i>Salix pumila angustifolia antera</i>
Wilhelm adam sertürner (1783–1841)	The German pharmacist isolated alkaloids with many potent physiologically active compounds including quinine, atropine, cocaine, and tubocurarine
Schleiden (1804–1881)	He not only contributed to the knowledge of the structure of plants, but was the first to recognize that drugs of different origin might be determined by their cellular differences

AYURVEDA

- Ayurveda, the traditional system of medicine which is one of world’s oldest medical systems has been practiced over 6000 years.
- The word Ayurveda is derived from two words in Sanskrit *Ayus*, meaning life from birth to death, and *veda*, meaning knowledge or science.
- Ayurveda indicates the science by which life in its totality is understood. It is a way of life that describes the diet, medicine and behavior that are beneficial or harmful for life.

Contribution in Field of Ayurveda

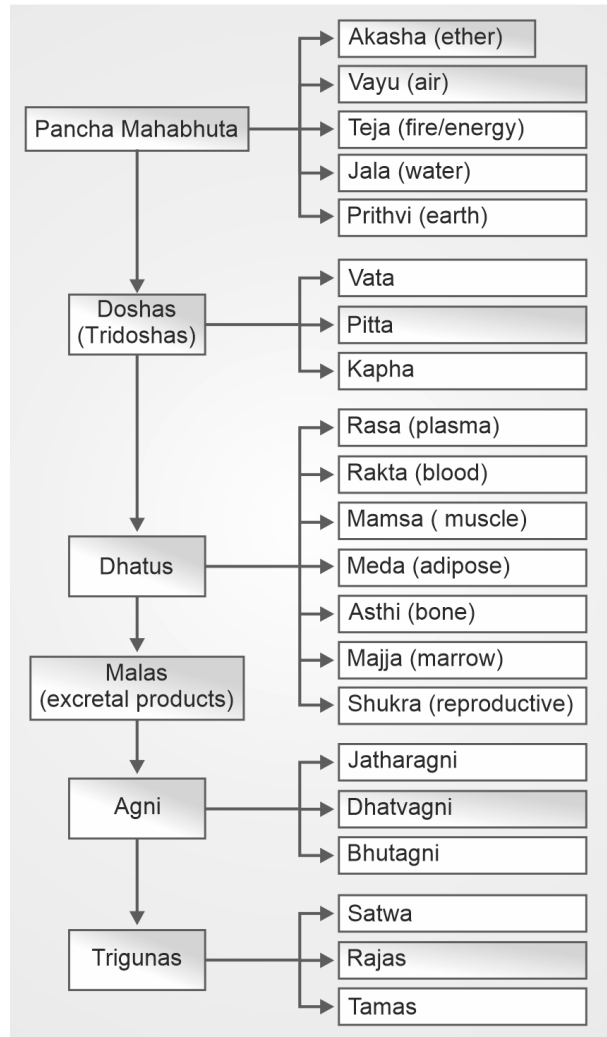
Charaka	Sushruta	Ashantanga hridaya
Charaka Samhita prime work on the basic concepts of Ayurveda is the oldest of the three and was probably first compiled around 1500 BC. It is a systematic work divided into eight Sthanas or sections, which are further divided into 120 chapters	Sushruta explains about sophisticated descriptions of diseases and surgical instruments. It represents Dhanwantri School of surgeons	The important authority in Ayurveda flourished about the seventh century AD is Vagbhatta of Sindh, His treatise called Ashtanga Hridaya. It is a combination of Surgery and Medicine

Eight Limbs of Asthanga Ayurveda

Kaya Chikitsa	Internal medicine	Agada Tantra	Toxicology
Shalaky Tantra	Diseases of eye, ear, nose and throat	Bhutavidya	Psychology and psychiatry
Shalya Tantra	Surgery	Rasayana	Rejuvenation
Kaumarabhritya	Paediatrics, obstetrics and gynecology	Vajikarana	Aphrodisiac/sexology

Contd...

APPROACH OF AYURVEDA



Siddha System of Medicine

- The word Siddha comes from the word Siddhi, meaning an object to be attained or perfection of heavenly bliss that is achievement.
- The Siddha system of medicine is based on remedies derived from the vegetable kingdom.
- The fundamental principle on which Siddha is guided is that "nature is man" and "man is nature" and thus both are essentially one.
- They are also the primordial elements, Bhutas known as Munn (solid), Neer (fluid), Thee (radiance), Vayu (gas), and Akasam (ether).

Eight Methods of Diagnosis in Siddha System of Medicine

- Pulse diagnosis
- Examination of the tongue
- Examination of the complexion
- Examination of the speech
- Examination of the eyes
- Examination of the palpitation
- Examination of the urine
- Examination of the stool

Unani System of Medicine

Unani system aims at restoring the equilibrium of various elements and faculties of the human body.

Principals and Philosophies

The proper functioning of human body depends on seven factors known as

Factors of Unani System of Medicine

These are:

Umoor-e-Tabaiya viz. Arkan/ Anasir	Elements
Mizaj	Temperament
Akhlat	Humors
Aaza	Organs
Arwah	Vital forces
Quwa	Faculties
Afaal	Functions

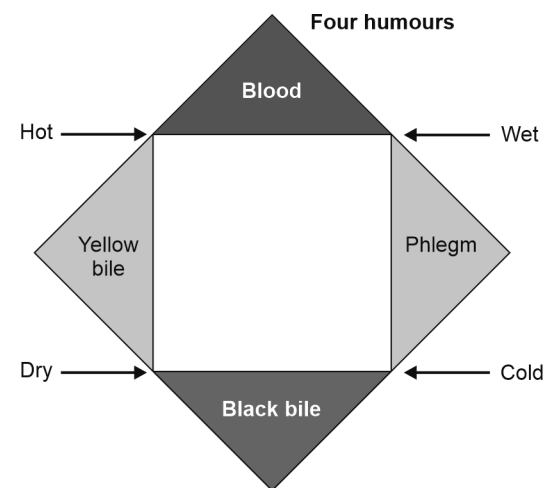


Fig. 1.1: Four humours in unani system of medicine

Six factors of health help in determining the state of a person. The primary six factors are examined in relation with health and disease. They are:

- The air of one's environment
- Food and beverages
- Movement and rest
- Sleep and wakefulness
- Eating and evacuation
- Emotion

HOMEOPATHY

- The term Homeopathy was coined by Hanhemann in 1807, which is derived from the Greek word "homeo", meaning like or similar and "pathos", meaning disease or suffering.
- Homoeopathy presents contemporary wisdom as it uses as medicine solutions that are diluted to a point beyond that which is measurable by normal scientific means.



Principles of Homeopathy

<i>Principles</i>	<i>Description</i>
Law of simila	It is based on the principle like cures like
Law of simplex	Homeopathic remedies should be given one at a time, i.e. a single and simple substance
Law of minimum	The minimum dose action is thus, appropriate as a gentle remedial effect and has led to the discovery of a more practical process called potentization
Doctrine of drug proving	Drug proving is a systematic investigation of pathogenic (disease-producing) power of medicine on healthy human being of different ages, both sexes and of various constitutions.
Theory of chronic disease	Cure is only possible by proper antimiasmatic treatment
Theory of vital force	The material organism without the vital force is capable of no sensation, no function, no self-preservation
Doctrine of drug dynamisation	The Principle of Dilution in Homeopathy is related with the process known as "dynamization" or "potentization", where a remedy is diluted in alcohol or water

2. Sources and Classification of Crude Drugs

Crude drugs, which are unrefined medicinal substances, are obtained from natural sources and can be classified based on their source and structure. They are primarily sourced from plants, animals, and minerals, and can be further divided into organized (cellular) and unorganized (non cellular) drugs.

CLASSIFICATION OF CRUDE DRUGS WITH THEIR BENEFITS AND DRAWBACKS

<i>Classification of crude drug</i>	<i>Benefits and drawbacks</i>
<p>Alphabetical classification The simplest way of classification and crude drugs are arranged in alphabetical order of their common names (English) and Latin names or vernacular names (local language names). This system of classification is accepted in pharmacopoeias like Indian Pharmacopoeia, British Pharmacopoeia, British Herbal Pharmacopoeia and dictionaries and reference books</p>	<p>Benefits</p> <ul style="list-style-type: none"> ▪ Easy system location, tracing and addition of drug entries ▪ No repetition of entries ▪ Devoid of confusion <p>Drawbacks There is no relationship between previous and successive drug entries Examples: <i>Curcuma zedoaria</i>, <i>Cassia acutifolia</i>, <i>Rauwolfia vomitoria</i>, <i>Styrax benzoin</i>, <i>Cinchona calisaya</i></p>
<p>Taxonomical classification Botanical classification and is based on principles of natural relationship and evolutionary developments. They are classified on basis of Kingdom, phylum, order, family genus and species</p>	<p>Benefits Helpful in studying evolutionary changes</p> <p>Drawbacks It cannot give detailed information about systematic pharmacognostic parameters like chemical constituents and biological activity It's insufficient to correlate evolutionary and systematic pharmacognostic parameters</p> <p>Thallophyta</p> <ul style="list-style-type: none"> ▪ Kingdom: Bacteria ▪ Phylum: Actinobacteria ▪ Class: Actinobacteria ▪ Order: Bifidobacteriales ▪ Family: Bifidobacteriaceae ▪ Genus: Bifidobacterium