Volgograd State Medical University
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Pharmacognosy as a science, its role in the practical activities of the pharmacist

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Pharmacognosy as a science, its role in the practical activities of the pharmacist.

1. Determination of pharmacognosy as a science and educational discipline.
2. Tasks of pharmacognosy nowaday.
3. Nomenclature of medicinal plants and medicinal plant materials.
4. Relationships of pharmacognosy with basic disciplines and specialized disciplines, its role in pharmacist’s practical activities.
5. The main stages in the development of pharmacognosy. Role of russian scientists in the development of pharmacognosy.

What Pharmacognosy is?

Pharmacognosy (*pharmakognosia*) is the science of medicinal plants, medicinal plant materials (MPM), products of its primary processing and some types animal derived medicinal materials (ADMM).

The name “Pharmacognosy” appeared only at the beginning of the 19th century and comes from the Greek words ***pharmakon*** - medicine, poison and ***gnosis*** - knowledge, science.

The name “Pharmacognosy” is believed to have been introduced by German chemist K. Seidler in 1815.

Objects of pharmacognosy

- **Medicinal plants** (plantae officinales) are plants as a source of medicinal plant materials.
- **Adulterated plants** are species that are close in systematic position or similar in morphological characteristics with medicinal plants, which can be confused with medicinal one.
- **Medicinal plant materials** - these are dried or freshly harvested whole plants or parts thereof, serving as raw materials for the manufacture of medicines.
- **Animal derived medicinal materials** - whole animals, their parts or other products, approved for use in medical practice or for the production of medicines.
- **Primary processing products of plants and animals** are essential and fatty oils, resins, gums and other materials derived from it.

Main tasks of pharmacognosy:

1. Investigation of medicinal plants as **sources of pharmacologically active substances** .
2. Search for new plants containing biologically active substances to create more effective drugs.
3. Conduct of resource studies aimed to identify new harvesting areas and account for material reserves. Based on this data science-based plans for the procurement of medicinal plant materials are developed.
4. **Normalization and standardization** of medicinal plant materials, **development and improvement** of MPM determination methods of its usefulness and quality are also the tasks of pharmacognosy.

Main tasks of pharmacognosy:

5. **Creation** of normative **documents** (drafts of state standards, pharmacopoeial articles and instructions).
6. Protection of natural medicinal plant resources and its rational usage.
7. Cultivation of medicinal plants.

The study of pharmacognosy is divided into general and practical (special) parts:

- The general part is about the main general issues, the history of pharmacognosy and the organization of the medicinal plant materials industry and medicinal plant resource science.
- **The special part** is about medicinal plants and medicinal plant materials.

- The course of pharmacognosy studies of preparation, drying, harvesting, storage of medicinal plant materials and its rational usage.
- Considerable attention in pharmacognosy is paid to the standardization of medicinal plant materials. Pharmacognosy has a system of methods of pharmacognostic analysis to reliably determine the authenticity and quality of medicinal plant materials.

- Modern educational materials are presented **according to chemical classification of MPM.**
- Medicinal plant materials are grouped according to biologically active substances of plants, allowing deviations for some chemically insufficiently investigated objects, which are classified by pharmacological activities.

All medicinal plants are divided into *officinal* and *non-officinal*.

- ***Officinal*** in Latin means ***factory*** or ***workshop.***
- Plants and its parts which are included in the list of the **State Register of Medicines** established by the Ministry of Health of the Russia, are called **officinal medicinal plants** from which **officinal medicinal plant materials** are obtained.
- Other plants which is not in **State Register of Medicines** are called **non-officinal medicinal plants** are not produced and can not be sold in pharmacies. Some of **non-officinal medicinal plants** are used in *traditional (folk) medicine.*

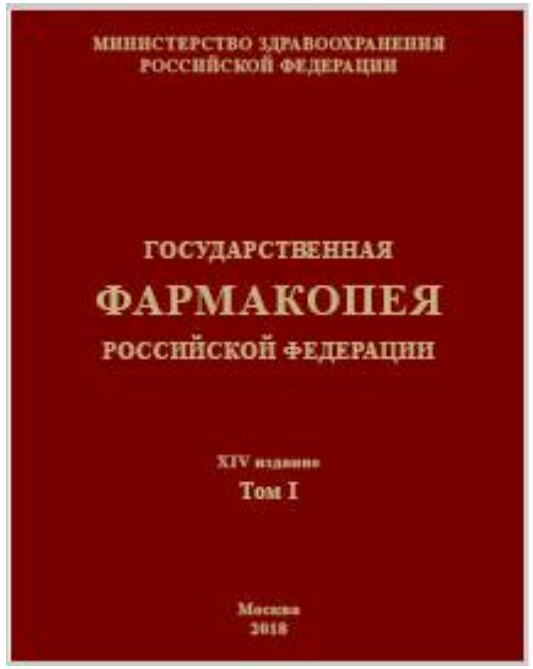
Pharmacopoeial and non-pharmacopoeial medicinal plant materials

All ***officinal*** medicinal plant materials divided into two groups:

- **Pharmacopoeial MPM** are medicinal plant materials included in the State Pharmacopoeia of Russian Federation.
- **Non-pharmacopoeial MPM** are medicinal plant materials which not included in the State Pharmacopoeia of Russian Federation.

Pharmacognosy course cover all medicinal plants included in the Soviet Union State Pharmacopoeias X, XI , XIII and XIV editions.

Regulatory documents in pharmacognosy



- Pharmacopoeial articles (permanent – PA and temporary - TPA) for all medicinal plant materials have been developed.
- State industry standards (SIS) have been developed for plant raw materials used in non-medical areas.

Names of medicinal plants

- According to international terminology, **the names of medicinal plants** and **raw materials** in pharmacognosy are given in **English** and **Latin**
- The Latin name is one and consists of two words, for example: ***acorus calamus*** L. (calamus marsh).
- If the plant differs in any way from the species type, then the names of the variety are also written, - *varietas* for example: ***Amugdalus communis varietas dulkis*** - almond, variety - sweet.
- The pharmacist must know the exact botanical name of the medicinal plant and its family name.

Names of medicinal plants materials

- **The name of the medicinal plant material** described in the Pharmacopoeia and prescribed by a doctor in prescriptions, consists of two words:
- the first word is a name of the medicinal plant,
- the second word is a name of the plant organ (plant part).

For example: ***Salviae officinalis folia*** - Sage leaves.

Both generic and specific names are less commonly used if several species of plants from the same genus are used as medicinal plant materials. For example: ***Digitalis Lanatae folia*** - Foxglove woolly leaves.

Some special names

Some types of medicinal plant materials have names that have long established in pharmacy.

It is ergot - ***Sekale cornutum*** (in translation, horned rye) for example. The name was given when it was not known that it was a sclerotium of the fungus.

Sennae folia - Senna leaves - the name is taken from Arabic medicine (the botanical name of the plant is ***Cassia acutifolia Del*** - holly cassia).

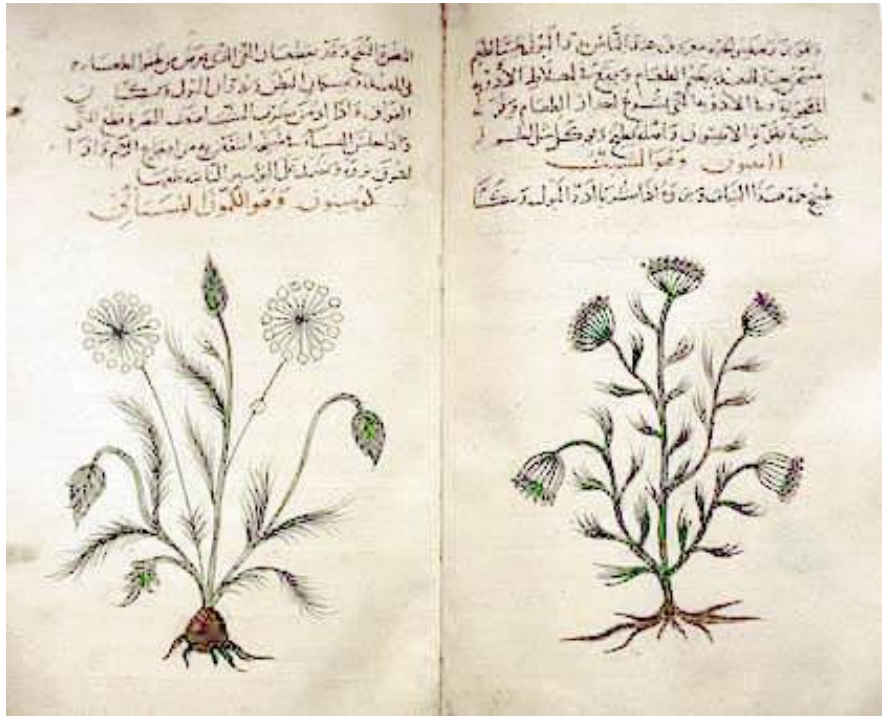
The importance of pharmacognosy for pharmacists

- **Modern pharmacognosy** is a highly specialized applied science, one of the five major pharmaceutical disciplines.
- Pharmacognosy, in complex with other pharmaceutical disciplines provide the professional knowledge **to a highly qualified pharmacist**
- Knowledge of pharmacognosy is necessary in the course of ***dosage forms technology***, as well as ***pharmacology,*** which deals with the mechanism of action and the use of drugs.
- ***Phytotherapy*** - is a pharmacognosy-based medical practice the use of plant-derived medications in the treatment and prevention of disease.

The importance of pharmacognosy for pharmacists

- Pharmacognosy is the basis of ***pharmaceutical chemistry*** in part of the chemistry of natural compounds and their analysis.
- In the practice of ***toxicological chemistry*** and ***forensics***, knowledge of pharmacognosy is necessary to determine which poisonous plant has caused the poisoning or death of a person.
- Knowledge of pharmacognosy is necessary for the preparation of a ***pharmacognostic pharmacist***
- In recent decades, a new trend in pharmacognosy has been developing – the cultivation of isolated cells and tissues of medicinal plants as sources of biologically active substances.

Pharmacognosy in ancient times



- The ancient Greek naturalist, philosopher and botanist ***Theophrastus*** , who is considered the “Father of botany” paid great attention to the medicinal plants.
- The “Father of pharmacognosy” an ancient Greek famous physician ***Dioscorides***. His main book “*Materia medica*” was illustrated with drawings of plants, translated into Latin. It was the most authoritative manual of medicinal plants in Europe until the 16th century.

Pharmacognosy in Russia

The first Russian pharmacognostic sources should be considered old handwritten Russian books – "***Travniki***" in which medicinal plants and other medicinal products were described.

Pharmacognosy in Russia

- The first russian pharmacy was opened by order of king **Ivan IV** in Moscow according to the Western European model in the 16th century.
- A significant development of pharmacognosy and pharmacy was provided by king **Peter the Great** who ordered to deploy pharmacies and plant pharmaceutical gardens in Russia.
- In **1706**, by decree of **Peter the Great**, the first military hospital pharmacy was organized in Moscow, where the hospital pharmacy garden was the main base for the study of botany and pharmacognosy.
- In **1724** the **Academy of Sciences** had a huge impact on the development of russian pharmacognosy. Academy systematized everything previously known about medicinal plants and then began to investigate the medicinal plants of the country.

Pharmacognosy in Russia

- When pharmacognosy in universities was singled out as an independent discipline, the first teachers of pharmacognosy were Professor **A.S. Ginzberg** in Leningrad and Professor **D.M. Shcherbachev** in Moscow.
- A special role in pharmacognostic science belongs to **Adele Fedorovna Hammerman** (1888 - 1978), she founded the school of Soviet pharmacognosts. She was an author of the famous pharmacognosy textbooks: “**Maps of the most important medicinal plants”** (1954), and **"Bibliography on medicinal plants"** (1957) and many other publications.
- The students of **A.F. Gammerman** are professors K.F. Blinova and G.P. Yakovlev (St. Petersburg State Chemical Pharmaceutical Academy), professor D.A. Muravyova (Pyatigorsk Pharmaceutical Academy), professor L.I. Eristavi (Tbilisi Medical Institute).

Pharmacognosy nowadays

- Research works on medicinal plants is concentrated in the **All-Union Institute of Medicinal and Aromatic Plants "VILAR"**, which was founded in 1931.
- Also a lot of research teams are conduct investigatons on pharmacognosy in departments of pharmaceutical and medical institutes, in research chemical-pharmaceutical institutes and many other labs across the country.

Thanks for your attention