ODESSA NATIONAL MEDICAL UNIVERSITY
Department of General and Clinical Pharmacology and Pharmacognosy

GUIDELINES
on independent work of students / VTS / № 4

on the topic: «Proteins and proteins. Macro- and microelements. Organic acids. Glucosinolates (thioglycosides) and cyanogenic glycosides. Enzyme preparations of plant and animal origin. Spirulina, alfalfa, white mistletoe, black damask, melon tree, pineapple, watermelon. Raw materials of animal origin. Bodyaga. Mummy. Phytotoxins of fungi, lectins, bee and snake venom. Medical leech, antlers. Garden spinach, citrus fruits, rose hips, horsetail, knotweed, rough-leaved and cereal plants (medicinal cucumber, creeping wheatgrass, sowing oats, etc.). Laurel, onion, garlic.»

Course: 3rd Faculty: medico-pharmaceutical

Approved
at the methodical meeting
departments
August 30, 2024
Protocol № 1

Head departments _____
prof. Rozhkovsky Ya.V.

Odessa - 2024

Topic: «Proteins and proteins. Macro- and microelements. Organic acids. Glucosinolates (thioglycosides) and cyanogenic glycosides. Enzyme preparations of plant and animal origin. Spirulina, alfalfa, white mistletoe, black damask, melon tree, pineapple, watermelon. Raw materials of animal origin. Bodyaga. Mummy. Phytotoxins of fungi, lectins, bee and snake venom. Medical leech, antlers. Garden spinach, citrus fruits, rose hips, horsetail, knotweed, rough-leaved and cereal plants (medicinal cucumber, creeping wheatgrass, sowing oats, etc.). Laurel, onion, garlic.»- 4 years.

1. Relevance of the topic

1. The biologically active substances to which the lecture is devoted belong to the compounds of primary synthesis, which ensure the existence of plant organisms, perform important functions and are very widespread. Proteins, macro- and microelements, organic acids are more often considered as concomitant BAS, although some of them are able to provide certain pharmacological effects, which is why they are used directly in medicine and pharmacy. Knowledge of the action of such BAS, as well as their role in ensuring the functioning of the human body is very important in the practical training of pharmacists. Due to the high prevalence of these groups of BAS, which are part of many plant and animal foods, the assimilation of the topic is largely based on previous practical experience of students, which provides additional positive motivation to study it.

2. Learning objectives:

As a result of independent elaboration of this theme students should:

- know:

- basic information about macroscopic and macroscopic methods of analysis of LR and LRS, which contain proteins and proteins, macro- and microelements, organic acids, glucosinolates (thioglycosides) and cyanogenic glycosides.

- effects on the human body, raw materials containing proteins and proteins, macro- and microelements, organic acids, glucosinolates (thioglycosides) and cyanogenic glycosides.

- about the main sources of enzymatic preparations of plant origin: spirulina, alfalfa, white mistletoe, black damask, melon tree, pineapple, watermelon.

- sources of drugs of animal origin: barberry, mummy. phytotoxins of fungi, lectins, bee and snake venom, medical leeches, antlers.

- basic information about garden spinach, citrus fruits, rose hips, horsetail, knotweed, rough-leaved and cereal plants (cucumber, creeping wheatgrass, oats, etc.). Laurel, onion, garlic.

- be able to:

- perform macroscopic analysis of LRS, which contains proteins and proteins, macro- and microelements, organic acids, glucosinolates (thioglycosides) and cyanogenic glycosides

- perform microscopic analysis of LRS, which contains proteins and proteins, macro- and microelements, organic acids, glucosinolates (thioglycosides) and cyanogenic glycosides

- distinguish from impurities raw materials that contain proteins and proteins, macro- and microelements, organic acids, glucosinolates (thioglycosides) and cyanogenic glycosides

3. Materials for pre-classroom training of students.

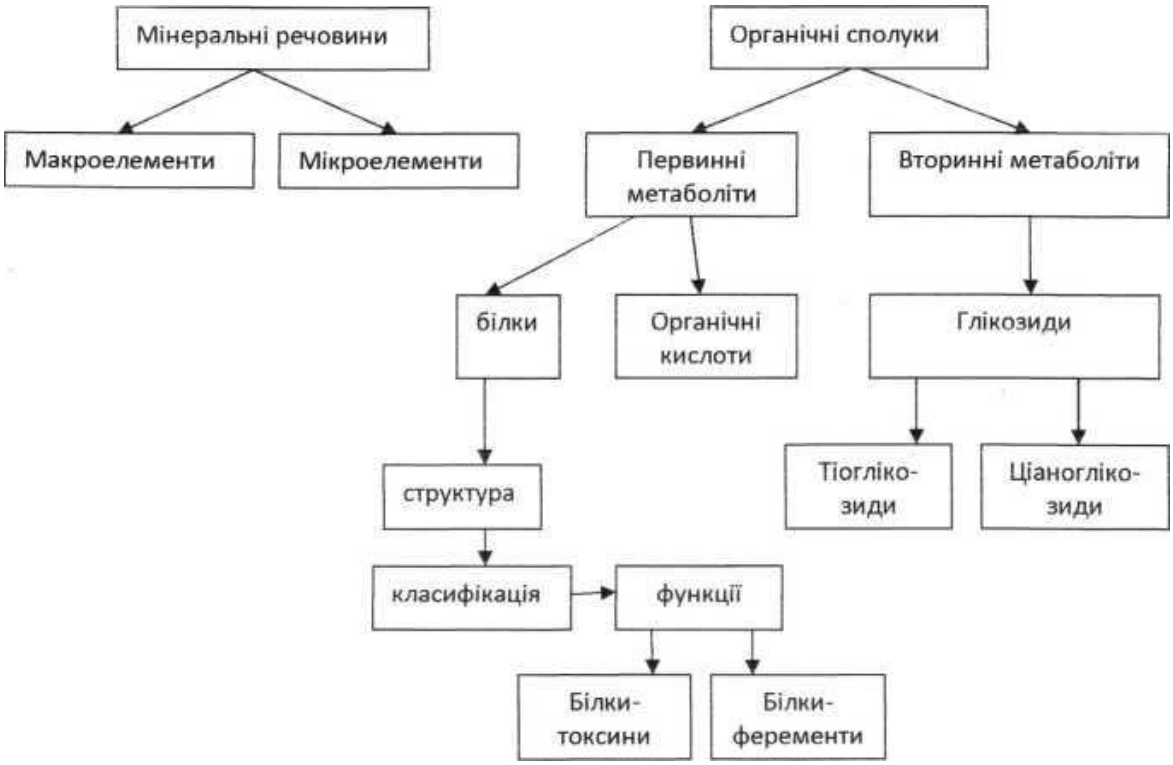
3.1. Basic basic knowledge, skills, abilities that are necessary for independent study and mastering of the topic and which are based on interdisciplinary connections:

№ №	Discipline	Know	Be able
1	2	3	4
	1. Botany	Characteristic features of the families of the studied plants. Morphology of stem, bark,	Use a microscope, prepare surface preparations and

		leaves, flower, fruit, root and rhizome. Anatomical structure of leaves, bark, fruit, roots, rhizomes.	cross-sections. Carry out qualitative reactions; purification of organic compounds.
	2. Organic chemistry	Physical and chemical properties of polysaccharides, glycosides, terpenoids, derivatives of aromatic series, heterocycles.	
	3. Analytical chemistry	Methods of acid - base titration (neutralization) and permanganatometry	Work with analytical balances, measuring vessels, photoelectrocalometer, use methods of chromatography on paper and in a thin layer of sorbent.

3.2. Contents of the topic.

- structural and logical scheme of the content of the topic:



3.3. Recommended Books:

8. Literature

Basic literature

1. Фармакогнозія: підручник (I—III р. а.) / І.А. Бобкова, Л.В. Варлахова. – 3-є видання Всеукраїнське спеціалізоване видавництво «Медицина» 2018, 504с.

2. Фармакогнозія: базовий підручн. для студ. вищ. фармац. навч. закл.(фармац. ф-тів) IV рівня акредитації / В.С. Кисличенко, І.О. Журавель, С.М. Марчишин та ін.; за ред. В.С. Кисличенко. – Харків: НФаУ: Золоті сторінки, 2015. - 736 с.

3. Навчальний посібник з дисципліни «Фармакогнозія» / Я. В. Рожковський, Б. В. Приступа, І. А. Бойко, Н. В. Герасимюк, В. В. Черногорюк -: Методична розробка кафедри фармакогнозії ОНМедУ. – Одеса: ОНМедУ, 2019 – 51 с.

4. Державна Фармакопея України: в 3 т. / Державне підприємство «Український науковий фармакопейний центр якості лікарських засобів». – 2-е вид. – Харків: Державне підприємство «Український науковий фармакопейний центр якості лікарських засобів», 2015. – Т. 1. – 1500 с.

Additional literature:

1 Державна Фармакопея України: в 3 т. / Державне підприємство «Український науковий фармакопейний центр якості лікарських засобів». – 2-е вид. – Харків: Державне підприємство «Український науковий фармакопейний центр якості лікарських засобів», 2014. – Т. 3. – 732 с.

2. Практикум з ідентифікації лікарської рослинної сировини: навч. посіб. / [В. М. Ковальов, С. М. Марчишин, О. П. Хворост та ін.] ; за ред. В. М. Ковальова, С. М. Марчишин. – Тернопіль: ТДМУ, 2014. – 250 с.

3.4. Guidance card for self - study of a student with using the literature on the topic:

№	Basic task	Student answer
1	Define the terms "Peptides" and "Proteins"	
2	The basic principle underlying the classification of proteins is ...	
3	Proteins are divided into the following groups:	AND) B)

		and) b) in) d)
4	The main biological functions of proteins in living organisms are:	AND) B) IN) D) E) IS) G)
5	Proteins of protein nature are used in medicine as ...	
6	Enzymes can be used in medicine as ...	
7	Define the terms "Macronutrients" and "Micronutrients"	
8	Name the plant sources and applications in medicine of the following trace elements:	A) iodine (I) B) iron (Fe) C) silicon (Si) D) potassium (K)
9	Define the term "Organic Acids"	
10	Organic acids are divided into:	AND) B) IN)
11	Describe the possibilities of using organic acids in medicine and pharmacy	
12	Define the term "Glycoside". What are the parts of glycoside molecules?	
13	Define the term "thioglycoside". What is their chemical structure?	
14	Describe the possibilities of using thioglycosides in medicine and pharmacy	
15	In which medicinal plant raw materials can be found non-glycosidic sulfur compounds?	
16	The use of APC containing non-glycosidic sulfur compounds.	
17	Define the term "Cyanogenic glycosides". What is their chemical structure?	
18	Describe the possibilities of using cyanogenic glycosides in medicine and pharmacy	
19	Write down the Latin names of the four-petalled cranberry and the LRS of the plant obtained from it	
20	Four-petalled cranberries are used in medicine as:	
24	Write down the Latin names of raspberries and LRS derived from this plant.	
25	Raspberries are used in medicine as:	
27	Specify the Latin names and uses in medicine of raw materials of animal origin:	A) propolis B) royal jelly C) bee venom D) thistle

3.5. Materials for self-control.

3.5.1. Questions for self-control.

1. Define the concept: proteins, proteids.
2. What biological functions are inherent in proteins?
3. How are toxic substances of protein nature used in medicine and pharmacy? What is their origin?
4. Name the plant enzymes known to you and describe their sources
5. How are plant enzymes used?
6. Name and describe the value of basic trace elements.
7. Give the classification of organic acids.
8. Describe the value of the most common organic acids.
9. Define thioglycosides and cyanogenic glycosides, name their plant sources.
10. Describe the pharmacological significance of thioglycosides.

3.5.2. Test tasks for self-control.

1. They do not belong to the substances of primary synthesis

A. Flavonoids
B. Proteins
C. Proteids
D. Lipids
E. Organic acids

2. Proteins are

A. Simple proteins consisting only of amino acid residues
B. B. Complex proteins
C. Proteins associated with substances of non-protein origin
D. Monomers of complex proteins
E. Vegetable proteins

3. Make the appropriate pairs of "enzyme function"

   A. Immunoglobulin 1. Structural

   B. Hemoglobin 2. Protective

   W. Collagen 3. Transport.

   Correct answer: A-2; B-3; B-1.

4. It belongs to aromatic organic acids

A. Head

B. Dairy

C. Vinegar

D. Lemon

E. Apple

5. In the free state, organic acids are found in plants

A. Cell juice

B. Wooden fabrics

C. Cell membranes

D. Special endogenous formations

E. Exogenous formations

6. Highlight the most common organic acids in the plant world:

A. Apple and lemon

B. Amber and pyruvic

C. Kumarov and chlorogenic

D. Oil and vinegar

E. Cinnamon and coffee

7. To determine the content of minerals in the LRS is analyzed

A. Ash

B. Alcohol extract

C. Broth

D. Dried raw materials

E. Fresh raw materials

8. Trace elements from plant materials are better absorbed by the human body because

A. Are in a plant in "biological" concentrations

B. Are in a free condition

C. Are in the form of soluble salts

D. Do not form toxic compounds

E. Are in high concentrations

9. Cyanoglycosides have sedative and analgesic effects, but their use is not common due to

A. Toxicity of their hydrolysis products

B. Lack of sufficient raw material base

C. Lack of optimal dosage forms

D. Low pharmacological activity of drugs

E. Very complex technology of their extraction from LRS

10. Seeds are used to make mustard seeds

A. Cultivated Sarepta and black mustard

B. Cultivated white mustard

C. Wild white mustard

D. Cultivated field mustard

E. Wild mustard field

Methodical recommendations were made by _____ *associate professor Boyko IA*