Confirmed at Dept. Council №8/11.09.2020

KONSPECTUS FOR STATE EXAM
IN PHARMACOGNOSIS, PHARMACOLOGY AND TOXICOLOGY
academic year 2020/2021

Pharmacognosis

1. Obtaining drugs from wild and cultivated medicinal plants – advantages and disadvantages. Measures for protection of wild medicinal plants. Cultivation of medicinal plants under natural and artificial conditions.
2. Objectives and stages in drug extraction. Basic rules and ways of picking, drying, packing, marking and storing drugs.
3. Modern requirements for the quality, safety and effectiveness of drugs for medical purposes. Standardization of drugs and problems in their standardization. Standardization documents – content advantages and disadvantages.
4. Pharmacognostic analysis – purpose and methods for its implementation. Physical, chemical, spectral, chromatographic and biological methods for qualitative and quantitative analysis of herbal drugs and natural substances. Examples.
5. Types of medicinal phytoproducts and stages in their creation. Pure natural substances and semi-synthetic derivatives of natural substances. Composition and problems in their standardization.
6. Carbohydrates. Monosaccharides, sugar alcohols and disaccharides. Polysaccharides – classification and general characteristics. Homopolysaccharides. Drugs and products containing monosaccharides and homopolysaccharides. Pharmacopoeial substances, semi-synthetic derivatives and medicinal products from carbohydrates and homopolysaccharides.
7. Types of heteropolysaccharides, mucous substances and drugs that contain them. Pharmacopoeial substances, semisynthetic derivatives and medicinal products of heteropolysaccharides.
8. Fats (lipids) – classification and general characteristics. Types of fats and liquid oils. Classification, representatives, composition and sources of receipt. Pharmacopoeial substances and semisynthetic derivatives of fatty acids and lipids.
9. Oils with specific action. Castor and fish oils, omega-3, omega-6 fatty acids, eicosanoids and prostaglandins. Waxes (lipoids) – general characteristics and representatives. Pharmacopoeial substances, semi-synthetic derivatives and medicinal products.
10. Phenolic compounds of plant origin – classification and general characteristics. Simple phenols (C6-OH), hydroxybenzoic derivatives (C6-C1), hydroxyphenylpropanes, hydroxychannel derivatives (C6-C3) and agents. Drugs that contain them. Pharmacopoeial substances, semi-synthetic derivatives and medicinal products.
11. Lignans (C6-C3-C3-C6) and coumarins (C6-C3) – classification, general characteristics, representatives and drugs that contain them. Semi-synthetic derivatives and medicinal products.

12. Quinones (C6-C4) and anthraquinones (C6-C2-C6) – classification, general characteristics, representatives and drugs in which they are contained. Medicinal products. K vitamins and semi-synthetic derivatives.
13. Flavonoids (C6-C3-C6) – classification, general characteristics and significance for pharmacy and medicine. Flavones, flavonols and their glycosides. Representatives and drugs that contain them. Pharmacopoeial substances, semi-synthetic derivatives and medicinal products.
14. Flavanones, flavanonols, isoflavonoids, proanthocyanidins, anthocyanidins and anthocyanins. Representatives and drugs that contain them. Pharmacopoeial substances and medicinal products. Propolis.
15. Tannins (tannins). Hydrolyzable (C6-C1) n and condensed (C6-C3-C6) n tannins - classification, general characteristics and representatives. Drugs they contain. Pharmacopoeial substances, semi-synthetic derivatives and medicinal products.
16. Terpenes - classification, biogenesis, general characteristics and examples of mono- and sesquiterpenes. Di-, tri- and tetraterpenes - classification, agents and drugs that contain them. Pharmacopoeial substances and medicinal products.
17. Essential oils - classification, general characteristics and significance for pharmacy and medicine. Acyclic and monocyclic monoterpenes and representatives (C_{10}). Drugs and oils containing mainly acyclic and monocyclic monoterpenes. Pharmacopoeial substances, semi-synthetic derivatives and medicinal products.
18. Essential oil drugs and oils containing mainly dicotyledonous monoterpenes (C_{10}), sesquiterpenes (C_{15}) and agents. Pharmacopoeial substances, semi-synthetic derivatives and medicinal products.
19. Essential oil drugs and oils containing mainly aromatic monoterpenes (C_{10}), phenylpropane derivatives (C_6-C_3) and agents. Resins and balsams. Pharmacopoeial substances and medicinal products.
20. Monoterpenoids - iridoids. Classification, general characteristics, representatives and action. Carbocyclic iridoids, secoiridoids and valepotriates and drugs containing them. Medical products.
21. Sesquiterpenoids - sesquiterpene lactones. General characteristics, classification, representatives and action. Drugs containing sesquiterpene lactones.
22. Triterpenoids - steroids. General characteristics and classification. Sterols, classification, characteristics and drugs containing them. Pharmacopoeial substances and medicinal products.
23. Cardiac glycosides. Classification, general characteristics and significance for pharmacy and medicine. Construction-action connection. Drugs containing cardenolides of digitalis and strophanthus type. type. Pharmacopoeial substances, semi-synthetic derivatives and medicinal products.
24. Saponins - general characteristics and classification. Steroid and triterpene saponins - classification and drugs that contain them. Medicinal products of saponins. Sterols, steroid aglycones and steroid alkaloids as a source for the semi-synthesis of steroid hormones and steroidal anti-inflammatory drugs.
25. Alkaloids. Classification, general characteristics and significance for pharmacy and medicine. Nitrogen alkaloids in the side chain, pyrrolidine, piperidine and pyridine alkaloids and drugs containing them. Pharmacopoeial substances, semi-synthetic derivatives and medicinal products.
26. Tropanic, quinoline and quinolizidine alkaloids and drugs containing them. Pharmacopoeial substances, semi-synthetic derivatives and medicinal products. Cocaine as a model for the synthesis of local anesthetics.
27. Isoquinoline alkaloids - biogenesis and classification. Benzylisoquinoline, morphine (opium) alkaloids and alkaloids of the aporphin group and drugs

containing them. Pharmacopoeial substances, semi-synthetic derivatives and medicinal products.

28. Isoquinoline alkaloids of the protoberberine, protopine and bisbenzylisoquinoline, benzophenanthridine, phenanthridine and emetine groups and drugs containing them. Pharmacopoeial substances, semi-synthetic derivatives and medicinal products.
29. Indole alkaloids - biogenesis and classification. Physostigmine, harmanic, strychnos and Rauwolfia alkaloids. Drugs that contain them. Pharmacopoeial substances, semi-synthetic derivatives and medicinal products.
30. Indole alkaloids of vinca, catharanthus and ergoalkaloids of rye horn. Drugs that contain them. Pharmacopoeial substances, semi-synthetic derivatives and medicinal products.
31. Imidazole, purine and steroid (glyco-) alkaloids and drugs containing them. Pharmacopoeial substances, semi-synthetic derivatives and medicinal products.
32. Drugs and herbal products used in diseases of the respiratory tract, gastrointestinal tract, liver and bile ducts, urinary system.
33. Drugs and herbal products used in cardiovascular and blood diseases affecting the nervous system, with antitumor action and for external use.
34. Drugs and herbal products used in diseases of the liver and bile ducts of the urinary system.
35. Drugs and herbal products used in diseases of the nervous system, with antitumor action and for external use.

Pharmacology

36. Pharmacodynamics – types of receptors, agonists and receptor antagonists. Physiological targets for the action of drugs – receptors, ion channels, enzymes, transport molecules.
37. Pharmacokinetics: routes of administration, transmembrane transport, resorption, distribution and elimination of drugs.
38. Drug metabolism. Factors influencing metabolic processes - genetic polymorphism of enzyme systems. Enzyme inducers and enzyme inhibitors of drug metabolism.
39. Pharmacokinetic parameters: bioavailability, bioequivalence, volume of distribution, steady-state plasma concentrations of drugs, elimination clearance of drugs.
40. Factors influencing the action and kinetics of drugs: childhood, old age, pregnancy and lactation.
41. Phases in preclinical and clinical trials of new drugs. Biomarkers and clinical and laboratory indicators for drug effect assessment.
42. Mediator systems in the CNS. Anxiolytics - classification, pharmacological characteristics, side effects, therapeutic use.
43. Antipsychotic drugs - classification, pharmacological characteristics, side effects, therapeutic use.
44. Antidepressants - classification, pharmacological characteristics, side effects, therapeutic use.
45. Psychostimulant and nootropic drugs - classification, pharmacological characteristics, side effects, therapeutic use.
46. Antiepileptic drugs - classification, pharmacological characteristics, side effects, therapeutic use.
47. Antiparkinsonian drugs - classification, pharmacological characteristics, side effects, therapeutic use.

48. Hypnotics and sedatives - classification, pharmacological characteristics, side effects, therapeutic use.
49. Opioid analgesics - classification, pharmacological characteristics, side effects and therapeutic use.
50. Non-opioid analgesics - classification, pharmacological characteristics, side effects and therapeutic use.Автакоиди – определение, класификация.
51. Antihistamines - classification, pharmacological characteristics, side effects, therapeutic use.
52. Inflammation and cycle of arachidonic acid possibilities for pharmacological action: non-steroidal anti-inflammatory drugs - classification, pharmacological characteristics, side effects and therapeutic use.
53. Cardiac glycosides - classification, pharmacological characteristics, side effects and therapeutic use.
54. Peripheral vasodilators - classification, pharmacological characteristics, adverse drug reactions and therapeutic use.
55. Antistenocardial drugs - classification, pharmacological characteristics, side effects and therapeutic use.
56. Antiarrhythmic drugs: classification, pharmacological characteristics, side effects and therapeutic use.
57. Antihypertensive drugs: pharmacological and pharmacotherapeutic characteristics, side effects.
58. Diuretics - classification, pharmacological characteristics, side effects and therapeutic use.
59. Antidyslipidemic drugs: classification, pharmacological characteristics, adverse reactions and therapeutic use.
60. Antiasthmatic drugs - classification, pharmacological characteristics, side effects and therapeutic use.
61. Antitussive drugs and expectorants - classification, pharmacological characteristics, adverse drug reactions and therapeutic use.
62. Antiulcer drugs - classification, pharmacological characteristics, side effects, therapeutic use.
63. Agents acting on the digestive system: antiemetics, appetite suppressants and appetite stimulants - classification, pharmacological characteristics, adverse drug reactions, therapeutic use.
64. Cholagogues, choleretic and hepatoprotective agents - classification, pharmacological characteristics, side effects, therapeutic use.
65. Endocrine pancreas and drugs affecting carbohydrate metabolism: insulin-containing drugs - classification, pharmacological characteristics, side effects, therapeutic use.
66. Drugs affecting carbohydrate metabolism: oral antidiabetic drugs - classification, pharmacological characteristics, side effects, therapeutic use.
67. Hematopoietic system, antianemic drugs and drugs affecting erythropoiesis - classification, pharmacological characteristics, side effects and therapeutic use.
68. Phases of blood coagulation and possibilities for pharmacological influence. Hemostatic agents - classification, pharmacological characteristics, adverse drug reactions and therapeutic use.
69. Antithrombotic agents: anticoagulants, fibrinolytics and platelet antiplatelet agents - classification, pharmacological characteristics, adverse drug reactions and therapeutic use.
70. Mineral and glucocorticosteroid drugs - classification, pharmacological characteristics, side effects and therapeutic use.

71. Medicines containing androgens, antiandrogens and anabolic agents - classification, pharmacological characteristics, adverse drug reactions and therapeutic use.
72. Drugs containing estrogens, antiestrogens, hormonal contraceptives - classification, pharmacological characteristics, side effects and therapeutic use.
73. Beta-lactam antibiotics - classification, antibacterial spectrum, pharmacokinetic features, side effects and therapeutic use.
74. Aminoglycoside and glycopeptide antibiotics - classification, antibacterial spectrum, pharmacokinetic features, side effects, therapeutic use.
75. Tetracyclines, macrolides, lincosanides and amphenicols - classification, antibacterial spectrum, mechanism of action, pharmacokinetic features, side effects, therapeutic use.
76. Quinolones and sulfonamides - classification, antibacterial spectrum, mechanism of action, pharmacokinetic features, side effects, therapeutic use.
77. Antiviral drugs and immunomodulators - classification, pharmacological characteristics, side effects, therapeutic use.
78. Antitumor drugs: classification, mechanism of action, adverse drug reactions and possibilities for chemoprotection and stimulation of leukopoiesis.
79. Drugs used in ophthalmology - classification, pharmacological characteristics, side effects and therapeutic use.
80. Medicines used in dermatology - classification, pharmacological characteristics, side effects and therapeutic use.
81. Drugs used in otorhinolaryngology - classification, pharmacological characteristics, adverse drug reactions and therapeutic use.

TOXICOLOGY

82. Basic concepts and processes - toxic aggression and antitoxic protection.
83. Toxic aggression - damaging mechanisms and phenomena. Intimate mechanisms of toxic action.
84. Toxicity. Toxicity criteria. Methods for assessing the toxic effect of chemical compounds. Quantitative characteristics (LD50, ED50, TD50, TI).
85. Relationship between structure, chemical and physical properties of substances and their toxicity.
86. Factors affecting the toxicity of xenobiotics during their absorption, distribution, metabolism and excretion.
87. Penetration of toxins into the body - "front door" and resorption. Specifics related to the path of penetration. The fate of the xenobiotic in the body.
88. Distribution, biotransformation and separation of xenobiotics. Toxicological and pharmacological characteristics for assessment and prediction.
89. Toxic effect of xenobiotics - cytotoxicity and free radical processes, thiol groups and specific receptor proteins. Altered biochemical mechanisms, enhancement of toxic effects. "Lethal synthesis".
90. Delayed and distant toxic manifestations - immunotoxicity, immune suppression and immuno-mediated hypersensitivity reactions. Xenobiotics-allergens.
91. Delayed and distant toxic manifestations - reproductive toxicity, mutagenic and carcinogenic effects of poisons.
92. Natural (physiological) detoxification protection - biological expediency, forms and mechanisms.
93. Medical antitoxic protection - "Scheme 10". Behavior and role of the pharmacist in acute, chronic and environmental toxic situations.

94. Basic principles and approaches in the treatment of acute and chronic intoxication. Justification of the main detoxification methods - general and specialized.
95. The most common acute and chronic poisonings - principles of recognition, treatment and prevention. Comparative characteristics between adverse drug reactions and drug intoxication. Pharmacological prevention of poisoning.
96. Organ toxicity - liver toxicity, toxic mechanisms. Examples - drugs, technical products, biological poisons.
97. Organ toxicity - poisons with predominantly neurotropic action. Types, mechanisms, typical intoxicants. Examples. Drug poisoning - benzodiazepines. Epidemiology, general clinical characteristics, treatment. Pharmaceutical prevention.
98. Organ toxicity - poisons with predominantly neurotropic action. Types, mechanisms, typical intoxicants. Examples. Drug poisoning - neuroleptics. Epidemiology, general clinical characteristics, treatment. Pharmaceutical prevention
99. Organ toxicity - poisons with predominantly cardiovascular toxicity. Types, mechanisms, typical intoxicants. Digitalis glucosides, calcium channel blockers. Epidemiology, general clinical characteristics, treatment. Pharmaceutical prevention. Examples.
100. Organic toxicity - poisons with predominantly cardiovascular toxicity. Types, mechanisms, typical intoxicants, beta blockers, herbs. Epidemiology, general clinical characteristics, treatment. Pharmaceutical prevention. Examples.
101. Organ toxicity - poisons with predominantly gastrointestinal toxicity. Types, mechanisms, typical intoxicants. Examples. Drug poisoning - NSAIDs, salicylates .. Epidemiology, general clinical characteristics, treatment. Pharmaceutical prevention.
102. Organic toxicity - poisons with predominantly gastrointestinal toxicity. Types, mechanisms, typical intoxicants. Examples. Drug poisoning - paracetamol and others. Epidemiology, general clinical characteristics, treatment. Pharmaceutical prevention.
103. Organ toxicity - chemotoxic xenobiotics. Disruption of haemostasis and safety profile of anticoagulants. Examples. Pharmaceutical prevention.
104. Poisoning by biological poisons - reptiles and insects. Local toxic and general toxic manifestations. Medicinal products for the treatment of poisoning. Pharmaceutical prevention. Repellents, antidotes.
105. Poisoning with carbon dioxide, chlorine gases. Ecotoxicity.
106. Poisoning with nitrous and sulfur gases. Ecotoxicity.
107. Opium drug poisoning, "New" drugs. Addiction
108. Poisoning with psychostimulants and dysleptics hallucinogens. "New" drugs. Addiction
109. Poisoning with ethyl alcohol, methyl alcohol and ethylene glycol. Epidemiology and biological identification. Prevention.
110. Medicines for the treatment of poisonings - Antidotes. Types, mechanism of action, pharmacological forms, application and delivery.
111. Toxoallergic / anaphylactic shock. Causes, manifestations and life-saving measures. Pharmacist's actions - prevention and support.
112. Drugs for treatment of poisonings - infusion solutions, organoprotectors, symptomatic means. Organization of toxicological care. Interaction of the pharmacist with the medical structures for medical care.

Main literature sources:

1. Basic and clinical pharmacology with toxicology. Edit.: N.Boyadjieva, Sofia: ARSO, 2021. – 449 p.
2. Pharmacology / Ed. Michael A. Clark et al. - 5th ed.- Balingen : Lippincott Williams & Wilkins, 2019. - 612 p.
3. The selection and use of essential medicines : Report of the WHO Expert committee, 2013 (including the 18th WHO model list of essential medicines and the 4nd WHO model list of essential medicines for children). Geneva: WHO, 2014,- 219 p. - (WHO technical report series ; 985)
4. Nanopharmaceutical carriers for targeted delivery of anticancer drugs : Recent advances and rationale for future developments. G.Momekov et al. – Plovdiv : Makros, 2013. – 95 p.
5. Clinical pharmacology. Peter N. Bennett et al. - 11th ed. – Edinburgh : Saunders & Elsevier, 2012. - 667 p.
6. Principles of clinical pharmacology. Arthur J. Atkinson et al. – 3-rd ed. – San Diego : Elsevier, 2012. - 626 p.
7. Clinical Pharmacy and Therapeutics. Edit.: R.Walker, C. Whittlesea, Churchill Livingstone, Elsevier 2012, 983 p.
8. The international pharmacopoeia [CD-ROM]. - 4th ed.- Geneva : WHO, 2011 Goodman and Gilman pharmacological basis of therapeutics / Ed. Laurence L. Brunton et al. – 12-th ed. New York : McGraw – Hill, 2011. - 2084 p. + DVD.

Books on electronic media

1. Basic & Clinical Pharmacology, 13e, 2015; Bertram G. Katzung, Anthony J. Trevor
2. Katzung & Trevor's Pharmacology: Examination & Board Review, 11e, 2015; Anthony J. Trevor, Bertram G. Katzung, Marieke Kruidering-Hall
3. Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 12e, 2011; Laurence L. Brunton, Bruce A. Chabner, Björn C. Knollmann
4. Harrison's Manual of Medicine, 19e, 2016; Dennis L. Kasper, Anthony S. Fauci, Stephen L. Hauser, Dan L. Longo, J. Larry Jameson, Joseph Loscalzo; Chapter 5: Principles of Clinical Pharmacology; Dan M. Roden

Prepared a Konspectus:

Prof. Dr. L. Peychev, MD, Ph.D.
Prof. Dr. Ya. Iliev, MD, ERT
Assoc. Prof. farm. N. Benbasat, DF