

THE QUESTIONS FOR THE EXAM IN PHARMACOLOGY

Basic principles of pharmacology. Pharmacodynamics & Pharmacokinetics.

1. Pharmacology: definition and the content. Pharmacokinetics of drugs, its main constituents.
2. Pharmacodynamics: definition and the content. Types (mechanisms) of action of drugs, their brief characterization.
3. Ways (routes) of administration of medicinal substances to an organism. Advantages and disadvantages of the oral way of administration.
4. Comparison of oral, sublingual, rectal, intranasal and inhalational ways (routes) of administration of medicinal substances, their advantages and disadvantages.
5. Comparison of parenteral ways of administration of medicinal substances. The requirements applied to medicinal forms for injections. Transdermal way of administration and its use.
6. The main mechanisms of drug's absorption. First-pass effect. Bioavailability of drugs and its clinical value. Bioequivalence. Comparative bioavailability (AUC).
7. Transport and distribution of drugs in an organism, factors influencing on them. One and two-compartment models of distribution; volume of distribution and its practical value.
8. Elimination and its components. Half-life ($t_{1/2}$) and clearance.
9. Biotransformation (definition, main steps and the factors changing metabolism). The ways of excretion of drugs from an organism. Quantitative indices of the rate of drug elimination.
10. Receptors: definition, types of receptors. Drugs as agonists (including partial) and antagonists of receptors.
11. The main mechanisms of interaction of drugs with receptors. Brief characterization of G-protein-associated receptors (with examples); secondary messengers and their role in mechanisms of action of drugs.
12. Receptors associated with ion channels, tyrosine kinase-associated receptors and intracellular receptors: brief characterization, examples.
13. Local, reflex, systemic (resorbative), selective and non-selective (protoplasmic) actions: brief characterization.
14. Direct and indirect, reversible and irreversible, main and adverse (side) actions: brief characterization.
15. Dependence of action of drugs on external factors. A dose (definition, classification). A therapeutic index and its practical value.
16. Dependence of action of drugs on physical and chemical properties (solubility, structure, stereoisomerism). Pharmaceutical incompatibility of medical products.
17. Combined action of drugs: the main types. Synergism, antagonism and their use in medical practice.
18. Dependence of action of drugs on internal factors (age and sex, pathological states). Distinctive features of pharmacokinetics and pharmacodynamics of drugs in older persons and children.
19. Chronopharmacology. Influence of biological rhythms on action of drugs. Clinical aspects of pharmacology (clinical pharmacology as a basis of pharmacotherapy of diseases).
20. Pharmacogenetics. Individual and specific tolerance; idiosyncratic drug response.
21. The phenomena developing at repeated application of drugs: tolerance, tachyphylaxis, a sensitization (allergy).
22. Cumulation of drugs and its kinds. The phenomena developing at a sudden withdrawal of drugs. Withdrawn syndrome and its prevention.
23. Kinds of medicinal therapy, their characterization and use.
24. Adverse (side) action of drugs, its kinds, prevention.

25. Drug allergy (drugs illness), definition, symptoms, diagnostics, the preventive measurements and the treatment.
26. The super infections caused by drugs (the causes, kinds, treatment and preventive measurements).
27. Negative influence of drugs on an embryo (kinds, preventive measurements). Carcinogenicity.
28. Drug dependence and its kinds. Medical and social aspects of drug dependence control and its prevention.

Drugs acting on the nervous system.

1. Classification of drugs acting on the afferent nervous system. Local anesthetics: definition, mechanism of action, classification. Factors influencing on the effect of the local anesthetics. Astringent drugs, absorbing drugs, counterirritant drugs (main representatives, mechanisms of action, application).
2. Distinctive features of the most known local anesthetics. Ways of application of the local anesthetics (kinds of anesthesia). Resorbative action of the local anesthetics.
3. Brief characterization of cholinergic synapses. Biosynthesis and metabolism of acetylcholine. Classification and localization of cholinergic receptors. M-cholinergic agonists (M-cholinomimetics): main representatives, effects, clinical application. Brief characterization of N-cholinergic agonists.
4. M, N-cholinergic agonists: direct and indirect agonists (cholinesterase inhibitors), effects and clinical application. Poisoning by cholinergic agonists: symptoms and treatment. Reactivators of cholinesterase and their application.
5. M-cholinergic antagonists (M-cholinoblockers): the main representatives, pharmacologic effects, application, adverse effects and contraindication. Distinctive features of specific agents. Poisoning by cholinergic antagonists: symptoms and treatment.
6. N-cholinergic antagonists – classification. Ganglionic-blocking drugs: the main representatives, effects, application, adverse effects. Neuromuscular-blocking drugs: classification by mechanism of the action, differences between groups, application. Distinctive features of specific drugs. Overdosing of neuromuscular-blocking drugs and its treatment.
7. Brief characterization of adrenergic synapses. Biosynthesis of norepinephrine and its elimination from the synapse (metabolism, pre-synaptic and post-synaptic uptake). Subtypes of adrenergic receptors (adrenoceptors): localization, effects. Dopamine receptors: localization and effects. α , β -Adrenergic agonists: the main representatives, their effects and application.
8. α -Adrenergic agonists: the main representatives, effects and application. β -Adrenergic agonists: classification, comparative characterization of their groups. Effects and application of dopamine and other dopaminergic agonists.
9. Alfa-adrenergic antagonists: classification, effects, differences between groups, application. Alfa,beta-antagonists: the main representatives, application.
10. Beta-adrenergic antagonists: classification, therapeutic and adverse effects, differences between groups, application.
11. Histamine and serotonin (5-hydroxytryptamine): physiological role, main subtypes of receptors, effects of their activation. Histamine antagonists: main subgroups, effects, application. Agonists and antagonists of serotonin: the main representatives, effects, application.
12. Eicosanoids: definition, the main pathways of biosynthesis. The main effects of prostanoids and leucotriens. Preparations of prostanoids and their application. Eicosanoid antagonists, their effects and application.
13. Nitric oxide: biosynthesis, main effects. Nitric oxide donors and drugs increasing the effects of endogenous nitric oxide: main representatives, application.
14. Vasoactive peptides. Angiotensin II: biosynthesis, main effects. Inhibitors of renine-angiotensin system: mechanisms of the action, application. Bradykinin: main effects. Drugs acting on biosynthesis and effects of bradykinin. Other vasoactive peptides.

15. General anesthesia: definition, main features. Preanesthetic medications. Comparison of various inhalation and non-inhalation (intravenous) anesthetics.
16. Hypnotic drugs: definition and classification. Characterization of various groups of hypnotic drugs. The rules and precautions during administration of hypnotic drugs.
17. Ethanol and its influence on organs and systems of organism during short and prolonged drinking. Acute poisoning by ethanol and its management. Pharmacotherapy of alcoholism.
18. Opioid (narcotic) analgesics: mechanism of action, classification. The main pharmacologic effects of morphine and other strong agonists of opioid receptors.
19. Adverse effects of the opioid analgesics. Opioid dependence and its treatment. Overdosing of the opioid analgesics – main signs and treatment.
20. Non-opioid analgesics (non-narcotic analgesics, analgesics–antipyretics), their mechanism of action and clinical use, adverse effects. Overdosing of the non-opioid analgesics: signs and treatment. Main distinctions between opioid and non-opioid analgesics.
21. Epilepsy - the basic clinical forms, principles of pharmacologic management. Antiepileptic drugs (definition and classification). Mechanism of action and side effects of phenobarbital, phenytoin, carbamazepine, ethosuximide, clonazepam, valproic acid. Epileptic status and its treatment.
22. Parkinsonism: conception of pathogenesis and approaches to its management. Classification of drugs for parkinsonism treatment, their mechanisms of action. Distinctive features of combined drugs. Drugs for treatment of spasticity.
23. Antipsychotic drugs: definition, classification, mechanism of action. Therapeutic and adverse effects of antipsychotic drugs, application. Distinctive features of the most important antipsychotic drugs. Comparison of typical and atypical antipsychotic.
24. Anxiolytic (sedative-hypnotic) drugs: definition, classification, possible mechanisms of action. Therapeutic and adverse effects, pharmacokinetic properties and possible application of benzodiazepine anxiolytics. Other anxiolytics (5 HT_{1A} serotonin receptor agonists).
25. Modern conception of depression pathogenesis. Antidepressants: classification, possible mechanisms of action, brief characterization of therapeutic effect. Comparison of different groups of antidepressants. Adverse effects of antidepressants. Overdosing of tricyclic antidepressants: symptoms, treatment.
26. Mood-stabilizing (anti-manic, normothymic) drugs: definition, main representatives. Lithium carbonate: mechanism of the action, therapeutic and adverse effects.
27. Psychostimulants (psychomotor stimulants): definition, main representatives, their mechanisms of action, effects, possible application. Nootropic drugs (psychometabolic stimulators): definition, main representatives, mechanisms of action, effects, possible application.

Drugs acting on organs and systems of body.

1. Classification of diuretic drugs, sites of action of the main groups of diuretic drugs. Brief characterization of the main groups of diuretics by their mechanisms of action, efficacy, influence on electrolyte balance, adverse effects and application.
2. Classification of drugs acting on myometrium, possible application of groups.
3. Basic principles of pathogenetic therapy of an arterial hypertension: chains of pathogenesis of hypertension and main directions of drug treatment (to specify the pharmacological groups and their main representatives).
4. Classification of hypotensive drugs that alter sympathetic nervous system function (to specify subgroups and their main representatives), main pharmacokinetic and pharmacodynamic properties (including the mechanism of action and side effects).
5. Hypotensive drugs which inhibit renin-angiotensin system (to specify subgroups and their main representatives), main pharmacokinetic and pharmacodynamic properties (including the mechanism of action and side effects).

6. Hypotensive drugs from the group of vasodilators (to specify subgroups and its main representatives), main pharmacokinetic and pharmacodynamic properties (including the mechanism of action and side effects). Hypotensive drugs that alter sodium and water balance (to specify subgroups and their main representatives), the mechanism of their hypotensive action, side effects.
7. Management of hypertensive crisis (for emergency and urgent treatment). Management of chronic and acute hypotensive states.
8. Classification of antiarrhythmic drugs for tachyarrhythmia treatment (classification of Vaughan-Williams, with the list of main drugs). Pharmacodynamic and pharmacokinetic properties of the main representatives.
9. The choice of drugs for the treatment of supraventricular and ventricular arrhythmias. Treatment of bradyarrhythmias.
10. Drugs for the treatment of angina pectoris (antianginal drugs): the main groups, their mechanisms of action in angina pectoris, side effects.
11. Treatment of uncomplicated myocardial infarction: the main groups of drugs, mechanisms of their beneficial effects in myocardial infarction.
12. Drugs for the treatment of brain vascular disorders (migraine, stroke). Drugs used in peripheral vascular disorders.
13. Hypolipidemic drugs: definition, the main representatives, mechanisms of their action.
14. The main approaches for the treatment of the congestive heart failure, pharmacological groups for realizing of this approaches, mechanisms of their beneficial action in congestive heart failure.
15. Cardiac glycosides: definition, main drugs and plants containing them. Mechanism of action and main pharmacologic effects of the cardiac glycosides. Pharmacokinetic properties of the main cardiac glycosides. Intoxication by cardiac glycosides: predisposing factors, symptoms, treatment.
16. Antitussive drugs: classification on the mechanism of action. Expectorants: definition, classification (on the mechanism of action), application.
17. Directions of pharmacotherapy of patients with a syndrome of bronchial obstruction (bronchial asthma and chronic obstructive pulmonary disease). Mechanisms of action of drugs and their place in a treatment of bronchial asthma, possible adverse effects.
18. Choice of preparations for treatment of bronchial asthma and chronic obstructive pulmonary disease. Drugs for relieving and preventing of the asthma attacks. The asthmatic status (definition, directions of pharmacotherapy).
19. Principles of pharmacotherapy of pulmonary edema in cardiologic practice.
20. The drugs used for treatment of peptic ulcer disease (PUD). Principles of therapy, classification of preparations and the mechanisms of action.
21. The drugs used at disturbances of appetite. The drugs used at insufficient and excessive secretory function of pancreas. The pathogenetic therapy of a acute pancreatitis.
22. Drugs used in disturbances of bile secretion and treatment of gallstone colic. Hepatoprotectors: definition and application.
23. Laxative drugs (definition, classification, the mechanism of action, the indication for use). Pharmacological basis of diarrhea treatment.
24. Emetic and antiemetic drugs (definition, classification, mechanisms of the action, indications).
25. Classification of drugs acting on hemostasis. Anticoagulant drugs: definition, classification, mechanisms of action, pharmacokinetic properties, possible application, adverse effects. Drugs used in overdosing of anticoagulants.

26. Antiplatelet drugs: definition, the main representatives, mechanisms of action, possible application, adverse effects. Thrombolytic (fibrinolytic) drugs: definition, the main representatives and their distinctive features, mechanisms of action, possible application.
27. Drugs for the treatment of bleeding disorders (hemostatic drugs): the main groups and their representatives, mechanisms of action, possible application, adverse effects.
28. Classification of drugs acting on hematopoiesis. Drugs used in different kinds of anemias: mechanisms of action, principles of application. Hematopoietic factors – main preparations and their application.

Hormonal drugs. Drugs influencing on the immune system and on an inflammation.

1. Hormones: definition, classification. Hypothalamic and pituitary hormones, their synthetic analogs and antagonists – effects and application. Effects and application of melatonin.
2. Thyroid hormones – effects and application. Antithyroid drugs – mechanism of action, application, adverse effects. Calcitonin, parathyroid hormone, synthetic drugs influencing calcium balance – mechanisms of action, application.
3. Hormones of pancreatic gland and their effects. Diabetes mellitus – the main types, strategy of treatment. Insulin preparations – classification, distinctive features. The main complications of insulin treatment. Oral antidiabetic (hypoglycemic) drugs: the main groups, mechanisms of action, adverse effects. Urgent situations in diabetes mellitus and their treatment.
4. Estrogen hormones and progestins: natural hormones and their physiologic effects, synthetic analogs and their distinctive feature. Possible application of the estrogens and progestins, adverse effects. Antagonists of estrogens and progesterone, their possible application. Oral contraceptive drugs: the main groups, mechanisms of action, administration, adverse effects.
5. Androgen hormones: natural hormones and their physiologic effects, synthetic analogs of the androgens, its possible application, adverse effects. Androgen antagonists and their application.
6. Glucocorticoids: natural hormones and their synthetic analogs, the main effects, comparison of natural and synthetic glucocorticoids, application and adverse effects. Mineralocorticoids, their effects and application. Antagonists of glucocorticoids and mineralocorticoids, their application.
7. The main components of the immune system. The main types of disorders of the immune system. Classification of drugs acting on the immune system. Immunomodulators: the main representatives, mechanisms of action, application.
8. Immunodepressants: the main representatives, mechanisms of action, application, adverse effects.
9. The main groups of drugs used in immediate-type allergic reactions, their mechanisms of action and application. Brief characterization of histamine H₁-receptors antagonists (classification, pharmacokinetic and pharmacodynamic differences, adverse effects). Treatment of anaphylactic shock.
10. Inflammation: the main mechanisms and mediators. Classification of anti-inflammatory drugs. Non-steroidal anti-inflammatory drugs: mechanism of action, classification (non-selective COX-inhibitors and selective COX-2 inhibitors), application, adverse effects. Drugs used in gout: classification, mechanisms of action.
11. Steroidal anti-inflammatory drugs: mechanisms of the anti-inflammatory action, application (as an anti-inflammatory drugs), adverse effects. Slow-acting anti-inflammatory drugs (disease-modifying anti-rheumatic drugs): the main representatives, mechanisms of action, application, adverse effects.

Chemotherapeutic agents.

1. Antiseptics and disinfectants (definition, classification with the name of the basic preparations, a principle of action, clinical significance).
2. Chemotherapeutic means, definition, classification. A role and a place of chemotherapeutic drugs in treatment of usual infectious diseases. Principles of chemotherapy of bacterial diseases. Antibiotics (definition, classification).
3. β -lactamic antibiotics. Penicillins (classification, the mechanism and a spectrum of action, side effects, indications).
4. Cephalosporins and others β -lactamic antibiotics (classification, the mechanism and a spectrum of action, side effects, indications).
5. Macrolides and tetracyclines (classification, the mechanism of action, clinical indications). Side effects of tetracyclines and contraindications to their use.
6. Aminoglycosides (classification, the mechanism and a spectrum of action, indications). Side effects of aminoglycosides and its prevention. Contraindications to use of aminoglycosides.
7. Antibiotics of various groups (lincomycins, chloramphenicol, rifampicin, polymyxins etc.): pharmacokinetics, spectra of action, application, side effects and their prevention).
8. Sulfonamides (a principle of action, classification, clinical significance, adverse effects).
9. Quinolones (a principle of action, classification, differences between groups, clinical significance, adverse effects). Brief characterization of nitrofurans, 8-oxyquinolines and nitroimidazole derivatives (the main representatives, application, adverse effects).
10. Antifungals (classification, a spectrum of action, pharmacokinetic and pharmacodynamic properties, indications for use and side effects).
11. Drugs for the treatment of tuberculosis (classification, the comparative characteristic of groups of preparations). Principles of pharmacotherapy of patients with tuberculosis. Drugs for the treatment of leprosy.
12. Antimalarials. Principles of pharmacotherapy of malaria, the main drugs and their place in the treatment of malaria. Chemoprophylaxis of malaria.
13. Principles of the treatment of amebiasis, brief characterization of the main drugs. Treatment of other protozoal infections (trichomoniasis, lambliosis, toxoplasmosis, balantidiasis, leishmaniosis, tripanosomosis) – to indicate the main drugs.
14. Antihelminthic drugs: classification, indications for use of the main drugs.
15. Drugs for the treatment of viral diseases of respiratory system: (*a flu* or *respiratory syncytial virus (RSV)*): classification, a spectrum of action, of pharmacokinetic and pharmacodynamic features, indications for use and side effects.
16. Drugs for the treatment of herpes diseases and their distinctive features. Brief characterization of drugs for the treatment of cytomegalovirus diseases.
17. Drugs for the treatment of retroviral infection (HIV): classification and main distinctive features. Drugs for the treatment of viral hepatitis.
18. Principles of therapy of malignant tumors. Classification, distinctive features of the main antitumors drugs (drugs for the treatment of oncologic diseases).

THE DRUGS FOR PRESCRIPTION

1. Solution of Lidocaine in ampules for infiltrative anesthesia.
2. Solution of Lidocaine in ampules for IV administration.
3. Ointment of Pilocarpine.

4. Betanechole in tablets.
5. Neostigmine in tablets.
6. Solution of Atropine in ampules.
7. Solution of Atropine as eye drops.
8. Ipratropium as an aerosole.
9. Solution of Epinephrine in ampules.
10. Solution of Phenylephrine as eye drops.
11. Solution of Xylomethazoline as nasal drops.
12. Prazosin in tablets.
13. Metoprolol in tablets.
14. Timolol as eye drops.
15. Sildenafil in tablets.
16. Zolpidem in tablets.
17. Disulfiram in tablets.
18. Chlordiazepoxide in tablets.
19. Solution of Morphine in ampules.
20. Tramadol in tablets.
21. Phentoin in tablets.
22. Carbamazepine in tablets.
23. Levodopa/Carbidopa (“Synemet”) in tablets.
24. Trifluoperazine in tablets.
25. Solution of Fluphenazine decanoate in ampules.
26. Olanzapine in tablets.
27. Imipramine in tablets.
28. Fluoxetine in tablets.
29. Guaifenesin (in syrup “Tussin”).
30. Metformin in tablets.
31. Zafirlukast in tab.
32. Fluticasone in aerosol.
33. Hydrochlorthiazide in tab.
34. Enalapril in tab.
35. Losartan in tab.
36. Procainamide in ampoules.

37. Amiodaron in tab.
38. Verapamil in ampoules.
39. Digoxin in tab.
40. Sibutramin in tab.
41. Ranitidine in tab.
42. Omeprazole in tab.
43. Drotaverine (No -Spa) in tab.
44. Bisacodyl in tab.
45. Loperamide in tab.
46. Metoclopramide in tab.
47. Spironolacton in tab.
48. Furosemide in ampoules.
49. Oxytocin in ampoules.
50. Nitroglycerine as sublingual tablets.
51. Oral sustained-release tablets of nitroglycerine.
52. Amlodipine in tab.
53. Aspirin in tablets as an antiplatelet drug.
54. Clopidogrel in tablets.
55. Heparin in vials.
56. Cyanocobalamine in ampoules.
57. Filgrastim in vials.
58. Warfarin in tab.
59. Methimazole in tablets.
60. Glyburide in tablets.
61. Conjugated estrogens (Premarine) in tablets.
62. Flutamide in tablets.
63. Prednisolone in tablets.
64. Loratadine in tablets.
65. Cyclosporine in capsules.
66. Diclofenac in tablets.
67. Metotrexate in tablets.
68. Penicillin G in ampoules.
69. Amoxicillin in tab.
70. Amoxicillin/Clavulanat (Augmentin) in tab.
71. Cefazolin in ampoules.

72. Ceftriaxone in ampoules.
73. Imipenem/Cilastatin (Tienam) in ampoules.
74. Clarithromycin in tab.
75. Azithromycin in tab.
76. Doxycycline in caps.
77. Clindamycin in caps.
78. Rifampicin in caps.
79. Linezolid in ampoules.
80. Gentamycin in ampoules.
81. Isoniazid in tab.
82. Etambutol in tab.
83. Natamycin in suppositories.
84. Itraconazole in tab.
85. Amphotericin B in ampoules;
86. Terbinafine in tab.
87. Acyclovir in caps.
88. Ozeltamivir in tab.
89. Ganciclovir in tab.
90. Zidovudine in tab.
91. Nevirapine in tab.
92. Mebendazole in tab.
93. Praziquantel in tab.
94. Metronidazole in tab.
95. Chloroquine in tab.
96. Salbutamol in aerosol