General Pharmacology

1. Pharmacology and its subdivisions, origins and sources of drugs, names of drugs
2. Preclinical drug evaluation, clinical trials (phases)
3. Routes of administration of drugs, advantages, disadvantages, dosage forms
4. Drug transport through biological membranes – passive, carrier-mediated
5. Basic pharmacokinetic parameters and processes, first order and zero order kinetics, saturation kinetics.
6. Absorption of drugs, Bateman function, bioavailability, determination of bioavailability, AUC
7. Distribution, of drugs, volume of distribution, redistribution, binding to plasma proteins, tissue barriers.
8. Elimination, elimination half-life (α, β phase), elimination rate constant, clearance
9. Dosage regimens, continuous and intermittent administration of drugs, accumulation, accumulation index
10. Biotransformation of drugs, phases, examples
11. The role of the liver in drug metabolism, first pass effect
12. Induction and inhibition of enzymes, clinical significance.
13. Renal and extrarenal excretion of drugs
14. General principles of drug action, molecular mechanisms of drug action, the importance of placebo and nocebo
15. Specific effect of drugs - targets of drug action, receptor theory - types of receptors.
16. Dose-response relationship, therapeutic index, therapeutic window, therapeutic risk
17. Factors influencing pharmacokinetics and pharmacodynamics of drugs, adherence, compliance
18. Drug interactions, synergism, antagonism
19. Pharmacogenetics, genetic polymorphism
20. Tolerance, tachyphylaxis, resistance
21. Influence of diseases on the effect of drugs, polypharmacy
22. Adverse drug reactions
23. Drug induced allergic (hypersensitivity) reactions, idiosyncratic drug reactions
24. Carcinogenic and mutagenic effects
25. Drugs in pregnancy, teratogenic effect, drugs in lactation,
26. Drug therapy in infants and children, drug therapy in the elderly

Special Pharmacology

1. Cholinergic neurotransmission, effects of drugs on cholinergic transmission, muscarinic and nicotinic actions of acetylcholine, direct-acting cholinergic agonists, clinical use
2. Reversible and irreversible anticholinesterase agents
3. Antimuscarinic agents – alkaloids and their derivatives, synthetic anticholinergic drugs, antispasmodics
4. Neurotransmission in autonomic ganglia, drugs acting on autonomic ganglia, ganglion-blocking drugs, nicotine, characteristics, effects of tobacco smoking and pharmacologic treatment of tobacco dependence
5. Adrenergic neurotransmission, effects of drug on adrenergic transmission, adrenoceptors, direct and indirect mechanism of action
6. Catecholamines, synthesis, biotransformation, uptake, adrenaline, noradrenaline, isoprenaline, dopamine, dobutamine
7. Alpha-adrenoceptor agonists, selective alpha-1 and alpha-2 agonists
8. Ephedrine, amphetamines
9. Beta-adrenoceptor agonists (β1, β2)
10. Alpha-adrenoceptor antagonists, classification, clinical use
11. Ergot alkaloids and their derivatives, serotonin (5-HT), 5-HT receptors and drugs acting on them
12. Beta-adrenoceptor antagonists (β-blockers)
13. Drugs used in ophthalmology
14. Nitric oxide (NO)
15. Neuromuscular-blocking agents, classification, depolarizing and nondepolarizing agents, antidotes, clinical use, adverse effects, drug interactions, malignant hyperthermia
16. Dantrolene, Botulinum toxin type A, centrally acting muscle relaxants
17. Local anaesthetics – chemical structure, pharmacokinetics, effects, types of local anaesthesia, classification by clinical use
18. Adverse effects and intoxications of local anaesthetics, prevention and therapy
19. Cocaine
20. General anaesthesia, stages, inhalation anaesthetics in general, volatile inhalation anaesthetics, nitrous oxide (N2O) and xenon in general anaesthesia
21. Intravenous general anaesthetics, neuroleptanalgesia, combined anaesthesia
22. Risks of general anaesthesia, premedication, drug interactions with general anaesthetics, specific and nonspecific antagonists in general anaesthesia
23. Hypnotics, principles of use, barbiturates and their effects, clinical use, current significance
24. Benzodiazepines as hypnotics and Z-hypnotics
25. Ethanol – acute effects, clinical use, methanol and therapy of methanol intoxication, alcoholism, effects on health, methods of treatment of alcohol addiction
26. Antiepileptic drugs, principles of use, adverse effects, “classic” antiepileptic drugs
27. “Newer” antiepileptic drugs
28. Drug treatment of Parkinson’s disease – classification, mechanism of action, adverse effects, dopamine agonists and acetylcholine antagonists used in Parkinson’s disease
29. Classification of psychiatric medication
30. Typical and atypical antipsychotics
31. Antidepressants – tricyclic
32. Antidepressants – monoamine oxidase inhibitors
33. Antidepressants – SSRI, SNRI and atypical antidepressants
34. Mood stabilizers
35. Anxiolytics (tranquilizers)
36. Psychostimulants, CNS stimulants, anorectic drugs
37. Drugs used in Alzheimer’s disease. Nootropics and related drugs.
38. Psychoactive agents (hallucinogens)
39. Cannabinoids, endocannabinoids: receptors, role in organism, possible use
40. Substance (drug) dependence
41. Opium and its alkaloids, endogenous opioids, morphine, morphine intoxication, morphine dependence
42. Derivatives and substitutes of morphine, opioid antagonists and dualists
43. Eicosanoids, significance, methods of influencing the eicosanoid synthesis, inflammatory cytokine inhibitors
44. Analgesic-antipyretics, classification, adverse effects
45. Nonsteroidal anti-inflammatory drugs – classification, clinical use, adverse effects, cyclooxygenase I and II
46. Pharmacotherapy of migraine
47. Anti-rheumatic drugs – disease-modifying drugs, monoclonal antibodies
48. Drugs used in gout
49. Immunomodulation, immunosuppressive drugs, immunostimulant drugs
50. Inotropic agents, digoxin and related drugs
51. Antiarrhythmic drugs – mechanism of action, classification, overview
52. Antiarrhythmic drugs – characteristics and representatives of individual groups, unclassified drugs
53. Vasoconstrictor drugs
54. Methylxanthines and their derivatives
55. Angiotensin-converting enzyme inhibitors and angiotensin receptor blockers
56. Aldosterone antagonists, drugs affecting natriuretic peptides
57. Diuretics in general – sites of action, classification by mechanism of action, osmotic diuretics and aquaretics
58. Thiazides, sulphonamide diuretics, carbonic anhydrase inhibitors
59. Loop diuretics, use, risks, potassium-sparing diuretics
60. Overview of vasodilator drugs (+ mechanism of action), direct vasodilator drugs (potassium channel openers – hydralazine, minoxidil and others)
61. Calcium channel blockers
62. Nitrites and nitrates
63. Overview of drugs used in heart failure
64. Overview of drugs used in coronary artery disease
65. Antihypertensive drugs and their clinical use, adverse effects, contraindications
66. Drugs used in atherosclerosis and drugs affecting lipid metabolism
67. Drugs affecting blood coagulation – Overview of mechanisms of action
68. Parenteral anticoagulants – indirect thrombin inhibitors (heparin)
69. Parenteral anticoagulants – indirect factor Xa inhibitors (low molecular weight heparins and pentasaccharides)
70. Direct oral anticoagulants: thrombin inhibitors (gatrans), factor Xa inhibitors (xabans)
71. Antivitamins K
72. Antidote for anticoagulants
73. Fibrinolytics, thrombolytics
74. Drugs affecting platelet aggregation
75. Agents that reduce increased bleeding, haemostatic agents
76. Drugs used in anaemia
77. Antitussives, expectorants
78. Histamine and antihistamines H1
79. Antiasthmatics, drugs used in obstructive lung disease
80. Intestinal adsorbents, disinfectants, laxatives, antidiarrheal drugs, antiinfectives, antiflatulent agents
81. Acids and antacids, pancreatic and proteolytic enzymes
82. Drugs used in peptic ulcer disease
83. Prokinetics, probiotics.
84. Emetics, antiemetics
85. Intestinal anti-inflammatory drugs and monoclonal antibodies (idiopathic inflammatory bowel diseases)
86. Substances with hepatoprotective effect, cholagogues, dissolution of gallstones
87. Hormones of the hypothalamus, hormones of the adenohypophysis and neurohypophysis, their analogues and clinical use
88. Thyroid and parathyroid hormones, iodine, iodides and antithyroid drugs
89. Mineralocorticoids, their antagonists, substitution therapy
90. Insulin and glucagon
91. Pharmacotherapy of diabetes, overview, oral antidiabetics, and their significant side effects
92. Glucocorticoids
93. Androgens, anabolic steroids
94. Oestrogens, progestogens: clinical use
95. Contraceptives, side effects, main contraindications
96. Uterotonics, tocolytics
97. Hormone antagonists
98. Drugs in the treatment of benign prostatic hyperplasia
99. Antibacterial agents: classification, mechanisms of action, pharmacokinetics, indications, resistance, principles of antibiotic treatment
100. β-lactam antibiotics: penicillins. Beta-lactamase inhibitors
101. β-lactam antibiotics: cephalosporins, carbapenems, monobactams
102. Aminoglycosides, quinolones
103. Glycopeptides, lipopeptides polypeptides, macrolides and azalides, lincosamides oxazolidinones
104. Tetracyclines and glycylcyclines, rifamycins, nitroimidazoles, sulphonamides
105. Chloramphenicol, fidaxomycin, fosfomycin, nitrofurantoin, fusidic acid, mupirocin, chemotherapeutics for urinary and intestinal infections, topical antibiotics
106. Antituberculosis and antileprosy drugs
107. Antifungals
108. Antivirals in general, drugs used in hepatitis B and C, herpes infections and influenza; ribavirin
109. Antiretrovirals, HIV therapy
110. Antiparasitic drugs
111. Anticancer drugs - general overview, mechanism of action
112. Anticancer drugs - principles of therapy, combinations, adverse effects, resistance, substances used to protect healthy tissue from toxic effects of anticancer drugs
113. Anticancer drugs - alkylating agents
114. Anticancer drugs - antimetabolites
115. Intercalating agents + topoisomerase inhibitors
116. Mitosis inhibitors
117. Anticancer drugs with combined mechanisms of action, monoclonal antibodies
118. Hormones and antihormones in cancer treatment
119. Platinum derivatives
120. X-ray contrast agents and their adverse effects
121. Disinfectants, antiseptics
122. Drugs used for local action on the skin and mucous membranes (excluding disinfectants)
123. Antagonists and specific antidotes for poisoning and overdose
124. Antidotes for metal poisoning in general, intoxication with mercury, arsenic and lead compounds, and their therapy
125. Calcium, magnesium, potassium
126. Zinc, selenium, antioxidants
127. Vitamins A, E, K
128. Vitamin D and hormones affecting Ca metabolism
129. Substances used in the treatment of osteoporosis
130. Vitamin C, B vitamins
131. Phytotherapy, alternative medicine (principles, significance)