Syllabus for the State Exam

I. PHARMACOLOGY

№ Topic

GENERAL PHARMACOLOGY

1. Types of drug transport in the body. Drug absorption and drug distribution - factors affecting drug absorption and distribution. Understanding for Physiologically-Based Pharmacokinetic (PBPK) Modelling.
2. Drug metabolism and factors affecting drug metabolism. Mechanisms of drug excretion and factors affecting drug excretion.
3. Drug dosage regimens. Pharmacokinetic modelling. Model-independent and basic pharmacokinetic parameters, their assessment and value for pharmacotherapy. Multiple drug administration. Population pharmacokinetic modelling and therapeutic drug monitoring.
4. Mechanisms for realization of drug activity. Quantitative (graded) and quantal (population) dose (concentration) – response relationship. Therapeutic index.
5. Drug interactions.
6. Adverse drug reactions. Classification. Drug safety and Pharmacovigilance.
7. Phases in drug development. Non-clinical tests of new drugs. Clinical trials of drugs.
8. Pharmacogenomics, pharmacogenetics and gene therapy.

SPECIAL (SYSTEMS) PHARMACOLOGY

9. Muscarinic agonists (M-cholinomimetics, parasympaticomimtics). Inhibitors of acetylcholinesterase. Muscarinic antagonists (M-cholinolytics, parasympatholytics).
10. Neuromuscular blockers and centrally acting miorelaxants. General and local anaestethics. Safety profile.
11. Alpha-adrenomimetics (sympathomimetics). Alpha-adrenolytics (sympatholytics). Beta-adrenomimetics. Beta-adrenolytics. Pharmacogenetic aspects.
12. Antihistamines and antimigraine drugs. Endothelin-1 antagonists.
13. Sedative-hypnotic and anxiolytic drugs. Safety profile.
14. Antidepressant drugs, antipsychotic drugs and mood-stabilizing drugs. Safety profile.
15. Antiepileptic drugs. Drugs for Neurodegenerative diseases (Parkinson’s disease, Huntington’s disease and Alzheimer’s disease). Safety profile.
16. Opioid analgetics. Nonsteroidal antiinflammatory drug agents’ (NSAID) and non-opioid analgesics and antipyretics. Safety profile.
17. Antirheumatic agents. DMAD and anticytokine agents. Drugs for gout. Antiosteoporotic drugs. Safety profile.
18. Immunomodulators and immunosuppressants. Glucocorticosteroids and mineralcorticoids. Safety profile.

19. Drugs for treatment of heart failure. Recombinant human B-natriuretic peptide. Antianginal drugs for ishemic heart disease. Pacemaker inhibitors. Safety profile.
20. Lipid-lowering drugs. Antihypertensive drugs. Diuretics. Safety profile.
21. Calcium channel blockers and vasodilators. Antiarrhythmic drugs. Angiotensin-converting enzyme inhibitors. Angiotensin AT1 – receptor blockers. Direct renin inhibitors. Safety profile.
22. Hematopoietic drugs. Anticoagulant, antiplatelet and fibrinolytic drugs. Anti-anaemic drugs with iron, folic acid and vitamin B12. Hematopoietic growth factors. Safety profile.
23. Drugs for Respiratory Tract disorders – Asthma, COPD. Antitussives and expectorants.
24. Drugs for Gastrointestinal Tract Disorders. Drugs for treatment of peptic ulcer disease. Antiemetic agents. Prokinetic drugs, drugs for treatment of constipation and antidiarrheal agents. Safety profile.
25. Drugs for treatment of hypo- and hyper-thyroidism. Safety profile.
26. Insulin drug products. Oral antidiabetic agents. Incretin mimetics and synthetic analogs of amylin. Drugs for treatment of obeistas. Safety profile.
27. Female sex hormones, therapeutic applications. Hormonal contraception. Hormonal replacement therapy (HRT). Uteroactive drugs. Male sex hormones, therapeutic applications. Anabolic steroids. Overview of treatment of erectile dysfunction. Safety profile.
28. Aminoglycosides. Sulfonamides. Trimethoprim. Tetracyclines and glycylcyclines. Chlorampenicol. Streptogramins and oxazolidinones. Safety profile.
29. Beta-lactam antibiotics. Cephalosporines and other beta-lactams. Bacitracin. Vancomycin and Safety profile.
30. Macrolides, ketolides and macrocyclic macrolides. Lincosamides. Fusidic acid. Pleuromutilins. Safety profile.
31. Fluoroquinolones. Metronidazole. Nitrofurantion. Polymixins and lipoglycopeptides. Safety profile.
32. Antituberculosis agents. Antileprosy drugs. Safety profile.
33. Antiviral drugs. Safety profile.
34. Antimycotic drugs. Safety profile.
35. Antiprotozoal agents: for treatment of trichomoniasis, toxoplasmosis and amebiasis. Antimalaria and antihelmintic drugs. Safety profile.

II. TOXICOLOGY

№	Topic
1.	Basic concepts in toxicology. Toxic substances. Intoxication. Toxic effects and interactions.
2.	Toxicometry. Quantitative characteristics of the toxic action.
3.	Intake of toxic substances. Factors influencing intake of toxic substances. Absorption and distribution - physico-chemical mechanisms. Blood-brain barrier.
4.	Metabolism of xenobiotics. General characteristics of metabolic processes. Types of reactions from Phase 1 and Phase 2. Factors affecting drug metabolism.
5.	Metabolism of xenobiotics - Phase 1 reactions. Enzyme systems. Significance for drug metabolism and drug toxicity.
6.	Metabolism of xenobiotics - Phase 2 reactions. Enzyme systems. Significance for drug metabolism and drug toxicity.
7.	Elimination of toxic substances and metabolic products. Routes of elimination and peculiarities. Extracorporeal methods for cleansing the body of toxic substances - hemodialysis, plasmafiltration, carbohemoperfusion. Use in the treatment of acute drug intoxications.
8.	Toxicodynamics. Mechanisms of toxic action. Toxic effect on enzyme systems, interaction with biological macromolecules.
9.	Carcinogenesis. Teratogenesis. Immunotoxicity, gene toxicity.
10.	Haematoxic substances. Representatives. Mechanism of toxic action. Antidotes.
11.	Hepatotoxic substances. Toxic damage to liver function.
12.	Toxic action of paracetamol. Mechanism. Antidote therapy.
13.	Intoxication with medicines, acting on the CNS. Benzodiazepines.
14.	Toxic effect of ethanol.
15.	Intoxication with methanol and ethylene glycol. Mechanism. Antidote therapy.
16.	Toxic action of organophosphorus compounds and carbamates. Mechanism. Antidote therapy.
17.	Toxic action of metals. Acute and chronic poisoning.
18.	Toxic action of amphetamines and cocaine.
19.	Toxic action of opiates. Acute poisoning, abstinence and substitution therapy.
20.	Poisoning with toxins of plant, animal and bacterial origin. Mushroom intoxications. Snake poisons. Botulism.

Bibliography

I. PHARMACOLOGY

Main sources:

1. Terziivanov, D. and I. Atanasova. Clinical Pharmacology. St. Kliment Ohridski Publisher, 2017
2. Goodman & Gilman's The Pharmacological Basis Of Therapeutics. 13th ed. John S. Lazo (Editor), Louis Sanford Goodman (Editor), Alfred Goodman Gilman (Editor), Keith L. Parker (Editor). McGraw-Hill, 2018
3. Rang, HP., Dale, MM., Ritter, JM., Moore, PK. Pharmacology. 9th edition. Edinburgh: Churchill Livingstone, 2020.

II. TOXICOLOGY

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1 Timbrell, J. Principles of biochemical toxicology. Taylor & Francis, London, 2000.
2 . Casarett & Doull's Toxicology. The basic science of poisons. (Klaassen, C. D., ed.). McGraw-Hill, New York, 2008.
3 . Barile, F.A. Clinical Toxicology – principles and mechanisms. CRC Press, Boca Raton, 2004.