Pharmacology Examination Topics

1. Pharmacodynamic principles. Receptors and subtypes
   - General description of parasympathetic nervous system from pharmacological point of view (neurotransmitters and receptors)
   - Antihypertensive mode of action of thiazide diuretics and the side effects, osmotic diuretics

2. Dose-response relationships. Efficacy and potency
   - Directly acting parasympathomimetics
   - Calcium channel blockers

3. Graded and quantal dose-response relationships. Therapeutic index, therapeutic window
   - Parasympatholytics
   - Centrally acting sympathoplegic drugs

4. Agonists and antagonists. Antagonism on the receptor level
   - Sympathomimetics
   - Pharmacology of renin/angiotensin system

5. Antagonism. Non-receptorial antagonism
   - Non-selective α-adrenoceptor blockers
   - General description of antiarrhythmic drugs. Vaughan Williams classification

6. Control of receptor expression. Receptor diseases and receptors and disease
   - β-adrenoceptor blockers
   - Treatment of myocardial ischemia especially the treatment of angina pectoris

7. Desensitization, tachyphylaxys and tolerance
   - Indirectly acting parasympathomimetics
   - Drugs used in the treatment of hyperlipidemias

8. The movement of drugs through biological membranes
   - Structure-activity relationships demonstrated among sympathomimetics
   - Drugs used for the treatment of congestive heart failure

9. Distribution of drugs in the body: the apparent volume of distribution ($V_d$)
   - General description of sympathetic nervous system from pharmacological point of view (neurotransmitters and receptors)
   - Characterization of quinidine, lidocaine, and amiodarone

10. Elimination of drugs: the half-life ($T_{1/2}$)
    - Pharmacological tools to influence the sympathetic neurotransmission
    - Expectorants and antitussives

11. The clearance
    - Selective α-adrenoceptor blockers
    - Pharmacology of the liver and the gall bladder

12. Plasma concentrations after repeated administration: loading dose and maintenance dose
    - Metabolism of catecholamines and pharmacological modulation
    - Pharmacological treatment of bronchial asthma

13. Absorption of drugs and ion trap
    - Comparison of elimination of acetylcholine (Ach) and norepinephrine/noradrenaline from the synaptic cleft and the possibilities of pharmacological modulation
    - Therapeutic importance of diuretics, mode of action and classification. Antialdosterone compounds and other potassium-sparing diuretics
14. Bioavailability. AUC
   Compare the effects of norepinephrine/noradrenaline, epinephrine/adrenaline and isoprenaline
   Inhibitors of carboanhydrase enzyme, thiazides and other sulfonamide type diuretics, high-ceiling diuretics (loop diuretics) and antidiuretics

15. First pass effect
   Synthesis, storage, release and elimination of acetylcholine (Ach). Demonstration of Dale’s experiment
   Agents used in anemias

16. Drug elimination: I. Biotransformation
   Non-adrenergic, non-cholinergic (NANC) transmission
   Drugs used in coagulation disorders

17. Factors influencing the drug elimination
   Uptake mechanisms, substrates and inhibitors
   Drugs used in acid-peptic disease

18. Drug elimination: II. Excretion
   α2 sympathomimetics and the concept of “false transmitter”
   Laxatives, antidiarrheal drugs. Drugs in the treatment of chronic inflammatory bowel disease, antiobesity drugs

19. Factors influencing the drug effect. Preclinical phase of drug development
   Pharmacology of cardiac glycosides
   Drugs promoting gastrointestinal motility. Emetics and antiemetic drugs

20. Drug interactions. Biologics (biological therapy), special considerations with respect to their development.
   Positive inotropic substances except cardiac glycosides
   Pharmacotherapeutic approach to exocrine pancreatic diseases

   Adrenergic neuron blockers and reserpine. Antihypertensive mode of action of β-blockers
   Botanical/herbal remedies