AL-FARABI KAZAKH NATIONAL UNIVERSITY

Faculty of Medicine and Healthcare, Higher School of Medicine

Department of Fundamental Medicine

**PROGRAM**

**of midterm examination II on discipline Pharmacology**

**MZiB2216 "Mechanisms of Defense and Disease”**

**I. Purpose:** The purpose of midterm examination is to allow students demonstrate their competence and knowledge in pharmacology discipline.

**Objectives:** At the completion of this midterm examination II, student will be able to:

1. Define the drug name, dosage, indications and contraindication, side effects of the drug.
2. Describe the mechanism of the drug.
3. Compare the drug with another group of drugs.

**II.** **The format and instruction of Midterm examination II.**

**Read the instructions below carefully.**

The Midterm Examination will be administered during the class, written**,** on 9 th week of academic study and at its scheduled time.

**Format:** Ticket will be uploaded on the classroom. It consists of two Tasks ( Task 1 and Task 2). Each Task will involve 3 questions. Every question will be evaluated regarding **Table 2**. (Grading). Please check the evaluation scale.

**Time:** Students will have 60 minutes to complete the midterm examination.

Task 1- 30 minutes

Task 2- 30 minutes

**Rules:** The student’s mark will be ***“0”*** and can not retake midterm examination, **IF** :

1. Student have network connection problems.
2. Student will not submit a task on scheduled time.
3. Students are not allowed to discuss the questions and send it to other students, and take a picture of questions or copy.
4. All answers will checked for plagiarism.
5. A student found to be guilty of falsifying, plagiarism and cheating or any other form of academic dishonesty will be given a failing grade.

Students are not allowed to use their books, notes, lecture Powerpoints and cheat other student’s response sheets.

**IMPORTANT!** A student must join to classroom and submit the tasks on scheduled time. If the student will break the listed rules, student participation will be declared as invalid and the mark will ***“ 0”***. **Re-grading policy ( appeal):** *A student who considers that he or she has been awarded an incorrect mark for a midterm examination may request that the mark be reviewed. You must appeal officially within* ***1 days*** *after getting unsatisfied examination marks. After the watching record* Commission's of Appeal  *will decide whether student can retake or not Midterm control. If the student will be given chance to retake midterm exam:*

1. Student will have ONLY 50 minutes to complete the answer in front of the Commission's of Appeal (consist of 6 commission members). If a student cannot answer questions his/her latest mark will be the final mark;
2. The questions will be higher-ordered.

**EXAMPLE OF THE TICKET ON MIDTERM EXAMINATION I.**

**Ticket №1**

**Task1.** A 60-year-old man suffering from bronchial asthma and arterial hypertension complains of difficulty urinating. Objectively: BP 160/100, slight enlargement of the prostate.

Q1 Which drug from the following will reduce blood pressure and improve urination:

labetalol, phentolamine, propranolol, isoprenaline, doxazosine? Explain your answer.

Q2. Describe the mechanism of action for each drug.

Q3. What other medications can be prescribed to this patient? Justify the answer.

**Task2.** A team of ambulance doctors arrived on call to a patient who developed supraventricular tachycardia against the background of a hypertensive crisis.

Q 1. What should be chosen from the following drugs as a the first-aid kit of this patient? enalapril tablets, captopril tablets, diazoxide in ampoules, clonidine tablets, propranolol in ampoules, metoprolol in ampoules? Explain your answer.

Q2. Describe the mechanism of action for each drug.

Q3. What medications can be prescribed to this patient if he develops acute heart failure? Justify the answer.

**III. List of topics. Table 1.**

|  |  |
| --- | --- |
| 1 | PNS. Adrenergic drugs. Noradrenaline and adrenaline (Norepinephrine and epinephrine), their functions in healthy human body. Alfa and beta adrenoreceptors, different subtypes. adrenomimetics. |
| 2 | Adrenoblockers. Alfa beta adrenoceptor antagonists, Sympatholytics |
| 3 | Antianginal drugs. Antihypertensive drugs. Diuretics, Ca channel blockers, Nitrates, ACEI |
| 4 | Pharmacology of the hematopoietic system and hemostasis. Preparations for the treatment of anemia. Coagulation disorders. Drugs, enhancing drugs and reducing coagulation. Drugs, increasing and reducing platelet aggregation. Fibrinolytics and antifibrinolytics. |

**Main questions:**

1. Adrenergic synapse. Effects of stimulation of α and β-adrenergic receptors.
2. Classification of adrenergic agents.
3. Substances that stimulate α and β-adrenergic receptors. Mechanism of action.
4. Pharmacological effects of epinephrine (adrenaline hydrochloride) on the heart, blood vessels, pupil, smooth muscles of internal organs, carbohydrate, fat and lipid metabolism, etc.
5. Side effects of epinephrine. Indications and contraindications for use.
6. Sympathomimetics (ephedrine hydrochloride). Mechanism of action. Main pharmacological effects. Differences from epinephrine. Side effects. Indications for use.
7. Drugs stimulating mainly α-adrenergic receptors. Main pharmacological effects. Indications and contraindications for use. Comparative characteristics of norepinephrine and mezaton.
8. β-adrenomimetics. Selective and nonselective β-adrenomimetics.
9. Peculiarities of pharmacokinetics and pharmacodynamics of Isoproterenol.
10. The use of β-adrenomimetics. Influence on the tone of the myometrium.
11. Adrenergic synapse. Effects of inhibition of α and β-adrenergic receptors.
12. Classification of antiadrenergic agents.
13. Substances that inhibit α and β-adrenergic receptors. Mechanism of action.
14. Pharmacological effects of α adrenoblockers. Side effects. Indications and contraindications for use.
15. β-adrenoblockers. The mechanism of development of pharmacological effects.
16. Indications for use. Side effects.
17. Division into selective and non-selective β-adrenoblockers. Comparative characteristics of drugs.
18. Sympatholytics. Mechanism of action. The main pharmacokinetic and pharmacodynamic features of this group.
19. Treatment of glaucoma.
20. Interaction of antiadrenergic drugs.
21. Classification of antihypertensive agents.
22. Vasodilators. Myotropic antihypertensives, indications for use. Comparative characteristics of magnesium sulfate and dibazol. Peripheral vasodilators (sodium nitroprusside). Application. Side effects. Contraindications.
23. Drugs that block calcium channels. Principle of hypotensive action. Indications, contraindications to use, complications.
24. Drugs that affect the renin-angiotensin system. ACE inhibitors. Mechanism of action. Application. Complications, contraindications.
25. Angiotensin receptor antagonists. Mechanism of action. Application.
26. Neurotropic antihypertensive agents of central action. Pharmacodynamics of clonidine and methyldopa. Contraindications and side effects.
27. Beta-blockers. Mechanism of hypotensive effect. Indications. Side effects
28. Alpha-adrenoblockers. Mechanism of hypotensive effect. Indications. Side effects
29. Neurotropic antihypertensives, affecting peripheral innervation (sympatholytics, ganglion blockers).
30. Basic principles of pharmacotherapy in ischemic heart disease.
31. Antianginal drugs. Classification, mechanism of action, indications, contraindications and side effects.
32. Organic nitrates. The mechanism of vasodilator action. Use in IHD. Side effects.
33. Nitrate-like compounds. Features of application.
34. β-adrenoblockers. The mechanism of antianginal action. Features of the use in IHD.
35. Calcium antagonists. The mechanism of antianginal action. Features of the use in IHD.
36. Coronarolytics of direct myotropic action: dipyridamole. The mechanism of antianginal action. Indications for use. Side effects
37. Drugs of metabolic therapy: trimetazidine. Operating principle. Indications for use. Side effects
38. Preparations of other pharmacological groups possessing antihypertensive action (glucagon, adrenaline, dobutamine, amrinone).
39. Methods of teaching and conducting classes: small groups and discussion, drafting a protocol, determining group affiliation, prescribing prescriptions.
40. Diuretics. Classification by mechanism and force of action, indications, contraindications, side effects
41. Classification of diuretics for localization of action and duration of action
42. Loop diuretics. The mechanism of diuretic action. Other pharmacological effects. Indications for use.
43. Advantages and disadvantages of furosemide and ethacrynic acid. Adverse and toxic effects
44. Thiazides and thiazide-like diuretics. Mechanism of action. Frequency of application. Indications for use. Adverse and toxic effects
45. Potassium-sparing diuretics, mechanisms of action, indications, contraindications, side effects
46. Carboanhydrase inhibitors, mechanism of action, indications, contraindications, side effects
47. Osmotic diuretics, mechanism of action, indications, contraindications, side effects
48. Hemostasis, stages. Factors involved in blood clotting. Antiplatelet agents, classification, mechanism of action. The main effects. Indications for use. Side effects.
49. Anticoagulants. Classification. Heparins. Comparative characteristics of various heparins. Mechanism of action. The main effects. Indications for use. Side effects. Medications used for overdose of heparin and indirect anticoagulants.
50. Indirect anticoagulants. Oral anticoagulants. Comparative characteristics of various anticoagulants. Interaction with other drugs.
51. Fibrinolytics. Comparative characteristics of various drugs. Mechanism of action. The main effects. Indications for use. Side effects. Medications used for overdose of fibrinolytics.
52. Medications used for bleeding. Local hemostatics. Comparative characteristics of various drugs. Mechanism of action. The main effects. Indications for use. Side effects.
53. Vitamin K. Drugs. Antifibrinolytics. Comparative characteristics of various drugs. Mechanism of action. The main effects. Indications for use. Side effects.
54. Hematopoiesis. Medications used for various types of anemia. Comparative characteristics of various drugs. Mechanism of action. The main effects. Indications for use. Side effects.
55. Medications used to stimulate leukopoiesis. Comparative characteristics of various drugs. Mechanism of action. The main effects. Indications for use. Side effects.
56. Medications that inhibit leukopoiesis. Comparative characteristics of various drugs. Mechanism of action. The main effects. Indications for use. Side effects.

**IV. List of drugs.**

Epinephrine, Norepinephrine, Ephedrine, Phenylephrine, Nafazoline, Galazoline (Xylometazoline), Isoprenaline, Fenoterol, Salmeterol, Terbutalin, Salbutamolum, Orciprenaline, Tropaphene, Talinolol, Metoprolol, Octadine, Reserpine, Phentolamine, Prazosin, Terazosin, Tamsulosin, Doxazosin, Propranolol, Carvedilol, Labetolol, Nebivolol, Atenolol, Bisoprolol, Captopril, Enalapril, Fosinopril, Losartan, Valsartan, Propranolol, Metoprolol, Atenolol, Ivabrodine, Alinidine, Ranolazine, Sodium nitroprusside, Phentolamine, Pentamine, Nifedipine, Amlodipine, Felodipine, Nimodipine, Papaverine, Dibazol, Clonidine, Methyldopa, Bisoprolol, Trimetazidine, Diltiazem, Verapamil, Pinacidil, Nicorandil, Validol, Nitroglicerine, Isosorbide dinitrate, Isosorbite mononitrate, erythrityl tetranitrate Sodium nitroprusside Amrinone, Digoxin, Milrinon, Asparkam, Dobutamine, Hydrochlorothiazide, Arifon, Amyloride, Spironolactone, Indapamide, Ethcarinic acid, Chlorthalidone, Triamterene

Heparin, Iron preparations, Vitamin B12, Folic acid, Erythropoietin, Vitamin K, Menadion, Fibrinogen, Ethamzylate, Enoxaparin, Fraxiparin, Fondaparinux, Lepirudin, Bivalirudin, Protamine sulfate, Warfarin, Dicumarol, Rivaroxaban, Dabigatran, Streptokinase, Urokinase, Alteplase, Aminocaproic acid, Tranexamic acid, Aspirin, Dipyridamole, Ticlopidine, Clopidogrel, Eptifibatide, Tirofiban.

**V. Table 2. Grading of Midterm examination I.**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Criteria** | **Level (point)** | | | | | |
| **Out of programm** | **At the levell of the Programm** | **Not complete answer** | **Need correction** | **need to study more** | **no pass** |
| **Task 1** | **Case** | 1 question | 30 | 30 | 20 | 15 | 10 | 0 |
| 2 question | 30 | 25 | 20 | 15 | 10 | 0 |
| 3 question | 40 | 35 | 25 | 20 | 15 | 0 |
|  | **100** | **90** | **65** | **50** | **35** | **0** |
| **Task 2** | **Case** | 1 question | 40 | 35 | 25 | 20 | 15 | 0 |
| 2 question | 30 | 27 | 20 | 15 | 10 | 0 |
| 3 question | 30 | 28 | 20 | 15 | 10 | 0 |
|  | **100** | **90** | **65** | **50** | **35** | **0** |