A. **Actuality**

The implementation of new diagnostic and treatment methods in medical practice is dictated by the increasing influence of various environmental factors and drugs on the body, including the endocrine system. Elucidation of pathogenetic mechanisms of endocrine disorders and pathological conditions caused by hormone insufficiency or hypersecretion opens new perspectives in the development of drug preparations capable of annihilating the changes that have occurred. Knowing the pharmacodynamic and pharmacokinetic properties of hormonal preparations is necessary for clinical endocrinology to solve the problems of diagnosis and treatment of endocrine diseases, emergency states and complications caused by them.

In the last few decades, the number of hormonal and, especially, anti-hormonal preparations has rapidly risen. Elucidation of molecular mechanisms of action opens new perspectives for their use as substitution, suppression, for normalization or stimulation of endocrine glands secretion. In addition, hormonal preparations are prescribed to the patient for vital purposes in major emergencies (various types of shock, hypotension, stroke, etc.).

B. **Training aim**

Acquiring the clinical and pharmacological principles to justify the prescription, use, dosage regimen of hormonal and anti-hormonal drugs.

C. **Teaching objectives**

*The student should be able to:*

- a) choose a minimum complex of investigation methods to assess the pharmacodynamic effect of hormonal and anti-hormonal drugs;
- b) analyze and appreciate the results of pharmacodynamic studies of hormonal and anti-hormonal medicinal preparations, obtained by laboratory and instrumental methods;
- c) predict possible complications and side effects of medications in these groups;
- d) predict adverse reactions depending on the dosage regimen of these drugs and the functional state of organs and systems of the body;
- e) apply contemporary methods of pharmacological and non-pharmacological correction of adverse reactions caused by hormonal and anti-hormonal drugs.

D. **Knowledge from previously studied disciplines and related subjects**


*Endocrinology.* Etiology, pathogenesis of the main forms of endocrine pathologies. Clinical manifestations of endocrine disorders. Functional and laboratory tests applied in endocrinology.

*Pharmacology.* Classification of hormonal medicinal preparations by structure and mechanism of action. Mechanisms of action, effects, indications and contraindications, side effects of hormonal preparations of the hypothalamus, pituitary, thyroid, parathyroid, pancreas, corticosuprarenals.

E. **Questions for self-training**

I. **Clinical and pharmacological characteristics of the drugs used in endocrine disorders.**
1. Thyroid hormone drugs. Particularities of the mechanism of action, pharmacological effects and their manifestations, pharmacokinetics, indications and dosing principles, contraindications, adverse reactions.

2. Antithyroid medication. Classification. Particularities of the mechanism of action and pharmacological effects, pharmacokinetics, indications and dosing principles, contraindications, adverse reactions of thioamides, iodine preparations, beta-adrenoblockers, lithium preparations etc.


5. Sulfonylureas derivatives: mechanism of action, hypoglycemic effects, other pharmacological effects, indications and dosing principles, contraindications, adverse reactions and manifestation peculiarities, pharmacokinetics.


7. Thiazolidinediones: the mechanism of action, the particularities of the hypoglycaemic effect, the indications and principles of dosing, contraindications, adverse reactions and manifestations, pharmacokinetics.

8. Meglitinides: mechanism of action, hypoglycemic effects, indications and dosing principles, contraindications, adverse reactions, pharmacokinetics.


10. GLP-1 receptor agonists: mechanism of action, particularities of antihyperglycemic effect, indications, dosage principles, contraindications, adverse reactions, pharmacokinetics.

11. DDP-IV inhibitors: mechanism of action, particularities of antihyperglycemic effect, dosage indications, dosage principles, contraindications, adverse reactions, pharmacokinetics.


II. Clinical-pharmacological selection and use of drugs in endocrine disorders:
   - Principles for the selection and use of drugs in diabetes type 1;
   - Principles for the selection and use of drugs in diabetes type 2 and obesity;
   - Principles for the selection and use of drugs in diabetes type 2 during pregnancy;
   - Principles for the selection and use of drugs for combined treatment of diabetes type 2;
   - Principles of selection and use of drugs for hypothyroidism and cardio-vascular diseases;
   - Principles of selection and use of drugs for radiation protection of the thyroid gland;
   - Principles of selection and use of drugs in diffuse toxic goiter;

E. Individual work:
1. Brief characterization of main drugs
   - Vertically. International Non-Proprietary Name (INN) of the drug.
   - Horizontally. Synonyms, forms of delivery, way of intake, doses (therapeutic, maximal doses), mechanisms of action, prescriptions, contraindications, adverse reactions:
     - Liotironine, potassium iodide, glimeperide, repaglinide, acarbose, sitagliptin, fluticasone.

2. Exercises on medical prescription (see methodological instructions for practical works on pharmacology for the 3rd year):
   - Levothyroxine, thiamazole, propranolol, regular human insulin, insulin aspart, insulin glargine, isophane (NPH) insulin, glibenclamide, metformin, hydrocortisone, prednisolone, methylprednisolone, dexamethasone, fluocinolone, budesonide, nandrolone decanoate.

3. Indicate the drugs used in (for):
   - Thyrotoxic crisis; myxedema; hyperthyroidism; radiation protection of the thyroid gland, hypothyroidism and allergy to thioamides; hypothyroidism; diabetes type 1, diabetes type 2 during pregnancy; diabetes type 2 and obesity; diabetes type 2-combined treatment; diabetic ketoacidotic coma; hypoglycemic coma; acute adrenal insufficiency; chronic adrenal insufficiency; adrenogenital syndrome in children; cachexia and malnutrition.

6. Virtual Cases.
7. Personal Drug (P-Drug) Selection and P-Treatment (Personal Treatment) according to the criteria of efficacy, safety, acceptability and cost for inclusion in the personal form (P drugs).