

**MEDICAL UNIVERSITY- PLOVDIV  
FACULTY OF PHARMACY  
DEPARTMENT OF CLINICAL LABORATORY**

**PROGRAMME OF THE PRACTICAL EXERCISES IN CLINICAL  
LABORATORY  
SPECIALTY “MEDICINE”**

***EXERCISE №1- 2 hours: The result in the clinical laboratory.***

1. Introduction to the structure and work process of the clinical laboratory. The main groups of clinical and laboratory indicators. Appointment of clinical and laboratory indicators - LIS. Basic methods and equipment in the clinical laboratory. Internal and external evaluation of the quality of laboratory results.
2. Influence of laboratory results in the preanalytical stage. Basic rules and requirements. Venous or capillary blood for examination.
3. Basic procedures and sources of errors in taking biological material for analysis and sending it to the clinical laboratory. Closed system for taking biological material.
4. Demonstration of impact on the results of changes in the biological material (hemolysis, clot, lipemia, etc.)

***EXERCISE №2 – 2hours: Urine. General characteristics and chemical tests.***

1. Rules and requirements for urine collection– random urine and diuresis.
2. Urine - general characteristics, reference ranges, results interpretation.
3. Chemical analysis - pH, glucose, protein, ketone bodies, bilirubin, urobilinogen, blood – quality and quantity analysis.
4. Presentation of samples of different color and transparency.
5. Getting to know the rules of processing and storage of express urine tests.

***EXERCISE №3 2hours: Evaluation of the laboratory results of micro- and macroelements in human serum.***

1. Inorganic Phosphorus, Calcium, Magnesium - total and ionized: laboratory methods, indications for investigation, reference ranges, results interpretation.
2. Serum Iron and Iron Binding Capacity. Laboratory methods, interferences, indications for investigation, reference ranges, results interpretation.

***EXERCISE №4 – 2 hours: Evaluation of the laboratory results of hematological parameters.***

1. Basic hematological parameters - CBC, DBC, RSR, reference ranges.
2. Indications for research, interpretation of results.
3. Normal and pathological morphology of erythrocytes in peripheral blood.

***EXERCISE №5 - 2 hours Clinical laboratory parameters in red blood cell disorders.***

1. Post-hemorrhagic anemia, iron deficiency, pernicious, hemolytic, etc.
2. Evaluation of the results of hematological parameters examination.
3. Microscopy of peripheral blood smear in different types of anemia.
4. Discussion of the clinical cases.

***EXERCISE №6 – 2 hours: Clinical laboratory parameters in white blood cell disorders.***

1. Diseases of the white blood cell - acute and chronic leukemia, leukemoid reactions.
2. Evaluation of the results of hematological parameters examination.
3. Specialized tests in acute and chronic leukemias.
4. Discussion of the clinical cases.

***EXERCISE №7 – 2 hours: Microscopic observation of bone marrow and venous blood smears***

***EXERCISE №8 – 2 hours: Clinical laboratory evaluation of hemostasis.***

1. The hemostasis as an integrated functional system. The action of vessels' wall, platelets and blood plasma in the hemostasis.
2. Coagulation. Key phases in the process of coagulation.
3. Plasma factors of coagulation and them inhibitors– necessity and opportunity for investigation.
4. Fibrinolysis – factors and inhibitors - necessity and opportunity for investigation.

***EXERCISE №9 – 2 hours: Clinical laboratory evaluation of hemostasis***

1. Clinical laboratory parameters for evaluation of hemostasis – test principles, sources of errors, patient preparation, specimen, indications for investigation.
2. Screening tests for evaluation of hemostasis. Results interpretation
3. Tests for investigation of activity and concentration of individual plasma factors of coagulation and fibrinolysis. Results interpretation.
4. Specialized analysis for evaluation of hemostasis.
5. Control of anticoagulant therapy.
6. Discussion of the clinical cases.

***EXERCISE №10 – 2 hours: Clinical laboratory parameters for evaluation disturbance of carbohydrate metabolism.***

1. Glucose in the blood – definition, interferences, indications for investigation, reference ranges, results interpretation.
2. Tests with overload – two-hour postprandial test and oral glucose tolerance test - indications for investigation, reference ranges.
3. Evaluation of glycaemia for preceded period of time - test principles (demonstration), sources of errors, patient preparation, specimen, reference ranges, indications for investigation.
4. Discussion of the clinical cases.

***EXERCISE №11 – 2 hours: Clinical laboratory parameters for evaluation of serum proteins.***

1. Total serum protein: principle of determination methods - sources of errors, drug interference, test indications, patient preparation, biological material, reference limits, interpretation of results.
2. Methods for serum protein fractionation - types, principles, disadvantages and advantages.
3. Discussion of electrophoresis results in different diseases

***EXERCISE №12 – 2 hours: Clinical laboratory parameters for evaluation of serum proteins.***

1. Individual proteins – biological characteristics. Results interpretation.
2. Immunoglobulins – quantity measurement, methods, specimen, reference ranges, indications for investigation, results interpretation in patients with disturbed immunoglobulin synthesis.
3. Demonstration of cases and finding of different types of myeloma multiplex and other diseases with hyperimmunoglobulinemia.
4. Discussion of the clinical cases.

***EXERCISE №13 –2 hours: Clinical laboratory parameters for evaluation of serum enzymes.***

1. Enzymes in the serum. Mechanisms of hyperenzymemia. Advantages and disadvantages of enzyme analysis.
2. Cell and secretory enzymes in the serum - test principles, sources of errors, reference ranges, indications for investigation, results interpretation.
3. Discussion of the clinical cases.

***EXERCISE №14 – 2 hours: Clinical laboratory parameters for evaluation of nonprotein nitrogen containing substances***

1. Urea – common data, principle of analytical methods, sources of errors, drug interference in laboratory testing, patient preparation, specimen, reference ranges, indications for investigation, results interpretation.
2. Creatine and creatinine – common data, principle of analytical methods, sources of errors, drug interference in laboratory testing, patient preparation, specimen, reference ranges, indications for investigation, results interpretation.
3. Uric acid and ammonia – common data, principle of analytical methods, sources of errors, drug interference in laboratory testing, patient preparation, specimen, reference ranges, indications for investigation, results interpretation.
4. Discussion of the clinical cases.

***EXERCISE №15 – 2 hours: Clinical laboratory evaluation of lipid parameters and lipoproteins.***

1. Basic classes of lipoproteins.

2. Basic clinical and laboratory indicators for assessment of lipid metabolism - methods, indications for examination, patient preparation, risk values.
3. Stages and approaches for selection of clinical and laboratory indicators in disorders of lipid metabolism.
4. Discussion of the clinical cases.