

MEDICAL UNIVERSITY- PLOVDIV
FACULTY OF PHARMACY
DEPARTMENT OF CLINICAL LABORATORY

SYLLABUS
CLINICAL CHEMISTRY EXAMINATION

1. Analytical reliability of clinical laboratory methods - criteria. Reference range - established population (definition, reference group, reference state, reference conditions, choice of statistical method, disadvantages), individual – advantages.
2. Diagnostic reliability of clinical laboratory parameters - criteria. Requirements for the criteria of diagnostic reliability of clinical laboratory tests in different groups of diseases
3. Permanent, long-term and short-term acting factors of biological variation of results - examples.
4. Effects of the medical procedures and medication (chemical and pharmacological interference) on the laboratory results. Guidelines for control of drug effects on laboratory tests.
5. Biological material for clinical laboratory testing - basic rules and requirements. Venous or capillary blood for testing? Closed system - advantages for clinic, advantages for the clinical laboratory.
6. Storage of the biological samples for analysis and transportation to the laboratory – requirements and sources of errors. Criteria for rejection of the specimen for laboratory analysis.
7. Urine for clinical laboratory investigation – basic rules and requirements for urine collection, storage and transportation to the laboratory. Sources of errors
8. Cerebrospinal fluid, body fluid punctats and stool - basic rules and requirements for collection, storage and transportation to the laboratory. Sources of errors.
9. Methods in the clinical laboratory- characteristics.
10. Calibration curve - conditions for calibration. Rules for construction.
11. Quality control in clinical laboratory - internal quality control.
12. Quality control in clinical laboratory - external evaluation of the quality of laboratory results.
13. Body water and its distribution in the body. Osmolality and osmolarity - methods for determination –reference range, informative significance.
14. Disturbances of water electrolyte exchange - terminology. Clinical laboratory parameters for assessment of water electrolyte exchange
15. Sodium and chloride - common data, indications for testing, analytical methods, principles. Reference limits, informative significance..
16. Potassium - general data for the parameter, analytical methods - principles. Reference limits, informative value.

17. Total and ionized calcium in serum - common data ,analytical methods - principles. Reference limits, informative value.
18. Inorganic phosphate - common data ,analytical methods - principles. Reference limits, informative value.
19. Acid-base exchange. Basic parameters. Methods for determination. Informative significance
20. Serum iron and TIBC – common data, analytical methods - types, principles, interference ,indications for testing. Reference limits and informative value.
21. Diabetes mellitus - disturbances in the normal course of conversion circuits: glycolysis and gluconeogenesis, glycogenolysis and glycogensynthesis, ketogenesis, ketonuria, glycosuria, osmotic diuresis and polyuria.
22. Glucose in the blood - principle of the analytical methods, interference, indications for testing, biological material, reference, border and pathological values. Hyperglycemia and hypoglycemia.
23. Glucose in the blood - overload tests: two-hour postprandial test and glucose tolerance test (GTT): indications and contraindications, the test, sources of errors, reference ranges, informative content.
24. Evaluation of glycemia for preceded period of time: glycated proteins - glycated hemoglobin HbA1; HbA1c and fructosamine: common data for the parameters, indications for investigation, patient preparation, specimen, reference ranges, informative content and results interpretation
25. Total protein - common data for the parameters, principles of the analytical methods and interferences, indications for investigation, patient preparation, reference ranges, result interpretation.
26. Major protein fractions – electrophoreses: indications for investigation, result interpretation, informational value.
27. Individual proteins – proteins of the acute phase – types, analytical methods for investigation, indications for investigation, patient preparation, reference ranges, results interpretation.
28. Immunoglobulins in the serum – common data for the parameters, classification, dynamic in prenatal and early postnatal period, methods of investigation, results' interpretation.
29. Urea - common data for the parameter, principles of the analytical methods, source of errors, indications for investigation, patient preparation, reference ranges, result's interpretation.
30. Creatinine - common data for the parameter, principles of the analytical methods, source of errors and interference, indications for investigation, patient preparation, specimen, reference ranges, result's interpretation.
31. Uric acid - common data for the parameter, principles of the analytical methods, source of errors and interference, indications for investigation, patient preparation, specimen, reference ranges, result's interpretation.
32. Transaminases in serum – general information, principles of analytical methods, sources of errors, indications for analysis, biological material, reference ranges, interpretation of results.

33. Alkaline and acid phosphatase in serum - general information, principles of analytical methods, sources of errors, indications for analysis, biological material, reference ranges, interpretation of results.
34. Lactate dehydrogenase and creatine phosphokinase in serum - general information, principles of analytical methods, sources of errors, indications for analysis, biological material, reference ranges, interpretation of results.
35. Amylase, gamma-glutamyltransferase and cholinesterase - general information, principles of analytical methods, sources of errors, indications for analysis, biological material, reference ranges, interpretation of results.
36. Lipids and lipoproteins. Common data. Endogenous and exogenous pathway.
37. Cholesterol in serum and its fractions - general information, analytical methods, interferences, risk limits, interpretation of results.
38. Triglycerides in serum general information, analytical methods, interferences, risk limits, interpretation of results.
39. Serum bilirubin and fractions – metabolism, methods, interferences, reference ranges, interpretation of results.
40. Hemostasis as a complex functional system – phases and factors.
41. Blood coagulation and fibrinolysis – factors and inhibitors.
42. Clinical laboratory parameters for evaluation of haemostasis.
43. Choice and discussion of laboratory parameters in hemorrhagic diathesis.
44. Choice and discussion of laboratory parameters in thrombophilia.
45. Choice and discussion of laboratory parameters in DIC syndrome.
46. Hemoglobin – types and methods for determination. Reference ranges. Informative content.
47. Urine - general properties, pH, protein - principles of the methods, interferences, informative content.
48. Urine - glucose, ketones - general methods, interferences, evaluate the results, informative value.
49. Urine - bile pigments - general methods, interferences, evaluate the results, informative value.
50. Functional examination of the kidneys. Clearance testing - conducting, reference ranges, informative value.
51. Tumor markers. Markers of the first and the second choice.
52. Hormones in biological fluids - general data, basic groups. Methods for testing.
53. Drug monitoring.

RECOMMENDED READING:

Basic:

1. Guide to practical trainings in clinical chemistry for pharmacy students / Bisera D. Atanasova, Nikolina Iv. Denikova, Blagovesta S. Dishlianova, Svetlana D. Hadjieva, Mariana P. Genova et al ; Ред. Kamen Tzatchev . - Plovdiv : Lax book, 2014.
2. Clinical chemistry / William J. Marshall, Andrew Day, Marta Lapsley. - 8th ed.- Edinburgh: Elsevier, 2017.
3. Clinical chemistry: Principles, techniques, and correlations / Ed. Michael L. Bishop, Edward P. Fody, Larry E. Schoeff . - 7th ed. . - Philadelphia : Wolters Kluwer / Lippincott Williams & Wilkins, 2013.
4. Clinical laboratory medicine / Kenneth McClatchey . - 2nd ed. Lippincott Williams & Wilkins, 2002.

Additional:

1. Kaplan LA, Pesce AJ (ed). Clinical Chemistry. Theory, analysis, and correlation. 3th edition. St. Louis, Missouri, Mosby-Year Inc., 1996.
2. Burtis CA, Ashwood ER&DEBruns (ed). Tietz. Textbook of Clinical Chemistry and molecular diagnostics. 4th ed. Elsevier Saunders, 2006.
3. Mcpherson R. and M. Pincus. Henry's Clinical diagnosis and Management by laboratory methods, 21st ed.
4. Chemistry laboratory manual / Angelina Stoyanova, Emil Rachin . - Pleven : MU - Pleven, 2009.