

MEDICAL UNIVERSITY- PLOVDIV
FACULTY OF MEDICINE
DEPARTMENT OF CLINICAL LABORATORY

CONSPECTUS IN CLINICAL CHEMISTRY
SPECIALTY PHARMACY

1. Analytical reliability of clinical laboratory methods - criteria. Reference limits - population-based (definition, reference group, reference conditions, choice of statistical method) and individual based (development, advantages).
2. Permanent, long-term and short-term acting factors of biological variation of results - examples.
3. Effects of the medical procedures and medication (chemical and pharmacological interference) on the laboratory results. Guidelines for control of drug effects on laboratory tests.
4. Biological material for clinical laboratory testing - basic rules and requirements. Venous or capillary blood for testing.
5. Closed system for biological material for the different groups of clinical-laboratory parameters. Advantages for the clinic, advantages for the clinical laboratory.
6. Storage of the biological samples for analysis and transport to the laboratory – requirements and sources of errors. Criteria for rejection of the specimen for laboratory analysis.
7. Urine for clinical laboratory investigation. Body fluids and stool. Basic rules and requirements for collection, storage and transport to the laboratory. Sources of errors
8. Methods in the clinical laboratory- characteristics.
9. Calibration curve - conditions for calibration. Rules for construction.
10. Quality control in clinical laboratory - internal quality control.
11. Quality control in clinical laboratory - external evaluation of the quality of laboratory results.
12. Body water and its distribution in the body. Osmolality - methods for determination – reference range, informative significance.
13. Disturbances of water electrolyte exchange - terminology. Clinical laboratory parameters for assessment of water electrolyte exchange
14. Sodium and chloride - common data, indications for testing, analytical methods, principles. Reference limits, interpretation of results.
15. Potassium - general data for the parameter, analytical methods - principles. Reference limits, interpretation of results.
16. Total and ionized calcium in serum - common data ,analytical methods - principles. Reference limits, results interpretation.
17. Inorganic phosphate - common data, analytical methods - principles. Reference limits, interpretation of results.
18. Acid-base exchange. Basic parameters. Methods for determination. Informative significance
19. Serum iron and TIBC – common data, analytical methods, interference, indications for testing. Reference limits and interpretation of results.
20. Glucose in the blood - principle of the analytical methods, interference, indications for testing, biological material, reference, border and pathological values. Hyperglycemia and hypoglycemia.

21. Glucose in the blood - overload tests: two-hour postprandial test and glucose tolerance test (GTT), indications and contraindications, sources of errors, reference ranges, interpretation of results.
22. Evaluation of glycemia for preceeded period of time: glycated proteins – glycated hemoglobin HbA1, HbA1c and fructosamine. Common data for the parameters, indications for investigation, patient preparation, specimen, reference ranges and results interpretation.
23. Total protein - common data for the parameters, principles of the analytical methods and interferences, indications for investigation, patient preparation, reference ranges, results interpretation.
24. Major protein fractions – electrophoreses: indications for investigation, result interpretation.
25. Individual proteins, proteins of the acute phase, immunoglobulins. Analytical methods for investigation, indications for investigation, patient preparation, reference ranges, results interpretation.
26. Urea - common data for the parameter, principles of the analytical methods, source of errors, indications for investigation, patient preparation, reference ranges, results interpretation.
27. Creatinine - common data for the parameter, principles of the analytical methods, source of errors and interference, indications for investigation, patient preparation, specimen, reference ranges, results interpretation.
28. 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, results interpretation.
29. Transaminases, alkaline phosphatase and gamma-glutamyltransferase in serum – general information, principles of analytical methods, sources of errors, indications for analysis, biological material, reference ranges, interpretation of results.
30. Lactatedehydrogenase and creatinephosphokinase in serum - general information, principles of analytical methods, sources of errors, indications for analysis, biological material, reference ranges, interpretation of results.
31. Amylase, lipase and cholinesterase - general information, principles of analytical methods, sources of errors, indications for analysis, biological material, reference ranges, interpretation of results.
32. Cholesterol in serum and its fractions - general information, analytical methods, interferences, risk limits, interpretation of results.
33. Triglycerides in serum general information, analytical methods, interferences, risk limits, interpretation of results.
34. Serum bilirubin and fractions – metabolism, methods, interferences, reference ranges, interpretation of results.
35. Hemostasis as a complex functional system – blood vessels, platelets, coagulation and fibrinolysis.
36. Blood coagulation and fibrinolysis – phases, factors and inhibitors.
37. Clinical laboratory parameters for evaluation of haemostasis - bleeding time, PT, aPTT, fibrinogen, TT, D-Dimers. Interpretation of the results.
38. Hemoglobin – types and methods for determination. Reference ranges. Informative content.
39. Urine - general properties, pH, protein. Principles of the methods, interferences, results interpretation.
40. Urine - glucose, ketones. Principles of the methods, interferences, results interpretation.
41. Urine - bile pigments. Principles of the methods, interferences, results interpretation.
42. Hormones in biological fluids - general data, basic groups. Methods for testing.
43. Drug monitoring.

BIBLIOGRAPHY

1. Guide to practical trainings in clinical chemistry for pharmacy students. ed. by K. Tzatchev. Plovdiv, Lax book, 2014.
2. Clinical laboratory interpretation of results. ed. by T. Deneva, Plovdiv, 2021
3. Devlin, T. M. (ed.). Textbook of Biochemistry with Clinical Correlation, Fifth Edition, New York, Wiley-Liss, 2002.
4. Marshall, William J. et al. Clinical chemistry / William J. Marshall, Andrew Day, Marta Lapsley. - 8th ed.- Edinburgh : Elsevier, 2017.
5. 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

Prof. Tanya Deneva, MD, PhD

Head of Department of Clinical Laboratory