

2023/2024
LABORATORY MEDICINE CLASSES
3rd year of English Division

Class no. 1. Urinalysis of kidney and urinary tract diseases	Department of Clinical Laboratory Diagnostics, room 5020 dr hab. n. med. Joanna Kamińska dr med. Jolanta Czyżewska
---	---

1. Urine specimen types, preparing the patient before examinations, collection techniques, standardization of the urine collection.
2. Routine urinalysis - physical parameters of urine (colour, clarity, pH, specific gravity); biochemical parameters of urine (protein, glucose, ketones, bilirubin, urobilinogen, nitrite, ascorbic acid, blood/hemoglobin/myoglobin, leukocyte/leucocyte esterase); and examination of urine formed elements in urine (e.g. erythrocytes/RBC, leukocytes/WBC (Sternheimer-Malbin cells), epithelial cells, casts, crystals, microorganisms and others) - diagnostic significance (without methodology).
3. Volume of urine – normal/pathological (terms: dysuria, nocturia, polyuria/diuresis, oliguria, anuria).
4. Lower urinary tract infection.
5. Infection of the upper urinary tract (pyelonephritis, tubular diseases, interstitial nephritis).
6. Glomerulonephritis and nephrotic syndrome.
7. Acute kidney injury (AKI) and chronic kidney failure.
8. Calculi.

Practical part:

Interpretation of results - urinalysis, ACR index, PCR index, protein in 24-hour urine collection, dysmorphic erythrocyturia.

Literature:

1. Kamińska J. Kidney and urinary tract diseases – in – Laboratory diagnostics of selected clinical conditions. Academic students book. Ed. Halina Kemon. Białystok: Medical University of Białystok Department of Clinical Laboratory Diagnostics, 2016, pages: 48-73. (PDF on the Blackboard platform)
 2. Brunzel NA. Fundamentals of urine & body fluid analysis. Fourth Edition (2018) or Fifth Edition (2022) ELSEVIER.
- Chapter 3, Urine specimen types, collection, and preservation.
 - Chapter 6, Physical examination of urine.
 - Chapter 7, Chemical examination of urine.
 - Chapter 8, Microscopic examination of urine sediment.
 - Chapter 9, Renal and metabolic disease.

Class no. 2. Laboratory tests in diabetes mellitus (DM)	Department of Biochemical Diagnostics, room 5029 dr hab. n. med. Ewa Gruszewska dr n. med. Monika Zajkowska
--	--

1. Definition, epidemiology and types of diabetes mellitus.
2. Laboratory tests of diabetes mellitus
 - a. diagnosis (fasting and random glucose concentration, oral glucose tolerance test (OGTT),
 - b. monitoring treatment (glycated haemoglobin, fructosamine, 24h glucose profile),
 - c. detection of complications.
3. Laboratory tests of renal function - glomerular filtration rate and testing.

Practical part:

1. Interpretation of laboratory results.
2. Drawing the curve of oral glucose tolerance test.

Literature:

William J. Marshall, Stephen K. Bangert. Clinical Chemistry, Mosby 2021 (Chapter 13 and part of Chapter 5 - Measurement of glomerular filtration rate).

Didactic handouts on the Blackboard platform.

Class no. 3. Laboratory diagnostics of allergy	Department of Biochemical Diagnostics, 5027 dr n. med. Monika Gudowska-Sawczuk dr n. med. Monika Zajkowska
---	---

1. Laboratory diagnostics of allergy.

Practical Part:

1. Interpretation of laboratory tests.

Literature:

Didactic handouts on the Blackboard platform.

Class no. 4. Plasma proteins	Department of Neurodegeneration Diagnostics, room 6053 prof. dr hab. Barbara Mroczko mgr Julia Doroszkiewicz
---	---

1. Alterations in plasma and urine proteins concentrations - pathogenesis and selected diseases.

Practical part:

1. Interpretation of serum protein electrophoresis results.

Literature:

William J. Marshall, Stephen K. Bangert. Clinical Chemistry, Mosby 2021 (chapter 16, 285-301).

Lecture no. 1

Class no. 5. Laboratory tests in endocrinology	Department of Biochemical Diagnostics, 5029 dr n. med. Małgorzata Czygier dr hab. n. med. Ewa Gruszevska
---	---

1. Hypothalamus and pituitary hormones (disorders of anterior pituitary functions).

2. Thyroid function and hormones (hormones, thyroid antibodies, disorders).

3. Adrenal function and hormones (mineralocorticoids, glucocorticoids, adrenal androgens, adrenal medulla hormones – catecholamines, disorders and tests of function).

4. The gonads and sex hormones (disorders of gonadal functions).

Practical part:

1. Demonstration of TSH and fT4 determination results.

2. Interpretation of laboratory results.

Literature:

William J. Marshall, Stephen K. Bangert. Clinical Chemistry, Mosby 2021 (chapter 9, pages: 155-174; chapter 10, pages: 175-193; chapter 11, pages: 195-209; chapter 12, pages: 211-223).

Class no. 6. Diagnostic significance of peripheral blood morphology	6th floor, room 4 dr hab. n. med. Ewa Grażyna Będkowska dr n. med. Joanna Pawlus
--	---

1. Blood cell count – normal value (WBC, RBC, HGB, HCT, MCV, MCH, MCHC, RDW, PLT, PCT, MPV, PDW, P-LCR, RETIC, CHr/RET-HE, IRF).

2. Diagnostic value of decreased and increased RBC, HGB and HCT (anemias and polycythemias).

3. Diagnostic value of decreased and increased MCV (microcytosis and macrocytosis).

4. Diagnostic value of decreased and increased WBC (leukopenia and leukocytosis).

5. Diagnostic value of decreased and increased PLT (thrombocytopenia and thrombocytosis).

6. Diagnostic value of decreased and increased reticulocytes (reticulocytopenia and reticulocytosis).

Practical part:

1. Demonstration of morphology determination.

2. Blood cell count in: iron deficiency anemia, megaloblastic anemia, hemolytic anemia, polycythemias, pancytopenia, leukemias, newborns, healthy adults.

Literature:

Didactic handouts on the Blackboard platform.

Class no. 7. Blood cell differential count – diagnostic significance.	Department of Haematological Diagnostics, room 5016 dr hab. n. med. Małgorzata Rusak dr n. med. Joanna Pawlus
--	--

1. Normal peripheral blood smear in children and adults.
2. Quantitative and qualitative changes of the white blood cells. Neutrophilia, left shift, neutropenia, agranulocytosis, eosinophilia, monocytosis, lymphocytosis.
3. Typical changes of the blood cell profile in acute leukemia, chronic myeloid leukemia, chronic lymphocytic leukemia.
4. Automated identification of WBC – cytometric diagnosis.

Practical part:

1. Practical evaluation of peripheral blood smear in: healthy person, infections, leukemias.
2. Interpretation of the results of peripheral blood smear.

Literature:

Didactic handouts on the Blackboard platform.

Class no. 8. Hemostasis - basic tests	6th floor, room 4 dr n. med. Joanna Pawlus dr hab. n. med. Ewa Grażyna Będkowska
--	---

1. Screening tests of primary hemostasis efficiency and clinical significance (PLT count and morphology, platelets function tests)
2. Screening tests of coagulation and fibrinolysis system (PT, APTT, TT, Fibrinogen levels, D-dimer).
3. Laboratory diagnostics of selected disorders of the hemostasis system
 - DIC
 - Hemophilia, von Willebrand Disease
 - Thrombophilia
4. Monitoring of anticoagulant therapy

Practical part:

1. Demonstration of clotting times determination.
2. Interpretation of tests results in different clinical cases.

Literature:

Didactic handouts on the Blackboard platform.

Class no. 9. Water, electrolytes and acid-base balance	Department of Biochemical Diagnostics, room 5027 dr hab. n. med. Karolina Orywał dr hab. n. med. Wojciech Jelski
---	---

1. Ionogram. Clinical significance of main extracellular and intracellular ions (sodium – Na⁺, potassium – K⁺, chloride – Cl⁻, total calcium – Ca and ionized calcium – Ca⁺⁺, phosphate – P, magnesium – Mg⁺⁺, bicarbonate – HCO₃⁻).
2. Acid-base balance, pathophysiology, assessment of acid-base status.
3. Osmolality of body fluids and its clinical significance.

Practical part:

1. Demonstration of acid-base status and electrolytes.
2. Interpretation of obtained results of acid-base balance, electrolytes and CO-oximetry examination in emergency states.

Literature:

William J. Marshall, Stephen K. Bangert. Clinical Chemistry, Mosby 2021 (chapter 3, pages: 25-53, chapter 4, pages: 55-76, chapter 14, pages 255-271).

Class no. 10. Clinical enzymology	Department of Biochemical Diagnostics, room 5031A dr hab. n. med. Wojciech Jelski dr hab. n. med. Karolina Orywal
--	--

1. Diagnostic classification of enzymes.
2. Enzymatic diagnostics of cardiac infarction, liver diseases, acute pancreatitis.

Practical part:

1. Demonstration of ALAT and AspAT determination.
2. Interpretation of enzymes activity determination.

Literature:

William J. Marshall, Stephen K. Bangert. Clinical Chemistry, Mosby 2021. (Part of the Chapter 16- Plasma enzymes; Part of the Chapter 17- Myocardial Infarction; Parts of the Chapter 6- Plasma enzymes and Liver disease; Part of the Chapter 7- The pancreas).

Class no. 11. Laboratory tests of cerebrospinal fluid (CSF) and other fluids from body cavities	Department of Neurodegeneration Diagnostics, 6029A dr n. med. Agnieszka Kulczyńska-Przybik mgr Julia Doroszkiewicz
--	---

1. General CSF examination.
2. Laboratory diagnostic tests of central nervous system (CNS) diseases:
 - Alzheimer disease (AD): biomarkers Tau, p-Tau, A β 1-42,
 - Infectious diseases of CNS: bacterial meningitis, viral meningitis, tuberculous meningitis – differentiation.
3. Physical and biochemical parameters of transudates and exudates.

Practical part:

1. The interpretation of laboratory tests in CNS diseases.
2. Interpretation of Reibergrams.

Literature:

1. Koper OM. Cerebrospinal fluid – in – Laboratory diagnostics of selected clinical conditions. Academic students book. Ed. Halina Kemon. Białystok: Medical University of Białystok Department of Clinical Laboratory Diagnostics, 2016, pages: 11- 20. With a special consideration of Table 1 (p.13), Table 2 (p.14), Table 5 (p.18) and Figure 2 (p.20).
2. Koper OM. Pericardial, peritoneal, and pleural fluids –in – Laboratory diagnostics of selected clinical conditions. Academic students book. Ed. Halina Kemon. Białystok: Medical University of Białystok Department of Clinical Laboratory Diagnostics, 2016, pages: 88-91. With a special consideration of Table 1 (p. 91).
3. Didactic handouts on the Blackboard platform.

Class no. 12. Diagnosis of sexually transmitted diseases	Department of Clinical Laboratory Diagnostics, room 5021 prof. dr hab. n. med. Violetta Dymicka-Piekarska dr n. med. Jolanta Czyżewska
--	---

1. HIV (Human immunodeficiency virus).
2. Syphilis.
3. Herpes genitalis.
4. Gonorrhoea.
5. Chlamydia.
6. Human Papillomavirus (HPV).
7. Cytomegalovirus (CMV).
8. Rubella.

Practical part:

Demonstration and interpretation of laboratory tests.

Literature:

Didactic handouts on the Blackboard platform.

Class no. 13. Tumor markers	Department of Biochemical Diagnostics, room 5030 dr hab. n. med. Marta Łukaszewicz-Zajac dr n. med. Monika Gudowska-Sawczuk
--	--

Biochemical analysis in neoplasms.

Practical part:

Interpretation of the results.

Literature:

William J. Marshall, Stephen K. Bangert. Clinical Chemistry, Mosby 2021. (Part of the Chapter 20 – Metabolic aspects of malignant disease - Tumor Markers)

Lecture no 2.

Didactic handouts on the Blackboard platform.

Class no. 14. Lipid status	Department of Biochemical Diagnostics, room 5028 dr n. med. Monika Zajkowska dr hab. n. med. Marta Łukaszewicz-Zajac
---	---

1. The classification and characteristics of lipoproteins (chylomicrons, VLDL, LDL, HDL) and apolipoproteins.
2. The reference ranges of lipids parameters in risk of cardiovascular disease: total cholesterol, triglycerides, LDL-cholesterol, HDL-cholesterol, apoA, apoB and Lp (a).
3. The diagnostic usefulness of electrophoresis of lipoproteins.
4. Classification of hyperlipidaemias.
5. The deficiency of lipoproteins.

Practical part:

Interpretation of lipid profiles.

Interpretation of lipoprotein electrophoresis results.

Literature:

William J. Marshall, Marta Lapsley, Andrew Day, Kate Shipman. Clinical Chemistry, 9th Edition, 2021. Chapter 17, pages: 303-323.

SEMINARS

Seminar 1 (prof. dr hab. n. med. Barbara Mroczko/ dr n. med. Monika Gudowska-Sawczuk).

Biochemical diagnostics - case reports.

Literature:

Didactic materials for exercises 2, 3, 4, 5, 9, 10, 11, 13 and 14 (Blackboard platform).

Seminar 2 (dr hab. Ewa Będkowska/dr hab. Joanna Osada).

Hematological diagnostics - case reports.

Literature:

Didactic handouts on the Blackboard platform (class no 6 and 7).

Seminar 3 (dr n. med. Jolanta Czyżewska)

Laboratory diagnostics of alimentary tract disorders and parasitological diseases.

Literature:

Didactic handouts on the Blackboard platform.

Required literature:

1. William J. Marshall, Stephen K. Bangert. Clinical Chemistry, Mosby 2021
2. V. Dymicka-Piekarska, P. Kaniewski, J. Czyżewska. „Selected issues of clinical laboratory diagnostics. Exercise book for students of Medicine”. Edition I, 2013.

Recommended medical sources:

www.labtestsonline.org

www.Medical-Lab.info