

Odesa I.I. Mechnikov National University, Odesa, Ukraine
Faculty of biology
Department of Microbiology,
Virology and Biotechnology
Odesa I. I. Mechnikov National University
SYLLABUS
Of the course

CLINICAL CYTOLOGY

COURSE SUMMARY

The course program provides students with modern scientific ideas about the structure and functions of cells in normal, reactive and pathological processes. Separate sections of the course will be devoted to various types of cytopathology, including viral cytopathology and cytopathology of hematopoietic germs. The lectures will highlight the problems of oncocytopathology, molecular genetic mechanisms involved in cell malignancy, development and growth of tumors. The cytomorphological features of pathological processes of various organ systems will be discussed. Students will receive basic knowledge about the general principles of cytological diagnostics of diseases of various etiologies, including diagnostics of the inflammatory process and detection of various infections (viral, fungal, bacterial nature), as well as diagnostics of neoplasms in the early stages of the disease (oncocytology).

The subject of study of the discipline is modern scientific ideas about modern scientific ideas about cytomorphological features of pathological processes of various organ systems, general principles of cytological diagnostics of diseases of various etiologies.

The purpose of the course "Clinical Cytology" is to provide modern ideas about cytomorphological features of pathological processes of various organ systems, to familiarize them with the general principles of cytological diagnostics of diseases of various etiologies to applicants for higher education in the specialty 091 Biology, 091 Biology and Biochemistry.

The objectives of the discipline:

- to form in students an idea of the cytomorphological features of cells in normal, reactive and pathological processes of various etiologies;
- to provide students with basic knowledge about the general principles of cytological diagnostics of diseases of various etiologies, including diagnostics of the inflammatory process and detection of various infections, as well as diagnostics of neoplasms in the early stages of the disease;
- to provide an idea of oncocytopathology, viral cytopathology, cytopathology of hematopoietic germs and cytopathology caused by microorganisms and protozoa.

Expected results: As a result of studying the academic discipline, the higher education applicant should **know**:

- cytomorphological features of cells in normal, reactive and pathological processes;
- general principles of cytological diagnostics of diseases of various etiologies;
- cytomorphological signs of benign and malignant oncoprocesses;
- cytomorphological signs of the inflammatory process, cells contaminated with viruses, bacteria, protozoa;
- cytomorphological signs of pathology of hematopoietic germ cells.

be able to:

- identify signs of cell pathology;
- identify cytomorphological signs of the inflammatory process;
- identify signs of morphological atypia of malignant cells in benign and malignant oncoprocesses of epithelioid and connective tissue origin, including carcinomas and sarcomas;

- identify signs of cell contamination by viruses, bacteria, protozoa;
- identify signs of hematopoietic cell pathology, including anemias and leukemias;
- implement the acquired systematized knowledge to solve specific research and practical tasks, when preparing and writing course, bachelor's, qualification, master's theses;
- independently search for modern scientific literature in electronic databases, analyze and systematize it.

CONTENT OF THE EDUCATIONAL DISCIPLINE

Content module 1. Cytomorphological features of cells in normal and pathological conditions

Topic 1. Introduction. Objectives of the course "Clinical Cytology". Clinical Cytology as a method of morphological analysis. The difference between cytological and histological examination. Advantages and disadvantages of the cytological method. Studies carried out using the cytological method.

Topic 2. Objects and methods of cytological examination. Cytological examination of puncture material. Cytological examination of punctates, secretions, excreta, secretions and scrapings from the surface of erosions, ulcers, wounds, fistulas, sputum, washings, exudates, transudates. Cytological examination of endoscopic material. Examination of material obtained during bronchoscopy, bronchial catheterization, with any localization of the pathological process. Cytological examination of biopsy and surgical material. Cytological examination of smears - prints. Criteria for cytological diagnosis.

Topic 3. Cytomorphological features of cells in normal and pathological conditions. Cytomorphology of cells of various organs in normal conditions. Typical forms of cell pathology: dystrophies, dysplasias, metaplasia, hypotrophy (atrophy), hypertrophy, necrosis, apoptosis. Pathological, vicarious (replacement) hypertrophy, neurohumoral. Cellular dystrophies. Molecular mechanisms of dystrophies. Cell death: necrosis, apoptosis. Paraneurosis and necrobiosis, lysis and autolysis. Pathological changes in the plasma membrane, causes, mechanisms and consequences of damage to the cytoplasmic membrane. Causes of mitochondrial damage, structural changes in mitochondria. Damage to the endoplasmic reticulum - hyperplasia, atrophy. Pathology of the Golgi apparatus, lysosomes, intermediate filaments. Pathology of the nucleus, reversible and irreversible morphological changes in the nucleus.

Content module 2. Cytomorphology of cells in diseases of various etiologies

Topic 4. Cytomorphological signs of the inflammatory process. General characteristics of inflammation. Signs, classification, mechanisms, etiology and pathogenesis of inflammation. Inflammatory cells. Cytological diagnostics of inflammation: morphology of exudate, its types. Granulomatous inflammation. Morphological signs of specific granulomas: tuberculous granuloma, granuloma in syphilis and leprosy. Clinical cytology of wounds. Pathological regeneration. Proliferation. Dysplasia. Metaplasia.

Topic 5. Cytomorphological signs of anaplasia. Signs of anaplasia - cellular atypism: the main morphological signs of oncocytology, pleomorphism, hyperchromatism, nuclear-cytoplasmic ratio, variable morphology of the nucleus, giant cells, mitotic figures (typical and atypical), chromosome abnormalities.

Topic 6. Cytomorphological signs of benign tumor growth: in fibroma, epithelioma, lipoma, chondroma, osteoma, myoma, angioma.

Topic 7. Cytomorphological signs of malignant tumor growth. Tumors of the urinary system: epithelial tumors of the bladder, rhabdomyosarcoma, metastatic tumors of the tumor. Squamous cell carcinoma. Adenocarcinoma. Malignant tumors of the kidneys: renal cell (hypernephroid: light cell and dark cell) cancer, adenocarcinoma, fibroangioma, hypernephroid cancer. Cytological diagnostics of breast diseases: cellular composition of the breast, benign neoplasms of the breast, malignant tumors - signet ring cell, small cell (oat cell), squamous cell, large cell neuroendocrine cancer. Cytomorphology of liver tumors. Cytomorphology of female genital organs in cancer. Cytological characteristics of sarcomas.

Topic 8. Cytomorphology of bone marrow cells and peripheral blood in normal and pathological conditions. Cytomorphological features of hematopoietic stem cells in normal conditions. Cytological characteristics of peripheral blood in anemias: posthemorrhagic, hemolytic, B12-deficient and iron-deficient anemia. Cytological characteristics of peripheral blood in hemoblastoses: acute and chronic leukemias, myeloma, lymphogranulomatosis.

Topic 9. Cytomorphology of peripheral blood cells in parasitic diseases - malaria, trypanosomiasis, tick-borne spirochetosis.

Topic 10. Cytomorphological signs of cells contaminated with microorganisms: Gardnerella vaginalis, Leptotrix, Neisseria gonorrhoeae, Chlamydia trachomatis, Mycobacterium tuberculosis, Trichomonas vaginalis.

Topic 11. Cytomorphological signs of cells contaminated with DNA and RNA viruses: cytomegalovirus, herpes simplex virus, human papillomavirus, varicella zoster virus, influenza virus.

Recommended literature

1. Gill G.U. Clinical cytology. – K.: Practical Medicine, 2015. – 384 p.
 2. Lapovets L.E. Clinical laboratory diagnostics: textbook / L.E. Lapovets, G.B. Lebed, O.O. Yastremska. — K.: All-Ukrainian Specialized Publishing House "Medicine", 2021. - 472 p.
 3. Bolgova L.S. Cytology of human organs and tissues.- K.: Kniga-plus, 2018. – 288 p.
 4. Dzerzhinsky M.E. General cytology: textbook / M.E. Dzerzhinsky, N.V. Skrypnyk, A.S. Pustovalov, G.V. Ostrovska, I.M. Varenyuk, O.K. Voronina, L.M. Pazyuk, S.M. Harmatina. – Kyiv: VPC "Kyiv University", 2020.– 640 p.
 5. Stepanenko O.Yu. Histology, cytology and embryology: an atlas of histological images with descriptions / O.Yu. Stepanenko, N.I. Mar'enko. – Kyiv: All-Ukrainian Specialized Publishing House "Medicine", 2024. - 327 p.
 6. Kochmar M.Yu. Cytology, embryology and general histology. – Uzhgorod: State Higher Educational Institution "UzhNU", 2022. - 131 p.
 7. Clinical oncology: a textbook / Yu.V.Moskalenko, I.O.Vynnychenko, R. A. Moskalenko and others. – Sumy: Sumy State University, 2020. –212 p.
https://essuir.sumdu.edu.ua/bitstream-download/123456789/80669/3/Moskalenko_onkolohiia.pdf
 8. Clinical Oncology / James Abraham, James L. Galli.-K.: All-Ukrainian Specialized Publishing House "Medicine", 2021. - 944 p.
 9. Vasko L. V. Cytology in questions and answers: a textbook. /L. V. Vasko, L. I. Kiptenko, O. M. Gortynska, N. B. Hryntsova.– Sumy: Sumy State University, 2016. – 95 p.
 10. Chaikovsky Yu.B. Test tasks on histology, cytology and embryology. General histology /Yu.B. Chaikovsky, N.O. Melnyk. – 2022. – 180 p.
 11. Oncology: textbook / G.V. Bondar, A.I. Shevchenko, I.Y. Galaychuk, Y.V. Dumansky and others. — .-K.: All-Ukrainian Specialized Publishing House "Medicine", 2019. - 520 p.
https://new.meduniv.lviv.ua/uploads/repository/kaf/kaf_oncology_fpge/05.pdf
 12. Oncology: textbook / A. I. Shevchenko, O. P. Kolesnik, N. F. Shevchenko and others; ed. A. I. Shevchenko. –Vinnytsia: NK, 2020. –488 p. <https://library.pdpu.edu.ua/images/2021/medbook/42.pdf>
 13. Siraj A. Misbah CLINICAL IMMUNOLOGY. - WILEY, 2022 . – 352 p.
 14. Clinical Immunology and Allergology: Textbook / G.M. Drannik, O.S. Prylutsky, Yu.I. Bazhora et al.; Edited by prof. G.M. Drannik.-K.: Zdorovya, 2016.-888 p.
- Electronic information resources
1. Scientific Library of ONU named after I. I. Mechnikov <http://www.lib.onu.edu.ua/>
 2. National Library of Ukraine named after V. I. Vernadsky <http://www.nbuv.gov.ua/>
 3. National Scientific Medical Library of Ukraine <http://www.library.gov.ua/>
 4. Ukrainian textbooks online: <http://pidruchniki.ws/>
 5. Website of the Faculty of Biology: <http://biologywiki.onu.edu.ua>
 6. Repository of the Scientific Library: <http://dspace.onu.edu.ua:8080/handle/123456789/19336>