

ONTÜSTIK-QAZAQSTAN MEDISINA AKADEMIASY «Оңтүстік Қазақстан медицина академиясы» АҚ		SOUTH KAZAKHSTAN MEDICAL ACADEMY АО «Южно-Казахстанская медицинская академия»
Department of Pathology and Forensic Medicine Lecture complex on the subject "General pathology"		63-11-2025 Page 1 of 24

LECTURE COMPLEX

Discipline: General pathology

Discipline code: GP 2223

Name and code of the EP: 6B 10115 "Medicine"

Amount of study hours/credits: 60 hours/ 2 credits

Course and semester of study: 2nd year, 4semester

Lecture length: 4 hours

Shymkent, 2025 year

ONTÜSTIK-QAZAQSTAN MEDISINA AKADEMIASY «Оңтүстік Қазақстан медицина академиясы» АҚ		SOUTH KAZAKHSTAN MEDICAL ACADEMY АО «Южно-Казахстанская медицинская академия»
Department of Pathology and Forensic Medicine Lecture complex on the subject "General pathology"		63-11-2025 Page 2of 24

The lecture complex is developed in accordance with the working program of the discipline (syllabus) 6B 10115 "Medicine" and discussed at the department meeting

Protocol No. 13 from "26" 06 2025 y.

Head of the Department



Sadykova A. Sh.

ONTÜSTIK-KAZAQSTAN MEDISINA AKADEMIASY «Оңтүстік Қазақстан медицина академиясы» АҚ		SOUTH KAZAKHSTAN MEDICAL ACADEMY АО «Южно-Казахстанская медицинская академия»
Department of Pathology and Forensic Medicine Lecture complex on the subject "General pathology"		63-11-2025 Page 3 of 24

Lecture No. 1

1. Subject: Subject, tasks and methods of pathological physiology. General nosology. General etiology and pathogenesis.

2. Objective: - to characterize the purpose, objectives and methods of pathophysiology; to define the basic concepts of general nosology.

- explain the role of causes and conditions in the occurrence of diseases; determine cause-and-effect relationships in pathogenesis.

3. Lecture abstracts

Pathological physiology is the main fundamental medical and biological science that studies the general features of the onset, development and outcomes of disease. Pathological physiology studies the causes and mechanisms of functional and biochemical disorders that form the basis of the disease, as well as adaptive mechanisms and restoration of functions impaired during the disease.

The course of pathological physiology consists of 3 sections.

1. Nosology, or the general theory of disease, provides answers to two questions that a doctor faces when analyzing a disease: why the disease arose and what is the mechanism of its development (etiology and pathogenesis).

Typical pathological processes – studies the processes underlying many diseases (inflammation, fever, tumors, hypoxia).

3. Particular pathological physiology – examines disorders of individual organs and systems.

The object of study of pathophysiology is disease, the main research method is a pathophysiological experiment conducted on animals.

The experiment is used by many sciences (normal physiology, pharmacology, etc.). The significance of the experiment in pathological physiology consists in the experimental reproduction of the disease on animals, its study and the use of the obtained data in the clinic.

There are 4 stages of the pathophysiological experiment:

- planning of the experiment;
- reproduction of a model of a pathological process in an experiment and its study;
- development of experimental methods of therapy;
- static processing of the obtained data and analysis of the research.

The following experimental methods are used to study pathological processes in living objects:

- irritation method;
- shutdown method;
- inclusion method;
- parabiosis method;
- cell culturing method.

The study of disease, or general nosology, is one of the ancient problems of medicine. Health and disease are two basic forms of life. Health and disease can replace each other many times during the life of a person or animal.

Health is, first of all, a state of the organism, in which the correspondence of structure and function is noted, as well as the ability of regulatory systems to maintain homeostasis. Health is expressed in the fact that in response to the action of everyday irritants, adequate reactions occur, which in strength, time and duration are characteristic of most people in a given population. A conclusion about health is made on the basis of anthropometric, physiological and biochemical studies.

Disease is a qualitatively new condition that arises under the influence of external and internal pathogenic factors, manifested in the limitation of protective and adaptive capabilities to the

ONTÜSTIK-QAZAQSTAN MEDISINA AKADEMIASY «Оңтүстік Қазақстан медицина академиясы» АҚ		SOUTH KAZAKHSTAN MEDICAL ACADEMY АО «Южно-Казахстанская медицинская академия»
Department of Pathology and Forensic Medicine Lecture complex on the subject "General pathology"		63-11-2025 Page 4of 24

action of environmental factors and a decrease in the biological and social capabilities of the whole organism.

In illness there are always 2 opposite processes, 2 principles. During fever, along with high body temperature, headache and other phenomena that reduce a person's ability to work, more active production of antibodies, more energetic phagocytosis and other "measures against illness" are observed. "Floor" and "measure against illness" are inextricably linked, if there is no unity, there will be no illness. Complete absence of a protective mechanism leads to death. Complete absence of "floor" means health.

The concept of disease is close to the concepts of pathological reaction, pathological process, pathological condition.

A pathological reaction is an inadequate short-term response of the body to any stimulus. For example, a short-term increase in blood pressure under the influence of negative emotions.

A pathological process is a complex set of pathological reactions. Typical pathological processes include inflammation, fever, etc.

A pathological condition is a slowly developing pathological process or its outcome. For example, cicatricial stenosis of the esophagus developing after a burn, injury, etc.

The course and outcome of diseases in children differs from adults. With the development of the nervous system and the reactivity of the body, the picture of the disease becomes more complex and defense mechanisms, compensatory-adaptive reactions, barrier systems, phagocytosis, and the ability to produce antibodies are improved.

Etiology is the study of the causes and conditions of occurrence of a disease.

The cause of the disease is the main etiological factor causing specific signs of the disease. Most often, the occurrence of the disease is associated with the influence of not one, but several factors. For example, the occurrence of lobar pneumonia of the lungs can be influenced by negative emotions, poor nutrition, hypothermia, and overwork. However, without the penetration of pneumococcus into the body, the above factors will not cause pneumonia.

In the history of the development of etiology, there were different trends. According to the trend of monocausalism, any disease occurs due to one single cause, therefore the action of this cause will necessarily lead to the disease. According to the trend called conditionalism, the disease is caused by many different conditions, but none of them can be the cause. The supporters of this trend believed that all conditions of the disease are equally necessary for the occurrence of the disease, if there is no at least one, then the disease will not occur. They, overestimating the importance of conditions, completely excluded causal factors. At the same time, in etiology there was also a trend called constitutionalism. According to this trend, it is believed that the occurrence of the disease is determined only constitutional features of the organism. Since constitutional features are associated with heredity, the occurrence of the disease is directly is subject not to environmental factors, but to the genotype.

The following causes of the disease are distinguished:

1. Mechanical factors (wounds, compression).
2. Physical factors (sound, changes in barometric pressure, influence of high or low temperature).
3. Chemical factors (alcohol, acids and alkalis).
4. Biological factors (bacteria, viruses, fungi).
5. Social factors (medical provision, sanitary and hygienic measures).

The interaction of the cause of a disease with the organism always occurs under certain conditions. The difference between conditions and the cause is that there is one cause, but many conditions, and that the latter are not necessary for the occurrence of a disease and do not impart specificity to it. Pathogenesis is a section of pathological physiology that studies the mechanisms of development and outcome of a disease. It is very closely related to the etiology of

ONTÜSTIK-QAZAQSTAN MEDISINA AKADEMIASY «Оңтүстік Қазақстан медицина академиясы» АҚ		SOUTH KAZAKHSTAN MEDICAL ACADEMY АО «Южно-Казахстанская медицинская академия»
Department of Pathology and Forensic Medicine Lecture complex on the subject "General pathology"		63-11-2025 Page 5 of 24

the disease. The main and most general pattern of pathogenesis is the pattern of self-development and self-maintenance.

The change of causes and effects leads to a vicious circle. Among the links of pathogenesis there are main and secondary. The main link is the one necessary for all the others.

Due to the peculiarities of the body's reactivity in childhood, the following pattern is characteristic of pathology during this period: the younger the child, the less pronounced the specific signs of the disease.

4. Illustrative material:

- presentation of lecture material;
- posters on the topic of the lesson;
- tables, diagrams.

5. **Literature:** see Appendix No. 1.(1,6,10,15)

6. Control questions (feedback)

1. What does pathophysiology study?
2. What is the essence of a pathophysiological experiment?
3. What is disease?
4. What is the difference between a pathological reaction, a pathological process and a pathological condition?
5. What are the characteristics of the course and outcome of diseases in children?
6. What is etiology ?
7. What are the causes of the disease?
8. What is pathogenesis?
9. How does the vicious circle of pathogenesis arise?
10. What are the main causes of illness in childhood ?

Lecture No. 2

1. **Topic:** Water-electrolyte metabolism disorders.

2. **Objective:** to explain the basic mechanisms of water and electrolyte metabolism disorders.

3. Lecture abstracts

Dehydration of the body can develop when large volumes of water are removed, electrolyte deficiency. At this time, intracellular and extracellular water decreases.

There are two types of dehydration: 1) when there is a lack of water in the body; 2) when there is a lack of mineral salts (electrolytes) in the body.

Dehydration from water loss occurs in various pathological conditions: with difficulty swallowing; in weakened and seriously ill patients; in premature or seriously ill children; hyperventilation of the lungs; with the excretion of very large amounts of urine.

Dehydration can develop with electrolyte deficiency, because, even if we do not take into account other useful properties of electrolytes, they have the ability to bind and retain water. Such properties are possessed by sodium, potassium, and chlorine ions.

Hypoosmotic dehydration develops when more salts are excreted from the body than water. Increased excretion of electrolytes from the body can occur through the gastrointestinal tract, kidneys and skin.

Isoosmotic dehydration develops with equal loss of water and salts. This condition is possible with polyuria, dyspepsia and blood loss. In this case, extracellular fluid is mainly reduced.

Hyperosmotic dehydration develops when more water is excreted from the body than salts. This condition can develop with increased salivation, increased deep breathing, and diabetes insipidus.

With dehydration, after the deterioration of blood circulation in the renal parenchyma, the kidneys' ability to excrete urine decreases. This leads to azotemia, then to uremia.

ONTÜSTIK-QAZAQSTAN MEDISINA AKADEMIASY «Оңтүстік Қазақстан медицина академиясы» АҚ		SOUTH KAZAKHSTAN MEDICAL ACADEMY АО «Южно-Казахстанская медицинская академия»
Department of Pathology and Forensic Medicine Lecture complex on the subject "General pathology"		63-11-2025 Page 6 of 24

Dehydration from electrolyte deficiency cannot be restored by water alone. Water must contain electrolytes. Electrolytes are lost along with water through the digestive system: with vomiting, diarrhea, etc. In addition, loss of electrolytes and water is observed in some types of nephritis, Addison's disease. Water and electrolytes are released in large quantities and with abundant sweating. Dehydration affects the functioning of many body systems. From the cardiovascular system, there is a decrease in blood pressure, a decrease in the volume of circulating blood, and thickening of the blood.

Water retention in the body occurs when you drink a lot of water or reduction of excretion processes. Hypo-osmotic hyperhydration develops when a large amount of water is introduced into the body. Isoosmotic hyperhydration can be observed briefly with excessive introduction of isotonic liquids for therapeutic purposes. Hyperosmotic hyperhydration is observed with forced use of sea water, introduction of a large amount of hypertonic solutions. Since the osmotic pressure outside the cell is higher, more liquid leaves the cell. Because of this, dehydration of the cell develops.

The retention and accumulation of fluid in tissues due to a disruption in water exchange between blood and tissues is called edema.

Pathological accumulation of fluid in the serous cavities of the body is called dropsy. Accumulation of fluid in the abdominal cavity is called ascites, in the pleural cavity - hydrothorax. There are cardiac, renal, hepatic edemas.

When edema develops, tissues are mechanically compressed and blood circulation in them is disrupted. A large amount of fluid in the tissues complicates the exchange of substances between the cell and the blood. On the other hand, edema has a protective and adaptive property. Edema reduces the concentration of toxic substances entering the body, their absorption, and distribution throughout the body.

Instability of water-electrolyte balance in small children is caused by the child's intensive growth and the tension of water-electrolyte metabolism.

4. Illustrative material:

- presentation of lecture material;
- posters on the topic of the lesson;
- tables, diagrams.

5. Literature: see Appendix No. 1. (1,7,10,13)

6. Control questions (feedback)

1. What are the types of dehydration ?
2. What is dehydration ?
3. What is hyperhydration ?
4. What causes swelling ?

Lecture No. 3

1. **Topic:** Hypoxia. Disorders of peripheral circulation.

2. **Objective:** - to explain the etiology and pathogenesis of hypoxic conditions, to provide an idea of the significance of hypoxia in the pathogenesis of structural and functional changes in cells and tissues in pathology.

- explain the main causes and mechanisms of development of peripheral circulatory disorders.

3. Lecture abstracts

Hypoxia is a typical pathological process that occurs as a result of insufficient biological oxidation and the resulting lack of energy supply for vital processes.

Classification of hypoxic conditions

1. Exogenous:

- A) hypobaric ;
- B) normal baric
2. Respiratory (breathing).
3. Circulatory (cardiovascular).
4. Hemic (blood).
5. Tissue (primary tissue).
6. Mixed.

According to the criteria of prevalence of the hypoxic state, a distinction is made between:
a) local; b) general hypoxia.

By speed of development and duration: a) lightning; b) acute; c) subacute; d) chronic.

By severity: a) mild; b) moderate; c) severe; d) critical.

Hypobaric hypoxia develops when atmospheric pressure decreases. It is most often observed during high-altitude ascents. The leading pathogenetic factor in its occurrence is also hypoxemia, but unlike normobaric hypoxia, hypocapnia is an additional negative factor. Normobaric hypoxia occurs when, at normal atmospheric pressure, the oxygen content in the inhaled air decreases. A similar situation can occur during a long stay in unventilated spaces of small volume, when working in wells, mines.

Respiratory hypoxia occurs as a result of insufficient gas exchange in the lungs due to alveolar hyperventilation, ventilation-perfusion disorders, excessive extra- and intracellular shunting of venous blood or with difficulty in oxygen diffusion in the lungs. The pathogenetic basis of respiratory hypoxia, like exogenous hypoxia, is also arterial hypoxemia, in most cases combined with hypercapnia.

Circulatory hypoxia develops with circulatory disorders, leading to insufficient blood supply to organs and tissues. The main reason for the development of this type of hypoxia is circulatory disorders: general and local.

During hemic hypoxia, the function of oxygen transport by blood is disrupted due to quantitative and qualitative changes in hemoglobin. Quantitative changes in hemoglobin are associated with a decrease in the number of erythrocytes. A decrease in the number of erythrocytes can occur with anemia and acute or chronic blood loss.

Tissue hypoxia develops as a result of a disruption in the ability of cells to absorb oxygen.

Mixed hypoxia is a combination of 2 or more of its main types.

Urgent compensatory reactions occur reflexively and are manifested in deepening and quickening of breathing, an increase in the minute volume of respiration, and the activation of reserve alveoli.

Long-term compensatory reactions occur during chronic hypoxia. This is manifested in the respiratory system by an increase in the diffusion volumes of the lungs, in the cardiovascular and blood systems by myocardial hypertrophy, due to the activation of erythropoiesis processes in the bone marrow by an increase in the number of erythrocytes and hemoglobin concentration.

The peculiarity of the course of hypoxic conditions in young children is associated with the immaturity of the respiratory and cardiovascular systems.

The main forms of peripheral circulatory disorders include : 1) arterial hyperemia ; 2) ischemia ; 3) venous hyperemia ; 4) disruption of the rheological properties of the blood, causing stasis in the microvessels.

Arterial hyperemia is a blood filling that develops as a result of increased blood flow through the arteries to organs and tissues.

External manifestations of arterial hyperemia include :

- dilation of small arteries and arterioles;
- increase in the number of functioning capillaries;
- redness of organs and tissues;

ONTÜSTIK-QAZAQSTAN MEDISINA AKADEMIASY «Оңтүстік Қазақстан медицина академиясы» АҚ		SOUTH KAZAKHSTAN MEDICAL ACADEMY АО «Южно-Казахстанская медицинская академия»
Department of Pathology and Forensic Medicine Lecture complex on the subject "General pathology"		63-11-2025 Page 8 of 24

- increase in the volume of organs and tissues;
- increase in local temperature.

Arterial hyperemia can be physiological and pathological. Physiological arterial hyperemia is observed with increased organ function, overheating, massage, emotional overstrain. Pathological arterial hyperemia develops in various conditions (inflammation, allergy, burns, fever, trauma, neuralgia, etc.).

Ischemia is a disorder of peripheral circulation that develops as a result of a decrease or complete cessation of blood flow to organs and tissues through arterial vessels.

Causes of ischemia : compression of the artery from the outside (compression ischemia); blockage of the lumen of the artery by a thrombus, embolus, foreign body (obstructive ischemia); spasm of the artery (angiospastic ischemia).

External manifestations of ischemia include :

- pallor of organs and tissues;
- reduction in the volume of organs and tissues;
- decrease in local temperature;
- dysfunction of organs.

Venous hyperemia is a blood filling that develops as a result of a disruption in the outflow of blood through the veins from organs and tissues.

External manifestations of venous hyperemia include :

- cyanosis of organs and tissues;
- increase in the volume of organs and tissues;
- decrease in local temperature;
- development of edema.

The fetus, newborn and child of the first 3 years of life have general and local plethora, anemia, stasis occur more easily and more often than in adults, which depends on the immaturity of the regulatory mechanisms of blood circulation.

4. Illustrative material:

- presentation of lecture material;
- posters on the topic of the lesson;
- tables, diagrams.

5. Literature: see Appendix No. 1. (1,8,10,16)

6. Control questions (feedback)

1. What is hypoxia?
2. What are the types of hypoxia ?
3. What is the body 's emergency adaptation to hypoxia?
4. What is the long - term adaptation of the body to hypoxia?
5. What are the characteristics of the development of hypoxic conditions in children ?
6. What types of peripheral circulation disorders are there?
7. What causes arterial hyperemia ?
8. What are the mechanisms of ischemia ?
9. What are the symptoms of venous congestion?
10. What are the characteristics of peripheral circulatory disorders in children?

Lecture No. 4

1. Topic: Inflammation.

2. Objective: to explain the main causes and mechanisms of development of inflammation.

3. Lecture abstracts

Inflammation is a typical process based on the influence of a damaging (phlogogenic) factor. During inflammation, cell structure disorders, changes in blood circulation, increased

vascular permeability and tissue proliferation are observed in the damaged tissue or organ. Phlogogenic factors are divided into 2 groups - exogenous and endogenous.

Exogenous factors include microorganisms (bacteria, viruses, fungi) ; animal organisms (protozoa, worms, insects); chemical substances (acids, alkalis); mechanical effects (foreign body, pressure) ; thermal effects (cold, heat); radiation energy (X-rays, radioactive, ultraviolet rays).

Endogenous factors include : accumulation of salts in joints, thrombosis, embolism. For example, at the site of a heart attack associated with a violation of microcirculation, an inflammatory process develops.

The inflammatory process consists of 3 stages :

Stage 1 – alteration;

Stage 2 – exudation with emigration of leukocytes;

Stage 3 – proliferation.

Vascular changes occur in 4 phases:

Phase 1 – vascular spasm;

Phase 2 – arterial hyperemia;

Phase 3 – venous hyperemia;

Phase 4 – stasis.

Inflammatory mediators :

a) mediators of humoral origin (kinins , complement system);

b) mediators of cellular origin, ready-made or pre-existing (mast cell mediators, serotonin, heparin, lysosomal enzymes);

c) mediators of cellular origin, newly formed (eicosanoids , lymphokines , monokines , free radicals).

Alteration can be primary and secondary. Primary alteration occurs with direct action of a damaging agent. Secondary alteration is the body's response to primary alteration.

Exudation is the exudation of protein-containing liquid part of blood through the vascular wall into the inflamed tissue. The liquid that comes out of the vessels into the tissue during inflammation is called exudate. Depending on the qualitative composition, the following types of exudates are distinguished: serous, fibrinous, purulent, putrefactive, hemorrhagic, mixed.

According to the mechanism of development, the process of exudation is associated with the influence of inflammation mediators. The leading factor of exudation is considered to be an increase in vascular permeability.

Emigration is the exit of leukocytes beyond the vessels . Polymorphonuclear leukocytes are the first to be found in the inflammation focus. The main function of leukocytes in the inflammation focus is the absorption of foreign bodies (phagocytosis).

Proliferation is the 3rd stage of inflammation. Leukocytes die after several hours of performing the phagocytic function. Macrophages clear the inflammation site from microorganisms. Dead cells secrete substances that stimulate proliferation.

A feature of the inflammatory process in children is the tendency to its generation. Children usually develop necrosis, common in most organs and mucous membranes of the skin .

4. Illustrative material:

- presentation of lecture material;
- posters on the topic of the lesson;
- tables, diagrams.

5. Literature: see Appendix No. 1. (1,9,10,19)

6. Control questions (feedback)

1. What is inflammation ?
2. What factors cause inflammation?
3. What are the stages of inflammation?

4. What vascular changes occur at the site of inflammation?
5. What are the characteristics of the course of the inflammatory process in children?

ONTÜSTİK-QAZAQSTAN MEDISINA AKADEMIASY «Оңтүстік Қазақстан медицина академиясы» АҚ		SOUTH KAZAKHSTAN MEDICAL ACADEMY АО «Южно-Казахстанская медицинская академия»
Department of Pathology and Forensic Medicine Lecture complex on the subject "General pathology"		63-11-2025 Page 11 of 24

Appendix No. 1

Main:

1. Патофизиология. 2 томдық. 1 т.: оқулық / қазақтіл. ауд. Б. А. Жетпісбаев ; ред. В. В. Новицкий. - М.: ГЭОТАР - Медиа, 2017. - 640 бет.
2. Патофизиология. Екі томдық. 2 т.: оқулық / қазақтіл. ауд. С. Б. Жәутікова ; ред. В. В. Новицкий. - М.: ГЭОТАР - Медиа, 2018. - 464 б. +эл. опт.диск (CD-ROM).
3. Нұрмұхамбетұлы, Ә. Клиникалық патофизиология. I - том: оқулық Патофизиология-II және оның клиникалық медицинадағы мәселелеріне нұсқама. - 2-ші бас. - Алматы: Эверо, 2016. - 180б. с.
4. Нұрмұхамбетұлы, Ә. Клиникалық патофизиология. 2 -т. Патофизиология - 2 және оның клиникалық медицинадағы маңызды мәселелеріне нұсқама :оқулық. - 2-ші бас. - Алматы :Эверо, 2016. - 252 бет.
5. Нұрмұхамбетұлы, Ә. Клиникалық патофизиология. 3 т. Патофизиология - II және оның клиникалық медицинадағы маңызды мәселелеріне нұсқама: оқулық. - 2-ші бас. - Алматы: Эверо, 2016. - 248 бет.
6. Нұрмұхамбетұлы, Ә. Патофизиология. 1 том :оқулық / Ә. Нұрмұхамбетұлы. - өнд., толықт. 3-бас. - Алматы: Эверо, 2015. - 182 бет
7. Нұрмұхамбетұлы, Ә. Патофизиология. 2 том: оқулық / Ә. Нұрмұхамбетұлы. - өнд., толықт. 4-бас. - Алматы :Эверо, 2015. - 214 бет
8. Нұрмұхамбетұлы, Ә. Патофизиология. 3 том: оқулық / Ә Нұрмұхамбетұлы. - өнд., толықт. 4- бас. - Алматы :Эверо, 2015. - 216 бет
9. Нұрмұхамбетұлы, Ә. Патофизиология. 4 том: оқулық / Ә. Нұрмұхамбетұлы. - өнд., толықт. 4-бас. - Алматы :Эверо, 2015. - 154 бет
10. Патофизиология : оқулық. 2 томдық. 1 том / қазақ тіл. ауд. Б. А. Жетпісбаев ; ред. В. В. Новицкий. - 4-бас.өнд.толық. - М.: ГЭОТАР - Медиа, 2017. - 640
11. Патофизиология : оқулық. 2 томдық. 2 том / қазақ тіл. ауд. С. Б. Жәутікова ; ред. В. В. Новицкий. - 4-бас.өнд.толық. - М.: ГЭОТАР - Медиа, 2018. - 464 б. +эл. опт. диск (CD-ROM).
12. Патологическая физиология. Т. 1 : учеб. для мед. вузов / ред. А. Д. Адо [и др.]. - Алматы : Эверо, 2014. - 244 с.
13. Патологическая физиология. Т. 2 : учебник для мед. вузов / А. Д. Адо [и др.]. - Алматы : Эверо, 2015. - 216 с.
14. Ефремов, А. В. Патофизиология. Основные понятия : учебное пособие / А. В. Ефремов, Е. Н. Самсонова, Ю. В. Начаров. - М.: ГЭОТАР - Медиа, 2010. - 256 с.
15. Фролов, В. А. Общая патологическая физиология : учебник / Рек. учебно-метод. объедин. по мед. и фарм. образ. вузов России. - М.: Издательский дом "Высшее образование и Науки", 2013. - 568 с.: ил.
16. Патологическая физиология (Общая и Частная) : учебник / В.А. Фролов [и др.]. - 4-е изд., пер. и доп. - М.: Издательский дом "Высшее образование и наука", 2019. - 730 с.
17. Ахметова, Н. Ш. Анатомия, физиология, патология органов слуха, речи, зрения [Текст] : учебное пособие. - 3-е изд. - Караганда: АҚНҰР, 2019. - 192 с
18. Патофизиология. В 2 т. Т. 2 [Текст] : учебник / под ред. В. В. Новицкого, Е. Д. Гольдберга, О. И. Уразовой ; М-во образования и науки РФ. - 4-е изд., перераб. и доп.; Рек. ГОУ ВПО "ММА им. И. М. Сеченова". - М.: ГЭОТАР - Медиа, 2012. - 640 с. +эл. опт. диск (CD-ROM)
19. Патофизиология. В 3 т. Т. 3 [Текст] : учебник / А. И. Воложин [и др.] ; под ред. А. И. Воложина, Г. В. Порядина. - Рек. УМО объедин. по мед. и фарм. образованию вузов России в качестве учебника. - М.: Академия, 2006. - 304 с. - (Высшее проф. образование).
20. Jain, A. K. Textbook of physiology : textbook. Vol. 1 / A. K. Jain. - 6 th ed. - Nev Delhi : Avichal publishing company, 2015. - 590 p.Перевод заглавия: Учебник физиологии
21. Jain, A. K. Textbook of physiology : textbook. Vol. 2 / A. K. Jain. - 6nd ed. - Nev Delhi : Avichal publishing company, 2015. - 1121 p. Перевод заглавия: Учебник физиологии
22. Norris, Tommie L. Porth's Pathophysiology: Concepts of Altered Health States [Text] : textbook / Tommie L. Norris. - 10 nd ed. - [S. l.] : Wolters Kluwer, 2019. - 1573 p. - ISBN 978-1-4963-7759-3 : 48115 Tr. Перевод заглавия: Патофизиология Porth's: концепции измененных состояний здоровья
23. Pathophysiology. Volume 1. : the book for medical institutes / A. D. Ado [and others]. - Almaty : "Evero", 2017. - 216 p.
24. Pathophysiology. Volume 2. : the book for medical institutes / A. D. Ado [and others]. - Almaty : "Evero", 2017. - 188 p.
25. Pathophysiology. Volume 3. : the book for medical institutes / A. D. Ado [and others]. - Almaty : "Evero", 2017. - 323 p.
26. Pathophysiology of Disease: An Introduction to Clinical Medicine. 7rd. ed. McGraw-Hill Education, 2014

ONTÜSTIK-QAZAQSTAN MEDISINA AKADEMIASY «Оңтүстік Қазақстан медицина академиясы» АҚ		SOUTH KAZAKHSTAN MEDICAL ACADEMY АО «Южно-Казахстанская медицинская академия»
Department of Pathology and Forensic Medicine Lecture complex on the subject "General pathology"		63-11-2025 Page 12 of 24

27. Kharissova, N. M. Physiology of the digestive system : teaching textbook / N. M. Kharissova. - Алматы : Эверо, 2016. - 428 p.

Supplementary

1. Патологиялық физиология. Тәжірибелік сабақтарға ұсақ: оқу құралы = Патофизиология. Руководство к практическим занятиям : учеб. пособие / В. В. Новицкий [ж. б.]; ред. басқ. В. В. Новицкий, О. И. Уразова ; қаз. тіліне ауд. С. Б. Жәутікова. - М. : ГЭОТАР - Медиа, 2014. - 768 бет.с.
2. Уразалина, Н. М. Тест тапсырмалары. II-бөлім. Біртектес дерттік құрдістер: - Алматы: Эверо, 2014. - 184 бет.
3. Жәутікова, С. Б. Мамандандырылған патологиялық физиология курсы: оқу-әдістемелік құралы / С. Б. Жәутікова, Е. Қ. Өмірбаева ; ҚР денсаулық сақтау министрлігі; КММУ. - Қарағанды : ЖК "Ақнұр", 2013. - 268 бет.
4. Жәутікова, С. Б. Патологиялық физиология пәні бойынша ситуациялық есептер жинағы: оқу-әдістемелік құрал. - Қарағанды : ЖК "Ақнұр 2013
5. Патофизиология. Задачи и тестовые задания: учеб.-методическое пособие / под ред. П. Ф. Литвицкого ; М-во образования и науки РФ. - ; Рек. ГОУ ВПО "ММА им. И. М. Сеченова". - М. : ГЭОТАР - Медиа, 2013. - 384 с. : ил
6. Роуз, Алан Г. Атлас патологии. Макро- и микроскопические изменения органов: атлас: пер. с англ. под ред Е. А. Коган / Алан Г. Роуз ; ред. Е. А. Коган. - М. : ГЭОТАР - Медиа, 2010. - 576 с.
7. Klatt, Edward C Robbins and Cotran Atlas of Pathology : textbook / Edward C. Klatt. - 3th ed. - Philadelphia : Elsevier Saunders, 2014. - 587 p. - ISBN 978-1-4557-4876-1 : 33050.00 Тг. Перевод заглавия: Роббинс и Котран Атлас патологии

Electronic Sources:

1. Патологиялық физиология. Тәжірибелік сабақтарға нұсқау [Электронный ресурс] : оқу құралы = Патофизиология. Руководство к практическим занятиям : учебное пособие / қаз. тіліне ауд. С. Б. Жәутікова ; ред. В. В. Новицкий. - Электрон. текстовые дан. (63,4Мб). - М. : ГЭОТАР - Медиа, 2014. - 768 бет. эл. опт. диск (CD-ROM)
2. Адам физиологиясы. Динамикалық сызбалар атласы [Электронный ресурс] : оқулық / К. В. Судаков [ж.б.] ; қазақ тіл. ауд. М. Қ. Қанқожа. - Электрон. текстовые дан. (105Мб). - М. : ГЭОТАР - Медиа, 2017. - 464б.
3. Патологиялық физиология. Досжанова М.П. , – Алматы: Эверо, 2015 ЦБ Aknurpress / <https://www.aknurpress.kz/reader/web/2476>
4. Кравцов В.И и др. Тестовые задания по патологической физиологии с элементами профилизации / Под ред. профессора В.И. Кравцов. - Алматы: Эверо, 2020. - 116 с. https://www.elib.kz/ru/search/read_book/472/
5. Кравцов В.И и др. Тестовые задания по патологической физиологии с элементами профилизации / Под ред. профессора В.И. Кравцов. - Алматы: Эверо, 2020. - 128 с. https://www.elib.kz/ru/search/read_book/471/
6. Кравцов В.И и др. Тестовые задания по патологической физиологии с элементами профилизации / Под ред. профессора В.И. Кравцов. - Алматы: Эверо, 2020. - 104 с. https://www.elib.kz/ru/search/read_book/473/
7. Патологиялық физиология: 2 том. Оқулық/қазақ тіліне аударған, жауапты редактор Ж.Б. Ахметов. , – Алматы: Эверо, 2020 - 200 https://www.elib.kz/ru/search/read_book/91/
8. Патологиялық физиология: 1 том. Оқулық/қазақ тіліне аударған, жауапты редактор Ж.Б. Ахметов. , – Алматы: Эверо, 2020 - 240 с https://www.elib.kz/ru/search/read_book/88/
9. Патологическая физиология: Учебник для медицинских вузов. 2 том. Алматы: Эверо, 2020 – 216 https://www.elib.kz/ru/search/read_book/98/
10. Адо А.Д, Адо М.Л, Пыцкого В.И., Порядина Г. В., Владимирова ЮЛ. Патологическая физиология: учебник для медицинских вузов. 1 том. Алматы: Эверо, 2020 - 248 с. https://www.elib.kz/ru/search/read_book/96/
11. Адо А.Д, Адо М.Л, Пыцкого В.И., Порядина Г. В., Владимирова ЮЛ. Патологическая физиология: Учебник для медицинских вузов. 3 том. Алматы: Эверо, 2020 https://www.elib.kz/ru/search/read_book/100/
12. Уразалин. Тест тапсырмалары. Профилизация элементтерімен бірге патологиялық физиология, Бойынша мамандықтар: 051301-жалпы медицина, 051302-стоматология. III-бөлім. Гемостаз қан жүйесінің, қанайналым және тыныс алу жүйелерінің патофизиологиясы. Алматы, «Эверо» баспасы, 2020 ж., 142 б. https://www.elib.kz/ru/search/read_book/896/
13. Уразалина. Тест тапсырмалары. Профилизация элементтерімен бірге патологиялық физиология, Бойынша мамандықтар: 051301-жалпы медицина, 051302-стоматология. II-бөлім.