Catalog of elective disciplines for the 2023-2024 academic year

1.Department: Normal anatomy.
2.Level of training: bachelor
3.Specialty: 5B110200 – «Public health»
4.Course: 1
5.Name of elective discipline: «Anatomy basics»
6.Number of credits: 3
7.Purpose: to Form a system of knowledge about the anatomical features of the human body and its constituent systems, the processes occurring in the human body, ensuring human activity in interactions with the environment.
8.Tasks: to Form students ' knowledge about the structure of organs and systems of the human body and their functions, as well as an understanding of the basic laws of formation of integral reactions of the human body.
To be able to determine the position and projection of organs and their parts for the development of skills of emergency and emergency medical care. To form system knowledge about the life of the organism in relation to the environment;
9.Rationale for the choice of discipline: Anatomy in the training of highly qualified medical specialists aims to obtain natural science knowledge for the implementation of activities in the field of public health and sanitary and epidemiological welfare.
10.Learning outcomes (competencies)

Knowledge (cognitive sphere)	**Skills (psychomotor sphere)**	**Personal and professional competences (relations)**
- Knows the structure, classification and function of muscles; - Fluent in anatomical terminology. Knows the basic techniques of working with anatomical preparations, textbooks; - Knows the structure and functions of the spinal cord and brain;	- defines the distinctive features of the bones of the skull, torso and limbs; - find on anatomic preparations of structural elements of joints bones; - finds the organs of the head, neck, chest, abdomen and pelvis; - distinguishes, describes, compares the characteristics of different body systems and explains their functions;	- formulate personal judgments, draws in essay, presentations, test tasks; - represents personal judgments in practical classes, meetings of the student circle, student scientific conferences. -transfers own knowledge and skills to students during educational experiments or explanation of theoretical material;

11.Prerequisites - school course in biology, anatomy and human physiology.
12.Post-requisites - fundamentals of General pathology; Microbiology, Virology and Parasitology, medical biology, introduction to clinical medicine.
13.Literature
on anatomy:
in Russian:
Basic:
1.Борзяк, Э. И. **Анатоми**я человека. Фотографический атлас. В 3 т. Т. 3. Внутренние органы нервная система: учебное пособие - М. : ГЭОТАР - Медиа, 2016. - 488 с
2.Борзяк, Э. И**. Анатоми**я человека. Фотографический атлас. В 3-х томах. Том 1. Опорно - двигательный аппарат учебное пособие - М. : ГЭОТАР - Медиа, 2014. - 480 с
3.Борзяк, Э. И**. Анатоми**я человека. Фотографический атлас. В 3-х томах. Том 2. Сердечно-сосудистая система. Лимфатическая система. - М.: ГЭОТАР - Медиа, 2015. – 368 с.

4.Сапин, М. Р. Нормальная **анатоми**я человека: В 2 кн. Кн.1: учебник / М. Р. Сапин, Г. Л. Билич ; - М. : МИА, 2010. - 480 с-20экз..
5.Сапин, М. Р. Нормальная **анатоми**я человека: В 2 кн. Кн. 2: учебник / М. Р. Сапин, Г. Л. Билич. - ; М. : МИА, 2010. - 548 с.-20экз
6.Синельников, Р. Д. Атлас анатомии человека. В 4 т. Т. 1. Учение о костях, соединении костей и мышцах : учеб. пособие . - 7-е изд, перераб . - М. : Новая волна : Издатель Умеренков, 2012.
7.Синельников, Р. Д. Атлас анатомии человека. В 4 т. Т. 2. Учение о внутренностях и эндокринных железах : учеб. пособие . - 7-е изд., перераб . - М. : Новая волна : Издатель Умеренков, 2012.
8.Сапин М.Р., Нормальная анатомия человека: В 2 кн. Кн.1: учебник / М.Р. Сапин, Г.Л. Билич; -М.:МИА, 2010. -480 с-20экз.
9.Сапин М.Р. Нормальная анатомия человека: В 2кн. Кн.2: учебник / М.Р. Сапин, Г.Л. Билич; -М.:МИА, 2010. -548 с-20экз.
10.Привес М.Г. Анатомия человека: учебник. -12-е изд., перераб. И доп. – СПб.: Изд. дом. СПбМАПО, 2009.
11.Синельников Р.Д. Атлас анатомии человека. В 4 т. Т.1. Учение о костях, соединении костей и мышцах: учеб. пособие. -7-е изд, перераб. –М.: Новая волна: Издатель Умеренков, 2012.
12.Синельников Р.Д. Атлас анатомии человека. В 4 т. Т.2. Учение о внутренностях и эндокринных железах: учеб. пособие. -7-е изд, перераб. –М.: Новая волна: Издатель Умеренков, 2012.
13.Синельников Р.Д. Атлас анатомии человека. В 4 т. Т.4. Учение о нервной системе и органах чувств: учеб. пособие. -7-е изд, перераб. –М.: Новая волна: Издатель Умеренков, 2012. Сапин М.Р. Атлас нормальной анатомии человека: атлас: Учеб.пособие. -4-е изд. – М.: Медпресс-информ, 2009.

1. **Department:** Biology and biochemistry
2. **Level of training** Undergraduate
3. **Educational program:** Public Health
4. **Well:** 2
5. **Name of elective disciplines:** Biochemistry
6. **Number of credits :** 3

7. Purpose: the formation of a holistic view of students about the molecular mechanisms and regulation of the main metabolic processes, the features of their course and a common understanding of their characteristics in tissues, the use of biochemical indicators to monitor their effectiveness in protecting health and the sanitary and epidemiological well-being of the population, their competent interpretation .

8. Content of discipline: Biological functions and structural organization of proteins. Enzymes. The role of membranes in metabolism and their diversity. Biochemical foundations of rational nutrition. Specific and general pathways of catabolism. Bioenergetics. Metabolism of carbohydrates , lipids and proteins . Biochemistry of hormones. Biochemistry of the liver and kidneys . Hemprotein exchange . Biochemistry of blood. Biochemistry of tissues.

9. Tasks:

- to form in students an understanding of the role of biochemical processes in the life of the organism in the norm;
- to form an idea about the metabolism of carbohydrates, proteins, lipids in the body, the mechanisms of regulation of metabolism, the features of the course of the main biochemical processes in various tissues;

- form an idea of biochemical disorders in the human body under the influence of environmental factors;
- give an idea of the main biochemical markers for assessing the effect of environmental factors

10. Rationale for the choice of discipline: Practical medicine requires the training of highly qualified medical personnel whose activities are aimed at improving the health of the population.

The main content of the course of biological chemistry at the medical university for the EP " Public Health " is aimed at studying the biochemical composition of the human body, forming an idea of metabolism and its regulation, research influence on the metabolism of various adverse environmental factors (radiation, salts of heavy metals, exhaust gases, etc.)

11. Learning outcomes (competencies)

Knowledge (cognitive sphere	**Skills and abilities (psychomotor sphere)**	**Personal and professional competencies (relationships)**
Demonstrates knowledge of the subject and tasks of medical biochemistry for professional activities. Knows the methods of conducting biochemical analyzes. Describes the molecular mechanisms of the flow and regulation of metabolic processes . Outlines the main provisions of bioenergetics and nutritional biochemistry. Knows the basic principles of the application of biochemical research methods in practice, the reference values of the main biochemical parameters.	Able to work on modern equipment: biochemical analyzer, spectrophotometer, when conducting biochemical analyses. Able to work and search for the necessary data from a special reference material a . Interprets the results of laboratory and instrumental studies of body fluids. Able to determine the reference values of the main biochemical parameters of blood serum.	Able to express their own opinions and critically analyze the results of educational experiments. He knows how to defend his own judgments in practical classes, at meetings of the student circle, student scientific conferences, etc. When planning and conducting educational experiments, he is able to explain the observed facts and phenomena, their cause-and-effect relationships. Able to work in a team, make a collective decision. Able to transfer to students, teachers, examiners the knowledge gained in the process of studying the discipline.

12. Prerequisites: Chemistry ; Fundamentals of Physiology

13. Postrequisites: Fundamentals of epidemiology; Health promotion and disease prevention

1 4. Literature:

main

In Russian

1. Biochemistry, ed. Corresponding Member RAS, prof. E.S. Severina .- M., 2011
2. Tapbergenov S.O. "Medical and Clinical Biochemistry ".- Evero , 2017 . I volume;
3. Tapbergenov S.O. "Medical and Clinical Biochemistry ".- Evero , 2017 . II volume;
4. Tapbergenov S.O. Medical biochemistry. - Astana, 2011.

Additional:

1. Campbell M.K., Biochemistry, part 1, Almaty-2013;
2. Biochemistry: textbook / ed. E. S. Severina . - 5th ed., rev . and additional - M. : GEOTAR - Media, 2011.
3. Guide to practical exercises in biological chemistry: textbook - methodical manual. for medical students Universities / ed. S. O. Tapbergenova . - Almaty: Evero , 2012. - 150 p.

4. Biological chemistry with exercises and tasks: textbook / ed. S. E. Severina . - M. : GEOTAR - Media, 2011. - 624 p. + email opt. disk (CD-ROM)

Medical Biochemistry: In Kazakh

1. "Biochemistry" E.S. Severinnin ed., "GEOTAR, Media", 2014; 2. Tapbergenov S.O. Medical Biochemistry - Almaty, 2011
2. Seitembetov T.S. Biological chemistry-Almaty 2011
3. Seitov Z.S., Biochemistry, - Almaty, 2012 ;

On English language

1. Baynes JW, Dominiczak MH Medical Biochemistry, Mosby Elsevier, 2014
2. Ferrier, Denise R. Biochemistry: Lippincott`s Illustrated Reviewes : textbook/Denise R.Ferrier. -7th ed . - Philadelphia: Wolters Kluwer, 2017.

Electronic resources: Medical biochemistry

1. Biochemistry [Electronic resource]: a textbook for universities / ed. E. S. Severina . - 5th ed. , correct . and additional - Electron. text data. (66.3 Mb). - M. : GEOTAR - Media, 2013. - 768 p. email opt. disc (CD-ROM).
2. Biochemistry [Electronic resource]: textbook / edited by E. S. Severin . - 5th ed. - Electron. text data. (66.4 MB). - M. : Publishing group "GEOTAR-Media", 2011. - 768 p. email opt. disc (CD-ROM
3. Biochemistry with exercises and tasks [Electronic resource]: textbook. for universities / E. S. Severin [and others]; ed. E. S. Severina . - Electron. text data. (58.2 Mb). - M. : GEOTAR - Media, 2010. - 384 p. email opt. disc (CD-ROM): ill. - (Electronic textbook).

1. **Department:** Biology and biochemistry
2. **Level of training** Undergraduate
3. **Educational program:** Public Health
4. **Well:** 2
5. **Name of elective disciplines:** Biochemistry
6. **6. Number of credits :** 3
7. **7. Purpose:** the formation of a holistic view of students about the molecular mechanisms and regulation of the main metabolic processes, the features of their course and a common understanding of their characteristics in tissues, the use of biochemical indicators to monitor their effectiveness in protecting health and the sanitary and epidemiological well-being of the population, their competent interpretation .

8. Content of discipline: Biological functions and structural organization of proteins. Enzymes. The role of membranes in metabolism and their diversity. Biochemical foundations of rational nutrition. Specific and general pathways of catabolism. Bioenergetics. Metabolism of carbohydrates , lipids and proteins . Biochemistry of hormones. Biochemistry of the liver and kidneys . Hemprotein exchange . Biochemistry of blood. Biochemistry of tissues.

9. Tasks:

- to form in students an understanding of the role of biochemical processes in the life of the organism in the norm;
- to form an idea about the metabolism of carbohydrates, proteins, lipids in the body, the mechanisms of regulation of metabolism, the features of the course of the main biochemical processes in various tissues;
- form an idea of biochemical disorders in the human body under the influence of environmental factors;
- give an idea of the main biochemical markers for assessing the effect of environmental factors

10. Rationale for the choice of discipline: Practical medicine requires the training of highly qualified medical personnel whose activities are aimed at improving the health of the population.

The main content of the course of biological chemistry at the medical university for the EP " Public Health " is aimed at studying the biochemical composition of the human body, forming an idea of metabolism and its regulation, research influence on the metabolism of various adverse environmental factors (radiation, salts of heavy metals, exhaust gases, etc.) .

11. Learning outcomes (competencies)

	Knowledge (cognitive sphere **)**	Skills and abilities (psychomotor sphere)	Personal and professional competencies (relationships)
	Demonstrates knowledge of the subject and tasks of medical biochemistry for professional activities. Knows the methods of conducting biochemical analyzes. Describes the molecular mechanisms of the flow and regulation of metabolic processes . Outlines the main provisions of bioenergetics and nutritional biochemistry. Knows the basic principles of the application of biochemical research methods in practice, the reference values of the main biochemical parameters.	Able to work on modern equipment: biochemical analyzer, spectrophotometer, when conducting biochemical analyses. Able to work and search for the necessary data from a special reference material a . Interprets the results of laboratory and instrumental studies of body fluids. Able to determine the reference values of the main biochemical parameters of blood serum.	Able to express their own opinions and critically analyze the results of educational experiments. He knows how to defend his own judgments in practical classes, at meetings of the student circle, student scientific conferences, etc. When planning and conducting educational experiments, he is able to explain the observed facts and phenomena, their cause-and-effect relationships. Able to work in a team, make a collective decision. Able to transfer to students, teachers, examiners the knowledge gained in the process of studying the discipline.

12. Prerequisites: Chemistry ; Fundamentals of Physiology

13. Postrequisites: Fundamentals of epidemiology; Health promotion and disease prevention

1 4. Literature:

main

In Russian

1. Biochemistry, ed. Corresponding Member RAS, prof. E.S. Severina .- M., 2011
2. Tapbergenov S.O. "Medical and Clinical Biochemistry ".- Evero , 2017 . I volume;
3. Tapbergenov S.O. "Medical and Clinical Biochemistry ".- Evero , 2017 . II volume;
4. Tapbergenov S.O. Medical biochemistry. - Astana, 2011.

Additional:

5. Campbell M.K., Biochemistry, part 1, Almaty-2013;
6. Biochemistry: textbook / ed. E. S. Severina . - 5th ed., rev . and additional - M. : GEOTAR - Media, 2011.
7. Guide to practical exercises in biological chemistry: textbook - methodical manual. for medical students Universities / ed. S. O. Tapbergenova . - Almaty: Evero , 2012. - 150 p.
8. Biological chemistry with exercises and tasks: textbook / ed. S. E. Severina . - M. : GEOTAR - Media, 2011. - 624 p. + email opt. disk (CD-ROM)

Medical Biochemistry: In Kazakh

4. "Biochemistry" E.S. Severinnin ed., "GEOTAR, Media", 2014; 2. Tapbergenov S.O. Medical Biochemistry - Almaty, 2011
5. Seitembetov T.S. Biological chemistry-Almaty 2011
6. Seitov Z.S., Biochemistry, - Almaty, 2012 ;

On English language
1. Baynes JW, Dominiczak MH Medical Biochemistry, Mosby Elsevier, 2014
2. Ferrier, Denise R. Biochemistry: Lippincott`s Illustrated Reviewes : textbook/Denise R.Ferrier. -7th ed . - Philadelphia: Wolters Kluwer, 2017.

Electronic resources: Medical biochemistry
1. Biochemistry [Electronic resource]: a textbook for universities / ed. E. S. Severina . - 5th ed. , correct . and additional - Electron. text data. (66.3 Mb). - M. : GEOTAR - Media, 2013. - 768 p. email opt. disc (CD-ROM).
2. Biochemistry [Electronic resource]: textbook / edited by E. S. Severin . - 5th ed. - Electron. text data. (66.4 MB). - M. : Publishing group "GEOTAR-Media", 2011. - 768 p. email opt. disc (CD-ROM
3. Biochemistry with exercises and tasks [Electronic resource]: textbook. for universities / E. S. Severin [and others]; ed. E. S. Severina . - Electron. text data. (58.2 Mb). - M. : GEOTAR - Media, 2010. - 384 p. email opt. disc (CD-ROM): ill. - (Electronic textbook).

1. Department: pharmacology, pharmacotherapy and clinical pharmacology

2. Level of training: baccalaureate

3. OP: "Public Health"

4. Course: 2

5. Name of elective discipline: Pharmacology

6. Number of credits: 5

7. Purpose: to form an idea among students at the Public Health Public Partnership on the general laws of action of drugs to recognize and prevent their undesirable effects.

8. Tasks:

• form an idea of the general laws of pharmacokinetics and pharmacodynamics of drugs;

• teach the possibilities of identifying groups of drugs based on ideas about their properties;

• teach to recognize the unwanted effects of drugs and eliminate them.

9. The content of the discipline: Pharmacology is the science of the effect of drugs on the body and the search for new drugs. It has a great influence on the development of biomedical disciplines. Pharmacology is associated both with biomedical and clinical disciplines, as well as with pharmacy and toxicology. The intermediate position between theoretical and clinical disciplines contributes to the development of many scientific areas developed by pharmacology. New directions in the field of pharmacology include both applied aspects related to obtaining new drugs and their introduction into medical practice, as well as fundamental problems.

10. Justification of the choice of discipline: The advent of highly active drugs led not only to the success of pharmacotherapy, but also was accompanied by an increase in cases of adverse and toxic effects of drugs, therefore, knowledge of pharmacology is necessary for doctors of any specialty, including specialists in public health, medical prophylactic profile.

11. Learning outcomes (competency):

Knowledge **(cognitive sphere)**	**Skills (psychomotor sphere)**	**Personalities and professional competencies (relationships)**
• Able to recognize unwanted effects of drugs, to prevent and correct side effects of drugs. • Knows and understands the clinical manifestations of common infectious diseases and their treatment principles • Knows and understands the clinical manifestations of common non-infectious diseases and their treatment principles: they can recognize unwanted effects when prescribing drugs, and prevent and correct side effects of drugs.	• at a professional level, searches and processes data on medicines to advise the population on their use • provide advice on the use of drugs for infectious diseases and their prevention; • correction of undesirable effects of drugs and the ability to use them for intoxication	• assess the possibility of toxic effects of drugs and methods of treatment of drug poisoning; • conduct a search on pharmacology issues using information sources - directories, databases, Internet resources • formulates arguments and solves problems in the field of healthcare, evaluates possible drug interactions • advises patients on possible side effects of drugs

12. . Prerequisites: physiology, anatomy, the basics of general pathology
13. Post-requisites: public health
14. Literature:

Primary:

1. Pharmacology: textbook / ed. R.N.Alyautdina.- M.: GEOTAR-Media, 2013.-832 + e-mail.

2. Kasopova V. N. Pharmacology: textbook / V.N. Kasopova. - M.: Eksmo, 2011 .-- 352 p.

3. Kharkevich, D.A. Fundamentals of Pharmacology: a textbook. - M.: GEOTAR - Media, 2015 .-- 720p.

4. Alyautdin, R. N. Pharmacology: textbook. - M.: GEOTAR - Media, 2014. - 704 p.

Additional:

1. Pharmacology of antimicrobial agents: textbook / T. A. Muminov. - Almaty: Letter Print. Kazakhstan, 2016 .-- 784 p.

2. Mashkovsky M.D. Medicines 16.th edition. rev., add. and rev. M. The New Wave. 2017 .-- 1216 p.

3. Pharmacology: a guide to laboratory studies: textbook. allowance / ed. D.A. Kharkevich. - 6th ed., Rev. and add. ; Rec. educational-methodical association for med. and farm. the formation of Russian universities. - M.: GEOTAR - Media, 2014 .-- 512 p.

4. Fundamentals of pharmacology with the formulation: textbook / M.Z. Shaydarov [et al.] .- Astana: Анқг, 2014. - 406 p.

5. Ormanov, N. Zh. Pharmacological directory of drugs (classification, nomenclature, mechanism of action and indications for use): textbook.-methodical manual / SKGFA. -; Approved at the Academic Council of SKFFA. - Almaty: Evero, 2013 .-- 138 p.

Electronic:

1. 1. Pharmacotherapy of diseases of the digestive system. [Electronic resource]: Textbook / Kerimbaeva Z. A., Ormanov N.Zh., Dzhakipbekova ZK, Ormanov TN Shymkent, 2018
2. Kharkevitch, D. A. Pharmacology [Electronic resource]: textbookformedicalstudents / D. A. Kharkevitch. - Electronic textual data. (83.9Mb). - M.: GEOTAR - Media, 2017 .-- email. opt. Disk
3. Pharmacology [Electronic resource]: оқиқұraly / ed. bass. G. M. Pichkhadze = Pharmacology: textbook / ed. G. M. Pichkhadze. - Electronic textual data. (43.0 Mb). - M.: Litterra, 2016. - 504 p.
4. Alyautdin, R. N. Pharmacology [Electronic resource]: a textbook for the average prof. Education / R.N. Alyautdin, N.G. Preferansky, N.G. Preferanskaya. - Electronic textual data. (44.6 MB). - M.: Publishing Group "GEOTAR-Media", 2010.-704 p.
5. Kharkevich, D. A. Pharmacology [Electronic resource]: textbook. - The electron. text data

(62.1 MB). - M.: Publishing House group "GEOTAR-Media", 2010. - 752 p

1. **Department:** Biology and biochemistry
2. **Level of training** Undergraduate
3. **Educational program:** General medicine
4. **Cours:** 2
5. **Name of elective**
6. **disciplines:** Medical biochemistry
7. **6. Number of credits :** 7

7. Purpose: the formation of a holistic view of students about the molecular mechanisms and regulation of the main metabolic processes, the features of their course in human organs and tissues, the use of biochemical parameters , their competent interpretation for diagnosis and monitoring the effectiveness of treatment.

8. Content of discipline: Biological functions and structural organization of proteins. Enzymes. The role of membranes in metabolism and their diversity. Biochemical foundations of rational nutrition. Specific and general pathways of catabolism. Bioenergetics. Metabolism of carbohydrates , lipids and proteins . Biochemistry of hormones. Biochemistry of the liver and kidneys . Hemprotein exchange . Biochemistry of blood. Biochemistry of the nervous muscular , connective , bone , dental tissues .

9. Tasks:

- to form students' understanding of the role of biological chemistry in the professional activities of future doctors ;
- give an idea of the chemical structure, properties and biological functions of proteins, carbohydrates, lipids and other biologically active compounds in living organisms;
- form an idea of the biochemical patterns of energy transformation, metabolism and regulation of metabolic processes;
- to give an idea of the features of the molecular organization and metabolism of the most important organs and tissues of the body;
- to form an idea of modern biochemical approaches for diagnosing diseases and correcting metabolic disorders.

10. Rationale for the choice of discipline: Practical medicine requires the training of highly qualified medical personnel whose activities are aimed at improving the health of the population.

In this regard, it is advisable for future doctors to study the discipline "Medical Biochemistry", which allows you to get a holistic view of the metabolic processes of the body, the mechanisms of the onset of diseases. Medical biochemistry is one of the main basic medical disciplines that studies the chemical processes that underlie the life of cells, tissues and the body as a whole. The main focus of teaching biochemistry is the study of metabolic processes and the characteristics of metabolism and its regulation in the human body in order to understand the causes and consequences of their violation in pathology.

11. Learning outcomes (competencies)

	Knowledge (cognitive sphere **)**	Skills and abilities (psychomotor sphere)	Personal and professional competencies (relationships)
	Demonstrates knowledge of the subject and tasks of medical biochemistry for professional activities. Knows the methods of conducting biochemical analyzes. Describes the molecular mechanisms of the flow and regulation of metabolic processes . Outlines the main provisions of bioenergetics and nutritional biochemistry. Knows the basic principles of the application of biochemical research methods in practice, the reference values of the main biochemical parameters.	Able to work on modern equipment: biochemical analyzer, spectrophotometer, when conducting biochemical analyses. Able to work and search for the necessary data from a special reference material a .Interprets the results of laboratory and instrumental studies of body fluids. Able to determine the reference values of the main biochemical parameters of blood serum.	Able to express their own opinions and critically analyze the results of educational experiments. He knows how to defend his own judgments in practical classes, at meetings of the student circle, student scientific conferences, etc. When planning and conducting educational experiments, he is able to explain the observed facts and phenomena, their cause-and-effect relationships. Able to work in a team, make a collective decision. Able to transfer to students, teachers, examiners the knowledge gained in the process of studying the discipline.

12. Prerequisites: chemistry, molecular biology and medical genetics, fundamentals of morphology and physiology.

1 3. Postrequisites: "Pathology of organs and systems", "Pharmacology", "Propaedeutics of childhood diseases" and "Propaedeutics of internal diseases".

1 4. Literature:

main
In Russian
1. Biochemistry, ed. Corresponding Member RAS, prof. E.S. Severina .- M., 2011

2. Tapbergenov S.O. "Medical and Clinical Biochemistry ".- Evero , 201 7 . Itom;
3. Tapbergenov S.O. "Medical and Clinical Biochemistry ".- Evero , 201 7 . III volume;
4. Tapbergenov S.O. Medical biochemistry. - Astana, 2011.

Additional:

9. Campbell M.K., Biochemistry, part 1, Almaty-2013;
10. Biochemistry: textbook / ed. E. S. Severina . - 5th ed., rev . and additional - M. : GEOTAR - Media, 2011.
11. Guide to practical exercises in biological chemistry: textbook - methodical manual. for medical students Universities / ed. S. O. Tapbergenova . - Almaty: Evero , 2012. - 150 p.
12. Biological chemistry with exercises and tasks: textbook / ed. S. E. Severina . - M. : GEOTAR - Media, 2011. - 624 p. + email opt. disk (CD-ROM)

Medical Biochemistry: In Kazakh

7. "Biochemistry" E.S. Severinnin ed., "GEOTAR, Media", 2014; 2. Tapbergenov S.O. Medical Biochemistry - Almaty, 2011
8. Seitembetov T.S. Biological chemistry-Almaty 2011
9. Seitov Z.S., Biochemistry, - Almaty, 2012 ;

On English language

1. Baynes JW, Dominiczak MH Medical Biochemistry, Mosby Elsevier, 2014
2. Ferrier, Denise R. Biochemistry: Lippincott`s Illustrated Reviewes : textbook/Denise R.Ferrier. -7th ed . - Philadelphia: Wolters Kluwer, 2017.

Electronic resources: Medical biochemistry
1. Biochemistry [Electronic resource]: a textbook for universities / ed. E. S. Severina . - 5th ed. , correct . and additional - Electron. text data. (66.3 Mb). - M. : GEOTAR - Media, 2013. - 768 p. email opt. disc (CD-ROM).
2. Biochemistry [Electronic resource]: textbook / edited by E. S. Severin . - 5th ed. - Electron. text data.(66.4 MB). - M. : Publishing group "GEOTAR-Media", 2011. - 768 p. email opt. disc (CD-ROM
3. Biochemistry with exercises and tasks [Electronic resource]: textbook. for universities / E. S. Severin [and others]; ed. E. S. Severina . - Electron. text data. (58.2 Mb). - M. : GEOTAR - Media, 2010. - 384 p. email opt. disc (CD-ROM): ill. - (Electronic textbook).