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ИНСТИТУТ МЕЖДУНАРОДНЫХ ОТНОШЕНИЙ,
ИСТОРИИ И ВОСТОКОВЕДЕНИЯ

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ENGLISH FOR STUDENTS OF MEDICINE

PART I

Казань

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English for Students of Medicine. Part I: учебное пособие по английскому языку для студентов медицинских специальностей высших учебных заведений / И.С. Налимова. – Казань: КФУ, 2016. – 152 с.

Учебное пособие предназначено для студентов медицинских специальностей высших учебных заведений и направлено на профессионально ориентированное обучение английскому языку. Пособие рассчитано на 1 год обучения и направлено на продолжающих изучение английского языка в вузе. Цель учебного пособия – совершенствование навыков чтения по специальности, а также устной речи в профессиональной коммуникации.

Введение

Учебное пособие “English for students of Medicine. Part I.” предназначено для студентов медицинских специальностей первого курса для занятия на уроках английского языка. Пособие может быть рекомендовано к использованию как для аудиторной, так и для самостоятельной работы. Уровень сложности может быть определен как Intermediate.

Цель пособия – развитие информационно-коммуникативной компетенции студентов вуза, предполагающей формирование навыков чтения профессионально ориентированных текстов; речевых высказываний в рамках изучаемых тем; самостоятельного поиска дополнительного материала для подготовки к устным сообщениям профессиональной направленности.

Пособие состоит из шести разделов. Каждый раздел посвящен определенной теме и состоит из нескольких текстов (два-три) на медицинскую тематику, упражнений на отработку лексики, на понимание текстов, а также упражнения на развитие навыков говорения. К каждому тексту отдельным списком вынесены профессиональные термины, встречающиеся в разделах. В заключении каждого раздела содержатся задания на поиск дополнительной информации, что должно стимулировать познавательную активность студентов. В качестве контроля усвоения материала ко всем разделам предлагаются итоговые контрольные упражнения.

На каждый раздел пособия рекомендуется отводить по шесть занятий, в зависимости от уровня подготовленности студентов – по два-три занятия на каждый тескт раздела. На первом уроке проходит первичное знакомство с профессиональной лексикой темы, которое предполагает работу со словарем, чтение и перевод текста выполнение лексических упражнений. Закрепление учебного материала проходит на втором-третьем уроке и включает работу над пониманием содержания прочитанного в виде вопросов и ответов. На четвертом-пятом уроках предполагается работа со вторым/ третьим текстами и работу над всем словарем раздела. На завершающем этапе (шестое занятие) студентам предлагается подготовить устное сообщение по теме раздела. Ряд упражнений предполагает творческое участие студентов в учебном процессе. В качестве контрольного этапа усвоения материала рекомендуются упражнения на потворение в конце каждого раздела.

Настоящее пособие дополняет комплекс учебников английского языка. Данное учебное пособие может помочь студентам совершить первый шаг к овладению английским в профессиональной сфере, в сфере медицины. Пособие содержит большое количество медицинской терминологии, которая будет полезна студентам в их учебной и профессиональной деятельности.

CONTENT

UNIT 1. STRUCTURAL ORGANIZATION OF THE BODY. PARTS OF THE BODY

Goal of Unit 1: this unit provides you with an orientation to the body as a whole—cells, tissues, organs, systems, and terminology describing positions and directions within the body. We begin with the smallest living unit, the cell, and build to an understanding of complex body systems.

Text 1. Cells

Ex. 1. Before reading the text, study the topical vocabulary.

Professional medical terms:

Word	**Pronunciation**	**Meaning**
cell	/sel/	клетка
the activity of the cell	/ æ kˈtɪvɪti/	деятельность клетки
cell division	/dɪˈvɪʒ(ə)n/	деление клеток
cellular	/ˈseljʊlə/	клеточный
cell membrane	/ sel ˈmembreɪn/	клеточная мембрана
gelatinous substance	/dʒɪˈlæ ɪnəs ˈsʌbst(ə)ns/	желатинозное вещество, роландово вещество
nucleus	/ˈnjuːklɪəs/	ядро
chromosome	/ˈkrəʊməsəʊm/	хромосома
karyotype	/ˈk æ rɪə(ʊ)taɪp/	кариотип, хромосомный набор клетки
ribosome	/ˈraɪbəsəʊm/	рибосома
gene	/dʒiːn/	ген
DNA	/diːenˈeɪ/	ДНК
DNA sequence	/ diːenˈeɪ ˈsiːkwəns/	Последовательность ДНК
synthesis	/ˈsɪnθəsɪs/	синтез
protein	/ˈprəʊtiːn/	белок, протеин
fat	/fæt/	жир
acid	/ˈæsɪd/	кислота
sugar	/ˈʃʊgə/	сахар
cytoplasm	/ˈsaɪtə(ʊ)plæz(ə)m/	цитоплазма
mitochondrion / mitochondria	/ˌmaɪtə(ʊ)ˈkɒndrɪən/ /ˌmʌɪtə(ʊ)ˈkɒndrɪə/	митохондрия / митохондрии
endoplasmic reticulum	/ˌendəʊˈplæz.mɪk rəˈtɪkjələm/	эндоплазматический ретикулум

catabolism	/kəˈtæbəlɪz(ə)m/	катаболизм, разложение
anabolism	/əˈnæbəlɪz(ə)m/	анаболизм
metabolism	/mɪˈtæbəlɪz(ə)m/	метаболизм, обмен веществ
embryo	/ˈembrɪəʊ/	эмбрион

Verbs

Word	**Pronunciation**	**Meaning**
contain	/kənˈteɪn/	содержать
be made up of something (Passive voice)	/ˌmeɪd ˈʌp/	состоять из чего-либо
be broken down (Passive voice)	/ˌbrəʊk(ə)nˈdaʊn/	распадаться, разбиваться
protect	/prəˈtekt/	защищать
control	/kənˈtrəʊl/	контролировать
direct	/dɪˈrekt/ OR /daɪˈrekt/	управлять
carry on/ out	/ˈkæri ɔn / aʊt/	продолжать / выполнять
aid in something / Ving something	/eɪd/	помогать в чем-либо
provide (energy)	/prəˈvaɪd/	снабжать, предоставлять

Ex. 2. Read the text and answer the following questions:

1. What is the fundamental unit of all living things?
2. In what way are cells similar?
3. In what way are cells different?
4. What are the major parts of a cell?
5. How many pairs of chromosomes do human body cells contain? What are the exceptions?
6. What’s DNA and its function?
7. What’s a karyotype?
8. What’s the difference between anabolism and catabolism? What’s the name for the whole process?

The cell is the fundamental unit of all living things (animal or plant). Cells are everywhere in the human body – every tissue, every organ is made up of these individual units.

Similarity in Cells. All cells are similar in that they contain a gelatinous substance composed of water, protein, sugar, acids, fats, and various minerals. Several parts of a cell are:

The **cell membrane** [1] not only surrounds and protects the cell but also regulates what passes into and out of the cell.

The **nucleus** [2] controls the operations of the cell. It directs cell division and determines the structure and function of the cell.

Chromosomes [3] are rod-like structures within the nucleus. All human body cells – except for the sex cells - the egg and the sperm – contain 23 pairs of chromosomes. Each sperm and each egg cell have only 23 unpaired chromosomes. After an egg and a sperm cell unite to form the embryo, each cell of the embryo then has 46 chromosomes (23 pairs).

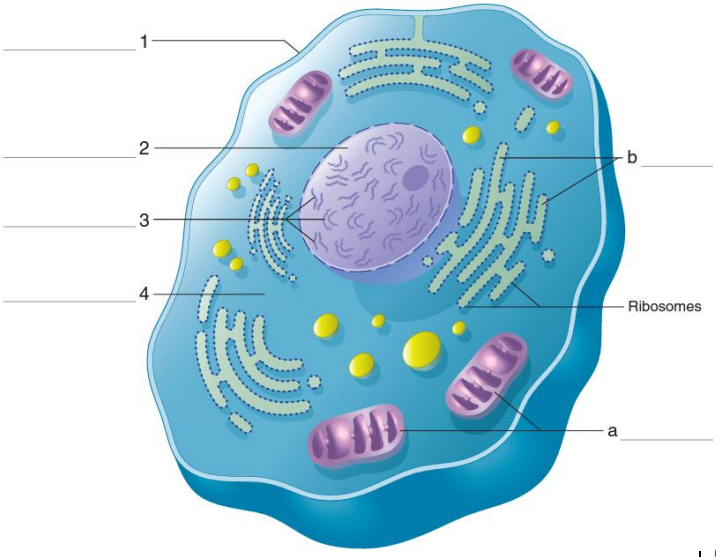


Figure 1-1. Major parts of a cell

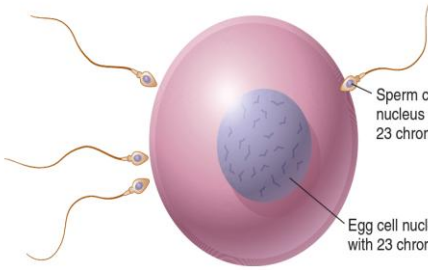


Figure 1-2. Egg and sperm cells, each containing 23 chromosomes

Chromosomes contain regions called **genes**. There are several thousand genes, in an orderly sequence, on every chromosome. Each gene contains a chemical called **DNA** (deoxyribonucleic acid). DNA regulates the activities of the cell according to its sequence (arrangement into genes) on each chromosome. The **DNA sequence** resembles a series of recipes in code. This code, when passed out of the nucleus to the rest of the cell, directs the activities of the cell, such as cell division and synthesis of proteins.

A **karyotype** is a photograph of an individual's chromosomes, arranged by size, shape, and number. Karyotyping can determine whether chromosomes are normal.

Figure 1-3. Karyotype of a normal male. Twenty-three pairs of chromosomes are shown. The 23rd pair is the XY pair present in normal males. In normal females, the 23rd pair is XX

The **cytoplasm** [4] (cyt/o = cell, -plasm = formation) includes all of the material outside the nucleus and enclosed by the cell membrane. It carries on the work of the cell (e.g., in a muscle cell, it does the contracting; in a nerve cell, it transmits impulses). The cytoplasm contains specialized apparatus to supply the chemical needs of the cell.

Mitochondria [a] are small sausage-shaped bodies that act like miniature power plants to produce energy by burning fuel (food) in the presence of oxygen. During this chemical process, called **catabolism** (cata = down, bol = to cast, -ism = process), complex foods (sugar and fat) are broken down into simpler substances and energy is released. In this way, catabolism provides the energy for cells to do the work of the body.

The **endoplasmic reticulum** [b] is a network (reticulum) of canals within the cell. These canals (containing small structures called **ribosomes**) are a cellular tunnel system that manufactures proteins for use in the cell. This process of building up complex materials, such as proteins, from simpler parts is **anabolism** (ana = up, bol = to cast, -ism = process). During anabolism, small pieces of protein (called amino acids) are fitted together like links in a chain to make larger proteins. Anabolism supports the growth of new cells.

Together, these two processes – anabolism and catabolism – are **metabolism** (meta = change, bol = to cast, -ism = process). Metabolism, then, is the total of the chemical processes occurring in a cell. If a person has a "fast metabolism," foods such as sugar and fat are used up very quickly, and energy is released. If a person has a "slow metabolism," foods are burned slowly, and fat accumulates in cells.

Differences in Cells. Cells are different, or specialized, throughout the body to carry out their individual functions. For example, a **muscle cell** is long and slender and contains fibers that aid in contracting and relaxing; an **epithelial cell** (a lining and skin cell) may be square and flat to provide protection; a **nerve cell** may be long and have various fibrous extensions that aid in its job of carrying impulses; a **fat cell** contains large, empty spaces for fat storage. These are only a few of the many types of cells in the body.

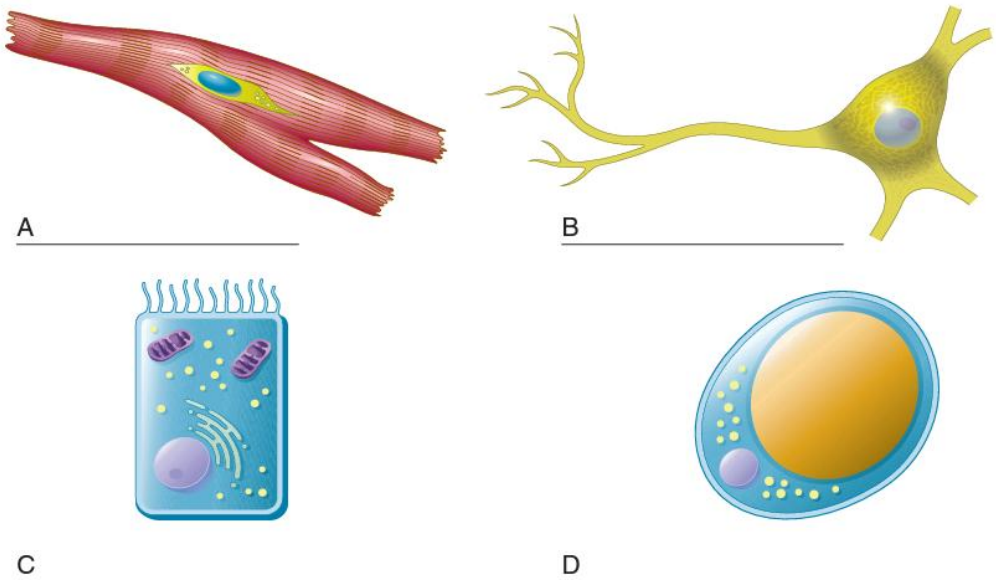


Figure 1-4. Types of cells. Label the **muscle cell (A)**, the **nerve cell (B)**, the **epithelial cell (C)**, and the **fat cell (D)**

(adapted from Davi-Ellen Chabner, The Language of Medicine, ninth edition – Saunders, Elsevier)

Ex. 3. Say whether the statements are true or false:

1. Cells are the smallest living units of the body.
2. Plants don't contain cells.
3. All cells are similar.
4. Cells contain a gelatinous substance composed of water, protein, sugar, acids, fats, and various minerals.
5. Metabolism includes catabolism and anabolism.
6. Karyotyping doesn't show if chromosomes are normal.

Ex. 4. Give Russian equivalents for:

Fundamental unit of all living things, protect the cell, rod-like structures within the nucleus, unpaired chromosomes, DNA sequence, supply the chemical needs of the cell, produce energy by burning fuel (food) in the presence of oxygen, provides the energy for cells, cellular tunnel system, support the growth of new cells.

Ex.5. Give English equivalents for:

Мембрана клетки, выполнять функции, энергия высвобождается, ДНК, хромосомы, рибосомы, регулировать деятельность клетки, деление клетки, синтез белка, защищать клетку, мышечная клетка, яйцеклетка, аминокислота, нервная клетка, распадаться на более простые вещества.

Ex. 6. Make up verb phrases with these words. There may be several combinations with some verbs:

1. make up	a. the cell
2. contain	b. the operations of the cell
3. protect	c. the chemical needs of the cell
4. break down into	d. protein, acids, fats, sugar
5. supply	e. complex materials
6. control	f. individual units
7. build up	g. simpler substances

Ex. 7. Match the terms with their definitions:

Anabolism	cytoplasm	karyotype
Catabolism	DNA	metabolism
cell membrane	endoplasmic reticulum	mitochondria
chromosomes	genes	nucleus

1. Rod-shaped structures in the nucleus that contain regions of DNA called genes. There are 23 pairs of them.
2. Chemical found within each chromosome. Arranged like a sequence of recipes in code, it directs the activities of the cell.
3. Regions of DNA within each chromosome.
4. Process of breaking down complex materials (foods) to form simpler substances and release energy.
5. The total of the chemical processes in a cell. It includes catabolism and anabolism.
6. Structure surrounding and protecting the cell. It determines what enters and leaves the cell.
7. Control center of the cell. It contains chromosomes and directs the activities of the cell.
8. Structures in the cytoplasm in which foods are burned to release energy.
9. Process of building up complex materials (proteins) from simple materials.

10. Structure (canals) within the cytoplasm. Site in which large proteins are made from smaller protein pieces.
11. Picture of chromosomes in the nucleus of a cell.
12. All the material that is outside the nucleus and yet contained within the cell membrane.

Ex.8. Read the sentences about the functions of cell parts. Fill in the gaps with the parts of a cell:

Cell membrane	Endoplasmic reticulum	DNA
Chromosomes	Mitochondria	
Cytoplasm	Nucleus	

1. The **…** contains specialized apparatus to supply the chemical needs of the cell.
2. **…** contain regions of DNA called genes.
3. The **…** protects the cell and also regulates what passes into and out of the cell.
4. The **…** produces proteins for use in the cell.
5. The **…** controls the operations of the cell, directs cell division and determines the structure and function of the cell.
6. **…** produce energy by burning fuel (food) in the presence of oxygen.
7. **…** directs the activities of the cell, such as cell division and synthesis of proteins.

Ex. 9. Make a summary of the text.

Text 2. Tissues and organs

Ex. 1. Before reading the text, study the topical vocabulary.

Professional medical terms:

Word	**Pronunciation**	**Meaning**
tissue	/ˈtɪʃuː/	ткань
histologist	/hɪˈstɒlədʒɪst/	гистолог
epithelial tissue	/ˌepɪˈθiːlɪ(ə)l ˈtɪʃuː/	эпителиальная ткань
organ	/ˈɔːgən/	орган
internal organs	/ɪnˈtɜː.n(ə)l/	внутренние органы
outer surface	/ˈaʊ.tə ˈsɜːfɪs/	наружная поверхность
gland	/glænd/	железа
exocrine gland	/ˈeksə(ʊ)kraɪn/ ALSO /ˈeksə(ʊ)krɪn/	экзокринная железа (железа с внешней секрецией)
endocrine gland	/ˈendə(ʊ)krɪn/ ALSO	эндокринная железа

	/ˈendə(ʊ)kraɪn/	(железа внутренней секреции)
muscle tissue	/ˈmʌs(ə)l ˈtɪʃuː/	мышечная ткань
voluntary / involuntary	/ˈvɒlənt(ə)ri/ /ɪnˈvɒlənt(ə)ri/	добровольный / недобровольный
conscious control	/ˈkɒnʃəs/	сознательный контроль
connective tissue	/kəˈnektɪv ˈtɪʃuː/	соединительная ткань
adipose (fat) tissue	/ˈædɪpəʊs ˈtɪʃuː/	жировая ткань
cartilage	/ˈkɑːt(ɪ)lɪdʒ/	хрящ
fiber fibrous	/ˈfaɪbə/ /ˈfaɪbrəs/	волокно волокнистый
nerve tissue	/nɜːv ˈtɪʃuː/	нервная ткань
stomach	/ˈstʌmək/	желудок
liver	/ˈlɪvə/	печень
intestine	/ɪnˈtestɪn/	кишечник
pancreas	/ˈpæŋkriəs/	поджелудочная железа
spleen	/spliːn/	селезенка
gallbladder	/ˈgɔːl ˌblædə/	желчный пузырь
abdominal	/æbˈdɒmɪn(ə)l/	брюшной
viscera (singular: **viscus**)	/ˈvɪs(ə)rə/	внутренние органы

Verbs

Word	**Pronunciation**	**Meaning**
specializes in	/ˈspeʃ(ə)laɪz/	специализироваться в
line (noun – lining)	/laɪn/ /ˈlaɪnɪŋ/	покрывать, выстилать выстилка
cover	/ˈkʌvə/	покрывать
conduct (impulses)	/kənˈdʌkt/	проводить (импульсы)
be composed of	/kəmˈpəʊzd/	состоять из

Ex. 2. Read the text and answer the following questions:

1. What is a tissue made up of?
2. What are the types of tissue?
3. What's the function of epithelial tissue / muscle tissue / connective tissue / nerve tissue?
4. What do types of tissue form?

5. Are organs formed of the same tissue or different types of tissue?

A **tissue** is a group of similar cells working together to do a specific job. A **histologist** (hist/o = tissue) is a scientist who specializes in the study of tissues. Several different types of tissue are recognized. Tissues of the same type may be located in various regions of the body.

Epithelial tissue, located all over the body, forms the linings of internal organs, and the outer surface of the skin covering the body. It also lines exocrine and endocrine glands. The term describes all tissue that covers the outside of the body and lines the inner surface of internal organs.

Muscle tissue. Voluntary muscle is found in arms and legs and parts of the body where movement is under conscious control. Involuntary muscle, found in the heart and digestive system, as well as other organs, allows movement that is not under conscious control. Cardiac muscle is a specialized type of muscle found only in the heart.

Connective tissue. Examples are **adipose** (fat) tissue, **cartilage** (elastic, fibrous tissue attached to bones), bone, and blood.

Nerve tissue conducts impulses all over the body.

Different types of tissue combine to form an **organ**. For example, an organ such as the stomach is composed of muscle tissue, nerve tissue, and glandular epithelial tissue. The medical term for internal organs is **viscera** (singular: **viscus**). Examples of abdominal viscera (organs located in the abdomen) are the liver, stomach, intestines, pancreas, spleen, and gallbladder.

(adapted from Davi-Ellen Chabner, The Language of Medicine, ninth edition – Saunders, Elsevier)

Ex. 3. Say whether the statements are true or false:

1. Cells form a tissue, and tissues forms organs.
2. A tissue is a group of different cells working together to do a specific job.
3. Histology is a science which studies tissues.
4. Connective tissue covers the outside of the body.
5. Muscle Tissue is always under conscious control.
6. Impulses move through nerve tissues.
7. Internal organs always consist of epithelial tissue.

Ex. 4. Give Russian equivalents for the following word expressions:

Form the linings of internal organs, the outer surface of the skin, movement under conscious control, cardiac muscle, cartilage, fibrous tissue, abdominal viscera.

Ex. 5. Match the terms with their definitions:

adipose tissue cartilage epithelial cells histologist viscera

1. Specialist in the study of tissues.
2. Internal organs.
3. Skin cells that cover the external body surface and line the internal surfaces of organs.
4. Collection of fat cells.
5. Flexible connective tissue attached to bones at joints.

Ex. 6. Find more examples organs which are composed of different types of tissue.

For example:

Stomach is composed of muscle tissue, nerve tissue, and glandular epithelial tissue.

Ex. 7. Speak about different types of tissue.

Text 3. Body systems and body cavities

Ex. 1. Before reading the text, study the topical vocabulary.

Professional medical terms:

Word	**Pronunciation**	**Meaning**
digestive system	/daɪˈdʒestɪv/ /ˈsɪstəm/	пищеварительная система
pharynx	/ˈfærɪŋks/	глотка
esophagus	/ɪˈsɒfəgəs/	пищевод
stomach	/ˈstʌmək/	желудок
intestine / bowel	/ɪnˈtestɪn/ /ˈbaʊəl/	кишечник
small intestine / bowel	/ˌsmɔːl ɪnˈtestɪn/	тонкий кишечник
large intestine / bowel	/ˌlɑːdʒ ɪnˈtestɪn/	толстый кишечник
liver	/ˈlɪvə/	печень
gallbladder	/ˈgɔːl ˌblædə/	желчный пузырь
pancreas	/ˈpæŋkriəs/	поджелудочная железа
urinary or excretory system	/ˈjʊərɪn(ə)ri/ /ɪkˈskriːtəri/	мочевыделительная система
kidneys	/ˈkɪdniz/	почки
ureter	/jʊˈriːtə/	мочеточник
urinary bladder	/ˈjʊərɪn(ə)ri ˌblædə/	мочевой пузырь

urethra	/jʊˈriːθrə/	уретра
respiratory system	/ˈrespərətɔːri/ /ˈsɪstəm/	дыхательная система
larynx (voice box)	/ˈlærɪŋks/	гортань
trachea (windpipe)	/ˈtreɪkɪə/ OR /trəˈkiːə/ /ˈwɪndpaɪp/	трахея
bronchial tubes	/ˈbrɒŋkiəl /tʃuːb/	бронхиолы
lungs	/lʌŋz/	легкие
endocrine system	/ˈendə(ʊ)krɪn/ ALSO /ˈendə(ʊ)kraɪn/ /ˈsɪstəm/	эндокринная система
thyroid gland	/ˈθɑɪrɔɪd ˌglænd/	щитовидная железа
pituitary gland	/pɪˈtjuːɪt(ə)ri ˌglænd/	гипофиз
sex gland	/seks ˌglænd/	половая железа
adrenal gland	/əˈdriːn(ə)l ˌglænd/	надпочечная железа
nervous system	/ˈnɜːvəs ˌsɪstəm/	нервная система
brain	/breɪn/	головной мозг
spinal cord	/ˌspaɪn(ə)l ˈkɔːd/	спинной мозг
nerve	/nɜːv/	нерв
circulatory system	/ˈsɝːkjələtɔːri/ /səːkjʊˈleɪt(ə)ri/	кровеносная система
heart	/hɑːt/	сердце
blood vessels (arteries, veins, and capillaries)	/ˈblʌd ˌves(ə)l/ /ˈɑːtəri/ /veɪn/ /kəˈpɪləri/	кровеносные сосуды артерии вены капилляры
lymphatic vessels	/lɪmˈfætɪk/	лимфатические сосуды
spleen	/spliːn/	селезенка
thymus gland	/ˈθaɪ.məs ˌglænd/	тимус, вилочковая железа
musculoskeletal system	/ˌmʌskjʊləʊˈskelɪt(ə)l/	опорно-двигательная система, костно-мышечная система
muscle	/ˈmʌs(ə)l/	мышца
bone	/bəʊn/	кость
reproductive system	/ˌriːprəˈdʌktɪv/	репродуктивная система, половая система

system of Skin and sense organs	/skɪn/ /ˈsens ˌɔː.gən/	система кожи и органов чувств
Word	**Pronunciation**	**Meaning**
cavity	/ˈkævəti/	полость
cranial cavity	/ˈkreɪnɪəl/	внутричерепная полость
thoracic cavity	/θɔːˈræsɪk/	полость грудной клетки, грудная полость
pleural cavity	/ˈplʊərəl/	плевральная полость
mediastinum	/ˌmiːdɪəˈstaɪnəm/	средостение
abdominal cavity / abdomen	/æbˈdɒmɪn(ə)l/ /ˈæbdəmən/	брюшная полость
peritoneum	/ˌperɪtəˈniːəm/	брюшина, перитонеальная полость
diaphragm	/ˈdaɪəfræm/	диафрагма
pelvic cavity	/ˈpelvɪk/	полость таза
abdominopelvic cavity	/æbˈdɒmɪnəˈpelvɪk/	полость живота и таза, брюшно-тазовая полость
spinal cavity	/ˈspaɪn(ə)l/	позвоночный канал
dorsal / posterior	/ˈdɔːs(ə)l/ /pɒˈstɪərɪə/	тыльный, задний, дорсальный
ventral / anterior	/ˈventr(ə)l/ /ænˈtɪərɪə/	передний, вентральный
chest	/tʃest/	грудная клетка

Verbs

Word	**Pronunciation**	**Meaning**
perform (functions)	/pəˈfɔːm/	выполнять (функции)
Divide	/dɪˈvaɪd/	делить

Ex. 2. Read the text and answer the following questions:

1. What forms the body systems?
2. What are the body systems?
3. What system do blood vessels (arteries, veins, and capillaries), lymphatic vessels, heart, spleen, thymus gland makes up?
4. What body system consists of the brain, spinal cord and nerves?
5. What is a body cavity?

6. How many cavities are there is the human body? What are they?
7. What muscular wall separates the thoracic and abdominal cavities?
8. Why do we refer together the abdominopelvic cavity?

SYSTEMS are groups of organs working together to perform complex functions. For example, the mouth, esophagus, stomach, and small and large intestines are organs that do the work of the digestive system to digest food and absorb it into the bloodstream.

The body systems with their individual organs are listed next:

Organs of the **Digestive system** are: Mouth, pharynx (throat), esophagus, stomach, intestines (small and large), liver, gallbladder, pancreas.

Organs of the **Urinary or excretory system** are: Kidneys, ureters (tubes from the kidneys to the urinary bladder), urinary bladder, urethra (tube from the bladder to the outside of the body).

Organs of the **Respiratory system** are: Nose, pharynx, larynx (voice box), trachea (windpipe), bronchial tubes, lungs (where the exchange of gases takes place).

Organs of the **Endocrine system** are: Thyroid gland (in the neck), pituitary gland (at the base of the brain), sex glands (ovaries and testes), adrenal glands, pancreas (islets of Langerhans), parathyroid glands.

Organs of the **Nervous system** are: Brain, spinal cord, nerves, and collections of nerves.

Organs of the **Circulatory system** are: Heart, blood vessels (arteries, veins, and capillaries), lymphatic vessels and nodes, spleen, thymus gland.

Organs of the **Musculoskeletal system** are: Muscles, bones, and joints.

Organs of the **system of skin and sense organs** are: Skin, hair, nails, sweat glands, and sebaceous (oil) glands; eye, ear, nose, and tongue.

Organs of the **Reproductive system** are:

Female : Ovaries, fallopian tubes, uterus (womb), vagina, mammary glands.

Male : Testes and associated tubes, urethra, penis, prostate gland.

A **BODY CAVITY** is a space within the body that contains internal organs (viscera). Follow Figure 1-5 as you read the following.

Cranial [1] cavity is the space in the head containing the brain and surrounded by the skull. Cranial cavity contains such organs as: brain, pituitary gland.

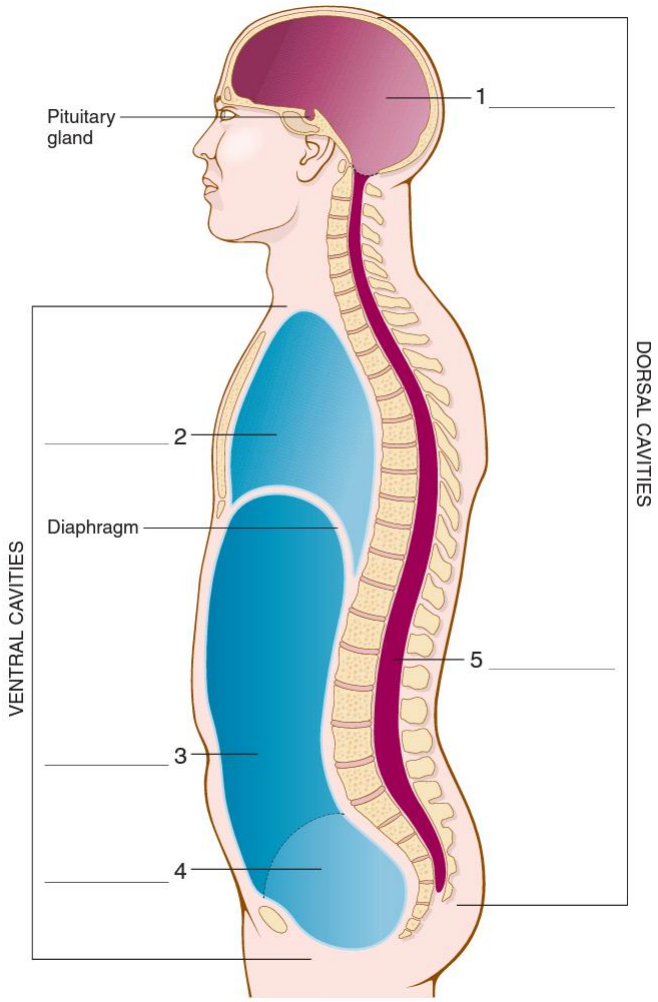


Figure 1-5. Body cavities. **Ventral** (anterior) cavities are in the front of the body. **Dorsal** (posterior) cavities are in the back

Thoracic [2] cavity is the space in the chest containing the lungs, heart, esophagus, trachea, bronchial tubes, thymus gland, aorta (large artery).

The thoracic cavity is divided into two smaller cavities:

a) **Pleural** cavity – space between the folds of the pleura surrounding each lung. The pleura is a double-folded membrane that surrounds the lungs and protects them. If the pleura is inflamed (as in pleuritis, also called pleurisy), the pleural cavity may fill with fluid.

b) **Mediastinum** – centrally located area outside of and between the lungs. It contains the heart, aorta, trachea, esophagus, thymus gland, bronchial tubes, and many lymph nodes.

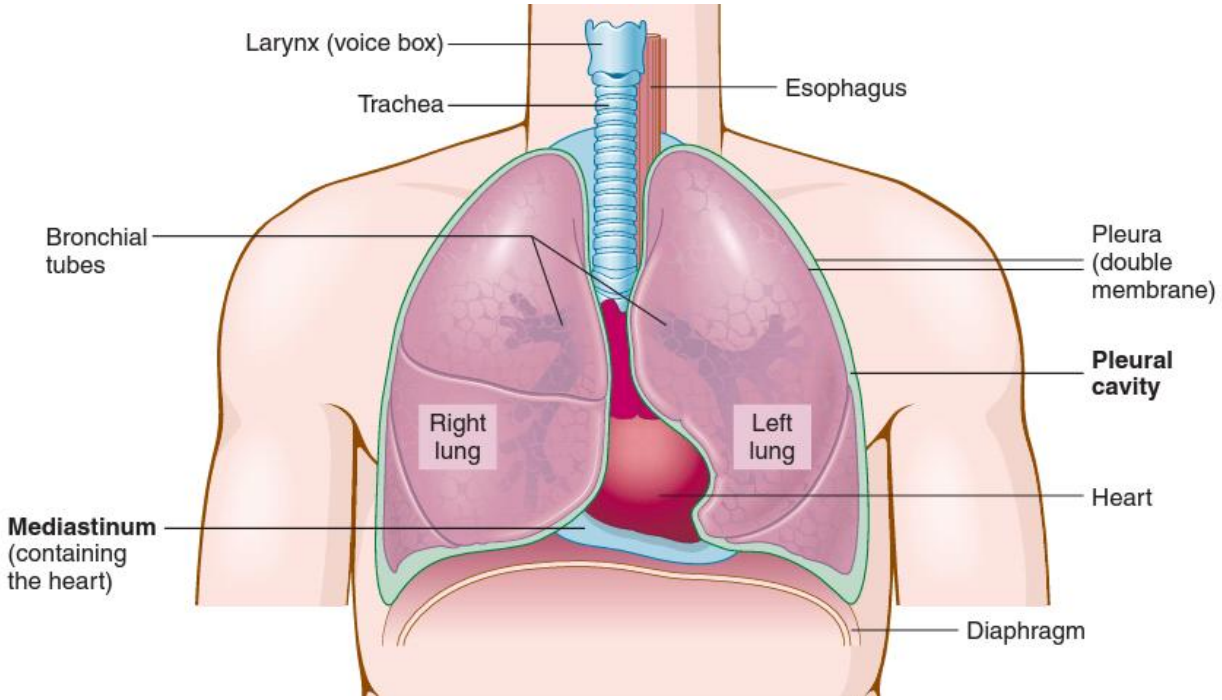


Figure 1-6. Divisions of the thoracic cavity

Abdominal [3] cavity is the space below the chest containing organs such as Stomach, small and large intestines, spleen, pancreas, liver, and gallbladder; also called the abdomen.

The **peritoneum** is the double-folded membrane surrounding the abdominal cavity. The kidneys are two bean-shaped organs situated behind (retroperitoneal area) the abdominal cavity on either side of the backbone. The **diaphragm** (a muscular wall) divides the abdominal and thoracic cavities.

Pelvic [4] cavity is the space below the abdomen containing portions of the intestines, rectum, urinary bladder, and reproductive organs.

Spinal [5] cavity is the space within the spinal column (backbones) and containing the spinal cord.

The cranial and spinal cavities are the **dorsal** body cavities because of their location on the back (**posterior**) portion of the body. The thoracic, abdominal, and pelvic cavities are **ventral** body cavities because they are on the front (anterior) portion of the body.

The thoracic and abdominal cavities are separated by a muscular wall called a **diaphragm**. Because the abdominal and pelvic cavities are not separated by a wall, they are frequently referred together as the **abdominopelvic cavity**.

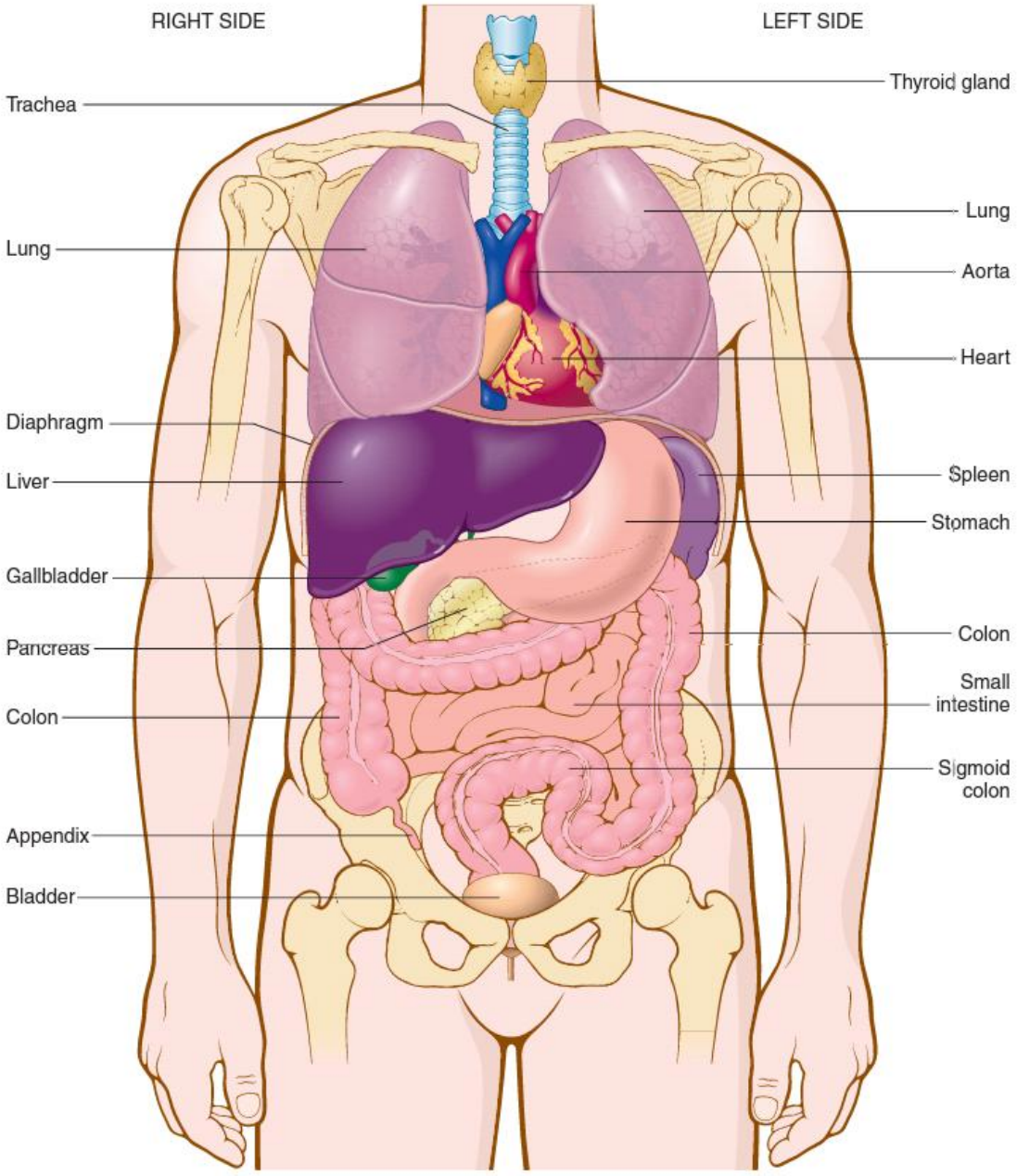


Figure 1-7. Organs of the abdominopelvic and thoracic cavities, anterior view

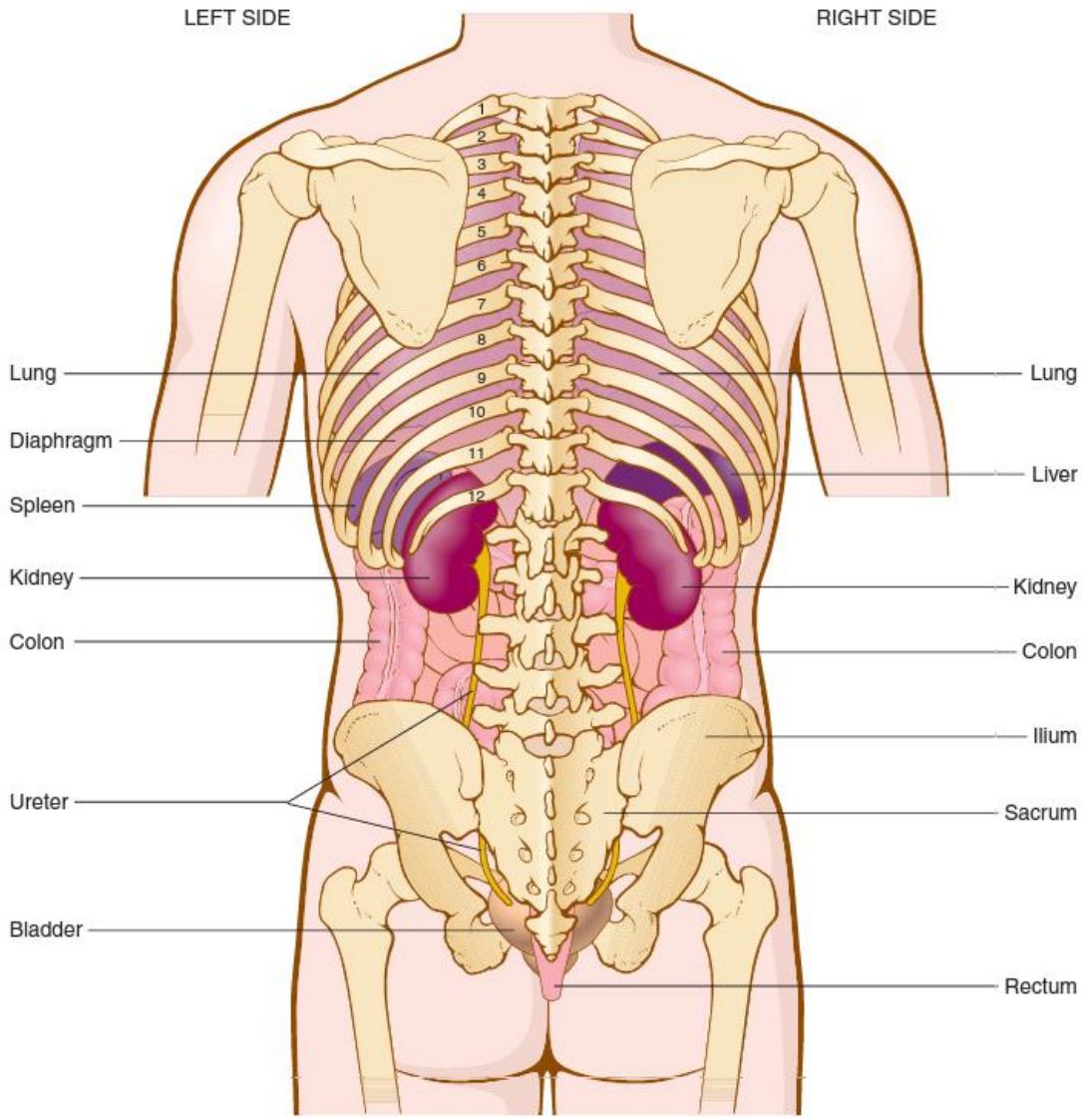


Figure 1-8. Organs of the abdominopelvic and thoracic cavities, posterior view

(adapted from Davi-Ellen Chabner, The Language of Medicine, ninth edition – Saunders, Elsevier)

Ex. 3. Give Russian equivalents for:

Perform complex functions, to digest food and absorb it into the bloodstream, esophagus, stomach, small and large intestine, respiratory system, liver, gallbladder, muscular wall called a diaphragm, dorsal, ventral, abdominal cavity, space below the chest, cranial cavity, divide into two smaller cavities, double-folded membrane.

Ex. 4. Give English equivalents for:

Нервная система, трахея, пищевод, печень, мочевой пузырь, желчный пузырь, дыхательная система, легкие, головной мозг, спинной мозг, сердце, артерии, вены, капилляры, опорно-двигательная система, кость, эндокринная система, пищеварительная система, мочевыделительная система, кровеносная

система, репродуктивная система, полость, диафрагма, тыльный, грудная клетка, грудная полость, брюшная полость, средостение, полость таза.

Ex.5. Match the organs with the body system they belong to:

- Musculoskeletal system
- Digestive system
- Respiratory system
- Circulatory system
- Nervous system
- Endocrine system
- System of skin and sense organs
- Reproductive system
- Urinary or excretory system

1. Brain, spinal cord, nerves
2. Heart, blood vessels (arteries, veins, and capillaries), lymphatic vessels, spleen, thymus gland.
3. Muscles, bones, and joints.
4. Ovaries, fallopian tubes, mammary glands, testes, urethra, prostate gland.
5. Kidneys, ureters, urinary bladder, urethra.
6. Nose, pharynx, larynx (voice box), trachea (windpipe), bronchial tubes, lungs
7. Thyroid gland, pituitary gland, sex glands (ovaries and testes), adrenal glands, pancreas (islets of Langerhans), parathyroid glands.
8. Skin, hair, nails, sweat glands, and sebaceous (oil) glands; eye, ear, nose, and tongue.
9. Mouth, pharynx (throat), esophagus, stomach, intestines (small and large), liver, gallbladder, pancreas.

Ex. 6. Match the organs with the body cavity:

Cranial cavity **Abdominal cavity** **Pelvic cavity** **Thoracic cavity** **Spinal cavity**

1. the lungs, heart, esophagus, trachea, bronchial tubes, thymus gland, aorta (large artery).
2. the spinal cord.
3. portions of the intestines, rectum, urinary bladder, and reproductive organs.
4. Stomach, small and large intestines, spleen, pancreas, liver, and gallbladder
5. brain, pituitary gland.

Ex. 7. Complete the sentences with the words from the text:

1. Cranial cavity is the space in the **…** surrounded by the skull.
2. Thoracic cavity is the space in the **…** .
3. Thoracic cavity is divided into **…** cavity and **…** .
4. Pleural cavity is the space between the folds of the pleura surrounding each **….**
5. Mediastinum is a centrally located area outside of and between the **…** .

6. Abdominal cavity is the space below the **…** .
7. The diaphragm divides the **…** and **…** cavities.
8. Pelvic cavity is the space below the **…** .
9. Spinal cavity is the space within the **…** column.

Ex. 8. Choose the odd word out, explaining what unites the other words:

1. Nose, pharynx, larynx, heart, trachea (windpipe), lungs.
2. Stomach, small and large intestines, spleen, pancreas, liver, pituitary gland, and gallbladder.
3. Mouth, kidneys, pharynx (throat), esophagus, stomach, intestines (small and large), liver, gallbladder, pancreas.
4. Thyroid gland, pituitary gland, sex glands (ovaries and testes), gallbladder, adrenal glands, pancreas.
5. Kidneys, ureters, urinary bladder, urethra, lungs.
6. Portions of the intestines, rectum, spinal cord, urinary bladder, and reproductive organs.
7. Heart, aorta, trachea, esophagus, pancreas, thymus gland, bronchial tubes, and many lymph nodes.
8. Brain, pituitary gland, esophagus.

Ex. 9. Speak on the Body systems and Body cavities.

UNIT 1 REVISION

Ex. 1. The listed terms are parts of a cell. Match each term with its correct meaning:

cell membrane	DNA	mitochondria
chromosomes	endoplasmic reticulum	nucleus
cytoplasm	genes	

1. material of the cell located outside the nucleus and yet enclosed by the cell membrane
2. chemical found within each chromosome
3. small sausage-shaped structures within which food is “burned” to release energy
4. rod-shaped structures in the nucleus that contain regions called genes
5. control center of the cell, containing chromosomes
6. structure that surrounds and protects the cell
7. regions of DNA within each chromosome
8. canal-like structure in the cytoplasm; the site of protein synthesis

Ex. 2. Use medical terms or numbers to complete the following sentences:

1. A picture of chromosomes in the nucleus of a cell is a (an) … .
2. The number of chromosomes in a normal male's muscle cell is … .
3. The number of chromosomes in a female's egg cell is … .
4. The process of building up proteins in a cell is … .
5. The process of chemically burning or breaking down foods to release energy in cells is … .
6. The total of the chemical processes in a cell is … .
7. A scientist who studies tissues is a (an) … .
8. The medical term for internal organs is … .

Ex. 3. Match each of the listed body parts or tissues with its correct description below:

adipose tissue	pharynx	trachea
cartilage	pituitary gland	ureter
epithelial tissue	pleura	urethra
larynx	thyroid gland	uterus

1. voice box
2. membrane surrounding the lungs
3. throat
4. tube from the kidney to the urinary bladder
5. collection of fat cells
6. endocrine organ located at the base of the brain
7. windpipe
8. flexible connective tissue attached to bones at joints
9. surface cells covering the outside of the body and lining internal organs
10. endocrine gland surrounding the windpipe in the neck
11. womb
12. tube leading from the urinary bladder to the outside of the body

Ex. 4. Name the five cavities of the body:

1. cavity surrounded by the skull
2. cavity in the chest surrounded by the ribs
3. cavity below the chest containing the stomach, liver, and gallbladder
4. cavity surrounded by the hip bones
5. cavity surrounded by the bones of the back

Ex. 5. Select from the following to define the terms listed below:

- space between the lungs
- nervous tissue within the spinal cavity

- muscle separating the abdominal and thoracic cavities
- space surrounding each lung
- bony tissue surrounding the spinal cavity
- membrane surrounding the abdominal organs

1. mediastinum
2. spinal cord
3. diaphragm
4. pleural cavity
5. spinal column
6. peritoneum

Ex. 6. Find videos in the internet about the topics of the unit – for watching and listening. Choose one episode and be ready to speak on it.

UNIT 2. DIGESTIVE SYSTEM

Unit 2 goals: Name the organs of the digestive system and describe their locations and functions. Describe signs, symptoms, and disease conditions affecting the digestive system.

Text 1. Introduction. Functions of the digestive system.

Ex. 1. Before reading the text, study the topical vocabulary.

Professional medical terms:

Word	**Pronunciation**	**Meaning**
Digestive system	/daɪˈdʒestɪv/ /ˈsɪstəm/	Пищеварительная система
digestive or gastrointestinal tract	/daɪˈdʒestɪv/ /ˌgæstrəʊɪnˈtestɪn(ə)l/ /trækt/ OR/ˌgastrəʊɪntesˈtaɪn(ə)l/	желудочно-кишечный тракт
waste material	/weɪst məˈtɪərɪəl/	отработанный материал
ingestion	/ɪnˈdʒestʃ(ə)n/	глотание, прием внутрь
digestion	/daɪˈdʒestʃ(ə)n/	пищеварение
absorption	/əbˈzɔːpʃ(ə)n/	всасывание
elimination	/ɪlɪmɪˈneɪʃ(ə)n/	элиминация, выведение
enzyme	/ˈenzaɪm/	энзим, фермент
nutrient	/ˈnjuːtrɪənt/	питательное вещество
bloodstream	/ˈblʌdstriːm/	кровоток

anus	/ˈeɪnəs/	задний проход
feces	/ˈfiːsiːz/	стул

Verbs

Word	**Pronunciation**	**Meaning**
break down (food) breakdown	/breɪk/ /daʊn/	расщеплять (еду)
speed up chemical reactions	/ˈspiːd.ʌp/	ускорить
pass through / from… to… / out of the body	/pɑːs/	переносить через/ от ... к... / из
release (energy)	/rɪˈliːs/	высвобождать (энергию)

Ex. 2. Read the text and answer the following questions:

1. What are the initial and final points of the gastrointestinal tract?
2. What are the functions of the digestive system?
3. Where is the food ingested?
4. What helps the digestive process? How does it happen?
5. Where does absorption of nutrients take place?
6. What happens during absorption of nutrients?
7. What materials does elimination concern?
8. Where does elimination take place?

The digestive or **gastrointestinal tract** begins with the mouth, where food enters, and ends with the anus, where solid waste material leaves the body. The four functions of the system are **ingestion**, **digestion**, **absorption**, and **elimination**.

First, complex food material taken into the mouth is **ingested**. Second, it is **digested**, or **broken down**, mechanically and chemically, as it travels through the gastrointestinal tract. Digestive **enzymes** speed up chemical reactions and help with the breakdown (digestion) of complex nutrients.

Third, via **absorption**, digested food passes through the lining cells or epithelium of the small intestine and into the bloodstream. Nutrients thus travel to all cells of the body. Cells then break down nutrients in the presence of oxygen to release energy.

The fourth function of the digestive system is **elimination** of the solid waste materials that cannot be absorbed into the bloodstream. The large intestine concentrates these solid wastes, called feces, and the wastes finally pass out of the body through the anus.

(adapted from Davi-Ellen Chabner, The Language of Medicine, ninth edition – Saunders, Elsevier)

Ex. 3. Say whether the statements are true or false:

1. The digestive or gastrointestinal tract begins with the stomach.
2. Solid waste material leaves the body through the anus.
3. Digestion takes place in the small intestine.
4. Energy is released in the presence of oxygen.
5. Enzymes don't break down complex nutrients.
6. Absorption takes place in the large intestine.
7. During absorption nutrients move to all cells in the body.
8. The large intestine concentrates solid waste materials which are not absorbed into the bloodstream.

Ex. 3. Give Russian equivalents for:

Release energy, solid waste materials, nutrients, speed up chemical reactions, pass through the lining cells or epithelium of the small intestine, cannot be absorbed into the bloodstream, finally pass out of the body through the anus, the breakdown of complex nutrients, digested food.

Ex. 4. Give English equivalents for:

Еда поступает через рот, отработанный материал, ускорять пищеварение, расщеплять еду / питательные вещества, переносить питательные вещества в короток, в присутствии кислорода.

Ex. 5. Complete the table with the correct form of the word:

Verb	**Noun**
absorb	…
…	digestion
ingest	…
…	elimination
break sown	…
…	release

Ex. 6. Make up verb phrases with these words.

1. break down	a) the gastrointestinal tract
2. speed up	b) into the bloodstream
3. release	c) chemical reactions / digestion
4. travel through	d) food / complex nutrients
5. absorb	e) with the breakdown of complex nutrients
6. pass	f) through the cells
7. help	g) energy

Ex. 7. Translate the sentences into English.

1. Пищеварительная система человека осуществляет переваривание пищи, всасывание питетельных веществ в кровь, выведение непереработанных остатков.
2. Пищеварительная система человека осуществляет переваривание пищи, всасывание питетельных веществ в кровь, выведение непереработанных остатков.
3. Пищеварительная система человека осуществляет переваривание пищи, всасывание питетельных веществ в кровь, выведение непереработанных остатков.
4. Пищеварительная система обеспечивает организм необходимой энергией и питательными веществами для восстановления и обновления клеток и тканей.
5. Пищеварительная система человека состоит из органов желудочно-кишечного тракта и вспомогательных органов (слюнные железы, печень, поджелудочная железа, желчный пузырь и др.)
6. Химическое расщепление питательных веществ на простые компоненты, которые могут пройти сквозь стенки пищеварительного тракта, происходит под действием ферментов, которые содержатся в соке пищеварительных желез.
7. Пищеварение – это процесс механической и химической обработки пищи.
8. Пищеварительный тракт начинается со рта, через который мы принимаем еду внутрь.
9. Всасывание питательных веществ происходит в тонком кишечнике. Тонкая кишка является самым длинным отделом пищеварительного тракта.

Text 2. The digestive process (anatomy and physiology).

Ex. 1. Before reading the text, study the topical vocabulary.

Professional medical terms:

Word	**Pronunciation**	**Meaning**
oral cavity	/ˈɔːr(ə)l ˈkævəti/	полость рта
mastication	/mæstɪˈkeɪʃ(ə)n/	пережевывание
food bolus	/fuːd ˈbəʊləs/	пищевой комок
saliva	/səˈlaɪvə/	слюна
salivary glands	/səˈlaɪv(ə)ri ˌglænd/ ALSO /ˈsæləveri ˌglænd/	слюнные железы
throat	/θrəʊt/	горло

epiglottis	/ˌepɪˈglɒtɪs/	надгортанник
esophageal hiatus	/ɪˌsɒfəˈdʒiəl haɪˈeɪtəs/	пищеводное отверстие диафрагмы
esophageal sphincters (upper and lower)	/ɪˌsɒfəˈdʒiəl ˈsfɪŋktə/	пищеводный сфинктер (нижний и верхний)
contraction and relaxation of muscles peristaltic contractions	/kənˈtrækʃ(ə)n/ /riːlækˈseɪʃ(ə)n/ /perɪˈstæltɪk/	сокращение и расслабление; перистальтические сокращения
peristalsis	/ˌperɪˈstælsɪs/	перистальтика
gastroesophageal junction	/ˌgæ.strəʊ.ɪ.sɒf.əˈdʒi.əl/ /ˈdʒʌŋ(k)ʃ(ə)n/	гастроэзофагеальное соединение, желудочно-пищеводное соединение
fundus body antrum	/ˈfʌndəs/ /ˈbɒdi/ /ˈæntrəm/	дно желудка тело желудка антральный отдел желудка
pyloric sphincter	/paɪˈlɒrɪk ˈsfɪŋktə/	сфинктер привратника
ruga, rugae (plural)	/ˈruːgə/	складка, морщина
pepsin	/ˈpepsɪn/	пепсин
hydrochloric acid	/ˌhaɪdrəˈklɔːrɪk ˈæsɪd/	соляная кислота
bowel = intestine	/ˈbaʊəl/	кишечник
duodenum	/ˌdjuːəˈdiːnəm/	двенадцатиперстная кишка
jejunum	/dʒɪˈdʒuːnəm/	тощая кишка
ileum	/ˈɪlɪəm/	подвздошная кишка
bile	/baɪl/	желчь
pancreatic juice	/ˌpæŋkriˌætik ˈdʒuːs/	поджелудочный сок, панкреатический сок
pancreatic duct	/ˌpæŋkriˌætik ˈdʌkt/	проток поджелудочной железы
duct	/ˈdʌkt/	проток
hepatic duct	/hepˈætɪk/	печеночный проток
cystic duct	/ˈsɪstɪk	пузырный проток

common bile duct	/ˈkɒm.ən/ˈbaɪl ˌdʌkt/	общий желчевыносящий проток
villi	/ˈvɪlaɪ/	ворсинки
cecum	/ˈsiːkəm/	слепая кишка
appendix	/əˈpendɪks/	апендикс
ascending colon	/əˈsendɪŋ ˈkəʊlɒn/	восходящая ободочная кишка
transverse colon	/trænzˈvɜːs ˈkəʊlɒn/	поперечная ободочная кишка
descending colon	/dɪˈsen.dɪŋ ˈkəʊlɒn/	нисходящая ободочная кишка
sigmoid colon	/ˈsɪgmɔɪd ˈkəʊlɒn/	сигмовидная кишка
rectum	/ˈrektəm/	прямая кишка
hepatic flexure	/hepˈætɪk ˈflekʃə/	правый изгиб ободочной кишки (печеночный)
splenic flexure	/ˈspliːnɪk ˈflekʃə/	левый изгиб ободочной кишки (селезёночный)
Digestive enzymes: amylase lipase protease	 /ˈæmɪleɪz/ /ˈlaɪpeɪz/ /ˈprəʊtiːeɪz/	 амилаза липаза протеаза
insulin	/ˈɪnsjʊlɪn/	инсулин

Verbs:

Word	**Pronunciation**	**Meaning**
digest	/daɪˈdʒest/	переваривать
chew – chewing	/ʧuː/	жевать
swallow – swallowing	/ˈswɒləʊ/	глотать
move	/muːv/	двигаться
lubricate	/ˈluːbrɪkeɪt/	смазывать
trigger	/ˈtrɪgə/	вызвать, инициировать
prevent something from Ving	/prɪˈvent/	предотвратить
constrict	/kənˈstrɪkt/	сужаться
extend	/ɪkˈstend/	тянуть, протягивать
receive food from the	/rɪˈsiːv/	получать

stomach		
release bile / wastes	/rɪˈliːs/	высвобождать
maintain	/meɪnˈteɪn/	поддерживать

Adjectives:

Word	**Pronunciation**	**Meaning**
tiny	/ˈtaɪni/	крошечный
crucial (role)	/ˈkruːʃ(ə)l/	решающий, важный
proper	/ˈprɒpə/	надлежащий

Ex. 2. Read the text and answer the following questions:

1. What organs does the digestive system comprise?
2. How long is the digestive tract?
3. What happens to the food in the oral cavity? What's the role of salivary glands?
4. What is mastication?
5. Pharynx serves as a passageway both for air traveling from the nose to the windpipe (trachea) and for food traveling from the oral cavity to the esophagus, doesn't it?
6. What's the role of the epiglottis? When does the epiglottis cover the trachea?
7. How many esophageal sphincters are there? What is their normal condition and function?
8. What happens in the stomach?
9. What is chyme?
10. What happens in the duodenum?
11. What digestive enzymes and juices help break down food in the duodenum?
12. What is the role of the pancreatic juice and the bile?
13. What parts is the small intestine made up of?
14. What parts is the large intestine made up of?
15. What happens in the small intestine and large intestine?

The digestive tract is some 8-10 m long and is divided into the following parts: **oral cavity**, **pharynx**, **esophagus**, **stomach**, **small intestine** and **large intestine**. The structures of the different parts of the tract have some special features.

Oral cavity. Digestion starts in the mouth also known as the oral cavity where mastication occurs, this is the process of chewing and mechanically breaking down the food bolus. Three pairs of **salivary glands** surround and empty into the oral cavity.

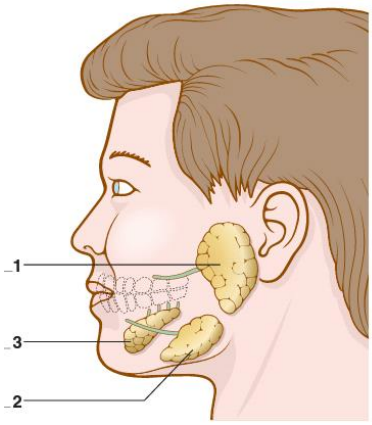


Figure 2-1. Salivary glands

These exocrine glands produce **saliva**, which lubricates the mouth. Saliva contains important digestive **enzymes**. The secretion of saliva helps to produce a bolus which can be swallowed to pass down the esophagus and into the stomach.

Pharynx. From the mouth the food bolus moves to pharynx or **throat**. The pharynx or throat is a muscular tube, about 5 inches long, lined with a mucous membrane. It serves as a passageway both for air traveling from the nose (nasal cavity) to the windpipe (trachea) and for food traveling from the oral cavity to the **esophagus**. When swallowing occurs, a flap of tissue, the **epiglottis**, covers the trachea so that food cannot enter and become lodged there.

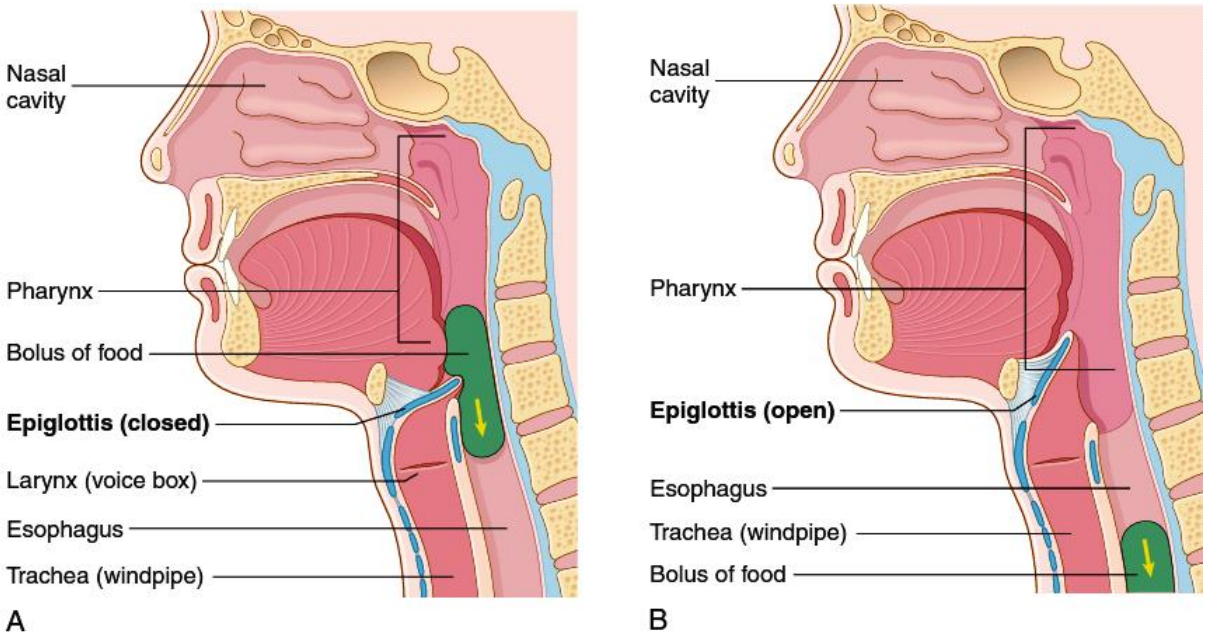


Figure 2-2. (A) Epiglottis closes over the trachea as the bolus of food passes down the pharynx toward the esophagus. **(B)** Epiglottis opens as the bolus moves down the esophagus

Figure 2-3 shows the passageway for food as it travels from the esophagus through the gastrointestinal tract. Label it as you read the following paragraphs.

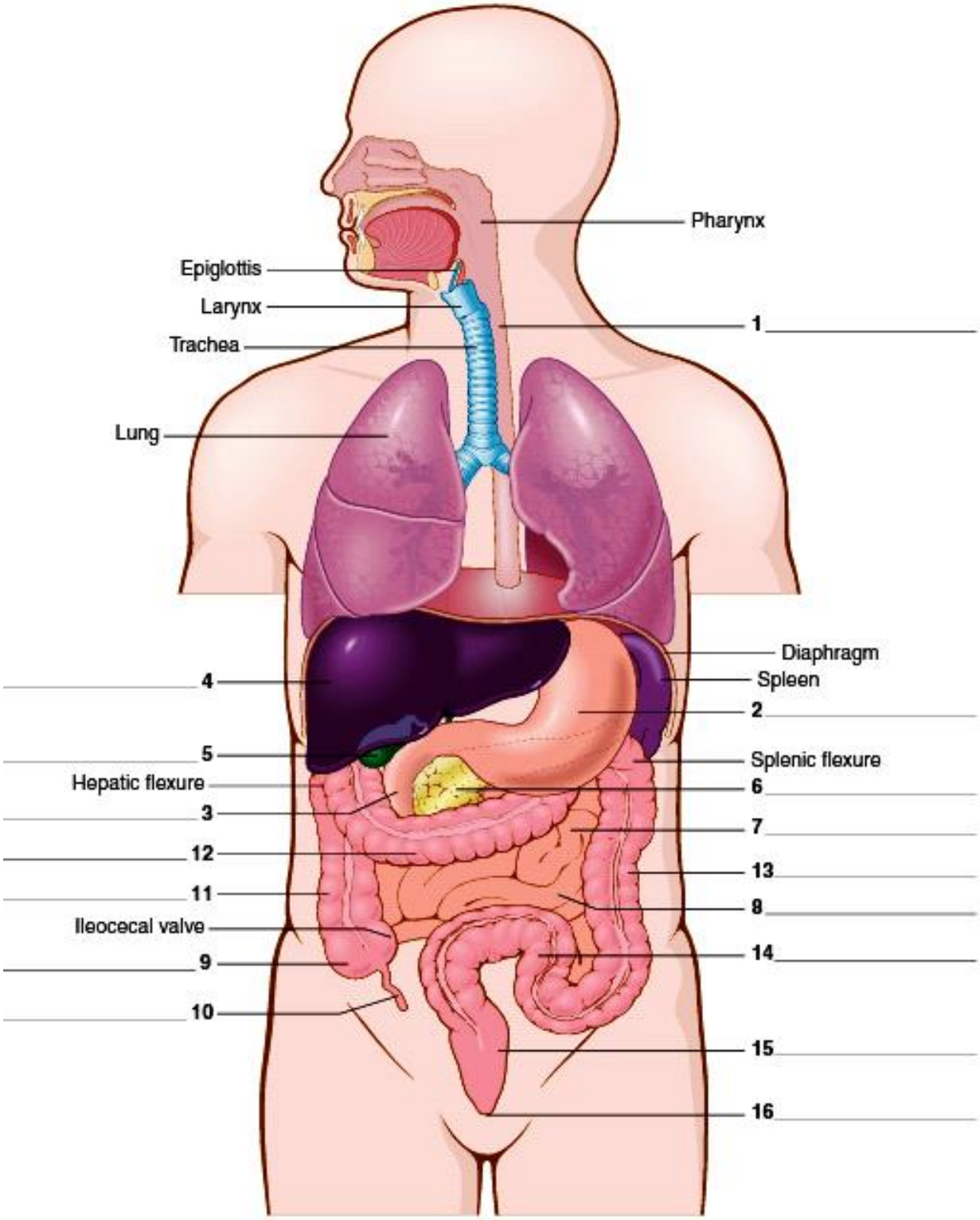


Figure 2-3. The gastrointestinal tract

Esophagus. Through the pharynx the food bolus moves down the esophagus. The **esophagus** [1] is a 9- to 10-inch (25 cm) muscular tube extending from the pharynx to the stomach. It passes through the posterior mediastinum in the thorax and enters the stomach through a hole in the thoracic diaphragm – the esophageal hiatus. At rest the esophagus is closed at both ends, by the upper and lower **esophageal sphincters**. The opening of the upper sphincter is triggered by the swallowing reflex so that food is allowed through. Once in the esophagus, the bolus travels down to the stomach via rhythmic contraction and relaxation of muscles known as **peristalsis.** The lower esophageal sphincter is a muscular sphincter surrounding the lower part of the esophagus. The junction between the esophagus and the stomach (the gastroesophageal junction) is controlled by the lower esophageal sphincter, which remains constricted to prevent the contents of the stomach from entering the esophagus.

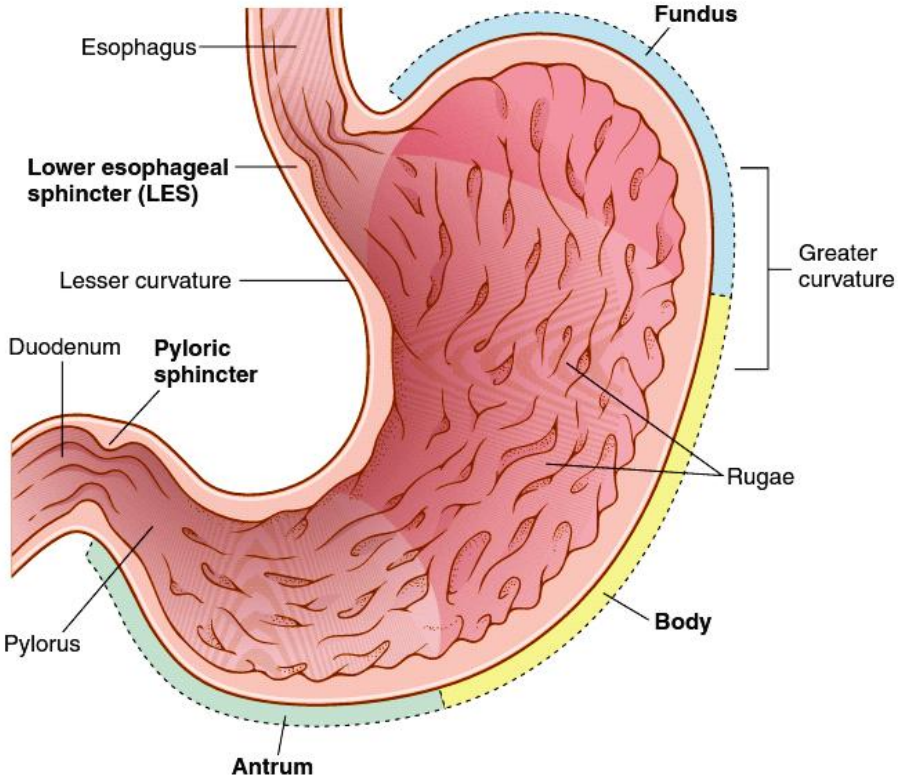


Figure 2-4. Parts of the stomach. The fundus and body (often referred to collectively as the fundus) are a reservoir for ingested food and an area for action by acid and pepsin (gastric enzyme). The antrum is a muscular grinding chamber that breaks up food and feeds it gradually into the duodenum.

Stomach. Food passes from the esophagus into the **stomach** [2]. The stomach has three main parts: **fundus** (upper portion), **body** (middle section), and **antrum** (lower portion). Rings of muscle called sphincters control the openings into and leading out of

the stomach. The **lower esophageal sphincter** relaxes and contracts to move food from the esophagus into the stomach; the **pyloric sphincter** allows food to leave the stomach when it is ready. Folds in the mucous membrane (mucosa) lining the stomach are called **rugae**. The rugae contain digestive glands that produce the enzyme **pepsin** (to begin digestion of proteins) and **hydrochloric acid**. The partially digested food enters the duodenum as a thick semi-liquid **chyme**. The stomach prepares food for the small intestine, where digestion and absorption into the bloodstream take place.

Small intestine (small bowel). The small intestine (small bowel) extends for 20 feet from the pyloric sphincter to the first part of the large intestine. It has three parts. The first section, the **duodenum** [3], is only 1 foot long. It receives food from the stomach as well as **bile** from the **liver** [4] and **gallbladder** [5] and pancreatic juice from the **pancreas** [6]. Enzymes and bile help digest food before it passes into the second part of the small intestine, the **jejunum** [7], about 8 feet long. The jejunum connects with the third section, the **ileum** [8], about 11 feet long. The ileum attaches to the first part of the large intestine. Millions of tiny, microscopic projections called **villi** line the walls of the small intestine. The tiny capillaries in the villi absorb the digested nutrients into the bloodstream.

Large intestine (large bowel). The large intestine extends from the end of the ileum to the anus. It has three main components: the cecum, the colon, and the rectum. The **cecum** [9] is a pouch on the right side that connects to the ileum at the ileocecal valve (sphincter). The **appendix** [10] hangs from the cecum. The appendix has no clear function. The **colon**, about 5 feet long, has four named segments: ascending, descending, transverse, and sigmoid. The **ascending colon** [11] extends from the cecum to the undersurface of the liver, where it turns to the left (hepatic flexure) to become the **transverse colon** [12]. The transverse colon passes horizontally to the left toward the spleen and then turns downward (splenic flexure) into the **descending colon** [13]. The **sigmoid colon** [14], shaped like an S, begins at the distal end of the descending colon and leads into the **rectum** [15]. The rectum terminates in the lower opening of the gastrointestinal tract, the **anus** [16].

The large intestine receives the fluid waste products of digestion (the material unable to pass into the bloodstream) and stores these wastes until they can be released from the body. The large intestine absorbs most of the water within the waste material.

Liver, gallbladder and pancreas. Three important additional organs of the digestive system – the liver, gallbladder, and pancreas – play crucial roles in the proper digestion and absorption of nutrients. Label Figure 2-5 as you study the following:

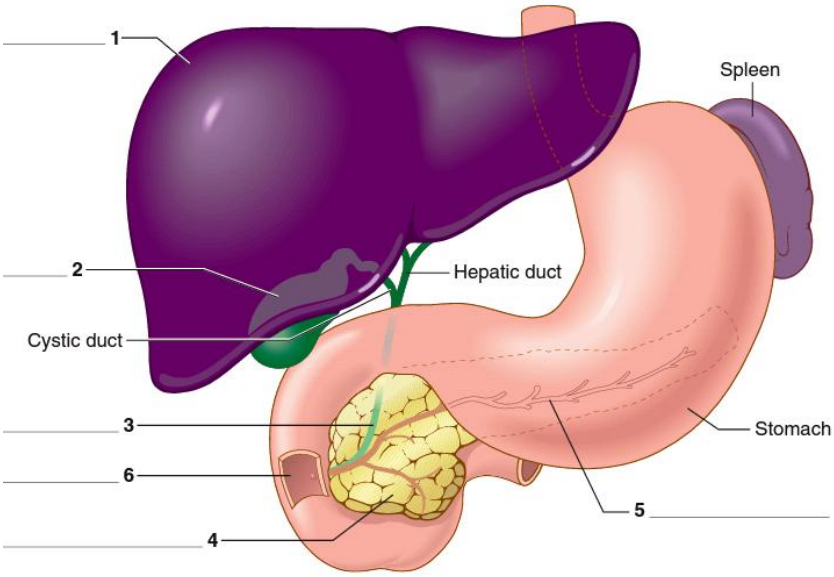


Figure 2-5. Liver, gallbladder, and pancreas

The **liver** [1] produces a thick, orange-black, sometimes greenish, fluid called **bile**. The liver continuously releases bile, which then travels through the hepatic duct to the cystic duct. The cystic duct leads to the **gallbladder** [2], a pear-shaped sac under the liver, which stores and concentrates the bile for later use. After meals, in response to the presence of food in the stomach and duodenum, the gallbladder contracts, forcing the bile out the cystic duct into the **common bile duct** [3]. Meanwhile, the **pancreas** [4] secretes pancreatic juices (enzymes) that are released into the **pancreatic duct** [5], which joins with the common bile duct just as it enters the **duodenum** [6]. The duodenum thus receives a mixture of bile and pancreatic juices.

Bile has a detergent-like effect on fats in the duodenum. Without bile, most of the fat taken into the body remains undigested. Besides producing bile, the liver has several other vital and important functions:

- Maintaining normal blood glucose (sugar) levels.
- Producing blood proteins, particularly those necessary for blood clotting
- Releasing bilirubin, a pigment in bile
- Removing poisons (toxins) from the blood

The pancreas is both an exocrine and an endocrine organ. As an exocrine gland, it produces enzymes to digest starch, such as **amylase (**amyl/o = starch, -ase = enzyme**);** to digest fat, such as **lipase** (lip/o = fat); and to digest proteins, such as **protease** (prote/o = protein). These pass into the duodenum through the pancreatic duct.

As an endocrine gland (secreting into the bloodstream), the pancreas secretes **insulin**. This hormone, needed to help release sugar from the blood, acts as a carrier to bring glucose into cells of the body to be used for energy.

(composed from Davi-Ellen Chabner, The Language of Medicine, ninth edition – Saunders, Elsevier and from https://en.wikipedia.org/wiki/Human_digestive_system)

Ex. 3. Match the terms with their definitions based on the information from the text:

bile	digestion	esophagus	liver	pharynx	stomach
intestine	enzyme	gallbladder	pancreas	saliva	

1. Digestive juice produced by salivary glands.
2. Bowel
3. A large organ located in the abdomen. It secretes bile; stores sugar, iron, and vitamins; produces blood proteins; and destroys worn-out red blood cells.
4. Digestive juice made in the liver and stored in the gallbladder. It breaks up large fat globules.
5. Muscular organ that receives food from the esophagus.
6. Throat, the common passageway for food from the mouth and for air from the nose.
7. A chemical that speeds up a reaction between substances.
8. Breakdown of complex foods to simpler forms.
9. Tube connecting the throat to the stomach.
10. Organ under the stomach; produces insulin (for transport of sugar into cells) and enzymes (for digestion of foods).
11. Small sac under the liver; stores bile.

Ex. 4. Give Russian equivalents for:

The oral cavity where mastication occurs, the process of chewing, salivary glands produce saliva, a muscular tube lined with a mucous membrane, extending from the pharynx to the stomach, a hole in the thoracic diaphragm, enzymes and bile help digest food, microscopic projections called villi, additional organs of the digestive system, proper digestion and absorption of nutrients, a pear-shaped sac under the liver, a detergent-like effect on fats, to digest starch.

Ex. 5. Give English equivalents for:

Пережевывание пищевого комка, слюна смазывает рот, ритмичное сокращение и расслабление мышц, остается суженным, содержание желудка, переваривать белки, полужидкий химус, соединение между пищеводом и

желудком, происходит всасывание в кровоток, играть решающую роль, выделять желчь, секретировать поджелудочный сок, выделять инсулин.

Ex. 6. Match pairs of synonyms:

1. release	a) receive
2. pass	b) include
3. get	c) make ready
4. produce	d) spread
5. chew	e) secrete
6. prepare	f) constrict
7. cover	g) support
8. contain	h) manufacture
9. maintain	i) move – travel
10. extend	j) masticate

Ex. 7. Complete the table with the correct form of the word:

Verb	**Noun**	**Adjective**
digest	*digestion*	*digestive*
chew	*chewing*	*chewy / chewing*
swallow	…	…
…	mastication	…
move	…	…
…	prevention	preventive
produce	…	…
…	maintenance / maintaining	…
release	…	…
…	…	receiving
constrict	…	…
…	…	contractive / contracted
relax	…	…
..	…	preparatory
ascend	…	…
…	descension	descending
-	peristalsis	…

-	…	pancreatic
-	esophagus	…
-	…	splenic
-	saliva	…
-	…	thoracic

Ex. 8. Fill in the gaps with the appropriate form of the words from ex. 7:

1. **…** glands are exocrine glands which produce saliva. (SALIVA)
2. The **…** of food bolus through the esophagus leads to the stomach. (MOVE)
3. The **…** of bile takes place in the gallbladder. (PRODUCE)
4. Rhythmic **…** and **…** of muscles is known as peristalsis. (CONTRACT, RELAX)
5. At rest **…** sphincters remain closed. (ESOPHAGUS)
6. Epiglottis helps **…** food from entering the trachea. (PREVENT)
7. **…** is the action of **…** food. (MASTICATE, CHEW)
8. **…** proper insulin levels is very important for bringing glucose into cells of the body. (MAINTAIN)
9. The duodenum receives a mixture of bile and **…** juices. (PANCREAS)
10. **…** of food for the small intestine takes place in the stomach. (PREPARE)

Ex. 9. Make up verb phrases. Translate them into Russian. Use them in sentences of your own:

digest	saliva / a bolus / enzymes (pepsin)
chew and swallow	the contents of the stomach from entering the esophagus
absorb	through the esophagus
produce	the food bolus
contain	bile / pancreatic juices / bilirubin
cover	from the pharynx to the stomach
pass	crucial roles
move / travel	food / starch
trigger	down to the stomach
prevent	insulin
prepare	digestive enzymes / digestive glands
receive	food from the stomach
extend	nutrients
play	food for the small intestine
releases	normal blood glucose levels

maintain	the trachea
secrete	the upper sphincter

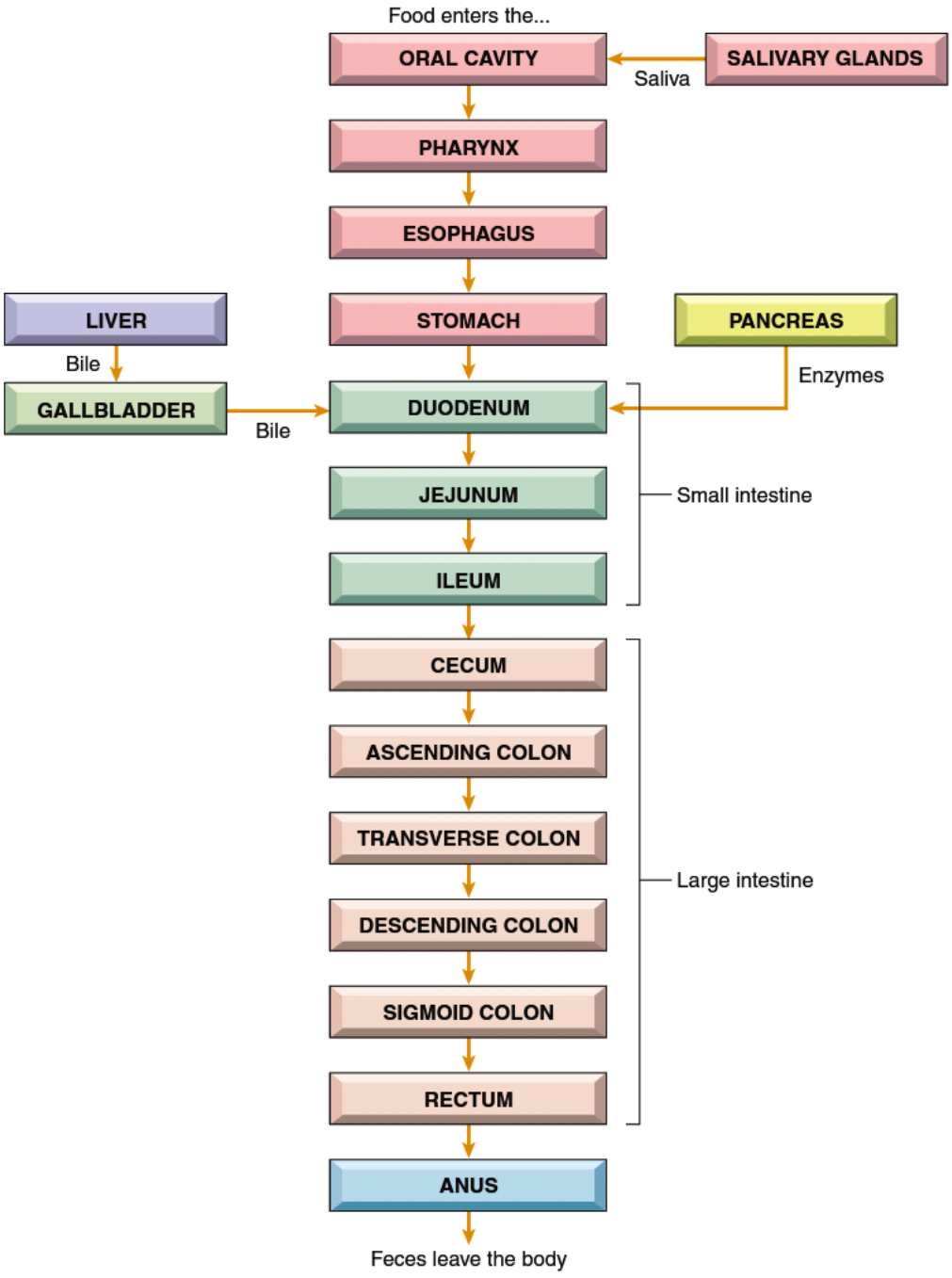
Ex. 10. Fill in the gaps with the words from the text:

1. The secretion of saliva helps to produce a food **…** .
2. When swallowing occurs, the **…** covers the trachea.
3. Through the pharynx the food bolus **…** down the esophagus.
4. The involuntary constriction and relaxation of the muscles of the intestine or another canal, creating wave-like movements which push the contents of the canal forward is known as **….**
5. Rings of muscle called sphincters control the openings **…** and leading **…** of the stomach.
6. The rugae contain digestive glands that produce **…** and **…** acid.
7. The duodenum receives **…** from the liver and gallbladder and **…** juice from the pancreas.
8. The first turning of the colon is known as **…** flexure, the second turning of the colon is known as **…** flexure.
9. Liver, gallbladder and pancreas play **…** roles in the proper digestion and absorption of nutrients.
10. The live releases **…** which is concentrated and stored in the gallbladder.

Ex. 11. Translate the sentences from Russian into English:

1. Пищеварение является формой катаболизма, и в глобальном смысле его можно разделить на два процесса - механический и химический процесс пищеварения. Механический процесс пищеварения заключается в физическом перемалывание крупных кусков пищи (пережевывание) на более мелкие, которые потом могут быть доступны для расщепления ферментами. Химическое пищеварение заключается в расщеплении пищи ферментами на молекулы, которые доступны для усваивания организмом.
2. После процесса пережевывания пища в виде комка проходит дальше в пищевод и далее в желудок под действием волнообразных движений мышц пищевода (перистальтики). Желудочный сок в желудке запускает процесс усваивания белков. Желудочный сок состоит главным образом из соляной кислоты и пепсина. В тоже время белковая ферментация происходит в процессе перистальтики, в ходе которого пища перемешивается и происходит смешивание с пищеварительными ферментами. Примерно через 1-2 часа полученная густая жидкость под названием химус попадает в двенадцатиперстную кишку.

Ex. 12. Study the chart and speak on the topic "The digestive process":



Ex. 13. Read the text and fill in the gaps with the words from the box:

appetite	**bile**	**conscious**	**diet**	**levels**
maintain	**prevents**	**skin**	**weight**	

The disease conditions affecting the digestive system

Anorexia is lack of **… (1)**. Anorexia often is a sign of malignancy or liver disease. Anorexia nervosa is loss of appetite associated with emotional problems such as anger, anxiety, and irrational fear of weight gain. Anorexia nervosa is characterized by refusal to **… (2)** a minimally normal body **… (3)**. The affected person is intensely afraid of gaining weight and has a disturbance in perception of the shape or size of her or his body. The condition predominantly affects adolescent females, and its principal symptom is a **… (4)**, relentless attempt to **… (5)** along with excessive, compulsive overactivity, such as exercise, running, or gymnastics.

Jaundice (icterus) is yellow-orange coloration of the **… (6)** and whites of the eyes caused by high **… (7)** of bilirubin in the blood (hyperbilirubinemia). Jaundice can occur when (1) excessive destruction of erythrocytes causes excess bilirubin in the blood; (2) malfunction of liver cells (hepatocytes) due to liver disease prevents the liver from excreting bilirubin with **… (8)**; or (3) obstruction of bile flow **… (9)** bilirubin in bile from being excreted into the duodenum.

Ex. 14. Match the signs and symptoms with the common diseases of the digestive system:

a) Constipation
b) Diarrhea
c) Flatulence
d) Nausea
e) Cholelithiasis
f) Pancreatitis

1. the presence of excessive gas in the stomach and the intestines.
2. Gallstones in the gallbladder
3. Unpleasant sensation in the stomach associated with a tendency to vomit. Common causes are sea and motion sickness and early pregnancy. It may be symptomatic of a perforation (hole in the wall) of an abdominal organ; obstruction of a bile duct, stomach, or intestine; or exposure to toxins (poisons).
4. Difficulty in passing stools (feces). When peristalsis is slow, stools are dry and hard. A diet of fruit, vegetables, and water is helpful.
5. Frequent passage of loose, watery stools. Abrupt onset of diarrhea immediately after eating suggests acute infection or toxin in the gastrointestinal tract. Antidiarrheal drugs are helpful.
6. Inflammation of the pancreas. Digestive enzymes attack pancreatic tissue and damage the gland. Other etiologic factors include chronic alcoholism, drug toxicity, gallstone obstruction of the common bile duct, and viral infections. Treatment includes medications to relieve epigastric pain, intravenous fluids.

Ex. 15. Using extra sources, prepare a report on a disease of the digestive system:

a) dental caries
b) hernia
c) (peptic) ulcer
d) viral hepatitis

UNIT 2 REVISION.

Ex. 1. Match the following digestive system structures with their meanings below:

anus	esophagus	liver
cecum	gallbladder	pancreas
colon	ileum	pharynx
duodenum	jejunum	sigmoid colon

1. consisting of ascending, transverse, descending, and sigmoid segments
2. small sac under the liver; stores bile
3. first part of the large intestine
4. end of the digestive tract opening to the outside of the body
5. second part of the small intestine
6. tube connecting the throat to the stomach
7. third part of the small intestine
8. large organ located in the right upper quadrant; secretes bile, stores sugar, produces blood proteins
9. throat
10. lowest part of the colon
11. first part of the small intestine
12. organ under the stomach; produces insulin and digestive enzymes

Ex. 2. Choose the term that fits the given definition:

1. microscopic projections in the walls of the small intestine:
   a) villi
   b) rugae
2. ring of muscle at the end of the stomach:
   a) pyloric sphincter
   b) lower esophageal sphincter
3. chemical that speeds up reactions and helps digest foods:
   a) amino acid
   b) enzyme
4. pigment released with bile:
   a) glycogen
   b) bilirubin
5. hormone produced by endocrine cells of the pancreas:
   a) insulin
   b) amylase
6. rhythm-like contraction of the muscles in the walls of the gastrointestinal tract:
   a) mastication
   b) peristalsis

Ex. 3. Give the names of the following gastrointestinal signs or symptoms based on their descriptions:

1. lack of appetite

2. an unpleasant sensation in the stomach and a tendency to vomit
3. loose, watery stools
4. difficulty in passing stools (feces)

UNIT 3. RESPIRATORY SYSTEM

Unit 3 goals: Name the organs of the respiratory system and describe their locations and functions. Identify pathologic conditions that affect the respiratory system.

Text 1. The process of respiration (anatomy and physiology).

Ex. 1. Before reading the text, study the topical vocabulary.

Professional medical terms:

Word	**Pronunciation**	**Meaning**
Respiratory system	/ˈrespərətɔːri/ /ˈsɪstəm/	дыхательная система
respiration	/respɪˈreɪʃ(ə)n/	дыхание
exhalation (expiration)	/eksəˈleɪʃ(ə)n/ /ˌekspɪˈreɪʃ(ə)n/	выдох, выдыхание
inhalation (inspiration)	/ɪnhəˈleɪʃ(ə)n/ /ɪnspɪˈreɪʃ(ə)n/	вдох
oxygen	/ˈɒksɪdʒən/	кислород
carbon dioxide	/ˌkɑːbəndaɪˈɒksaɪd/	углекислый газ
nostrils (nares)	/ˈnɒstr(ə)l/ /ˈneːriːz/	ноздри
nasal cavity	/ˈneɪz(ə)l ˈkævəti/	носовая полость
cilia	/ˈsɪlɪə/	реснички
larynx (voice box)	/ˈlærɪŋks/	гортань
pharynx	/ˈfærɪŋks/	глотка
paranasal sinuses	/ˌpærəˈ neɪz(ə)l ˈsaɪnəsɪz /	околоносовые пазухи, придаточные пазухи носа
mucous membrane	/ˌmjuːkəs ˈmembreɪn/	слизистая оболочка
nasopharynx	/ˌneɪzəʊˈfærɪŋks/	носоглотка
pharyngeal tonsil, or adenoid	/fəˈrɪndʒiəl ˈtɒns(ə)l/ /ˈædɪnɔɪdz/	аденоидная миндалина
oropharynx	/ˌɔːrə(ʊ)ˈfærɪŋks/	мезофаринкс, зев, ротовая часть глотки
palatine tonsils	/ˈpælətaɪn ˈtɒns(ə)l /	нёбная миндалина
laryngopharynx	/ˌlærɪngəˈfærɪŋks/	ларингофаринкс,

		гортанная часть глотки
vocal cords	/ˈvəʊ.k(ə)l ˌkɔːdz/	голосовые связки
aspiration (of food)	/æspəˈreɪʃ(ə)n/	проникновение инородного тела в дыхательные пути
trachea	/ˈtreɪkɪə/ OR /trəˈkiːə/	трахея
windpipe	/ˈwɪndpaɪp/	трахея
air sac	/ˈeə ˌsæk/	альвеолярный мешочек
lungs	/lʌŋz/	легкие
bronchial tubes, or bronchi (singular: bronchus)	/ˈbrɒŋkɪəl/ /ˈbrɒŋkaɪ/ /ˈbrɒŋkəs/	бронхи
bronchus (*plural:* bronchi)	/ˈbrɒŋkəs/ plural /ˈbrɒŋkaɪ/	бронх (бронхи)
bronchiole	/ˈbrɒŋkɪəʊl/	бронхиола
alveolus (*plural:* alveoli)	/ˌælviˈəʊləs/ plural /ˌælviˈəʊlaɪ /	альвеола (альвеолы)
capillary	/kəˈpɪləri/	капилляр
erythrocyte	/ɪˈrɪθrə(ʊ)sʌɪt/	эритроцит
parietal pleura	/pəˈraɪɪt(ə)l ˈplʊərə/	париетальная плевра, пристеночная плевра
visceral pleura	/ˈvɪs(ə)r(ə)l ˈplʊərə/	висцеральная плевра, легочная плевра
lobe (of the lung)	/ləʊb/	легочная доля
apex	/ˈeɪpeks/	верхушка легкого
base	/beɪs/	основная часть легкого
hilum	/ˈhaɪləm/	ворота легкого
diaphragm	/ˈdaɪəfræm/	диафрагма
(air) pressure	/ˈpreʃə/	давление
cartilage	/ˈkɑːt(ɪ)lɪdʒ/	хрящ

Verbs:

Word	**Pronunciation**	**Meaning**
breathe in / out	/briːð/	вдыхать, делать вдох / выдыхать
inhale	/ɪnˈheɪl/	вдыхать, делать вдох
exhale	/eksˈheɪl/	выдыхать

filter (out)	/ˈfɪltə/	отфильтровать
warm	/wɔːm/	нагревать
moisten (the air)	/ˈmɔɪs(ə)n/	увлажнять (воздух)
obstruct	əbˈstrʌkt/	затруднять проходимость, преграждать
mix	/mɪks/	перемешать
divide (subdivide) – division	/dɪˈvʌɪd/	делить (подразделять)
narrow	/ˈnærəʊ/	суживаться, уменьшаться
accept	/əkˈsept/	принимать, допускать
flow (through the capillaries)	/fləʊ/	течь
deposit	/dɪˈpɒzɪt/	откладывать
facilitate	/fəˈsɪlɪteɪt/	способствовать
enlarge	/ɪnˈlɑːdʒ/	увеличить, расширять
increase	/ɪnˈkriːs/	увеличивать
decrease	/dɪˈkriːs/	уменьшать
carry	/ˈkæri/	нести, переносить
choke	/tʃəʊk/	поперхнуться

Ex. 2. Read the text and answer the following questions:

1. What is respiration?
2. Does breathing occur consciously?
3. What does the respiratory system include?
4. What happens to the air in the nasal cavity?
5. What are the three divisions of the pharynx?
6. Where are the vocal cords located? What is the role of the vocal cords?
7. What prevents choking or aspiration of food in the larynx?
8. What keeps the trachea open?
9. Where does the trachea divide into bronchi?
10. What do the lungs divide into?
11. How many lobes do the lungs contain? Are both lungs identical?
12. How does the exchange of gases happen in the alveoli and the lung capillaries?
13. What happens to the diaphragm in inhalation and exhalation?

We usually think of respiration as the mechanical process of breathing, the exchange of air between the lungs and the external environment. This exchange of air at the lungs is called external respiration. The exchange of gases at the level of the cells within all organs of the body is known as internal respiration.

We breathe in oxygen, and we breathe out carbon dioxide. This process is known as respiration.

Breathing happens automatically. Every day the body breathes about 20,000 times. All this breathing occurs because of the **respiratory system** – which includes the **nose**, **throat**, **voice box**, **windpipe** and **lungs**. Follow Figure 3-1 as you read the following paragraphs.

Air enters the body via the **nose** [1] through two openings called **nostrils** or **nares**. Air then passes through the **nasal cavity** [2], lined with a mucous membrane and fine hairs (**cilia**) to help filter out foreign bodies, as well as to warm and moisten the air. **Paranasal sinuses** [3] are hollow, air-containing spaces within the skull that communicate with the nasal cavity. They, too, have a mucous membrane lining. Besides producing mucus, a lubricating fluid, the sinuses lighten the bones of the skull and help produce sound.

After passing through the nasal cavity, the air next reaches the **pharynx (throat)**. There are three divisions of the pharynx. The first is the **nasopharynx** [4]. It contains the **pharyngeal tonsils**, or **adenoids** [5], which are collections of lymphatic tissue. They are more prominent in children and, if enlarged, can obstruct air passageways. Below the nasopharynx and closer to the mouth is the second division of the pharynx, the **oropharynx** [6]. The **palatine tonsils** [7], two rounded masses of lymphatic tissue, are in the oropharynx. The third division of the pharynx, the **laryngopharynx** [8], serves as a common passageway for food from the mouth and air from the nose. It divides into the **larynx (voice box)** [9] and the **esophagus** [10].

The esophagus leads into the stomach and carries food to be digested. The larynx contains the vocal cords and is surrounded by pieces of cartilage for support. As expelled air passes the vocal cords, they vibrate to produce sounds. The tension of the vocal cords determines the high or low pitch of the voice.

Because food entering from the mouth and air entering from the nose mix in the pharynx, the **epiglottis** [11], a flap of cartilage attached to the root of the tongue, prevents choking or aspiration of food. It acts as a lid over the opening of the larynx. During swallowing, when food and liquid move through the throat, the epiglottis closes over the larynx.

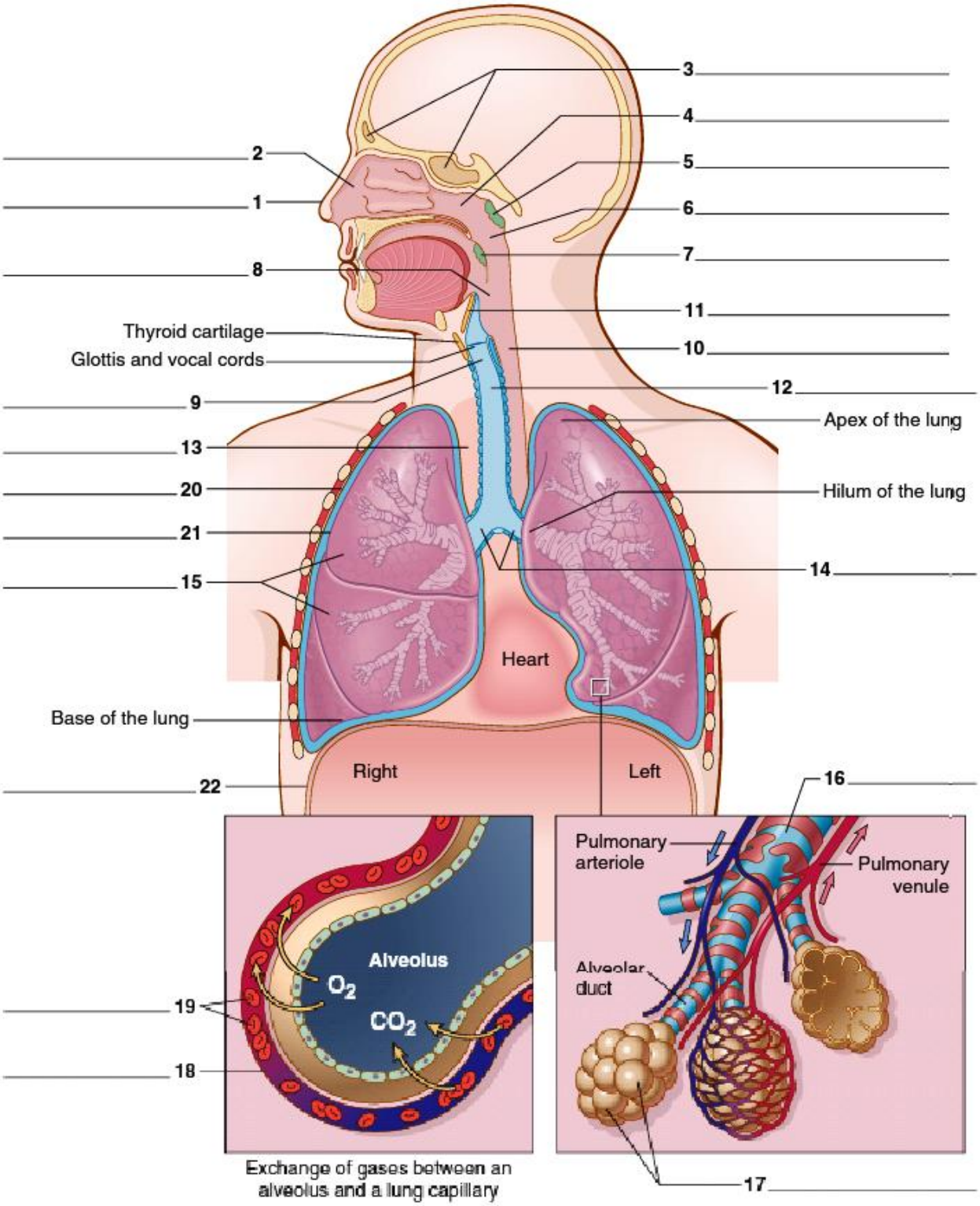


Figure 3-1. Organs of the respiratory system

On its way to the lungs, air passes through the larynx to the **trachea (windpipe)** [12], a vertical tube about 4.5 inches long and 1 inch in diameter. The trachea is kept open by 16 to 20 C-shaped rings of cartilage separated by fibrous connective tissue that stiffen the front and sides of the tube.

In the region of the **mediastinum** [13], the trachea divides into two branches, the right and left **bronchial tubes**, or **bronchi** [14] (singular: **bronchus**). The bronchi are tubes composed of delicate epithelium surrounded by cartilage rings and a muscular wall. Each bronchus leads to a separate **lung** [15] and divides and subdivides into smaller and finer tubes, somewhat like the branches of a tree.

The small bronchial branches are the bronchioles. Each terminal **bronchiole** [16] narrows into alveolar ducts, which end in collections of air sacs called **alveoli** [17] (singular: **alveolus**). About 300 million alveoli are estimated to be present in both lungs. Each alveolus is lined with a one-cell-thick layer of epithelium. This very thin wall permits an exchange of gases between the alveolus and the **capillary** [18] surrounding it. Blood flowing through the capillary accepts oxygen from the alveolus while depositing carbon dioxide into the alveolus. **Erythrocytes** [19] in the blood carry oxygen to all parts of the body and carbon dioxide to the lungs for **exhalation**.

Each lung is covered by a double-folded membrane called the **pleura**. The outer layer of the pleura, nearer the ribs, is the **parietal pleura** [20], and the inner layer, closer to the lung, is the **visceral pleura** [21]. A serous (thin, watery fluid) secretion moistens the pleura and facilitates movements of the lungs within the chest (thorax).

The two lungs are not quite mirror images of each other. The slightly larger right lung is divided into three **lobes**, whereas the smaller left lung has two **lobes**. One lobe of the lung may be removed without damage to the rest. The uppermost part of the lung is the **apex**, and the lower area is the **base**. The **hilum** of the lung is the midline region in which blood vessels, nerves, lymphatic tissue, and bronchial tubes enter and exit.

The lungs extend from the collarbone to the **diaphragm** [22] in the thoracic cavity. The diaphragm is a muscular partition separating the thoracic from the abdominal cavity and aiding in the process of breathing. It contracts and descends with each **inhalation (inspiration).** The downward movement of the diaphragm enlarges the area in the thoracic cavity, decreasing internal air pressure, so that air flows into the lungs to equalize the pressure. When the lungs are full, the diaphragm relaxes and elevates, making the area in the thoracic cavity smaller, thus increasing air pressure in the chest. Air then is expelled out of the lungs to equalize the pressure; this is **exhalation (expiration).**

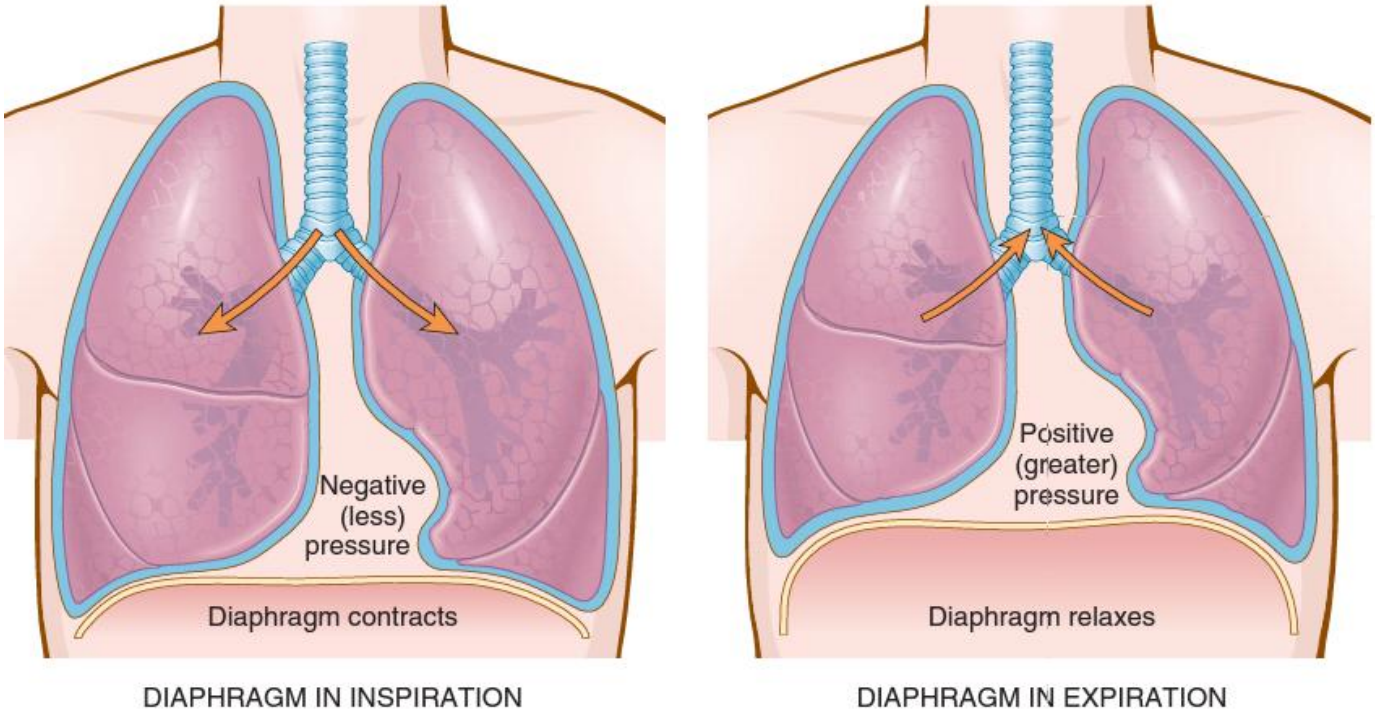


Figure 3-2. Position of the diaphragm during inspiration (inhalation) and expiration (exhalation)

(composed from Davi-Ellen Chabner, The Language of Medicine, ninth edition – Saunders, Elsevier and from www.youtube.com)

Ex. 2. Choose the right option on the basis of the information from the text:

1. We breathe in … .
   a) oxygen
   b) carbon dioxide
   c) hydrogen
2. Cilia help … .
   a) produce sound
   b) filter out foreign bodies, warm and moisten the air
   c) deposit carbon dioxide into the alveolus
3. Nasopharynx contains … .
   a) adenoids
   b) vocal cords
   c) epiglottis
4. The trachea is kept open by … .
   a) epiglottis

b) rings of cartilage
c) larynx

5. The right lung is divided into … lobes, whereas the left lung has … lobes.
   a) two / two
   b) three / two
   c) two / three
6. Organs that help produce sound are … .
   a) vocal cords
   b) paranasal sinuses
   c) vocal cords and paranasal sinuses
7. Vocal cords are located in … .
   a) nasopharynx
   b) oropharynx
   c) laryngopharynx
8. Organ that prevents choking or aspiration of food is … .
   a) tongue
   b) epiglottis
   c) alveolus
9. Exchange of gases happens between … .
   a) the alveolus and the capillary
   b) bronchiole and erythrocytes
   c) apex of the lung and base of the lung
10. The diaphragm … in the process of inhalation, and it … in the process of exhalation.
   a) contracts / relaxes
   b) relaxes / contracts

Ex. 3. Give Russian equivalents for:

Filter out foreign bodies, produce sound, air reaches the pharynx, pharyngeal tonsils, prominent in children, two rounded masses of lymphatic tissue, C-shaped rings of cartilage, each terminal bronchiole, collections of air sacs, accept oxygen, deposit carbon dioxide, enlarge the area in the thoracic cavity, increase air pressure in the chest.

Ex. 4. Give Russian equivalents for:

Согревать и увлажнять воздух, нёбная миндалина, затруднять проходимость дыхательных путей, высота голоса, во время глотания, газообмен между альвеолой и капилляром, переносить кислород ко всем частям тела, уровнять давление воздуха в груди.

Ex. 5. Find pairs of synonyms:

1.	trachea	a) adenoid
2.	nostrils	b) bronchi
3.	exhalation	c) thorax
4.	inhalation	d) windpipe
5.	pharyngeal tonsil	e) occur
6.	pharynx	f) expiration
7.	bronchial tubes	g) nares
8.	chest	h) inspiration
9.	happen	i) throat

Ex. 6. Find pairs of antonyms:

1.	breathe in	a) enlarge
2.	inhale	b) carbon dioxide
3.	contract	c) breathe out
4.	increase	d) decrease
5.	oxygen	e) exhale

Ex. 7. Complete the table with the correct form of the word:

Verb	**Noun**	**Noun**	**Adjective**
divide	*division*	*lymph*	*lymphatic*
breathe	…	…	mucous
…	inhalation	nose	…
exhale	…	…	vocal
…	moisture	bronchus	…
increase	…	…	visceral
…	decrease	pharynx	…
obstruct	…	…	thoracic

Ex. 8. Fill in the gaps with the appropriate form of the words from ex. 7:

1. How long can you hold your … under water? (BREATHE)
2. Our … apparatus can produce a large diversity of sounds. (VOICE)
3. In the process of …, we … air pressure in the chest. (EXHALE/ INCREASE)
4. The left … arteries arise from the ventral surface of the … aorta. (BRONCHUS / THORAX)
5. The … of lungs into lobes is not identical. (DIVIDE)
6. Her throat felt dry and her eyes … as a tear jerked itself out, her … turned to gasps of disbelief. (MOISTEN / BREATHE)

7. The … is connected to the esophagus and the larynx. (PHARYNX)
8. Doctors should carry a thorough examination of the air passageways to look for … . (OBSTRUCT)
9. Air enters the body through the … cavity. (NOSE)
10. You could tell from her … that she wasn't pleased. (VOICE)

Ex. 9. Translate the sentences with the correct forms of the words from ex. 7:

1. Дыхание – одна из немногих функций организма, которая может контролироваться сознательно и неосознанно. Кроме того, дыхательная система участвует в таких важных функциях, как терморегуляция, голосообразование, обоняние, увлажнение выдыхаемого воздуха.
2. Обычный спокойный вдох связан с деятельностью мышц диафрагмы и наружных межреберных мышц. При вдохе диафрагма опускается, ребра поднимаются, расстояние между ними увеличивается. Обычный спокойный выдох происходит в большой степени пассивно, при этом активно работают внутренние межреберные мышцы и некоторые мышцы живота.
3. При выдохе диафрагма поднимается, ребра перемещаются вниз, расстояние между ними уменьшается.
4. Газообмен – обмен газов между организмом и внешней средой. Из окружающей среды в организм непрерывно поступает кислород, который потребляется всеми клетками, органами и тканями; из организма выделяются образующийся в нем углекислый газ и незначительное количество других продуктов метаболизма.
5. Газообмен необходим почти для всех организмов, без него невозможен нормальный обмен веществ и энергии, а, следовательно, и сама жизнь.
6. Газообмен осуществляется в альвеолах легких.
7. В дыхательном аппарате легкие выполняют газообменную функцию, а полость носа, носоглотка, гортань, трахея и бронхи – воздухопроводящую.

Ex. 10. Study the chart and speak on the topic "The respiratory system and the process of respiration":

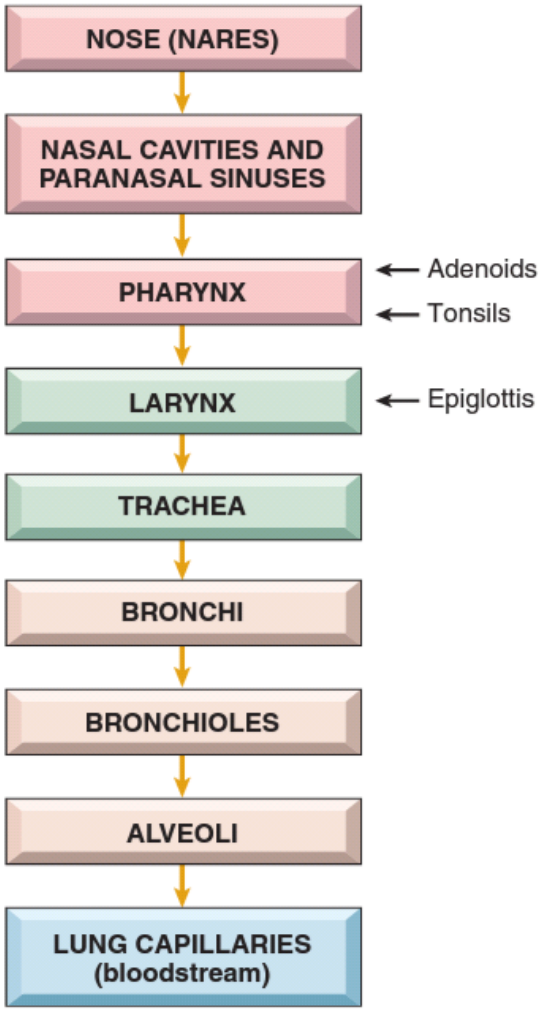


Figure 3-3. Pathway of air from the nose to the capillaries of the lungs

Text 2. Pathologic conditions that affect the respiratory system. Clinical procedures

Ex. 1. Before reading the text, study the topical vocabulary.

Professional medical terms:

Word	**Pronunciation**	**Meaning**
auscultation	/ˌɔːsk(ə)lˈteɪʃ(ə)n/	выслушивание (больного), аускультация
stethoscope	/ˈsteθəskəʊp/	стетоскоп
percussion	/pəˈkʌʃ(ə)n/	постукивание
rales	/rɑːl/	хрипы
fluid	/ˈfluːɪd/	жидкость
rhonchi	/ˈrɒŋkaɪ/	сухие хрипы
bronchiectasis	/ˌbrɒŋkɪˈektəsɪs/	бронхоэктаз

acute bronchitis	/əˈkjuːt/ /brɒŋˈkaɪtɪs/	острый бронхит
inflammation	/ɪnfləˈmeɪʃ(ə)n/	воспаление
congestion	/kənˈdʒestʃ(ə)n/	застой
croup	/kruːp/	круп (острый ларингит или ларинготрахеит)
influenza	/ɪnflʊˈenzə/	грипп
asthma	/ˈæsmə/	астма
bronchial edema	/ˈbrɒŋkɪəl/ /ɪˈdiːmə/	бронхиальный отек
dyspnea	/dɪspˈniːə/	одышка
cough	/kɒf/	кашель
chronic bronchitis	/ˈkrɒnɪk/ /brɒŋˈkaɪtɪs/	хронический бронхит
chronic obstructive pulmonary disease (COPD)	/ˈkrɒnɪk/ əbˈstrʌktɪv/ /ˈpʊlmən(ə)ri/ /dɪˈziːz/	хроническое обструктивное заболевание легких (ХОЗЛ)
lung cancer	/lʌŋ/ /ˈkænsə/	рак легких
malignant tumor	/məˈlɪgnənt/ /ˈtjuːmə/	злокачественная опухоль
pneumonia	/njuːˈməʊnɪə/	пневмония, воспаление легких
tuberculosis (TB)	/tjʊˌbəːkjʊˈləʊsɪs/	туберкулез

Ex. 2. Read the text and answer the following questions:

1. When do doctors use a stethoscope?
2. How can doctors diagnose conditions of the lungs, heart, and abdomen?
3. How can percussion help diagnose pneumonia?
4. What kind of sounds can be heard in patients with pneumonia and acute bronchitis?
5. What diseases do rhonchi indicate?
6. What are the symptoms of asthma?
7. How do we call inflammation of bronchi persisting over a long time?
8. What is the most frequent fatal malignancy?
9. How can doctors detect TB?

When examining patients with pathological conditions of the respiratory system, doctors use the following **diagnostic terms**:

- Auscultation – Listening to sounds within the body.

This procedure, performed with a stethoscope, is used chiefly for listening to the passage of air into and out of the lungs. It is helpful to diagnose conditions of the lungs, pleura, heart, and abdomen.

- Percussion – Tapping on a surface to determine the difference in the density of the underlying structure.

Tapping over a solid organ produces a dull sound without resonance. Percussion over an air-filled structure, such as the lung, produces a resonant, hollow note. When the lungs or the pleural space are filled with fluid and become more dense, as in pneumonia, resonance is replaced by dullness.

- Rales (crackles) – Fine crackling sounds heard on auscultation (during inhalation) when there is fluid in the alveoli.

These popping or clicking sounds can be heard in patients with pneumonia, bronchiectasis, and acute bronchitis.

- Rhonchi – Loud rumbling sounds heard on auscultation of bronchi obstructed by sputum.

These coarse rumbling sounds resemble snoring. Rhonchi indicate congestion and inflammation in larger bronchial tubes.

Some **pathological disorders of the respiratory system** are:

Croup. Acute viral infection of children with obstruction of the larynx, barking cough, and stridor. The most common causative agents are influenza viruses or respiratory syncytial virus (RSV).

Asthma. Chronic bronchial inflammatory disorder with airway obstruction due to bronchial edema and constriction and increased mucus production. Associated signs and symptoms of asthma are dyspnea, wheezing, and cough.

Chronic bronchitis. Inflammation of bronchi persisting over a long time; type of chronic obstructive pulmonary disease (COPD).

Infection and cigarette smoking are etiologic factors. Signs and symptoms include excessive secretion of infected mucus, a productive cough, and obstruction of respiratory passages.

Lung cancer. Malignant tumor arising from the lungs and bronchi. This group of cancers, often associated with cigarette smoking, is the most frequent fatal malignancy.

Pneumonia. Acute inflammation and infection of alveoli, which fill with pus or products of the inflammatory reaction.

Tuberculosis (TB). Infectious disease caused by Mycobacterium tuberculosis; lungs usually are involved, but any organ in the body may be affected. Rod-shaped bacteria called bacilli invade the lungs, producing small tubercles (from Latin tuber, a swelling) of infection. Early TB usually is asymptomatic and detected on routine chest x-ray studies. Signs and symptoms of advanced disease are cough, weight loss, night sweats, hemoptysis, and pleuritic pain.

(adapted from Davi-Ellen Chabner, The Language of Medicine, ninth edition – Saunders, Elsevier)

Ex. 3. Write out all the diseases of the respiratory system mentioned in the text. Point out their symptoms in brief.

Example: asthma – dyspnea, wheezing, and cough; etc.

Ex. 4. Give English definitions or synonyms to the following words:

Chronic, fatal, auscultation, resonance, acute, rales, density, rhonchi, stethoscope, frequent, asymptomatic.

Ex. 5. Translate the words into Russian:

to diagnose – diagnosis – diagnostic;
to infect – infection – infected – infectious;
to inflame – inflammation – inflammatory;
to resonate – resonance – resonant;
to obstruct – obstructed – obstructive – obstruction;
malignant – malignancy.

Ex. 6. Fill in the gaps with the appropriate form of the words from ex. 5:

1. The doctor has made an initial **…** .
2. Hepatitis A is an **…** that leads to **…** of the liver and is caused by the hepatitis A virus.
3. Influenza is an **…** disease.
4. The process by which **…** cancer cells multiply isn't fully understood.
5. The doctor **…** asthma.
6. His voice **…** in the empty church.
7. Lupus is a chronic **…** disease in which your immune system attacks some of your own cells.
8. Chronic bronchitis and asthma are components of chronic **…** pulmonary disease (COPD).
9. The area has a high population **…** .
10. Doctors have a lot of **…** tools at their disposal.

Ex. 7. Using extra sources make a report on a disease of the respiratory system. Speak about its symptoms and possible treatment:

a) pneumothorax
b) adenoids
c) pulmonary edema
d) diphtheria

UNIT 3 REVISION.

Ex. 1. Match the following anatomic structures with their descriptions below:

adenoids	epiglottis	paranasal sinuses
alveoli	hilum	parietal pleura
bronchi	larynx	pharynx
bronchioles	mediastinum	trachea
cilia	palatine tonsils	visceral pleura

1. outer fold of pleura lying closer to the ribs
2. collections of lymph tissue in the nasopharynx
3. windpipe
4. lid-like piece of cartilage that covers the voice box
5. branches of the windpipe that lead into the lungs
6. region between the lungs in the chest cavity
7. air-containing cavities in the bones around the nose
8. thin hairs attached to the mucous membrane lining the respiratory tract
9. inner fold of pleura closer to lung tissue
10. throat
11. air sacs of the lung
12. voice box
13. smallest branches of bronchi
14. collections of lymph tissue in the oropharynx
15. midline region of the lungs where bronchi, blood vessels, and nerves enter and exit the lungs

Ex. 2. Complete the following sentences.

1. The apical part of the lung is the … .
2. The gas that passes into the bloodstream at the lungs is … .
3. Breathing in air is called … .
4. Divisions of the lungs are known as … .
5. The gas produced by cells and exhaled through the lungs is … .
6. The space between the visceral and the parietal pleura is the … .

7. Breathing out air is called … .
8. The essential tissues of the lung that perform its main function are pulmonary … .
9. The exchange of gases in the lung is … respiration.
10. The exchange of gases at the tissue cells is … respiration.

Ex. 3. Give the meanings (in English) of the following medical terms:

1. rales (crackles)
2. auscultation
3. percussion
4. rhonchi
5. dyspnea
6. stridor
7. wheeze
8. pulmonary edema
9. pneumonia
10. tuberculosis
11. adenoid hypertrophy

Ex. 4. Match the following terms with their descriptions below:

Asthma	Chronic bronchitis	Croup
Diphtheria	Lung cancer	

1. acute infectious disease of the throat caused by Corynebacterium
2. acute respiratory syndrome in children and infants that is marked by obstruction of the larynx and stridor
3. inflammation of tubes that lead from the trachea; over a long period of time
4. chronic inflammatory disorder characterized by airway obstruction
5. malignant neoplasm originating in a lung or bronchus

UNIT 4. CARDIOVASCULAR SYSTEM

Unit 4 goals: Name the parts of the heart and associated blood vessels and their functions in the circulation of blood. Trace the pathway of blood through the heart. Identify and describe major pathologic conditions affecting the heart and blood vessels.

Text 1. Introduction. Blood vessels.

Ex. 1. Before reading the text, study the topical vocabulary.

Professional medical terms:

Word	Pronunciation	Meaning
Cardiovascular/ Circulatory system	/ˌkɑːdɪəʊˈvæskjʊlə ˈsɪstəm / /ˈsɝːkjələtɔːri/ /səːkjʊˈleɪt(ə)ri/	сердечно-сосудистая система / кровеносная система
(muscular) pump	/pʌmp/	насос, качок
blood vessel	/ˈblʌd ˌves(ə)l/	кровеносный сосуд
artery	/ˈɑːtəri/	артерия
vein	/veɪn/	вена
capillary	/kəˈpɪləri/ALSO /ˈkæpəleri/	капилляр
arteriole	/ɑːˈtɪərɪəʊl/	артериола, мелкая артерия
venule	/ˈvenjuːl/	венула
endothelium	/ˌendə(ʊ)ˈθiːlɪəm/	эндотелий
blood clotting	/blʌd klɒtɪŋ/	свертывание крови
blood clot	/blʌd klɒt /	тромб, сгусток крови
oxygenated blood	/ˈɒksɪdʒəneɪtɪd blʌd/	кровь, насыщенная кислородом
deoxygenated blood	/diːˈɒksɪdʒəneɪtɪd blʌd/ /	бедная кислородом кровь
bloodstream	/ˈblʌdstriːm/	кровоток
valve	/vælv/	клапан
pressure	/ˈpreʃə/	давление

Verbs:

Word	Pronunciation	Meaning
supply	/səˈplaɪ/	снабжать, поставлять
deliver (oxygen)	/dɪˈlɪvə/	доставлять
carry	/ˈkæri/	нести
reduce	/rɪˈdjuːs/	уменьшить
expand	/ɪkˈspænd/	расширять
affect smth/smb	/əˈfekt/	влиять
keep the blood moving		продолжать что-то делать
flow	/fləʊ/	течь, литься
move	/muːv/	двигаться

Ex. 2. Read the text and answer the following questions:

1. What do body cells depend on?

2. What does the cardiovascular system consist of?
3. What are the types of blood vessels?
4. What blood do arteries carry?
5. What are the strongest blood vessels? What makes them stronger? And why?
6. What is the role of the elastic layer in arteries?
7. Why do capillaries have walls that are only one endothelial cell in thickness?
8. What blood do veins carry?
9. Why do veins have valves in them?
10. What is the function of arteries / capillaries / veins?

Body cells are dependent on a constant supply of nutrients and oxygen. When the supplies are delivered and then chemically combined, they release the energy necessary to do the work of each cell. How does the body ensure that oxygen and food will be delivered to all of its cells? The cardiovascular system, consisting of the heart (a powerful muscular pump) and blood vessels (fuel line and transportation network), performs this important work.

There are three types of blood vessels in the body: **arteries**, **veins**, and **capillaries**.

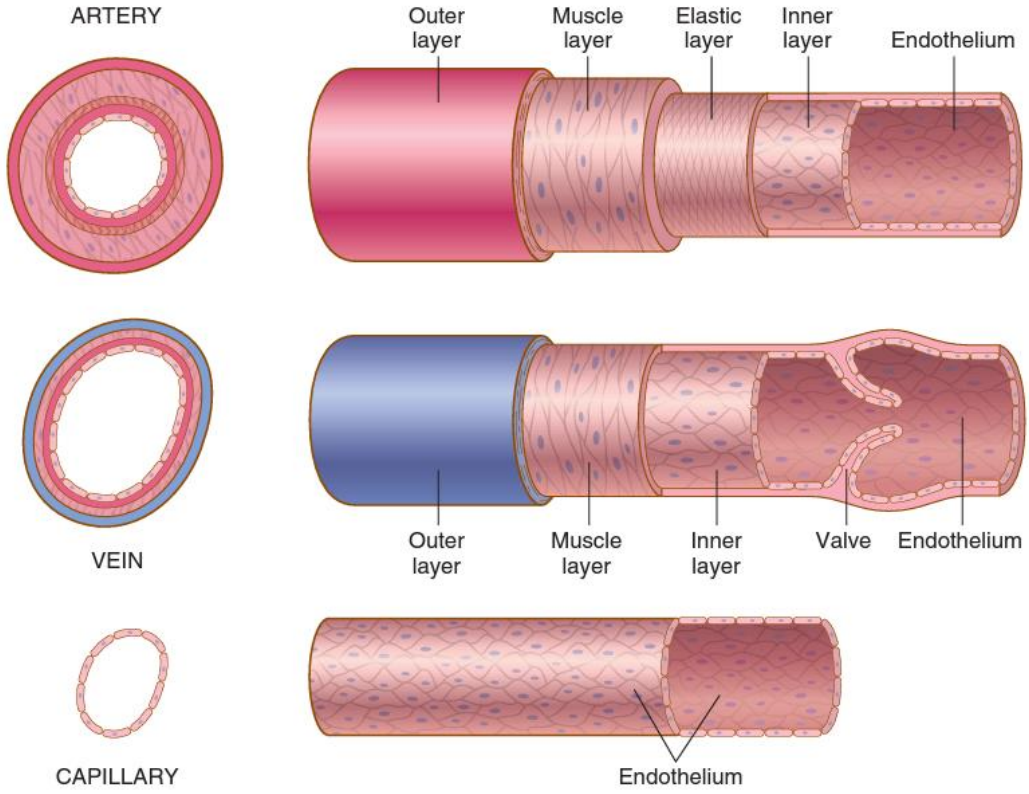


Figure 4-1. Blood vessels

Arteries are large blood vessels that carry blood away from the heart. Their walls are lined with connective tissue, muscle tissue, and elastic fibers, with an innermost layer of epithelial cells called endothelium. Endothelial cells, found in all blood vessels, secrete factors that affect the size of blood vessels, reduce blood clotting, and promote the growth of blood vessels. Because arteries carry blood away from the heart, they must be strong enough to withstand the high pressure of the pumping action of the heart. Their elastic walls allow them to expand as the heartbeat forces blood into the arterial system throughout the body. Smaller branches of arteries are **arterioles**. Arterioles are thinner than arteries and carry the blood to the tiniest of blood vessels, the capillaries.

Capillaries have walls that are only one endothelial cell in thickness. These delicate, microscopic vessels carry nutrient-rich, oxygenated blood from the arteries and arterioles to the body cells. Their thin walls allow passage of oxygen and nutrients out of the bloodstream and into cells. There, the nutrients are burned in the presence of oxygen (catabolism) to release energy. At the same time, waste products such as carbon dioxide and water pass out of cells and into the thin-walled capillaries. Waste-filled blood then flows back to the heart in small **venules**, which combine to form larger vessels called veins.

Veins have thinner walls compared with arteries. They conduct blood (that has given up most of its oxygen) toward the heart from the tissues. Veins have little elastic tissue and less connective tissue than arteries, and blood pressure in veins is extremely low compared with pressure in arteries. In order to keep blood moving back toward the heart, veins have **valves** that prevent the backflow of blood and keep the blood moving in one direction. Muscular action also helps the movement of blood in veins.

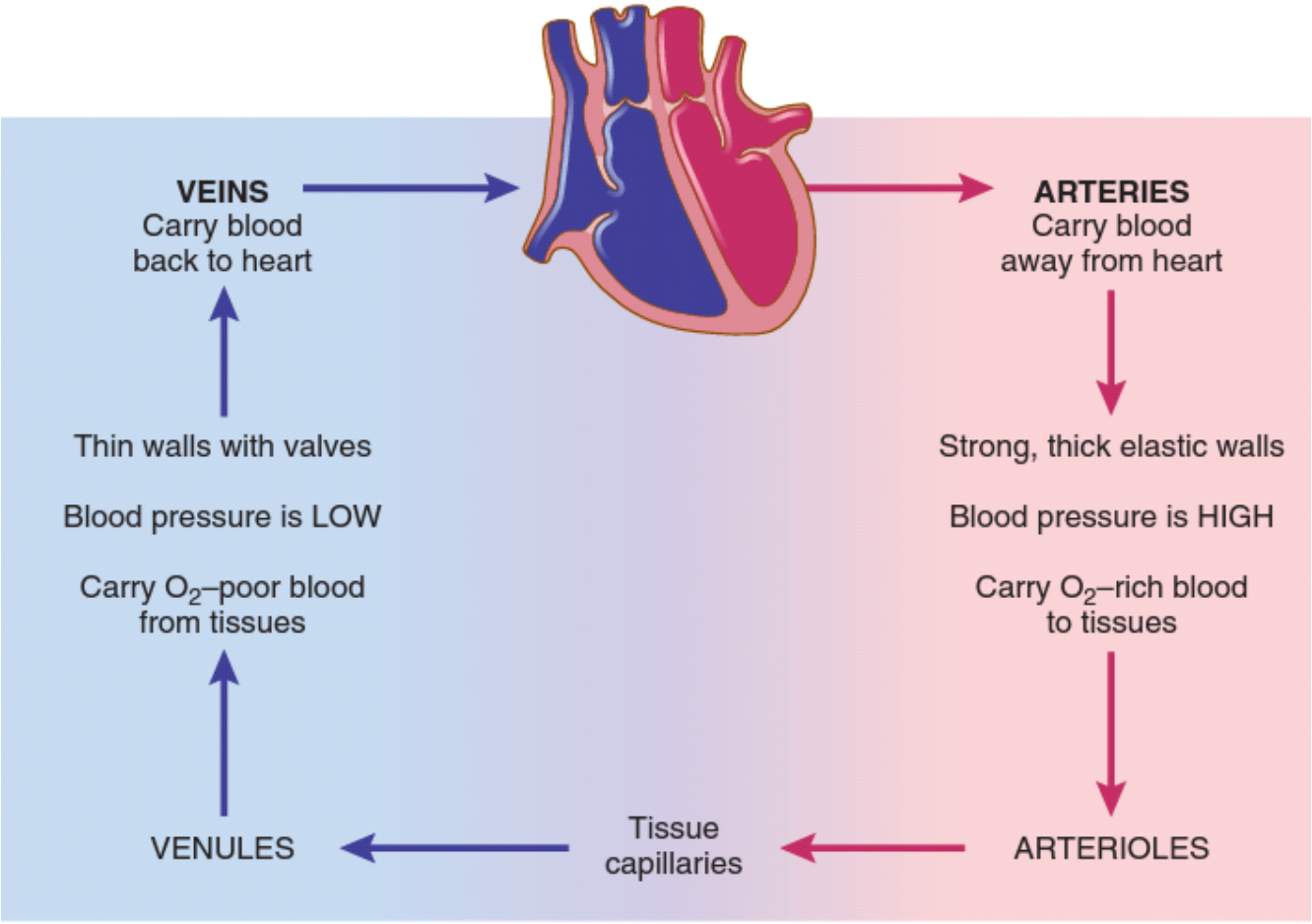


Figure 4-2. Relationship and characteristics of blood vessels

(adapted from Davi-Ellen Chabner, The Language of Medicine, ninth edition – Saunders, Elsevier)

Ex. 3. Read the following statements and say whether they are true or false:

1. The cardiovascular system consists of the heart and blood vessels.
2. Arteries are the tiniest blood vessels.
3. Arteries carry blood away from the heart, and veins carry blood back to the heart.
4. Blood pressure in arteries is extremely low.
5. Veins have an elastic layer.
6. Veins have valves.
7. Valves help withstand the high pressure of the heart.
8. Capillaries are the strongest blood vessels.
9. Capillaries carry nutrients into the bloodstream.

Ex. 4. Give Russian equivalents for:

A constant supply of nutrients and oxygen; an innermost layer of epithelial cells called endothelium; to withstand the high pressure of the pumping action of the heart;

delicate, microscopic vessels; allow passage of oxygen and nutrients; the nutrients are burned in the presence of oxygen; keep the blood moving in one direction.

Ex. 5. Give English equivalents for:

Мощный мышечный насос, снижают свертываемость крови, богатая питательными веществами кровь, предотвращать обратный поток крови.

Ex. 6. Read and translate the words and their derivatives:

to pump – pumping (action of the heart) – (muscular) pump
to clot – (blood) clotting – (blood) clot
to oxygenate – oxygenated – deoxygenated – oxygen – oxygenation
to reduce – reduced – reducing – reduction
to supply – supply – supplier
to deliver – delivered – delivering – delivery
to depend on – (be) dependent on – dependence
to prevent – preventive – prevention
to nourish – nutrient – nutrient-rich – nutritious

Ex. 7. Complete the sentences with the appropriate word from exercise 6:

1. Home-cooked burgers make a **…** meal.
2. Valves in veins **…** the blood from flowing back.
3. Fish is a source of many important **…**, including protein, vitamins, and minerals.
4. The infected cells stick together, forming **…** in the blood vessels of the brain.
5. Platelets are essential for blood **…** .
6. The heart **…** blood through the arteries round the body.
7. The left heart pumps **…** blood out to the systemic circulation.
8. Capillaries **…** oxygen and nutrients to all body cells.
9. Shall we go to the countryside tomorrow? – It **…** on the weather.
10. At the beginning of the semester teachers **…** students with a list of books which they are expected to read.

Ex. 8. Study the difference between the words *affect* / *effect* and then complete the sentences with them:

Affect is a verb meaning ‘influence or cause someone or something to change’:
*E.g. The cold weather has really **affected** her health.*
*New technologies continue to **affect** how we live.*
Effect is a noun that means ‘the result of an influence’:
*E.g. The pollution in the city had a bad **effect** on me.*
*Most people these days understand the serious **effects** of smoking.*

1. His illness … almost every aspect of his life.

2. I think I’m suffering from the … of too little sleep.
3. Both buildings were badly … by the fire.
4. The radiation leak has had a disastrous … on the environment.

Ex. 9. Match the types of blood vessels with their description:

Blood vessels	**Description**
Arteries	Vessels with carry blood from all parts of the body towards heart.
Veins	Very fine blood vessels with thin walls. They join arteries and veins. They facilitate the exchange of substances – oxygen and carbon dioxide – between them and cells.
Capillaries	Vessels wich carry blood from the heart to different parts of the body.

Ex. 10. Summarize Text 1.

Text 2. Circulation of blood

Ex. 1. Before reading the text, study the topical vocabulary.

Professional medical terms:

Word	**Pronunciation**	**Meaning**
blood circulation	/blʌd səːkjʊˈleɪʃ(ə)n/	кровообращение
pulmonary circulation	/ˈpʊlməneri səːkjʊˈleɪʃ(ə)n/ /ˈpʌlmən(ə)ri səːkjʊˈleɪʃ(ə)n/	малый круг кровообращения, легочное кровообращение,
systemic circulation	/sɪˈstemɪk səːkjʊˈleɪʃ(ə)n	большой круг кровообращения
vena cava (plural – venae cavae)	/ˌviː.nə ˈkeɪvə/ /ˌviːniː ˈkeɪviː/	полая вена
pulmonary artery	/ˈpʊlməneri ˈɑːtəri/ /ˈpʌlmən(ə)ri ˈɑːtəri/	легочная артерия
carotid artery	/kəˌrɒt.ɪd ˈɑːtəri /	сонная артерия
aorta	/eɪˈɔːtə/	аорта
deficient in (oxygen)	/dɪˈfɪʃ(ə)nt/	дефицит кислорода
waste products	/ˈweɪst ˌprɒdʌkt/	продукты жизнедеятельности, шлаки

Ex. 2. Read the text and answer the following questions:

1. What makes up the circulatory system?
2. Where does blood circulation begin?
3. What are the two types of blood circulation? What's the difference between them?
4. Why is the pulmonary artery unusual?
5. Why are pulmonary veins unusual?
6. What's the largest single artery in the body?
7. What arteries supply blood to the head and neck?
8. Where does oxygen enter body cells?
9. What waste product is released from the cell into the tissue capillaries at the same time that oxygen enters?

Arteries, arterioles, veins, venules, and capillaries, together with the heart, form a circulatory system for the flow of blood. Figure 4-3 is a more detailed representation of the entire circulatory system. Refer to it as you read the following paragraphs.

Blood that is deficient in oxygen flows through two large veins, the **venae cavae** [1], on its way from the tissue capillaries to the heart. The blood became oxygen-poor at the tissue capillaries when oxygen left the blood and entered the body cells.

Oxygen-poor blood enters the **right side of the heart** [2] and travels through that side and into the **pulmonary artery** [3], a vessel that divides in two: one branch leading to the left lung, the other to the right lung. The arteries continue dividing and subdividing within the lungs, forming smaller and smaller vessels (arterioles) and finally reaching the **lung capillaries** [4]. The pulmonary artery is unusual in that it is the only artery in the body that carries blood deficient in oxygen.

While passing through the lung (pulmonary) capillaries, blood absorbs the oxygen that entered the body during inhalation. The newly oxygenated blood next returns immediately to the heart through **pulmonary veins** [5]. The pulmonary veins are unusual in that they are the only veins in the body that carry oxygen-rich (oxygenated) blood. The circulation of blood through the vessels from the heart to the lungs and then back to the heart again is the **pulmonary circulation**.

Oxygen-rich blood enters the **left side of the heart** [6] from the pulmonary veins. The muscles in the left side of the heart pump the blood out of the heart through the largest single artery in the body, the **aorta** [7]. The aorta moves up at first (ascending aorta) but then arches over dorsally and runs downward (descending aorta) just in front of the vertebral column. The aorta divides into numerous branches called **arteries** [8]

that carry the oxygenated blood to all parts of the body. The **carotid** arteries supply blood to the head and neck.

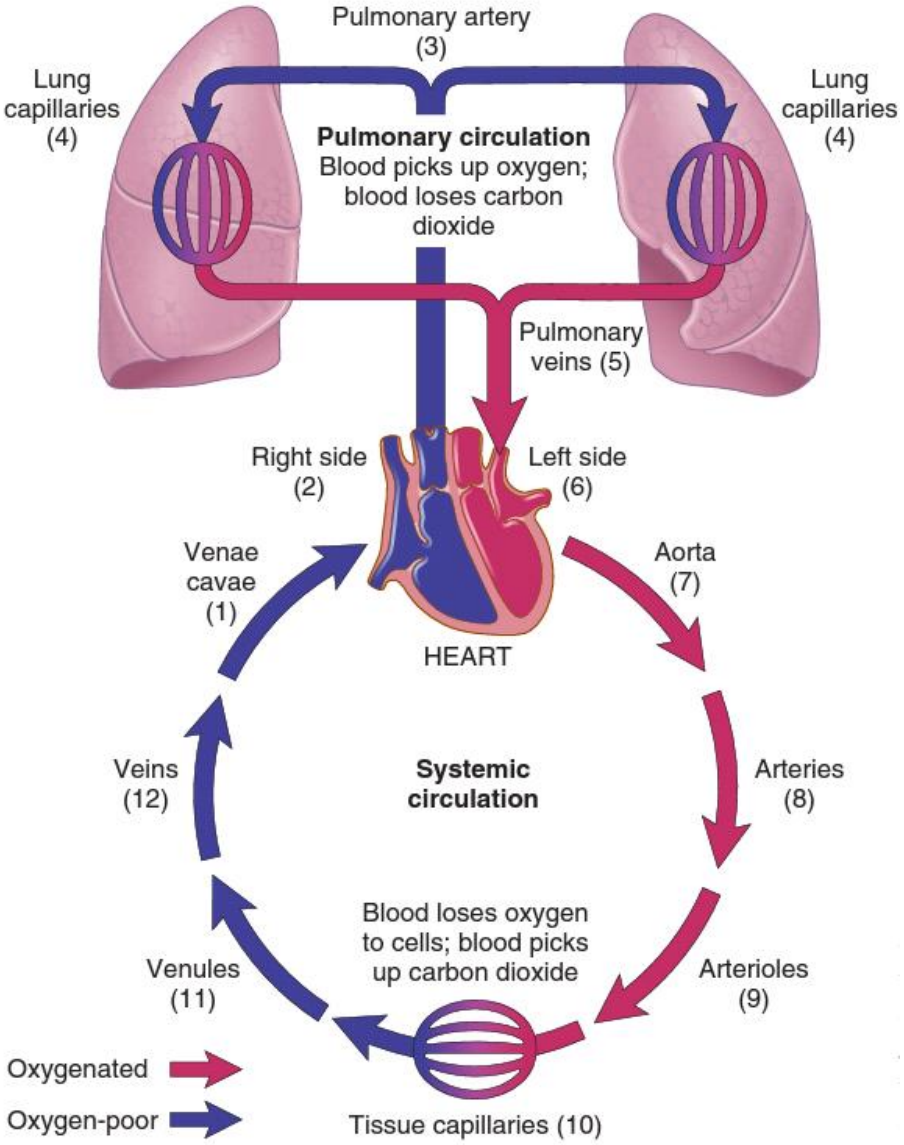


Figure 4-3. Diagram of the **pulmonary circulation** (blood flow from the heart to lung capillaries and back to the heart) and **systemic circulation** (blood flow from the heart to tissue capillaries and back to the heart)

The relatively large arterial vessels branch further to form smaller **arterioles** [9]. The arterioles, still containing oxygenated blood, branch into smaller **tissue capillaries** [10], which are near the body cells. Oxygen leaves the blood and passes through the thin capillary walls to enter the body cells. There, food is broken down, in the presence of oxygen, and energy is released.

This chemical process also releases carbon dioxide (CO2) as a waste product. Carbon dioxide passes out from the cell into the tissue capillaries at the same time that oxygen enters. Thus the blood returning to the heart from tissue capillaries through **venules** [11] and **veins** [12] is filled with carbon dioxide but is depleted of oxygen.

As this oxygen-poor blood enters the heart from the venae cavae, the circuit is complete. The pathway of blood from the heart to the tissue capillaries and back to the heart is the **systemic circulation**.

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(adapted from Davi-Ellen Chabner, The Language of Medicine, ninth edition – Saunders, Elsevier)

Ex. 3. Say whether the statements are true or false:

1. The vena cava receives deoxygenated blood.
2. Oxygen-poor blood enters the left side of the heart.
3. From the heart oxygen-poor blood travels into the aorta.
4. The aorta is the largest single artery in the body.
5. The pulmonary circulation is the circulation of blood through the vessels from the heart to the lungs and then back to the heart again.
6. The systemic circulation is the circulation of blood flow from the heart to tissue capillaries and back to the heart.

Ex. 4. Read the text again and find all the synonyms to *oxygenated blood* and *deoxygenated blood.*

For example, deoxygenated blood – oxygen-poor blood, etc.

Ex. 5. Give English equivalents for:

На своем пути из капилляров тканей к сердцу, поступать в клетки, переносить кровь, поглощать кислород, малый круг кровообращения, большой круг кровообращения, разветвляться на более мелкие капилляры, продукты жизнедеятельности (побочные продукты).

Ex. 6. Combine the following words into the word combinations:

1.	deficient in	a)	artery / veins / circulation
2.	tissue	b)	carbon dioxide / energy
3.	pulmonary	c)	capillaries
4.	enter the body	d)	during inhalation
5.	release	e)	oxygen

Ex. 7. Make up sentences of your own with the expression from exercises 5 and 6.

Ex. 8. Match the terms with their definitions:

- Aorta
- Capillaries
- Deoxygenated blood
- Heart
- Lungs
- Oxygenated blood
- Pulmonary artery

- Pulmonary circulation
- Systemic circulation
- Vena cava
- Pulmonary veins
- Valve

1. The veins that return the oxygenated blood from the lungs to the left side of the heart.
2. The hollow, muscular organ that maintains the circulation of the blood.
3. One of a pair of organs in the chest that supplies the body with oxygen, and removes carbon dioxide from the body.
4. A large vein which returns blood from the head, neck and extremities to the heart.
5. The largest artery in the body. It carries oxygen-rich blood away from the heart to vessels that reach the rest of the body.
6. Structure in veins or in the heart that temporarily closes an opening so that blood flows in only one direction.
7. Oxygen-rich blood.
8. Oxygen-poor blood.
9. The smallest of the body's blood vessels. Oxygen and glucose pass through their walls and enter the cells. Waste products such as carbon dioxide pass back from the cells into the blood through them.
10. The circulation of the blood through the lungs.
11. Flow of blood from body tissue to the heart and then from the heart back to body tissues.
12. This artery and its branches deliver blood rich in carbon dioxide (and lacking in oxygen) to the capillaries that surround the air sacs.

Ex. 9. Translate into English:

1. К сердечно-сосудистой системе относятся сердце и кровеносные сосуды. Эта система выполняет функции транспорта крови, которая несет в себе питательные вещества и энергетические материалы к тканям и органам, а от них транспортирует продукты обмена веществ.
2. Сердце выполняет функцию «насоса», ритмические сокращения которого обуславливают движение крови по кровеносным сосудам.
3. Кровеносные сосуды сердечно-сосудистой системы образуют две основных подсистемы: сосуды малого круга кровообращения и сосуды большого круга кровообращения.
4. Сосуды малого круга кровообращения переносят кровь от сердца к легким и обратно. По легочным артериям кровь попадает в капилляры

легких, где отдает двуокись углерода и обогащается кислородом. Затем по легочным венам она попадает в левую часть сердца.

5. Сосуды большого круга кровообращения соединяют сердце со всеми другими частями тела. Функция большого круга кровообращения заключается в снабжении кислородом всех органов и тканей и в транспорте газообразных продуктов метаболизма от тканей к легким.

6. Артерии и артериолы несут кровь от сердца к клеткам организма. Вены и венулы доставляют кровь обратно в сердце.

Ex. 10. Make a summary of Text 2.

Text 3. The heart

Ex. 1. Before reading the text, study the topical vocabulary.

Professional medical terms:

Word	**Pronunciation**	**Meaning**
chamber (heart chamber)	/hɑːt ˈtʃeɪmbə/	камера сердца
atrium (right atrium and left atrium); plural – atria	/ˈeɪtriəm/	предсердие
ventricle (right ventricle and left ventricle)	/ˈventrɪk(ə)l/	желудочек (сердца, мозга)
cardiac cycle	/ˈkɑːdiæk ˈsaɪkl/	сердечный цикл
superior vena cava	/suːˈpɪərɪə ˌviːnə ˈkeɪvə/	верхняя полая вена
inferior vena cava	/ɪnˈfɪərɪə ˌviːnə ˈkeɪvə/	нижняя полая вена
cusp	/kʌsp/	створка клапана сердца или сосуда
tricuspid valve	/traɪˈkʌs.pɪd ˌvælv/	трикуспидальный клапан, трехстворчатый клапан, правый предсердно-желудочковый клапан
pulmonary valve	/ˈpʊlməneri vælv/ /ˈpʌlmən(ə)ri vælv/	легочный клапан
mitral valve	/ˈmaɪ.tr(ə)l ˌvælv/	митральный клапан, двустворчатый клапан, левый предсердно-желудочковый клапан
aortic valve	/eɪˈɔːtɪk ˌvælv/	аортальный клапан

diastole	/daɪˈastəli/	диастола
systole	/ˈsɪstəli/	систола
conduction system of the heart	/kənˈdʌkʃ(ə)n ˈsɪstəm/	проводящая система сердца
heartbeat	/ˈhɑːtbiːt/	сердцебиение
rhythm	/ˈrɪð(ə)m/	ритм
sinoatrial node (SA node) or pacemaker	/ˌsaɪnəʊˈeɪtrɪəl nəʊd/	синусно-предсердный узел, синусный узел
current (wave) of electricity	/ˈkʌr(ə)nt/ /ˌelɪkˈtrɪsəti/	электрический ток
myocardium	/ˌmaɪə(ʊ)ˈkɑːdɪəm/	миокард, сердечная мышца
conduction myofiber	/kənˈdʌkʃ(ə)n ˈmaɪə(ʊ)faɪbə/	мышечные волокна проводимости
atrioventricular node (AV node)	/ˌeɪtrɪə(ʊ)ve nˈtrɪkjʊlə nəʊd/	предсердно-желудочковый узел
atrioventricular bundle, or bundle of His	/ˌeɪtrɪə(ʊ)ve nˈtrɪkjʊlə ˈbʌnd(ə)l/	предсердно-желудочковый пучок, пучок Гиса
left / right bundle branch	/ˈbʌnd(ə)l brɑːn(t)ʃ/	левый/ правый пучок Гиса
electrocardiogram (ECG or EKG)	/ɪˌlektrəʊˈkɑːdɪəgram/ /ˌiːsiːˈdʒiː/ /ˌiː.keɪˈdʒiː/	электрокардиограмма, ЭКГ
deflection	/dɪˈflekʃ(ə)n/	отклонение
normal sinus rhythm (NSR)	/ˈnɔːm(ə)l ˈsʌɪnəs ˈrɪð(ə)m/	нормальный синусовый ритм

Verbs:

Word	**Pronunciation**	**Meaning**
bind (bound) into one organ	/baʊnd/	связывать
pick up (oxygen)	/pɪk ʌp/	забрать кислород
release (carbon dioxide)	/rɪˈliːs/	высвобождать, выпускать углекислого газа
force out	/fɔːs/	выкачивать, вытолкнуть
contract / contraction	/ˈkɒntrækt/	сжиматься
relax / relaxation	/rɪˈlæks/	уменьшать напряжение, расслабляться

prevent from Ving	/prɪˈvent/	предотвратить, препятствовать
propel	/prəˈpel/	продвигать, подталкивать
initiate (the heartbeat)	/ɪˈnɪʃɪeɪt/	положить начало, запустить

Ex. 2. Read the text and answer the following questions:

1. Where is the heart located?
2. How many chambers does the heart consist of? What are the upper chambers and the lower chambers?
3. The heart is a double pump, isn't it? Explain it.
4. Where does the cardiac cycle begin: on the left side or on the right side of the heart?
5. Where do the superior vena cava and the inferior vena cava carry blood from?
6. What is the main function of valves in the heart? Name those valves.
7. How do chambers of the heart pump blood?
8. Which chamber of the heart has the thickest walls? Why?
9. What are the phases of the heartbeat? Characterize them.
10. What is responsible for the heartbeat?
11. What do doctors use to detect electrical changes in heart?

The human heart weighs less than a pound, is roughly the size of an adult fist, and lies in the thoracic cavity, just behind the breastbone in the mediastinum (between the lungs).

The heart is a pump, consisting of four chambers: two upper chambers called **atria** (singular: **atrium**) and two lower chambers called **ventricles**. It is actually a double pump, bound into one organ and synchronized very carefully. Blood passes through each pump in a definite pattern. Pump station number one, on the right side of the heart, sends oxygen-deficient blood to the lungs, where the blood picks up oxygen and releases its carbon dioxide. The newly oxygenated blood returns to the left side of the heart to pump station number two and does not mix with the oxygen-poor blood in pump station number one. Pump station number two then forces the oxygenated blood out to all parts of the body. At the body tissues, the blood loses its oxygen, and on returning to the heart, to pump station number one, blood poor in oxygen (rich in carbon dioxide) is sent out to the lungs to begin the cycle anew.

Follow Figure 4-4 as you learn the names of the parts of the heart and the vessels that carry blood to and from it.

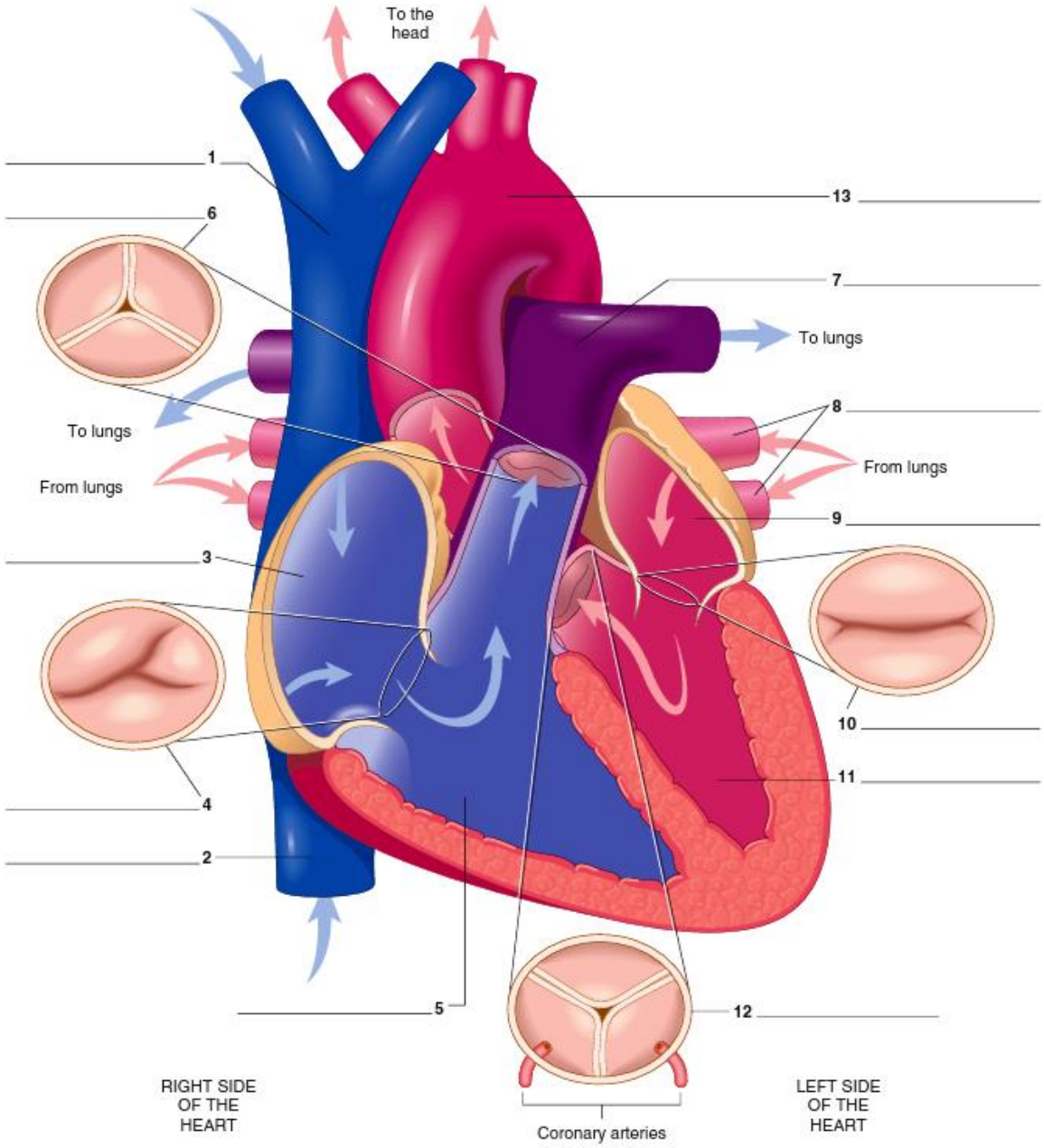


Figure 4-4. Structure of the heart

Oxygen-poor blood enters the heart through the two largest veins in the body, the **venae cavae**. The **superior vena cava** [1] drains blood from the upper portion of the body, and the **inferior vena cava** [2] carries blood from the lower part of the body.

The venae cavae bring oxygen-poor blood that has passed through all of the body to the **right atrium** [3], the thin-walled upper right chamber of the heart. The right atrium contracts to force blood through the **tricuspid valve** [4] into the **right ventricle** [5], the lower right chamber of the heart. The cusps of the tricuspid valve form a one-way passage designed to keep the blood flowing in only one direction. As the right

ventricle contracts to pump oxygen-poor blood through the **pulmonary valve** [6] into the **pulmonary artery** [7], the tricuspid valve stays shut, thus preventing blood from pushing back into the right atrium. The pulmonary artery then branches to carry oxygen-deficient blood to each lung.

The blood that enters the lung capillaries from the pulmonary artery soon loses its large quantity of carbon dioxide into the lung tissue, and the carbon dioxide is expelled. At the same time, oxygen enters the capillaries of the lungs and is brought back to the heart via the **pulmonary veins** [8]. The newly oxygenated blood enters the **left atrium** [9] of the heart from the pulmonary veins. The walls of the left atrium contract to force blood through the **mitral valve** [10] into the **left ventricle** [11].

The left ventricle has the thickest walls of all four heart chambers (three times the thickness of the right ventricular wall). It must pump blood with great force so that the blood travels through arteries to all parts of the body. The left ventricle propels the blood through the **aortic valve** [12] into the **aorta** [13], which branches to carry blood all over the body. The aortic valve closes to prevent return of aortic blood to the left ventricle.

Heart beat and heart sounds.

There are two phases of the heartbeat: **diastole** (relaxation) and **systole** (contraction).

Diastole occurs when the ventricle walls relax and blood flows into the heart from the venae cavae and the pulmonary veins. The tricuspid and mitral valves open in diastole, as blood passes from the right and left atria into the ventricles. The pulmonary and aortic valves close during diastole (Figure 4-5).

Systole occurs next, as the walls of the right and left ventricles contract to pump blood into the pulmonary artery and the aorta. Both the tricuspid and the mitral valves are closed during systole, thus preventing the flow of blood back into the atria (see Figure 4-5).

This diastole-systole cardiac cycle occurs between 70 and 80 times per minute (100,000 times a day). The heart pumps about 3 ounces of blood with each contraction. This means that about 5 quarts of blood are pumped by the heart in 1 minute (75 gallons an hour and about 2000 gallons a day).

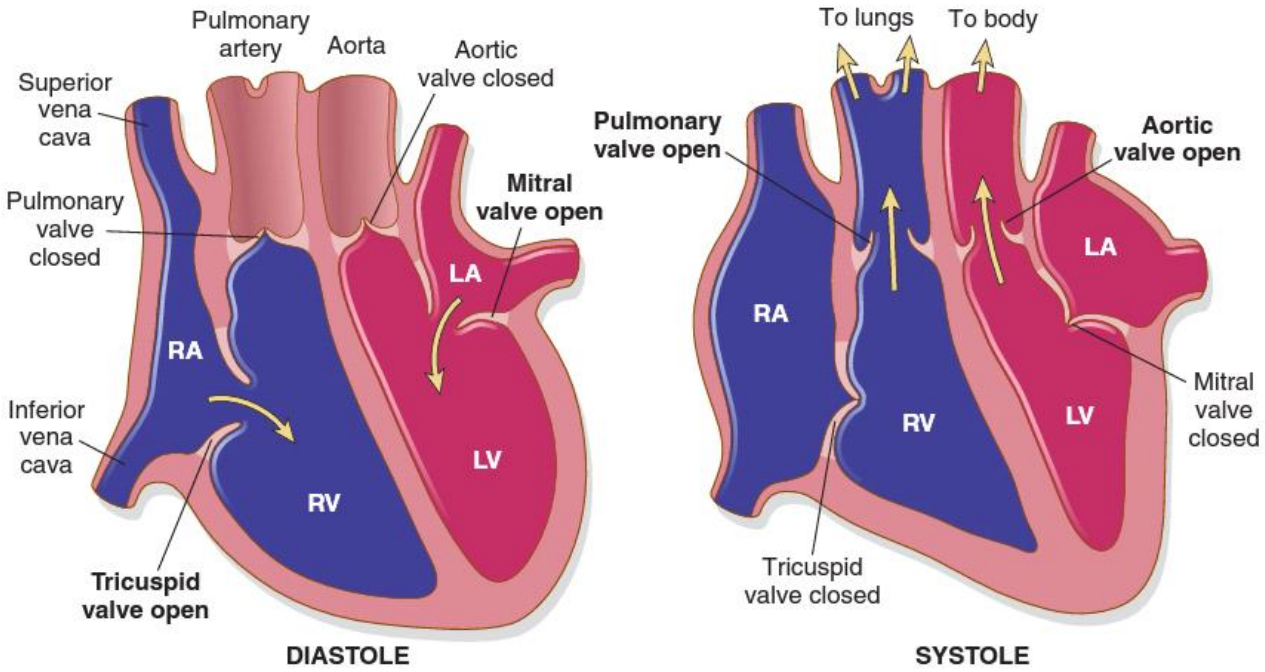


Figure 4-5. Phases of the heartbeat: diastole and systole. During diastole, the tricuspid and mitral valves are open as blood enters the ventricles. During systole, the pulmonary and aortic valves are open as blood is pumped to the pulmonary artery and aorta. LA, left atrium; LV, left ventricle; RA, right atrium; RV, right ventricle

Conduction system of the heart.

What keeps the heart at its perfect rhythm? Although the heart has nerves that affect its rate, they are not primarily responsible for its beat. The heart starts beating in the embryo before it is supplied with nerves, and continues to beat in experimental animals even when the nerve supply is cut. Follow Figure 4-6 as you read the following.

Primary responsibility for initiating the heartbeat rests with a small region of specialized muscle tissue in the posterior portion of the right atrium, where an electrical impulse originates. This is the **sinoatrial node** (**SA node**) or **pacemaker** [1] of the heart. The current of electricity generated by the pacemaker causes the walls of the atria to contract and force blood into the ventricles.

The wave of electricity passes from the pacemaker to another region of the myocardium – the **atrioventricular node** (**AV node**) [2]. The AV node immediately sends the excitation wave to a bundle of specialized muscle fibers called the **atrioventricular bundle**, or **bundle of His** [3]. Within the interventricular septum, the bundle of His divides into the **left bundle branch** [4] and **right bundle branch** [5], which form the conduction myofibers that extend through the ventricle walls and contract on stimulation. Thus systole occurs and blood is pumped away from the heart.

A short rest period follows, and then the pacemaker begins the wave of excitation across the heart again.

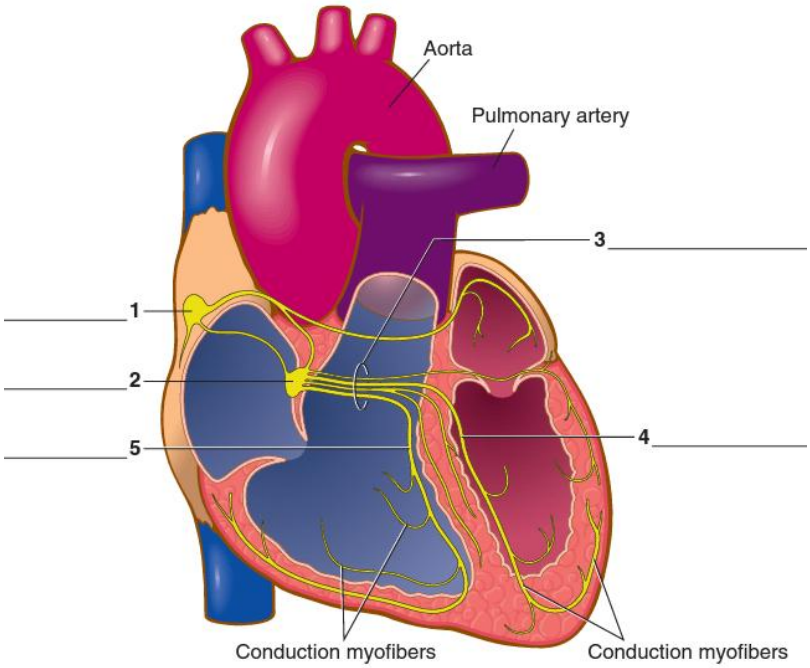


Figure 4-6. Conduction system of the heart

The record used to detect these electrical changes in heart muscle as the heart beats is an **electrocardiogram** (**ECG** or **EKG**). The normal ECG shows five waves, or deflections, that represent the electrical changes as a wave of excitation spreads through the heart. Figure 4-7 illustrates P, QRS, and T waves on a normal ECG tracing.

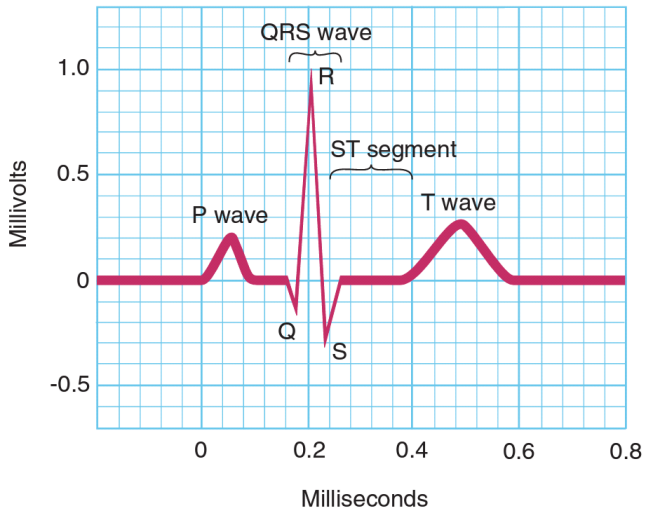


Figure 4-7. Electrocardiogram. **P wave** = spread of excitation wave over the atria just before contraction; **QRS wave** = spread of excitation wave over the ventricles as the ventricles contract; **T wave** = electrical recovery and relaxation of ventricles. A heart attack or myocardial infarction (MI) can be recognized by an elevation in the **ST segment** of the electrocardiographic tracing. Thus, one type of MI is an ST elevation MI (STEMI). (From Applegate MS: The Anatomy and Physiology Learning System, 2nd ed., Philadelphia, Saunders, 2000, p. 250.)

Heart rhythm (originating in the SA node and traveling through the heart) is called **normal sinus rhythm** (**NSR**).

(adapted from Davi-Ellen Chabner, The Language of Medicine, ninth edition – Saunders, Elsevier)

Ex. 3. Agree or disagree with the following:

1. The heart is a double-chambered organ.
2. The upper chambers are called atria, and the lower chambers are called ventricles.
3. Oxygenated blood never mixes with oxygen-deficient blood.
4. The pathway of blood in the heart is: Right atrium – right ventricle – left atrium – left ventricle.
5. Systole is contraction, and diastole is relaxation.
6. During diastole, blood enters the ventricles; during systole blood is pumped out of the ventricles.
7. Nerves are responsible for the heartbeat.

Ex. 4. Give Russian equivalents for:

In a definite pattern, oxygen-deficient blood, the thin-walled chamber of the heart, form a one-way passage, enter the capillaries of the lungs, pump blood with great force, 3 ounces of blood, primary responsibility for the heartbeat, the current of electricity, a short rest period, detect these electrical changes in heart muscle.

Ex. 5. Give English equivalents for:

Размером с кулак, сдвоенный насос, большое количество углекислого газа, через легочные вены, этапы сердцебиения, запуск сердцебиения, 5 литров (кварт) крови, волна электричества, сокращаться при стимуляции.

Ex. 6. Arrange the words into pairs of antonyms:

1.	poor in	a)	shut
2.	lower chamber	b)	inferior vena cava
3.	superior vena cava	c)	relax
4.	diastole	d)	upper chamber
5.	open	e)	rich in
6.	pick up (oxygen)	f)	systole
7.	contract	g)	release (carbon dioxide)

Ex. 7. Combine the following words into the verb combinations:

1. bound	a) the current of electricity
2. keep the blood	b) in the SA node
3. initiate	c) into one organ
4. originate	d) deflections
5. prevent	e) the flow of blood back
6. generate	f) flowing in only one direction

7. send g) the excitation wave to a bundle of fibers
8. shows h) the heartbeat

Ex. 8. Match the terms with their definitions:

- atrioventricular bundle (bundle of His)
- atrioventricular node (AV node)
- atrium
- diastole
- electrocardiogram
- mitral valve
- myocardium
- normal sinus rhythm
- pulmonary valve
- pulse
- sinoatrial node (SA node)
- systole
- tricuspid valve
- ventricle

1. Muscular, middle layer of the heart.
2. Valve between the left atrium and the left ventricle; bicuspid valve.
3. Record of the electricity flowing through the heart. The electricity is represented by waves or deflections called P, QRS, or T.
4. Heart rhythm originating in the sinoatrial node with a resting rate of 60 to 100 beats per minute.
5. Specialized tissue in the wall between the atria. Electrical impulses pass from the pacemaker (SA node) toward the ventricles.
6. One of two lower chambers of the heart.
7. One of two upper chambers of the heart.
8. Valve positioned between the right ventricle and the pulmonary artery.
9. Contraction phase of the heartbeat.
10. Relaxation phase of the heartbeat.
11. Specialized muscle fibers connecting the atria with the ventricles and transmitting electrical impulses between them.
12. Valve between the right atrium and the right ventricle; it has three (tri-) leaflets, or cusps.
13. Beat of the heart as felt through the walls of the arteries.
14. Specialized nervous tissue in the right atrium that begins the heartbeat.

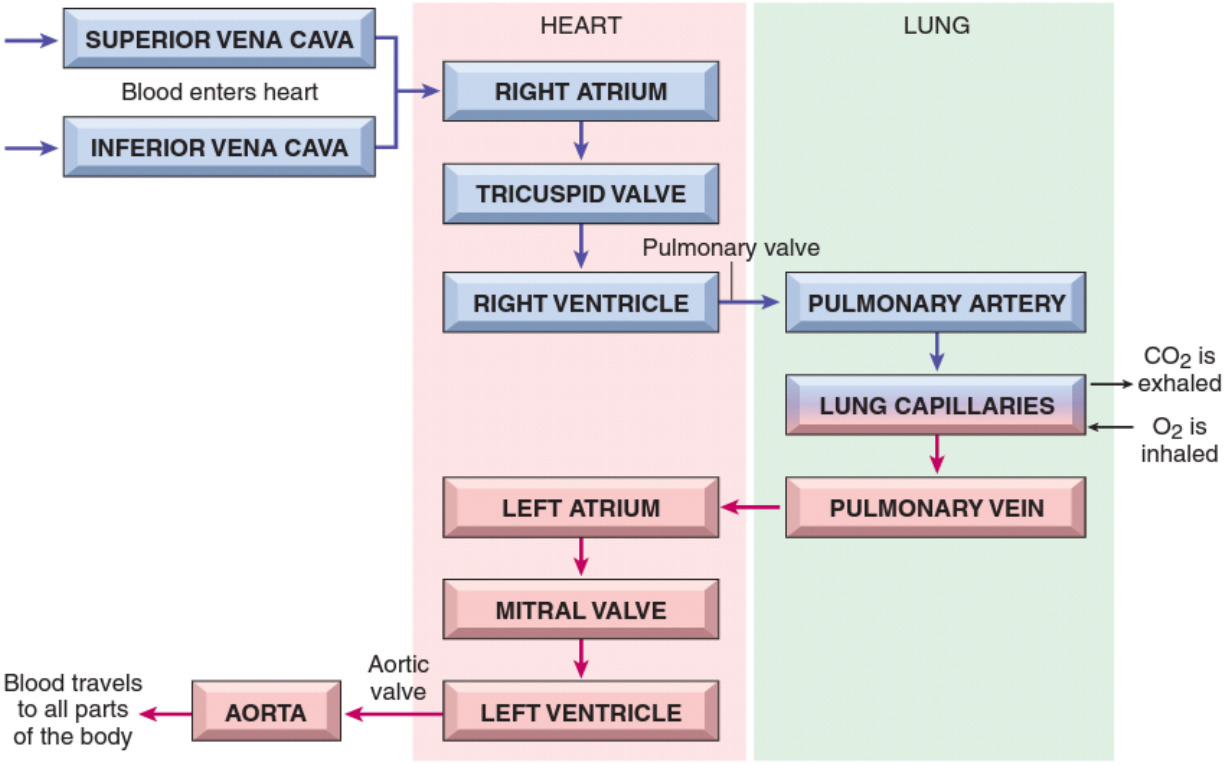
Ex. 9. Fill in the gaps with prepositions where necessary:

Movement of blood in the heart.

Let's start with deoxygenated blood. It comes **…** your superior and inferior vena cava. It enters **…** your right atrium. Then it goes **…** the valve – the tricuspid valve – **…** your right ventricle. Then the blood goes out **…** the semilunar valve **…** the pulmonary artery. And it moves away **…** the heart **…** the lungs, and now it becomes oxygenated.

… pulmonary veins the oxygenated blood comes back … the heart – … your left atrium. Then it flows down … your left ventricle … the mitral valve. Then it moves … of the heart … the big artery called aorta. So the blood flows … the body and then comes … to the heart.

Ex. 10. Study the chart and speak on the topic "The circulatory system and the pathway of blood in the heart":



Ex. 11. Using extra sources make a report on a disease of the circulatory system. Speak about its symptoms and possible treatment:

a) Arrhythmias: bradycardia and heart block (atrioventricular block); flutter; fibrillation
b) Ischemia
c) Myocardial infarction
d) congestive heart failure
e) murmur
f) deep vein thrombosis
g) hypertension
h) varicose veins

UNIT 4 REVISION.

Ex. 1. Match the following terms with their meanings below:

aorta	atrium	inferior vena cava
arteriole	capillary	mitral valve

pulmonary artery	superior vena cava	ventricle
pulmonary vein	tricuspid valve	venule

1. valve that lies between the right atrium and the right ventricle
2. smallest blood vessel
3. carries oxygenated blood from the lungs to the heart
4. largest artery in the body
5. brings oxygen-poor blood into the heart from the upper parts of the body
6. upper chamber of the heart
7. carries oxygen-poor blood to the lungs from the heart
8. small artery
9. valve that lies between the left atrium and the left ventricle
10. brings blood from the lower half of the body to the heart
11. a small vein
12. lower chamber of the heart

Ex. 2. Trace the path of blood through the heart. Begin as the blood enters the right atrium from the venae cavae (and include the valves within the heart):

1. *Right atrium*
2. …
3. …
4. …
5. …
6. *Capillaries of the lung*
7. …
8. …
9. …
10. …
11. …
12. *Aorta*

Ex. 3. Complete the following sentences:

1. The pacemaker of the heart is the ___ .
2. The relaxation phase of the heartbeat is called ___ .
3. Specialized conductive tissue in the wall between the ventricles is the ___ .
4. The contractive phase of the heartbeat is called ___ .
5. A gas released as a metabolic product of catabolism is ___ .
6. Specialized conductive tissue at the base of the wall between the two upper heart chambers is the ___ .
7. An abnormal heart sound due to improper closure of heart valves is a ___ .
8. The beat of the heart as felt through the walls of arteries is called the ___ .

UNIT 5.BLOOD SYSTEM

Unit 5 goals: Identify terms relating to the composition, formation, and function of blood. Differentiate among the four major blood types. Identify terms related to blood clotting. Identify various pathologic conditions affecting blood.

Text 1. Functions of blood. Composition and formation of blood.

Ex. 1. Before reading the text, study the topical vocabulary.

Professional medical terms:

Word	**Pronunciation**	**Meaning**
blood	/blʌd/	кровь
hormone	/ˈhɔːməʊn/	гормон
protein	/ˈprəʊtiːn/	белок, протеин
antibody	/ˈæntɪbɒdi/	антитело
antigen	/ˈæntɪdʒən/	антиген
formed elements	/fɔːmd ˈelɪm(ə)nts/	форменные элементы
plasma	/ˈplæzmə/	плазма
cytoplasm	/ˈsʌɪtə(ʊ)plaz(ə)m/	цитоплазма
erythrocyte = red blood cell	/ɪˈrɪθrəʊsaɪt/ OR /ˌred ˈblʌd ˌsel/	эритроцит, красная кровяная клетка
leukocyte = white blood cell	/ˈluːkə(ʊ)saɪt/ OR /ˌwaɪt ˈblʌd ˌsel/	лейкоцит, белая кровяная клетка
thrombocyte = platelet = clotting cell	/ˈθrɒmbə(ʊ)sʌɪt/ OR /ˈpleɪtlɪt/ OR /ˈklɒt.ɪŋ ˌsel/	тромбоцит
vitamin	/ˈvaɪtəmɪn/ ALSO /ˈvɪtəmɪn/	витамин
bone marrow	/ˈbəʊn ˌmærəʊ/	костный мозг
hematopoietic stem cell	/ˌhiːmætəʊpɔɪˈetɪk ˈstem ˌsel/	гемопоэтическая стволовая клетка
nucleus, **Plural -** nuclei	/ˈnjuːklɪəs/; Plural /ˈnjuːklɪʌɪ/	ядро
molecule	/ˈmɒlɪkjuːl/	молекула
hemoglobin (also haemoglobin)	/ˌhiːməˈgləʊbɪn/	гемоглобин
heme	/hiːm/	гем (небелковая часть гемоглобина)
globin	/ˈgləʊbɪn/	глобин

oxyhemoglobin	/ˌɒksɪhiːməˈgləʊbɪn/	оксигемоглобин
macrophage	/ˈmækrə(ʊ)feɪdʒ/	макрофаг
megakaryocyte	/ˌmegəˈkærɪə(ʊ)saɪt/	мегакариоцит
hemolysis	/hiːˈmɒlɪsɪs/	гемолиз
granulocyte	/ˈgrænjʊlə(ʊ)ˌsaɪt/	гранулоцит
polymorphonuclear granulocytic leukocytes: • neutrophil • eosinophil • basophil	/ˌpɒlɪˌmɔːfə(ʊ)ˈnjuːklɪə grænjʊlə(ʊ)ˌˈsɪtɪk ˈluːkə(ʊ)saɪt/ • /ˈnjuːtrə(ʊ)fɪl/ • /ˌiːə(ʊ)ˈsɪnəfɪl/ • /ˈbeɪsə(ʊ)fɪl/	полиморфноядерные гранулоцитарные лейкоциты: • нейтрофил • эозинофил • базофил
mononuclear agranulocytic leukocytes: • lymphocyte • monocyte	/ˌmɒnə(ʊ)ˈnjuːklɪə əˌgrænjʊləˈsɪtɪk ˈluːkə(ʊ)saɪt/ • /ˈlɪmfə(ʊ)saɪt/ • /ˈmɒnə(ʊ)saɪt/	мононуклеарные агранулоцитарные лейкоциты: • лимфоцит • моноцит
heparin	/ˈhepərɪn/	гепарин
histamine	/ˈhɪstəmiːn/	гистамин
eosin	/ˈiːə(ʊ)sɪn/	эозин (краситель)
alkaline/ acidic dye	/ˈælkəlʌɪn/ /əˈsɪdɪk/ /daɪ/	щелочной / кислотный краситель
phagocyte	/ˈfægə(ʊ)saɪt/	фагоцит
phagocytic	/fægə(ʊ)ˈsaɪtɪk/	фагоцитарный
phagocytosis	/ˌfagə(ʊ)saɪˈtəʊsɪs/	фагоцитоз
immune response	/ɪˈmjuːn rɪˈspɒns/	иммунная реакция
bacterium, plural- bacteria	/bakˈtɪərɪəm/ plural /bækˈtɪə.ri.ə/	бактерия
virus	/ˈvaɪərəs/	вирус
albumin	/ˈælbjʊmɪn/	альбумин
globulin	/ˈglɒbjʊlɪn/	глобулин
immunoglobulin	/ˌɪmjʊnəʊˈglɒbjʊlɪn/	иммуноглобулин
fibrinogen	/faɪˈbrɪnədʒ(ə)n/	фибриноген
prothrombin	/prəʊˈθrɒmbɪn/	протромбин
coagulation	/kəʊagjʊˈleɪʃ(ə)n/ /kəʊˌægjəˈleɪ.ʃ(ə)n/	свертывание, коагуляция

fibrin	/ˈfɪbrɪn/ UK; ALSO /ˈfaɪbrɪn/ US	фибрин
serum	/ˈsɪərəm/	сыворотка крови
µL (microliter)	/ˈmaɪkrəʊliːtə/	микролитр

Verbs:

Word	**Pronunciation**	**Meaning**
transport	/tranˈspɔːt/	перевозить
remove	/rɪˈmuːv/	удалить
contain	/kənˈteɪn/	содержать
fight (infection)	/faɪt/	бороться с
clot	/klɒt/	свертываться, сгущаться (о крови)
originate in	/əˈrɪdʒɪneɪt/	происходить, брать начало
take place	/teɪk pleɪs/	происходить, состояться
fulfill the role/ function	/fʊlˈfɪl/	выполнять
engulf	/ɪnˈgʌlf/	поглощать
trigger (the allergies)	/ˈtrɪgə/	запускать, вызывать
protect	/prəˈtekt/	защищать
attack	/əˈtæk/	нападать, поражать, разрушать
neutralize	/ˈnjuːtrəlaɪz/	нейтрализовать
dispose of	/dɪˈspəʊz/	избавиться, удалить
differentiate	/ˌdɪfəˈrenʃɪeɪt/	различать
be converted to	/kənˈvɜːtɪd/	быть преобразованным в

Ex. 2. Read the text and answer the following questions:

1. What functions does blood fulfill in the body?
2. What does blood transport?
3. What does blood contain?
4. What is blood composed of?
5. Where do all blood cells originate? What is the original cell?
6. What do erythrocytes look like? What is their function?
7. What is hemoglobin?
8. How many types of leukocytes are there? What are they?
9. What is the function of leukocytes?

10. What is the function of platelets?
11. What does plasma consist of? What are the main plasma proteins?
12. What proteins help in clotting?

The primary function of blood is to maintain a constant environment for the other living tissues of the body. Blood transports nutrients, gases, and wastes to and from the cells of the body. Nutrients from food, digested in the stomach and small intestine, pass into the bloodstream through the lining cells of the small intestine. Blood then carries these nutrients to all body cells. Oxygen enters the body through the air sacs of the lungs. Blood cells then transport the oxygen to cells throughout the body. Blood also helps remove the waste products released by cells.

Blood transports chemical messengers called hormones from their sites of secretion in glands, such as the thyroid or pituitary, to distant sites where they regulate growth, reproduction, and energy production.

Finally, blood contains proteins, white blood cells and antibodies that fight infection, and platelets (thrombocytes) that help the blood to clot.

Blood is composed of cells, or formed elements, suspended in a clear, straw-colored liquid called **plasma**. The cells constitute 45% of the blood volume and include **erythrocytes** (red blood cells), **leukocytes** (white blood cells), and **platelets** or **thrombocytes** (clotting cells). The remaining 55% of blood is plasma, a solution of water, proteins, sugar, salts, hormones, and vitamins.

All blood cells originate in the marrow cavity of bones. Both the red blood cells that carry oxygen and the white blood cells that fight infection arise from the same blood-forming or **hematopoietic stem cells**. Under the influence of proteins in the bloodstream and bone marrow, stem cells change their size and shape to become specialized, or differentiated. In this process, the cells change in size from large (immature cells) to small (mature forms), and the cell nucleus shrinks (in red cells, the nucleus actually disappears).

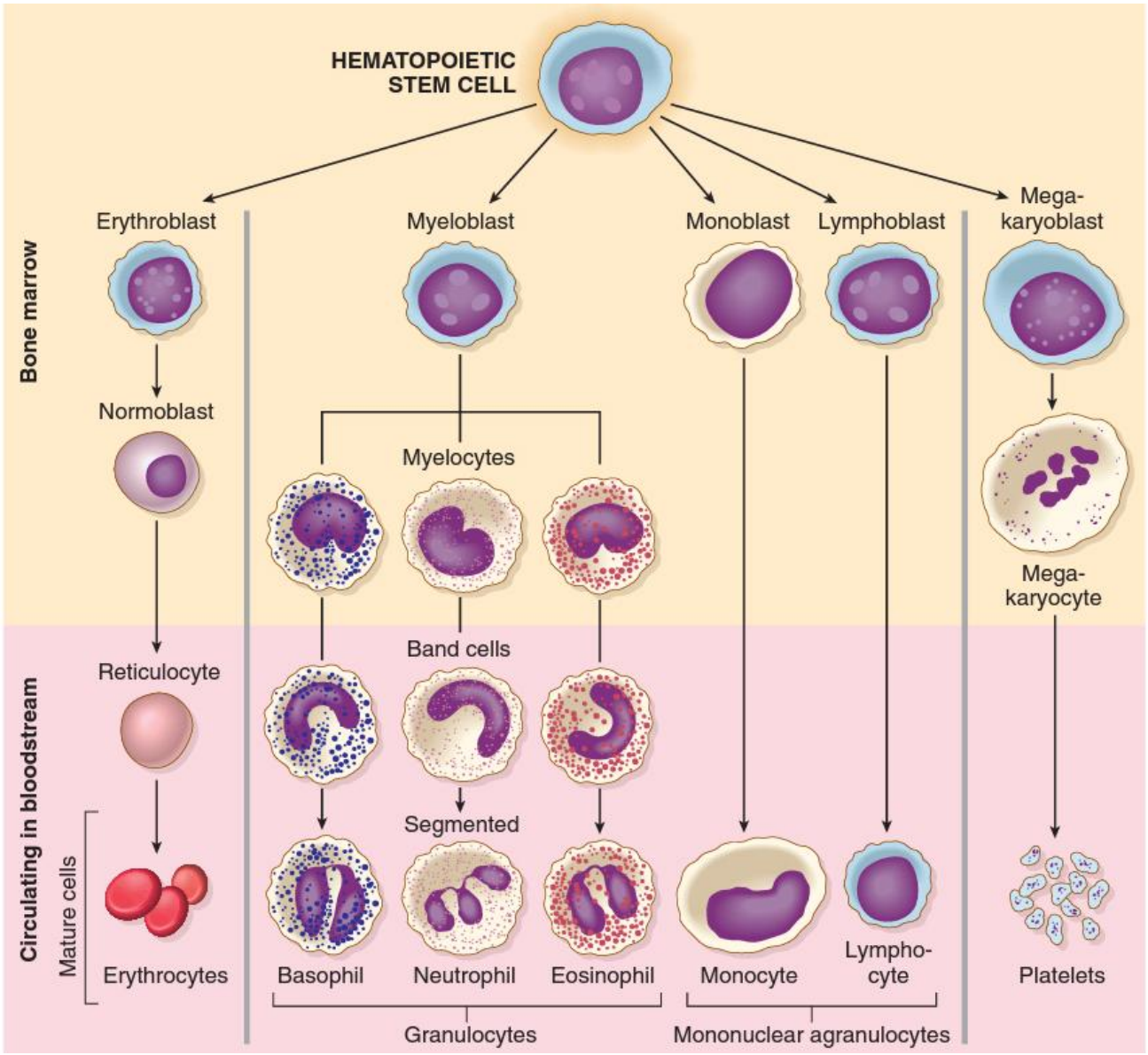


Figure 5-1. Stages in blood cell development (hematopoiesis). All blood cells originate from hematopoietic stem cells. Notice that the suffix *–blast* indicates immature forms of all cells.

Erythrocytes. As a red blood cell matures, it loses its nucleus and assumes the shape of a biconcave disk. This shape (a hollow surface on each side of the cell) allows for a large surface area so that absorption and release of gases (oxygen and carbon dioxide) can take place (Figure 5-2). Red cells contain the unique protein **hemoglobin**, composed of **heme** (iron-containing pigment) and **globin** (protein). Hemoglobin enables the erythrocyte to carry oxygen. The combination of oxygen and hemoglobin (oxyhemoglobin) produces the bright red color of blood.

Figure 5-2. Normal erythrocytes (red blood cells)

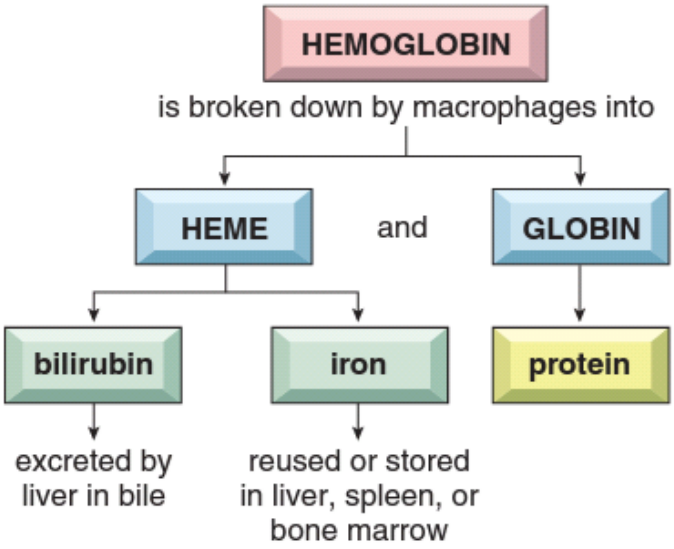


Figure 5-3. The breakdown of hemoglobin

Erythrocytes originate in the bone marrow. Erythrocytes live and fulfill their role of transporting gases for about 120 days in the bloodstream. After this time, **macrophages** (in the spleen, liver, and bone marrow) destroy the worn-out erythrocytes. This process is called **hemolysis**. From 2 to 10 million red cells are destroyed each second, but because they are constantly replaced, the number of circulating cells remains constant (4 to 6 million per µL).

Leukocytes. White blood cells (7000 to 9000 cells per µL) are less numerous than erythrocytes, but there are five different types of mature leukocytes, shown in Figure 5-4. These are three polymorphonuclear granulocytic leukocytes (neutrophil, eosinophil, and basophil) and two mononuclear agranulocytic leukocytes (lymphocyte and monocyte).

The granulocytes, or **polymorphonuclear leukocytes** (**PMNs**), are the most numerous (about 60%). **Basophils** contain granules that stain dark blue with a basic (alkaline) dye. These granules contain heparin (an anticlotting substance) and histamine (a chemical released in allergic responses). **Eosinophils** contain granules that stain with eosin, a red acidic dye. These granules increase in allergic responses and engulf substances that trigger the allergies. **Neutrophils** contain granules that are neutral; they do not stain intensely and show only a pale color. Neutrophils are **phagocytes** (phag/o means to eat or swallow) that accumulate at sites of infection, where they ingest and destroy bacteria.

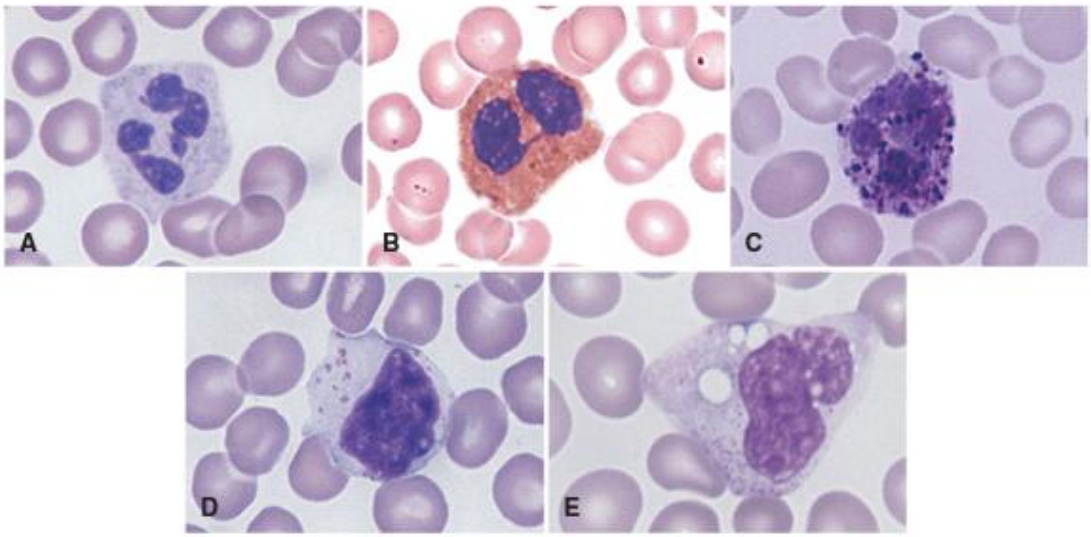


Figure 5-4. Leukocytes. (A) **Neutrophil**/ (B) **Eosinophil**/ (C) **Basophil**/ (D) **Lymphocyte**/ (E) **Monocyte**

Mononuclear (containing one large nucleus) leukocytes do not have large numbers of granules in their cytoplasm, but they may have a few granules. These are **lymphocytes** and **monocytes** (see Figure 5-3). Lymphocytes are made in bone marrow and lymph nodes and circulate both in the bloodstream and in the parallel circulating system, the lymphatic system.

Lymphocytes play an important role in the **immune response** that protects the body against infection. They can directly attack foreign matter and, in addition, make antibodies that neutralize and can lead to the destruction of foreign bacteria and viruses. Monocytes are phagocytic cells that also fight disease. They move from the bloodstream into tissues and dispose of dead and dying cells and other tissue debris by phagocytosis.

Platelets (thrombocytes). Platelets are formed in red bone marrow from giant cells with multilobed nuclei called megakaryocytes. Tiny fragments of a megakaryocyte break off to form platelets. The main function of platelets is to help blood to clot.

Plasma. Plasma, the liquid part of the blood, consists of water, dissolved proteins, sugar, wastes, salts, hormones, and other substances. The four major plasma proteins are **albumin**, **globulins**, **fibrinogen**, and **prothrombin**.

Albumin maintains the proper proportion (and concentration) of water in the blood. Because albumin cannot pass easily through capillary walls, it remains in the blood and carries smaller molecules bound to its surface. It attracts water from the tissues back into the bloodstream and thus opposes the water's tendency to leave the blood and leak out into tissue spaces. Edema (swelling) results when too much fluid from blood "leaks" out into tissues.

Globulins are another component of blood and one of the plasma proteins. There are alpha, beta, and gamma globulins. The gamma globulins are **immunoglobulins**, which are antibodies that bind to and sometimes destroy antigens (foreign substances).

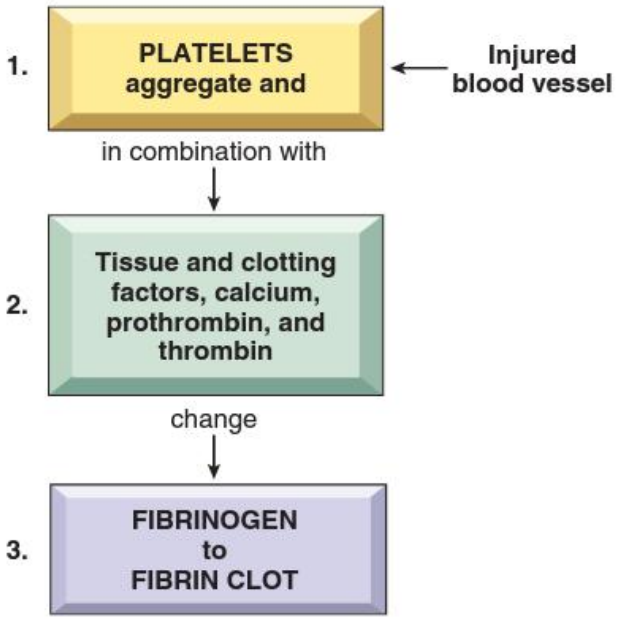


Figure 5-5. The sequence of events in blood clotting

Fibrinogen, and prothrombin are clotting proteins. Blood clotting, or **coagulation**, is a complicated process involving many different substances and chemical reactions. The final result is the formation of a fibrin clot from the plasma protein **fibrinogen**. Platelets are important in beginning the process following injury to tissues or blood vessels. The platelets become sticky and collect at the site of injury. Then, in combination with tissue and clotting factors, plus calcium, **prothrombin**, and thrombin, fibrinogen is converted to fibrin to form a clot (Figure5-5).

The fibrin threads form the clot by trapping red blood cells. Then the clot retracts into a tight ball, leaving behind a clear fluid called **serum**. Normally, clots (thrombi) do not form in blood vessels unless the vessel is damaged or the flow of blood is impeded. **Anticoagulant substances** in the bloodstream inhibit blood clotting, so clots do not form. Heparin, produced by tissue cells (especially in the liver), is an example of an anticoagulant. Other drugs such as **warfarin** (**Coumadin**) are given to patients with thromboembolic diseases to prevent the formation of clots.

(adapted from Davi-Ellen Chabner, The Language of Medicine, ninth edition – Saunders, Elsevier)

Ex. 3. Choose the right answer, based on the information from the text:

1. Formed elements are a) blood cells

b) proteins
c) clots

2. Blood cells originate in
a) blood vessels
b) bone marrow
c) heart

3. Hemoglobin is contained in
a) erythrocytes
b) leukocytes
c) platelets

4. Absorption of gases takes place in
a) erythrocytes
b) leukocytes
c) platelets

5. Hemolysis is the process
a) cells becoming mature
b) destruction of ruined erythrocytes
c) blood clotting

6. Phagocytic cells are
a) Basophils, Neutrophils and lymphocytes
b) Lymphocytes and monocytes
c) Neutrophils, monocytes and eosinophils

7. Blood clotting proteins are
a) Hemoglobin and immunoglobulin
b) fibrinogen, and prothrombin
c) albumin and fibrin

8. Heparin and warfarin are
a) anticoagulant substances
b) antigens
c) antibodies

Ex. 4. Give Russian equivalents for:

The primary function; to maintain a constant environment; transport nutrients, gases, and wastes; sites of secretion in glands; constitute 45% of the blood volume; a solution of water, proteins, sugar, salts, hormones, and vitamins; immature cells; a large surface area; the unique protein; an anticlotting substance; ingest and destroy bacteria; attack foreign matter; the proper proportion of water in the blood.

Ex. 5. Give English equivalents for:

Бороться с инфекцией; стволовые клетки; под влиянием белков; отработаннные эритроциты; аллергические реакции; место раны.

Ex. 6. Arrange the words in pairs of synonyms:

1. originate in	a) absorb
2. allow	b) arise from
3. engulf	c) balance, compensate
4. trigger	d) carry, move
5. fulfill	e) coagulate
6. transport	f) enable
7. take place	g) happen

8. neutralize — h) initiate, cause
9. dispose (of) — i) get rid of, throw away
10. clot — j) obstruct
11. impede — k) perform

Ex. 7. Combine the following words into verb combinations:

a) maintain	a) the unique protein hemoglobin
b) transport	b) in the bone marrow
c) fight	c) foreign matter
d) originate	d) a constant environment / the proper proportion of water
e) arise	e) the role / function
f) contain	f) infection
g) produce	g) bacteria
h) fulfill	h) from the hematopoietic stem cells
i) ingest and destroy	i) the bright red color of blood
j) attack	j) nutrients, gases, and wastes

Ex. 8. Translate the combinations of derivatives into Russian:

to clot – clotting – anticlotting – clot
to neutralize – neutral – neutralization – neutralizer
to destroy – destruction
to differentiate – differentiated – different – difference
to coagulate – coagulation – coagulant – anticoagulant
to bleed – bleeding – blood
to infect – infectious – infection
to injure – injury
to fight – fight
to originate – original – origin
to mature – mature – immature – maturation
allergy – allergic
to phagocytose – phagocytic – phagocyte – phagocytosis

Ex. 9. Complete the sentences with the appropriate word from exercise 8:

1. Some people have an **...** reaction to penicillin.
2. Several train passengers received serious **…** in the crash.
3. **…** begins almost instantly after an injury to the blood vessel has damaged the endothelium lining the vessel.
4. Neutrophils and monocytes are the most **…** of the white blood cells; they ingest foreign particles, bacteria.

5. Although the technology **…** in the UK, it has been developed in the US.
6. Many important historical documents were **…** in the fire.
7. He's very **…** for his age.
8. He is unable to **…** between fantasy and reality.
9. An artery carries more **…** than does a vein or capillary.
10. Platelets are essential for blood **…** .

Ex. 10. Study the different types of <u>leukocytes</u> and their functions. Fill in the gaps with the words from the box:

allergic	**infection**	**phagocytic**
heparin	**response**	**histamine**

Leukocyte	**Function**
Granulocytes	
Basophil	Contains **…(1)** (prevents clotting) and **…(2)** (involved in allergic responses)
Eosinophil	Phagocytic cell involved in **…(3)** reactions
Neutrophil	Phagocytic cell that accumulates at sites of **…(4)**
Mononuclear Cells	
Lymphocyte	Controls the immune **…(5)**; makes antibodies to antigens
Monocyte	**…(6)** cell that becomes a macrophage and digests bacteria

Ex. 11. Translate the sentences about <u>erythrocytes</u> into English:

Красные кровяные клетки представляют собой двояковогнутые диски без ядра. Эритроциты содержат пигмент гемоглобин, который придает красный цвет крови. Гемоглобин – красный белок отвечает за транспортировку кислорода в крови.

Формирование эритроцитов происходит в костном мозге. Продолжительность жизни эритроцита — 3-4 месяца, разрушение (гемолиз) происходит в печени и селезенке.

Ex. 12. Match the functions of <u>plasma proteins</u> with their functions:

Plasma protein	**Function**
Albumin	is converted to thrombin in the clotting process
Globulins	is converted to fibrin in the clotting process.
Fibrinogen	maintains the proper amount of water in the blood.
Prothrombin	are involved in defense mechanisms of the body

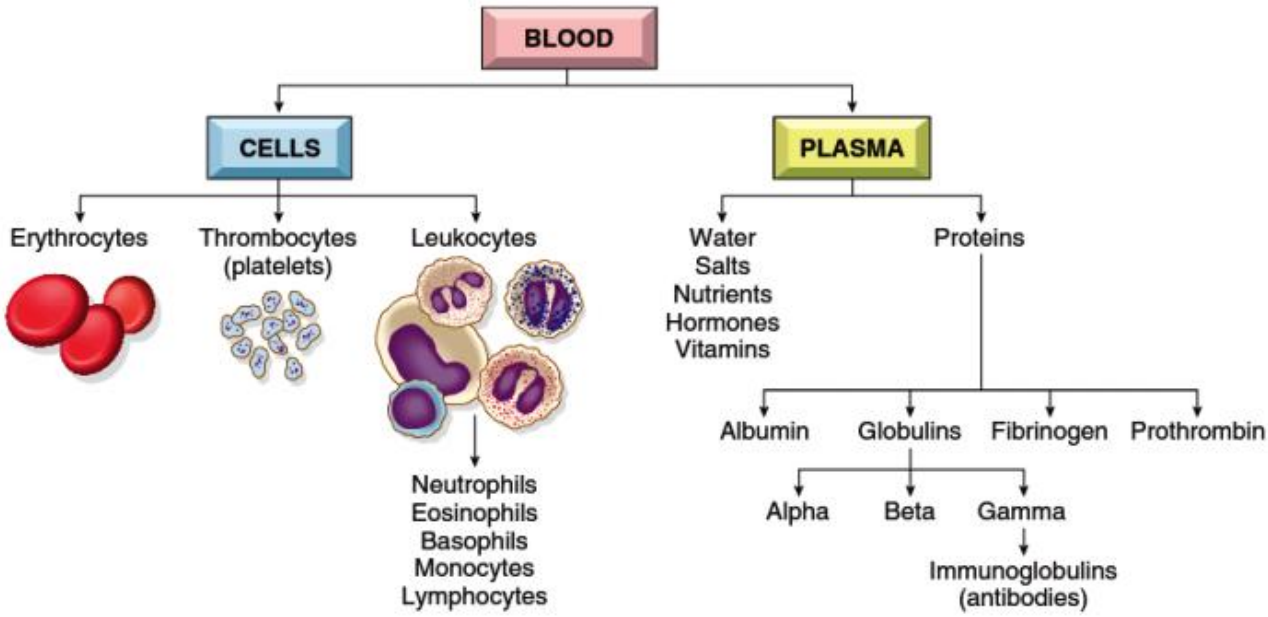
Ex. 13. Match the following terms related to <u>blood clotting</u> with their meanings as given below:

coagulation	heparin	thrombin
fibrin	prothrombin	warfarin
fibrinogen	serum	(Coumadin)

1. anticoagulant substance found in liver cells, bloodstream, and tissues
2. protein threads that form the basis of a blood clot
3. plasma protein that is converted to thrombin in the clotting process
4. plasma minus clotting proteins and cells
5. drug given to patients to prevent formation of clots
6. plasma protein that is converted to fibrin in the clotting process
7. process of clotting
8. enzyme that helps convert fibrinogen to fibrin

Ex. 14. Make an outline of the blood clotting process.

Ex. 15. Study the table and speak on the topic "The composition of blood and its functions"



Ex. 16. Read and translate the text:

Blood types

Although all blood is made of the same basic elements, not all blood is alike. In fact, there are eight different common blood types, which are determined by the presence or absence of certain antigens – substances that can trigger an immune

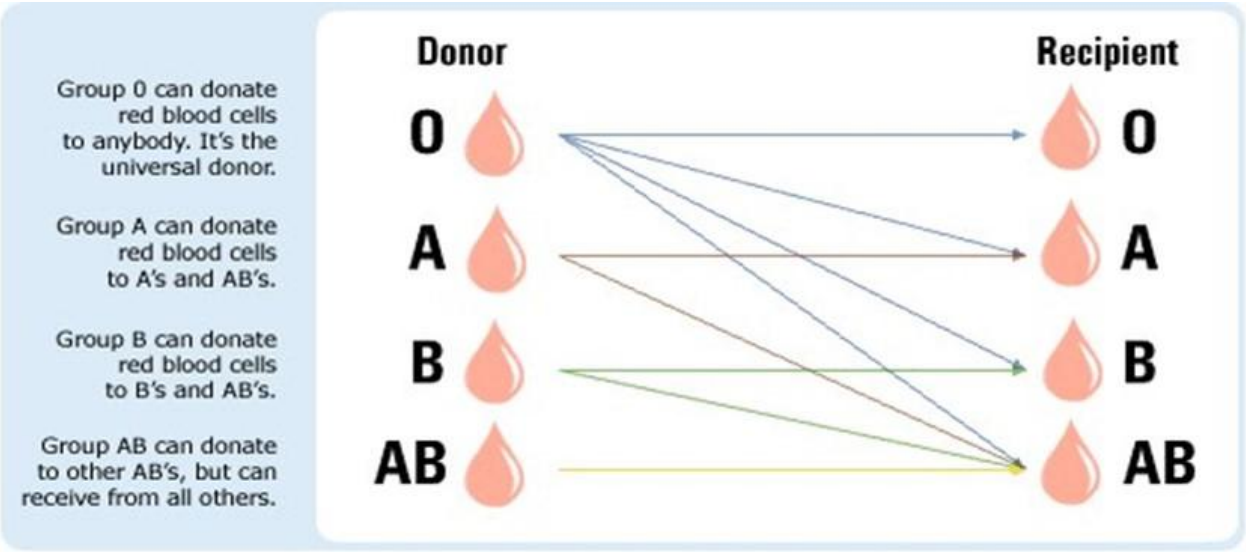
response if they are foreign to the body. Since some antigens can trigger a patient's immune system to attack the transfused blood, safe blood transfusions depend on careful blood typing and cross-matching.

The ABO Blood Group System:

There are four major blood groups determined by the presence or absence of two antigens – A and B – on the surface of red blood cells:

- **Group A** – has only the A antigen on red cells (and B antibody in the plasma)
- **Group B** – has only the B antigen on red cells (and A antibody in the plasma)
- **Group AB** – has both A and B antigens on red cells (but neither A nor B antibody in the plasma)
- **Group O** – has neither A nor B antigens on red cells (but both A and B antibody are in the plasma)

There are very specific ways in which blood types must be matched for a safe transfusion. See the chart below:



In addition to the A and B antigens, there is a third antigen called the Rh factor, which can be either present (+) or absent (–). In general, Rh negative blood is given to Rh-negative patients, and Rh positive blood or Rh negative blood may be given to Rh positive patients.

- The universal red cell donor has Type O negative blood type.
- The universal plasma donor has Type AB blood type.

(from http://www.redcrossblood.org/learn-about-blood/blood-types)

Ex. 16. Read the text again and answer the questions:

1. Do all people have the same blood, in spite of the same elements?
2. What is the blood type determined by?
3. What are the 4 blood type groups? How do they correspond in English and in Russian?
4. Who are donors and recipients?
5. What does the Rh factor indicate?
6. Why is it important to match blood types for a safe transfusion?

Ex. 17. Form different parts of speech from the following words and give the meanings:

Donor, recipient, transfusion; presence; absence.

Text 2. Pathologic conditions of the blood

Ex. 1. Before reading the text, study the topical vocabulary.

Professional medical terms:

Word	**Pronunciation**	**Meaning**
anemia	/əˈniːmiə/	анемия, малокровие
iron deficiency anemia	/aɪən dɪˈfɪʃ(ə)nsi əˈniːmiə/	железодефицитная анемия
aplastic anemia	/eɪˈplæstɪk əˌniːmɪə/	апластическая анемия
pancytopenia	/ˌpænsaɪtə(ʊ)ˈpiːniə/	панцитопения (низкое содержание всех форменных элементов крови)
antibiotic	/ˌæntibaɪˈɒtɪk/	антибиотик
hemolytic anemia	/ˌhiːməˈlɪtɪk əˈniːmiə/	гемолитическая анемия
congenital spherocytic anemia (hereditary spherocytosis)	/kənˈdʒenɪt(ə)l sfɪərə(ʊ)ˈsaɪtɪk əˈniːmiə/ /hɪˈredɪt(ə)ri sfɪərə(ʊ)saɪˈtəʊsɪs/	врожденная сфероцитарная анемия (наследственный сфероцитоз)
pernicious anemia	/pəˈnɪʃəs əˈniːmiə/	пернициозная анемия
sickle cell anemia	/ˌsɪkəl sel əˈniːmiə/	серповидноклеточная анемия, дрепаноцитарная анемия
infarction	/ɪnˈfɑːkʃən/	инфаркт

ischemia	/ɪˈskiːmiə/	ишемия
thalassemia	/ˌθæləˈsiːmɪə/	талассемия, мишеневидно-клеточная гемолитическая анемия
hemochromatosis	/ˈheməkrəʊmətəʊsɪs/	гемохроматоз
diabetes	/ˌdaɪəˈbiːtiːz/	сахарный диабет
polycythemia vera erythremia	/ˌpɒlɪsaɪˈθiːmɪə ˈvɪərə/ /ˌerɪˈθiːmɪə/	истинная (первичная) полицитемия эритремия
phlebotomy	/flɪˈbɒtəmi/	флеботомия, вскрытие вены
leukemia	/luːˈkiːmɪə/	лейкемия, лейкоз, белокровие
lymphadenopathy	/ˌlɪmfædɪˈnɒpəθi/	увеличение лимфатических узлов
splenomegaly	/ˌspliːnə(ʊ)ˈmɛg(ə)li/	увеличение селезёнки
hepatomegaly	/heptəˈmegəlɪ/	гепатомегалия; увеличение печени
granulocytosis	/ˈgrænjʊlə(ʊ)ˌsaɪtəʊsɪs/	гранулоцитоз (увеличенное содержание в крови всех видов гранулоцитов)
mononucleosis	/ˌmɒnə(ʊ)njuːklɪˈəʊsɪs/	мононуклеоз
lymph node	/ˈlɪmf ˌnoʊd/	лимфатический узел
hemophilia	/ˌhiːməˈfɪlɪə/	гемофилия, кровоточивость
purpura	/ˈpəːpjʊrə/	пурпура (геморрагическая сыпь); розовая сыпь
hemorrhage	/ˈhemərɪdʒ/	кровоизлияние; кровотечение
multiple myeloma	/ˌmʌltɪpl ˌmaɪəˈləʊmə/	множественная миелома
cardiac failure	/ˈkɑːdi.æk ˈfeɪljə/	сердечная недостаточность

Verbs:

Word	**Pronunciation**	**Meaning**
lack smth	/læk/	недоставать, отсутствовать
treat	/triːt/	лечить
inherit	/ɪnˈherɪt/	наследовать
require	/rɪˈkwaɪə/	требовать

Adjectives:

Word	Pronunciation	Meaning
fragile	/ˈfrædʒaɪl/	хрупкий
excessive	/ɪkˈsesɪv/ ALSO /ekˈsesɪv/	избыточный, чрезмерный
hereditary	/hɪˈredɪt(ə)ri/	наследственный
inherited	/ɪnˈherɪtɪd/	наследственный
crescent, or sickle	/ˈkres(ə)nt/ ˌsɪkəl	серповидный
hyperplastic	/haɪpəˌplæstɪk/	гиперпластический

Ex. 2. Read the text and answer the following questions:

1. What types of pathologic conditions of the blood are there?
2. Name the diseases of red blood cells.
3. What is anemia?
4. What treatment is required in aplastic anemia?
5. What makes erythrocytes fragile in hereditary spherocytosis?
6. What helps vitamin B12 get absorbed into the body?
7. What type of anemia is typical for Mediterranean people?
8. What type of anemia is typical for black people of African background?
9. Name the diseases of white blood cells.
10. What causes leukemia?
11. What does hereditary lack of blood clotting factors cause?
12. How do doctors treat multiple myeloma?

Diseases of red blood cells

1. Anemia. Deficiency in erythrocytes or hemoglobin. The most common type of anemia is **iron deficiency anemia**; it is caused by a lack of iron, which is required for hemoglobin production.

Aplastic anemia – failure of blood cell production in the bone marrow. The cause of most cases of aplastic anemia is unknown (idiopathic), but some have been linked to benzene exposure and to antibiotics such as chloramphenicol. **Pancytopenia** occurs when stem cells fail to produce leukocytes, platelets, and erythrocytes. Blood transfusions prolong life, allowing the marrow time to resume its normal functioning, and antibiotics control infections. Bone marrow transplantation and regimens of drugs that inhibit the immune system are successful treatments in cases in which spontaneous recovery is unlikely.

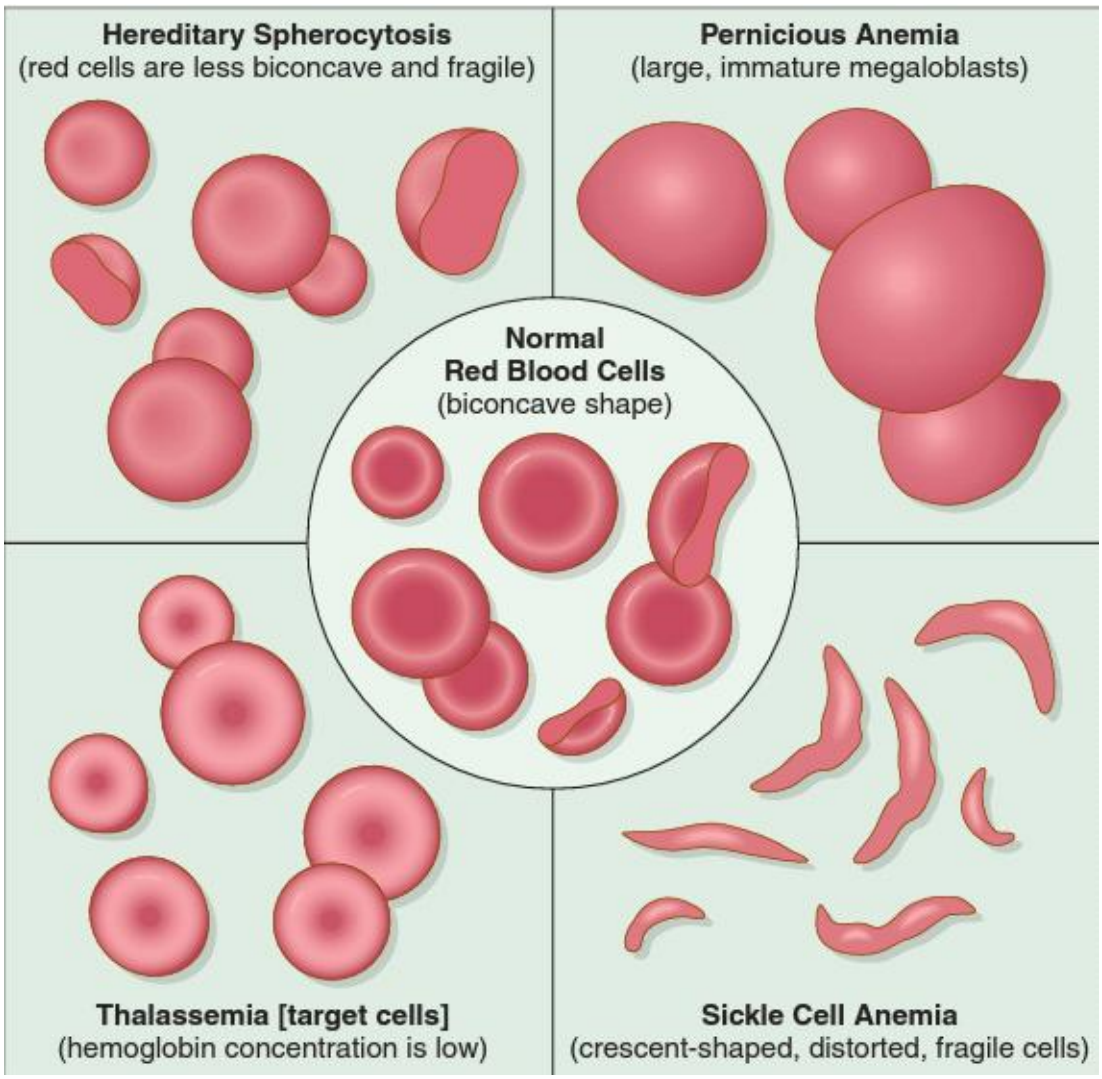


Figure 5-5. Normal red blood cells and the abnormal cells in several types of anemia

Other types of anemia include:

Hemolytic anemia – reduction in red cells due to excessive destruction. One example of hemolytic anemia is **congenital spherocytic anemia** (**hereditary spherocytosis**). Instead of their normal biconcave shape, erythrocytes become spheroidal. This rounded shape makes them fragile and easily destroyed (hemolysis). Shortened red cell survival results in increased reticulocytes in blood as the bone marrow compensates for hemolysis of mature erythrocytes. Because the spleen destroys red cells, removal of the spleen usually improves this anemia.

Pernicious anemia – lack of mature erythrocytes caused by inability to absorb vitamin B12 into the body. Vitamin B12 is necessary for the proper development and maturation of erythrocytes. Although vitamin B12 is a common constituent of food (liver, kidney, sardines, egg yolks, oysters), it cannot be absorbed

into the bloodstream without the aid of a special substance called **intrinsic factor** that is normally found in gastric juice. People with pernicious anemia lack this factor in their gastric juice, and the result is unsuccessful maturation of red blood cells, with an excess of large, immature, and poorly functioning cells in the bone marrow and large, often oval red cells (macrocytes) in the circulation. Treatment is administration of vitamin B12 for life.

Sickle cell anemia – hereditary condition characterized by abnormal sickle shape of erythrocytes and by hemolysis. The crescent, or sickle, shape of the erythrocyte is caused by an abnormal type of hemoglobin (hemoglobin S) in the red cell. The distorted, fragile erythrocytes cannot pass through small blood vessels normally, leading to thrombosis and infarction (local tissue death from ischemia). The genetic defect (presence of the hemoglobin S gene) is particularly prevalent in black persons of African or African American ancestry and appears with different degrees of severity.

Thalassemia – inherited defect in the ability to produce hemoglobin, usually seen in persons of Mediterranean background.

2. Hemochromatosis. Excess iron deposits throughout the body. Hepatomegaly, skin pigmentation, diabetes, and cardiac failure may occur.

3. Polycythemia vera. General increase in red blood cells (erythremia). Blood consistency is thick because of greatly increased numbers of erythrocytes. The bone marrow is hyperplastic, and leukocytosis and thrombocytosis commonly accompany the increase in red blood cells. Treatment consists of reduction of red cell volume to normal levels by phlebotomy (removal of blood from a vein) and by suppressing blood cell production with myelotoxic drugs.

Diseases of white blood cells

Leukemia. Increase in cancerous white blood cells (leukocytes). Acute leukemias have common clinical characteristics: abrupt onset of symptoms, fatigue, fever, bleeding, bone pain, lymphadenopathy, splenomegaly, and hepatomegaly. If the disease has spread to the spinal canal, headache and vomiting may occur. In addition, because normal blood cells are crowded out, patients have little defense against infection.

All forms of leukemia are treated with chemotherapy, using drugs that prevent cell division and selectively injure rapidly dividing cells. Transplantation of normal bone marrow from donors of similar tissue type is successful in restoring normal bone marrow function in some patients with acute leukemia. This procedure is performed after high-dose chemotherapy, which is administered to eliminate the leukemic cells.

Granulocytosis. Abnormal increase in granulocytes in the blood. An increase in neutrophils in the blood may occur in response to infection or inflammation of any type.

Eosinophilia is an increase in eosinophilic granulocytes, seen in certain allergic conditions. Basophilia is an increase in basophilic granulocytes seen in certain types of leukemia.

Mononucleosis. Infectious disease marked by increased numbers of leukocytes and enlarged cervical lymph nodes. This disease is transmitted by the Epstein-Barr virus (EBV). No treatment is necessary for EBV infections. Antibiotics are not effective for self-limited viral illnesses. Rest during the period of acute symptoms and slow return to normal activities are advised.

Disorders of blood clotting

Hemophilia. Excessive bleeding caused by hereditary lack of blood clotting factors (factor VIII or IX) necessary for blood clotting. Treatment consists of administration of the deficient factor.

Purpura. Multiple pinpoint hemorrhages and accumulation of blood under the skin.

Disease of bone marrow cells

Multiple myeloma. Malignant neoplasm of bone marrow. The malignant cells (lymphocytes that produce antibodies) destroy bone tissue and cause overproduction of immunoglobulins. Treatment is with analgesics, radiotherapy, various doses of chemotherapy, and special orthopedic supports.

(adapted from Davi-Ellen Chabner, The Language of Medicine, ninth edition – Saunders, Elsevier)

Ex. 3. Give Russian equivalents for:

Deficiency in erythrocytes; blood cell production; fail to produce leukocytes, platelets, and erythrocytes; bone marrow transplantation; due to excessive destruction; proper development and maturation of erythrocytes; hereditary condition; skin pigmentation; common clinical characteristics; defense against infection; chemotherapy; prevent cell division; allergic conditions; enlarged lymph nodes; hereditary lack of blood clotting factors; overproduction of immunoglobulins; radiotherapy.

Ex. 4. Give English equivalents for:

Распространенный тип; переливание крови; продлить жизнь; удаление селезенки; наследственный дефект; производить гемоглобин; усталость; головная боль; воспаление любого типа; злокачественные новообразования.

Ex. 5. Arrange the words in pairs of synonyms:

1. deficiency in
2. failure
3. crescent
4. require
5. prolong
6. remove

7.	hereditary	d)	need
8.	fragile	e)	component
9.	constituent	f)	lack of
10.	due to	g)	extend, make longer
a)	sickle	h)	because of
b)	take away	i)	inability
c)	delicate	j)	inherited, congenital

Ex. 6. Complete the table with the correct form of the word:

Verb	**Noun**
…	defense
remove	…
…	failure
treat	…
…	(blood) consistency
constitute	…
…	production – overproduction
inherit	…
…	constituent
infect	…
…	lack of something

Ex. 7. Fill in the gaps with the appropriate form of the words from exercise 6. Pay attention to Verb Tenses:

1. She **…** a fortune from her father.
2. In Japan, the country's National Health Scheme takes total care of medical **…** for heart problems.
3. Leukocytes help the body to **…** against infections.
4. There is a **…** of parking space in the city centre.
5. What are the basic **…** of the mixture?
6. Bone marrow is engaged in the **…** of all blood cells.
7. Some patients suffer from **…** diseases.
8. The ability to **…** hemoglobin is very important for the proper condition of blood.
9. Patients with iron deficiency anemia **…** iron.
10. Blood transfusion is advised when stem cells **…** to produce leukocytes, platelets, and erythrocytes.

11.The kidneys play an important role the **…** of waste products from the blood.

12.Patients with serious cases are **…** in hospitals.

13.The medical staff **…** of 5 doctors and some nurses.

14.Mosquitoes can **…** people with some viruses.

Ex. 8. Study the difference in *lack something / lack of something* and then complete the sentences with them:

Lack something is a verb meaning *"*be without or deficient in something:

*E.g. He just **lacks** a little confidence.*

*What we **lack** in this house is space to store things.*

Lack of something is a noun meaning "the fact that something is not available or that there is not enough of it".

*E.g. Her only problem is **a lack of** patience.*

*There is **no lack of** entertainment aboard ship.*

1. Hospitals are being forced to close departments because of lack **…** money.
2. Lack **…** sleep had made him irritable.
3. His death was not due **to** any lack **…** care.
4. We lack … time to wait for him.
5. She also found signs of hypoxic damage to nerve cells due **to** lack **…** oxygen before death.

Ex. 9. Study the meanings of the verb *treat* and translate the sentences into Russian:

1. Give medical care:

*E.g. Two firefighters were **treated** for smoke inhalation.*

*Western medicine tends to **treat** the symptoms and not the cause.*

2. Deal with someone or something in a particular way:

*E.g. He **treated** his wife very badly.*

*It's wrong to **treat** animals as if they had no feelings.*

3. to buy or pay for something for another person:

*E.g. I'm going to **treat** you **to** some ice cream.*

Ex. 10. Fill in the gaps with prepositions where necessary:

1. We lack … three members of staff due **…** illness.
2. He suffered from an increase … erythrocytes.
3. Laboratory tests suggest that the new drug may be used to treat … cancer.
4. Three patients required … operations.
5. The blood tests revealed a deficiency … certain key minerals and vitamins.
6. Any increase … production would be helpful.

7. The rebel's only form of defence … soldiers' guns was stick and stones.

Ex. 11. Translate the sentences into English.

1. В составе человеческой крови находится три группы клеток – эритроциты, лейкоциты и тромбоциты. Каждые из них ответственны за определенную функцию. В частности,эритроциты – это красные тельца, содержащие гемоглобин. Они не только влияют на цвет крови, но и выполняют важную миссию – доставляют кислород из легких в разные уголки организма. Когда эритроцитов недостаточно или содержание гемоглобина очень низкое, развивается анемия.
2. Анемия опасна и тем, что развивается часто в сочетании с заболеваниями, которые могут привести к тяжелым последствиям. К числу таких болезней, например, относятся разного рода воспалительные и инфекционные заболевания, злокачественные опухоли.
3. За счет различных форм данного патологического состояния, в основе которых лежат разные причины, малокровие также представляет угрозу. Ведь, например, недостаток витамина В12, который провоцирует возникновение одного из видов болезни крови, пагубно сказывается в целом на состоянии здоровья.
4. **Апластическая анемия.** Данный подвид специалистами относится к так называемым депрессивным кровяным болезням. Базируется на значительном укорачивании жизни эритроцитов, также проявляется скоротечным разрушением кровяных клеток в костном мозге. Такой вид анемии считается достаточно тяжелой формой и требует медицинского вмешательства.
5. **Серповидноклеточная анемия.** Считается патологическим состоянием, которое передается по наследству. В норме эритроциты имеют двояковогнутую форму, по виду напоминающую диск. Однако в случае развития данной патологии кровяные тельца видоизменяются во время передачи кислорода, становятся похожими на серп, отсюда и название анемии. Происходит это по причине того, что нормальный гемоглобин заменяется на патологический.
6. Лейкемия (лейкоз, гемобластоз) – это онкологическое заболевание, при котором клетки костного мозга мутируют, не развиваясь в нормальные зрелые лейкоциты, а становясь раковыми клетками.

Ex. 12. Make an outline of Text 2.

Ex. 13. Speak on the topic "Pathologic conditions of the blood".

UNIT 5 REVISION

Ex. 1. Match the following cells with their definitions as given below.

basophil	hematopoietic	monocyte
eosinophil	stem cell	neutrophil
erythrocyte	lymphocyte	platelet

1. mononuclear white blood cell (agranulocyte) formed in lymph tissue; it is a phagocyte and the precursor of a macrophage
2. thrombocyte or cell fragment that helps blood clot
3. cell in the bone marrow that gives rise to different types of blood cells
4. mononuclear leukocyte formed in lymph tissue; produces antibodies
5. leukocyte with dense, reddish granules having an affi nity for red acidic dye; associated with allergic reactions
6. red blood cell
7. leukocyte (polymorphonuclear granulocyte) formed in the bone marrow; granules do not stain intensely and have a pale color
8. leukocyte (granulocyte) with dark-staining blue granules; releases histamine and heparin

Ex. 2. Give the medical terms for the following descriptions:

1. liquid portion of blood
2. orange-yellow pigment produced from hemoglobin when red blood cells are destroyed
3. iron-containing nonprotein part of hemoglobin
4. proteins in plasma; separated into alpha, beta, and gamma types
5. foreign material that stimulates the production of an antibody
6. plasma protein that maintains the proper amount of water in the blood
7. proteins made by lymphocytes in response to antigens in the blood

Ex. 3. Give short answers for the following:

1. Name four types of plasma proteins.
2. What is hemolysis?
3. What is the Rh factor?
4. A person with type A blood has … antigens and … antibodies in his or her blood.
5. A person with type B blood has … antigens and … antibodies in his or her blood.
6. A person with type O blood has … antigens and … antibodies in his or her blood.
7. A person with type AB blood has … antigens and … antibodies in his or her blood.

8. Can you transfuse blood from a type A donor into a type B recipient? Why or why not?
9. Can you transfuse blood from a type AB donor into a type O recipient? Why or why not?
10. Why is type O the universal donor?
11. What is immunoglobulin?
12. What is differentiation?

Ex. 4. Give the meanings of the following terms:

1. Coagulation
2. Granulocyte
3. Mononuclear
4. Polymorphonuclear
5. Globulins
6. Megakaryocyte
7. Macrophage
8. Hemoglobin
9. Plasma
10. Erythroblast

Ex. 5. Describe the problem in each of the following forms of anemia:

1. iron deficiency anemia
2. pernicious anemia
3. sickle cell anemia
4. aplastic anemia
5. thalassemia

Ex. 6. Choose the term that fits the given definition:

1. Protein in blood; maintains the proper amount of water in the blood:
   a) Hemoglobin
   b) Albumin
   c) Fibrinogen
2. Protein (immunoglobulin) produced by lymphocytes in response to bacteria, viruses, or other antigens:
   a) Antibody
   b) Erythrocyte
   c) Heparin
3. Blood clotting:
   a) Antigen
   b) Immune reaction
   c) Coagulation
4. Red blood cell:
   a) Platelets
   b) Thrombocytes
   c) Erythrocytes
5. Liquid portion of blood; contains water, proteins, salts, nutrients, hormones, and vitamins:

a) Serum
b) Plasma
c) Protein

6. Response of the immune system to foreign invasion:
   a) Allergic response
   b) Immune response
   c) Phagocytosis

7. White blood cell with numerous dark-staining granules: eosinophil, neutrophil, and basophil:
   a) Granulocyte
   b) Agranulocyte
   c) Macrophage

8. Blood protein containing iron; carries oxygen in red blood cells:
   a) Lymphocyte
   b) Hemoglobin
   c) Bilirubin

9. Plasma minus clotting proteins and cells. Clear, yellowish fluid that separates from blood when it is allowed to clot. It is formed from plasma, but does not contain protein-coagulation factors:
   a) Megakaryocyte
   b) basophil
   c) Serum

10. Unspecialized cell that gives rise to mature, specialized forms:
   a) Stem cell
   b) Monocyte
   c) Antigen

UNIT 6. LYMPHATIC AND IMMUNE SYSTEM

Unit 6 goals: Identify the structures of the lymphatic and immune systems and understand how the systems work. Learn basic terminology related to these systems. Recognize terms describing pathologic conditions.

Text 1. Introduction. Relationship between the circulatory systems of blood and lymph. Relation of the lymphatic and the immune systems.

Ex. 1. Before reading the text, study the topical vocabulary.

Professional medical terms:

Word	Pronunciation	Meaning
lymph	/lɪmf/	лимфа
lymphatic system	/lɪmˈfætɪk ˈsɪstəm/	лимфатическая система
immune system	/ɪˈmjuːn ˈsɪstəm/	иммунная система
lymph fluid	/lɪmf ˈfluːɪd/	лимфа, лимфатическая жидкость
lymph node	/ˈlɪmf ˌnoʊd/	лимфатический узел
interstitial fluid	/ˌɪntəˈstɪʃəl ˈfluːɪd/	тканевая жидкость
lymph vessels	/lɪmf ˈves(ə)l/	лимфатические сосуды
drainage	/ˈdreɪnɪdʒ/	дренаж
lipid	/ˈlɪpɪd/	липид, жир
thymus gland	/ˈθaɪməs ɡlænd/	тимус, зобная железа, вилочковая железа
foreign organisms	/ˈfɒrɪn ˈɔːg(ə)nɪz(ə)mz/	инородные организмы

Verbs:

Word	Pronunciation	Meaning
surround	/səˈraʊnd/	окружать
leaked out	/liːk/	вытекать, просочиться
protect	/prəˈtekt/	защищать
mount	/maʊnt/	подняться

Ex. 2. Read the text and answer the following questions:

1. In what way is lymph different from blood?
2. What contains more protein: plasma or lymph?
3. What does lymph originate from?
4. What is interstitial fluid?
5. What are lymph nodes?
6. What does lymph transport proteins to the bloodstream by?
7. How is the lymphatic system related to the immune system?

The lymphatic system and the immune system are considered together in this unit because some aspects of their functions in the body are very closely related.

Lymph is a clear, watery fluid that surrounds body cells and flows in a system of thin-walled lymph vessels (the lymphatic system) that extends throughout the body.

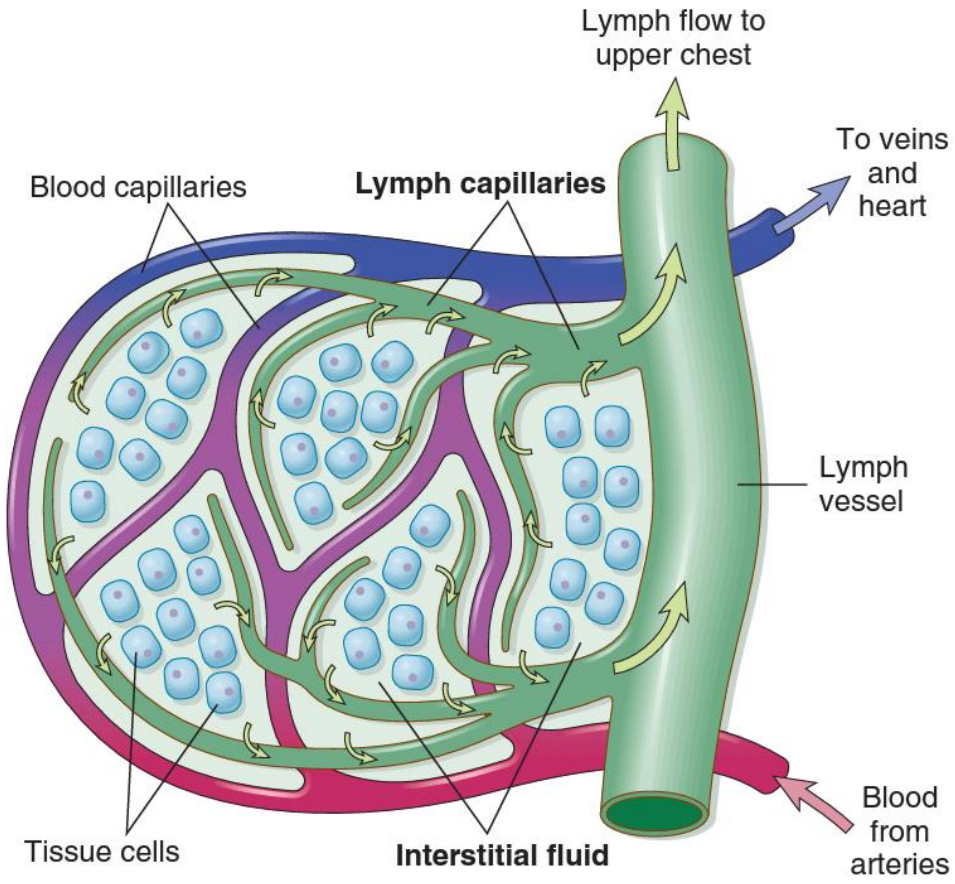


Figure 6-1. Interstitial fluid and lymph capillaries

Lymph differs from blood, but it has a close relationship to the blood system. Lymph fluid does not contain erythrocytes or platelets, but it is rich in two types of white blood cells (leukocytes): **lymphocytes** and **monocytes**. The liquid part of lymph is similar to blood plasma in that it contains water, salts, sugar, and wastes of metabolism such as urea and creatinine, but it differs in that it contains less protein. Lymph actually originates from the blood. It is the same fluid that filters out of tiny blood capillaries into the spaces between cells. This fluid that surrounds body cells is called **interstitial fluid**. Interstitial fluid passes continuously into specialized thin-walled vessels called **lymph capillaries**, which are found coursing through tissue spaces (Figure 6-1).

The fluid in the lymph capillaries, now called **lymph** instead of interstitial fluid, passes through larger lymphatic vessels and through clusters of lymph tissues (**lymph nodes**), finally reaching large lymph vessels in the upper chest. Lymph enters these large lymphatic vessels, which then empty into the bloodstream. Figure 6-2 illustrates the relationship between the blood and the lymphatic systems.

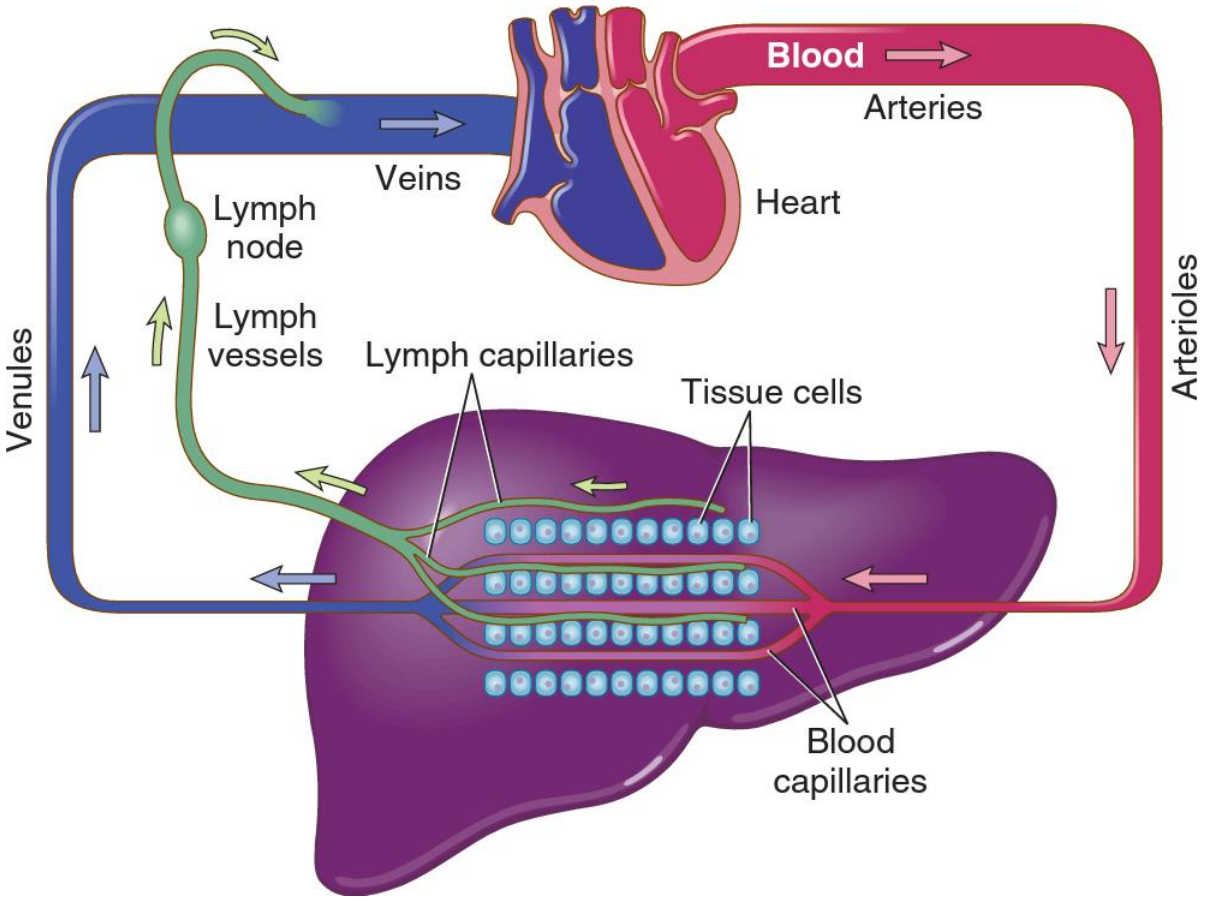


Figure 6-2. Relationship between the circulatory systems of blood and lymph

The lymphatic system has **several functions**. First, it is a drainage system to transport needed proteins and fluid that have leaked out of the blood capillaries (and into the interstitial fluid) back to the bloodstream via the veins.

Second, the lymphatic vessels in the intestines absorb lipids (fats) from the small intestine and transport them to the bloodstream.

A third function of the lymphatic system relates to the **immune system**: the defense of the body against foreign organisms such as bacteria and viruses. Lymphocytes and monocytes, originating in bone marrow, lymph nodes, and organs such as the spleen and thymus gland, protect the body by producing antibodies and by mounting a cellular attack on foreign cells and organisms.

(adapted from Davi-Ellen Chabner, The Language of Medicine, ninth edition – Saunders, Elsevier)

Ex. 3. Read the following statements and say whether they are true or false:

1. The lymphatic system and the immune system are connected with each other.
2. Lymph is a constituent of plasma.
3. Lymph doesn’t contain proteins.

4. Lymph is rich in erythrocytes and lymphocytes.
5. Lymphatic vessels carry interstitial fluid.
6. Lymph nodes are clusters of lymph tissues.
7. One of the functions of the lymphatic system is body protection against foreign organisms.

Ex. 4. Give Russian equivalents for:

Surround body cells; extend throughout the body; is rich in leukocytes; originate from the blood; clusters of lymph tissues; drainage system; via the veins; intestines absorb lipids from the small intestine; the defense of the body against foreign organisms.

Ex. 5. Match the terms with the definitions:

Term	**Definition**
1. interstitial fluid	a) Thin, watery fluid found within lymphatic vessels and collected from tissues throughout the body.
2. lymph	b) Carrier of lymph throughout the body; these vessels empty lymph into veins in the upper part of the chest.
3. lymph capillaries	c) Fluid in the spaces between cells. This fluid becomes lymph when it enters lymph capillaries.
4. lymph node	d) Organ near the stomach that produces, stores, and eliminates blood cells.
5. lymph vessel	e) A collection of stationary solid lymphatic tissue along lymph vessels.
6. spleen	f) Tiniest lymphatic vessels.

Ex. 6. Translate the sentences into English:

1. Лимфа – это практически прозрачная жидкость, которая течет в лимфатических сосудах и омывает все органы.
2. Лимфатическая циркуляция похожа на кровообращение, однако у нее нет насоса, т.е. сердца.
3. Лимфа удаляет из тканей жидкость, белки, загрязняющие вещества и возвращает их в кровь (без токсинов).
4. Лимфатические узлы фильтруют токсины, бактерии, инородные частицы, опухолевые клетки, то есть создают мощную защиту организма.
5. Лимфа представляет собой бесцветную жидкость, которая циркулирует в лимфатической системе.

6. Состав лимфы похож на плазму крови, но с меньшим содержанием белка и сильно варьирует, а также зависит от характера органа, ткани (например, лимфа из кишечника богата липидами).
7. Функции лимфы: удаление избытка жидкости; удаление липидов; защита организма.
8. В лимфе, лимфатических узлах содержатся белые кровяные клетки, которые защищают организм от инфекций.
9. Лимфатические сосуды составляют большую часть иммунной системы. Их роль заключается в ликвидации токсичных веществ из всех тканей организма.
10. В нормальном режиме работы ежедневно через лимфатическую систему проходит 3 — 4 л жидкости, которая на самом деле является побочными продуктами метаболических процессов.
11. Отсутствие физических упражнений, мышечная слабость являются наиболее распространенной причиной недостаточного дренажа токсинов, вредных веществ в суставах, тканях.
12. Так как лимфа, является ответственной за поддержание иммунитета в организме человека, в случае, если она теряет свои функции, в организм начинают моментально проникать различные болезнетворные микробы, бактерии, вирусы, грибки, и прочие опасные для здоровья человека микроорганизмы.
13. Многие эксперты утверждают, что лимфа может нести в себе намного больше информации, чем даже сама кровь человека, так как поступление всех продуктов жизнедеятельности, которые так необходимы для развития клеток, поступают сначала именно в лимфу, и только потом распространяются по крови.
14. Сама лимфа также содержит в себе множество составляющих, которыми ее снабжают органы организма человека на ее функциклирующем пути. К примеру, кишечник является для лимфы проводников различных питательных веществ, в то время, как эндокринные железы поставляют в лимфу гормоны.

Text 2. Lymphatic system

Ex. 1. Before reading the text, study the topical vocabulary.

Professional medical terms:

Word	**Pronunciation**	**Meaning**

(infectious, inflammatory, and cancerous) lesion	/ˈliːʒ(ə)n/	поражение, повреждение
B lymphocyte (bone marrow derived)	/biːˈlɪmfəsaɪt/	В-лимфоцит, костномозговой лимфоцит
T lymphocyte	/tiːˈlɪmfəsaɪt/	Т-лимфоцит, тимусзависимый лимфоцит (лимфоцит вилочковой железы)
cervical lymph node	/ˈsəːvɪk(ə)l ˈlɪmf ˌnoʊd/	шейный лимфатический узел
axillary lymph node armpit	/ækˈsɪlərɪ ˈlɪmf ˌnoʊd/ /ˈɑːmpɪt/	подмышечный лимфатический узел подмышечная впадина
mediastinal lymph node	/ˌmiːdɪəsˈtaɪn(ə)l ˈlɪmf ˌnoʊd/	медиастинальный лимфатический узел
inguinal (groin) lymph node	/ˈɪŋgwɪn(ə)l ˈlɪmf ˌnoʊd/ /grɔɪn/	паховые лимфатические узлы
tonsils	/ˈtɒns(ə)l/	миндалины; гланды
adenoids	/ˈædɪnɔɪdz/	аденоиды
right lymphatic duct	/raɪt lɪmˈfætɪk dʌkt/	правый лимфатический проток
thoracic duct	/θəˈræsɪk dʌkt/	грудной лимфатический проток
hemorrhage	/ˈhemərɪdʒ/	кровотечение, кровоизлияние
splenectomy	/splɪˈnektəmi/	спленэктомия (удаление селезёнки)
fetal life	/ˈfiːt(ə)l laɪf/	эмбриональный период, внутриутробный период развития
immunity	/ɪˈmjuːnəti/	иммунитет
autoimmune disease	/ɔːtəʊɪˈmjuːn dɪˌziːz/	аутоиммунное заболевание
tolerance	/ˈtɒl(ə)r(ə)ns/	переносимость, устойчивость

rupture of the spleen	/ˈrʌptʃə/	разрыв селезенки

Verbs:

Word	**Pronunciation**	**Meaning**
filter lymph	/ˈfɪltə/	фильтровать
trap	/træp/	поймать в ловушку, поглощать
drain	/dreɪn/	процедить, осушать, дренировать, фильтровать
attach to	/əˈtætʃ/	прикреплять, присоединить
inject	/ɪnˈdʒekt/	ввести, внедрять
liberate hemoglobin	/ˈlɪbəreɪt/	высвобождать
take over	/teɪk/	перенимать, взять контроль над
recognize	/ˈrekəgnaɪz/	распознавать

Adjectives:

Word	**Pronunciation**	**Meaning**
swollen	/ˈswəʊlən/	опухший, вздувшийся
essential to life	/ɪˈsenʃ(ə)l/	существенно-важный
susceptible to injury	/səˈseptəbl/	восприимчивый, впечатлительный

Ex. 2. Read the text and answer the following questions:

1. In what way are lymph capillaries similar to veins?
2. What do lymph nodes represent?
3. What are the functions of lymph nodes?
4. What's the role of B lymphocytes and T lymphocytes?
5. What are the main regions of lymph nodes concentration?
6. In what way are tonsils different from adenoids?
7. What are the two large lymphatic ducts?
8. What areas do the two large lymphatic ducts drain? What area is smaller?
9. Where does the lymph enter the bloodstream?
10. What specialized organs are also a part of the lymphatic system?
11. What is the function of the spleen in the body?
12. What important role does the thymus gland play? Where is it located?

13. What is characteristic feature of the thymus gland during fetal life and childhood?

Label Figure 6-3A as you read the following paragraphs.

Lymph capillaries [1] begin at the spaces around cells throughout the body. Like blood capillaries, they are thin-walled tubes. Lymph capillaries carry lymph from the tissue spaces to larger **lymph vessels** [2]. Lymph vessels have thicker walls than those of lymph capillaries and, like veins, contain valves so that lymph flows in only one direction, toward the thoracic cavity. Collections of stationary lymph tissue, called **lymph nodes** [3], are located along the path of the lymph vessels. Each lymph node is a mass of lymph cells and vessels, surrounded by a fibrous, connective tissue capsule.

Lymph nodes not only produce lymphocytes but also filter lymph and trap substances from infectious, inflammatory, and cancerous lesions. Special cells called **macrophages**, located in lymph nodes (as well as in the spleen, liver, and lungs), swallow (phagocytose) foreign substances. When bacteria are present in lymph nodes that drain a particular area of the body, the nodes become swollen with collections of cells and their engulfed debris and become tender. Lymph nodes also fight disease when specialized lymphocytes called **B lymphocytes** (**B cells**), present in the nodes, produce antibodies. Other lymphocytes, the **T lymphocytes** (**T cells**), attack bacteria and foreign cells by accurately recognizing a cell surface protein as foreign, attaching to the foreign or cancerous cells, poking holes in them, and injecting them with toxic chemicals.

Label the major sites of lymph node concentration on Figure 6-3A. These are the **cervical** [4], **axillary** (armpit) [5], **mediastinal** [6], and **inguinal** (groin) [7] regions of the body. Remember that **tonsils** are masses of lymph tissue in the throat near the back of the mouth (oropharynx), and **adenoids** are enlarged lymph tissue in the part of the throat near the nasal passages (nasopharynx).

Lymph vessels all lead toward the thoracic cavity and empty into two large ducts in the upper chest. These are the **right lymphatic duct** [8] and the **thoracic duct** [9]. The thoracic duct drains the lower body and the left side of the head, whereas the right lymphatic duct drains the right side of the head and the chest (a much smaller area) (see Figure 6-3B). Both ducts carry the lymph into **large veins** [10] in the neck, where the lymph then enters the bloodstream.

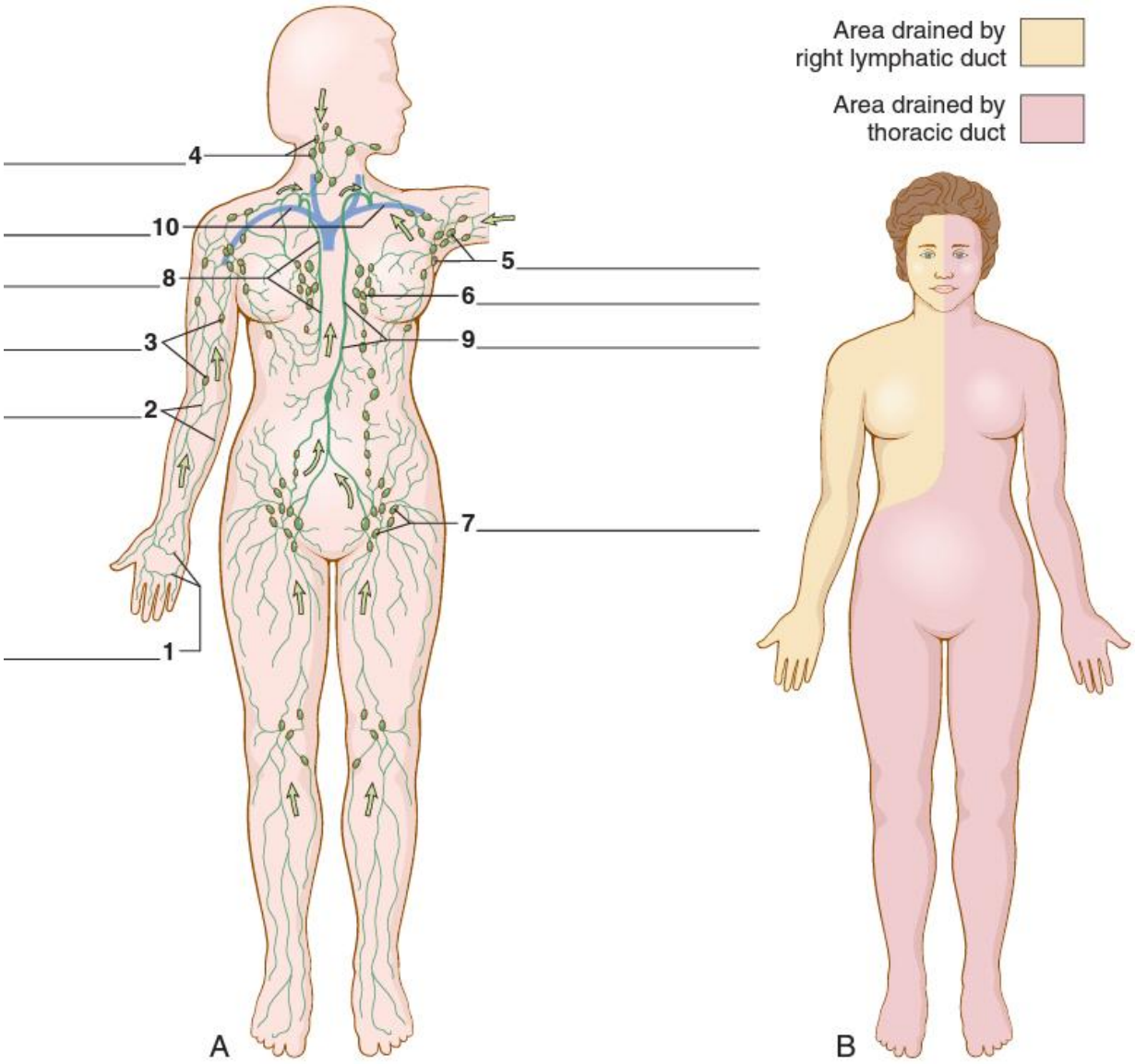


Figure 6-3. Lymphatic system. **(A)** Label the figure according to the descriptions in the text. **(B)** Note the different regions of the body drained by the right lymphatic duct and the thoracic duct.

Spleen and thymus gland.

The spleen and the thymus gland are specialized organs that are also a part of the lymphatic system.

The **spleen** (Figure 6-4A) is located in the left upper quadrant of the abdomen, next to the stomach. Although the spleen is not essential to life, it has several important functions:

1. Destruction of old erythrocytes by macrophages. In the slow-moving circulation of the spleen, red cell breakdown (hemolysis) liberates hemoglobin, which is converted to bilirubin in the liver and then is excreted into the bile.
2. Filtration of microorganisms and other foreign material from the blood.

3. Activation of lymphocytes by antigens filtered from the blood. Activated B cell lymphocytes produce antibodies. Activated T cell lymphocytes attack foreign materials.

4. Storage of blood, especially erythrocytes and platelets.

The spleen is susceptible to injury. A sharp blow to the upper abdomen may cause rupture of the spleen. Massive hemorrhage can occur when the spleen is ruptured, and immediate surgical removal (splenectomy) may be necessary. After splenectomy, the liver, bone marrow, and lymph nodes take over the functions of the spleen.

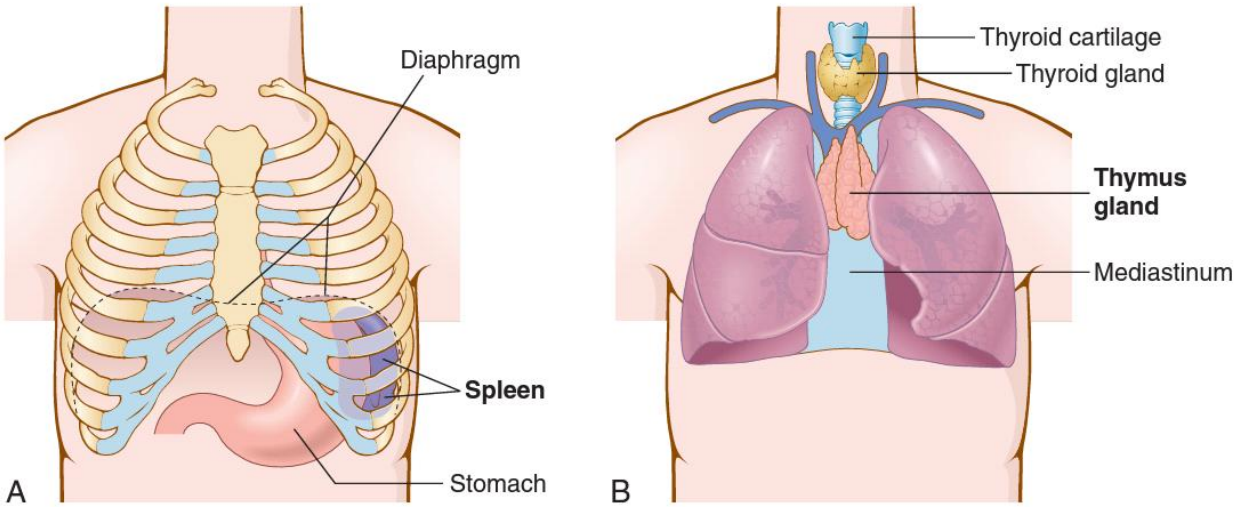


Figure 6-4. (A) Spleen and adjacent structures. **(B) Thymus gland** in its location in the mediastinum between the lungs.

The **thymus gland** (see Figure 6-4B) is a lymphatic organ located in the upper mediastinum between the lungs. During fetal life and childhood it is quite large, but it becomes smaller with age. The thymus gland is composed of nests of lymphoid cells resting on a platform of connective tissue. It plays an important role in the body's ability to protect itself from disease (immunity), especially in fetal life and during the early years of growth. Thus, the thymus gland is important in development of an effective immune system in childhood.

Early in development, in the thymus, lymphocytes learn to recognize and accept the body's own antigens as "self" or friendly. This acceptance of "self" antigens is called **tolerance**. When the tolerance process fails, immune cells react against normal cells, resulting in various conditions (**autoimmune disease**).

(adapted from Davi-Ellen Chabner, The Language of Medicine, ninth edition – Saunders, Elsevier)

Ex. 3. Read the following statements and say whether they are true or false, correct the false ones:

1. Lymph capillaries contain valves.
2. Lymph flows in only one direction, toward the thoracic cavity.
3. There are two lymph node concentrations.
4. Tonsils and adenoids are the same things.
5. The only function of lymph nodes is to produce lymphocytes.
6. The right lymphatic duct drains a much smaller area.
7. Specialized organs that are also a part of the lymphatic system are the kidneys and the thymus gland.
8. The thymus gland plays an important role in immunity, especially in adults.
9. The spleen is susceptible to injury.

Ex. 4. Give Russian equivalents for:

Thin-walled tubes; flow in only one direction; fibrous, connective tissue capsule; enlarged lymph tissue; essential to life; susceptible to injury; During fetal life and childhood; autoimmune disease.

Ex. 5. Give English equivalents for:

Переносить лимфу; по направлению к грудной полости; воспаленные лимфатические узлы; поступать в квороток; высвобождать гемоглобин; обширное кровотечение; узнавать и признавать собственные антигены организма.

Ex. 6. Make up verb phrases with these words. Translate them into Russian. Use them in sentences of your own:

1. filter	a) the body's antigens
2. swallow	b) disease
3. fight	c) into two large ducts
4. drain	d) lymph
5. recognize	e) toward the thoracic cavity
6. inject	f) foreign substances
7. lead	g) the functions of the spleen
8. empty	h) cells with toxic chemicals
9. take over	i) a particular area of the body

Ex. 7. Substitute the <u>underlined</u> words with their synonyms from Text 2:

engulf	immunity (to)	susceptible
hemolysis	splenectomy	phagocytose

1. Women who develop <u>the body's ability to protect itself from</u> the infection before pregnancy are not in danger of transmitting it to their babies.

2. Patients with liver disease may be vulnerable to infection.
3. Not all patients who develop the antibody will undergo red blood cell breakdown.
4. These pills help the body to absorb nutrients.
5. A surgical removal of the spleen may be done to combat the disorder.
6. The granulocytes swallow foreign substances.

Ex. 8. Match the terms with their definitions:

- adenoids
- axillary nodes
- cervical nodes
- inguinal nodes
- mediastinal nodes
- right lymphatic duct
- tolerance
- thoracic duct
- thymus gland
- tonsils

1. Lymph nodes in the neck region.
2. Lymph nodes in the area between the lungs in the thoracic (chest) cavity.
3. Lymph nodes in the armpit (underarm).
4. Lymph nodes in the groin region.
5. Large lymphatic vessel in the chest that receives lymph from below the diaphragm and from the left side of the body above the diaphragm; it empties the lymph into veins in the upper chest.
6. Large lymphatic vessel in the chest that receives lymph from the upper right part of the body.
7. Organ in the mediastinum that conditions T lymphocytes to react to foreign cells and aids in the immune response.
8. The ability of T lymphocytes to recognize and accept the body's own antigens as "self" or friendly.
9. Mass of lymphatic tissue in the back of the oropharynx.
10. Mass of lymphatic tissue in the nasopharynx.

Ex. 9. Complete the table with the correct form of the word:

Verb	**Noun**	**Noun**	**Adjective**
inject	…	…	immune
…	filtration	mediastinum	…
store	…	…	susceptible
…	rupture	essentials	…
drain	…	…	surgical
…	attachment	fetus	…
trap	…	…	tolerant

Ex. 10. Fill in the gaps with the appropriate form of the words from ex. 9:

1. The brain has the ability to **…** information which it considers non-essential.
2. They also may have lower **…** to infection than older family members, plus increased viral shedding and longer duration of illness.
3. Patients with liver disease may be **…** to infection
4. Computers are an **…** part of our lives.
5. Lasers are used in a variety of situations in medicine and **….**
6. People whose **…** systems have fought the infection will then be **…** to TB.
7. Many children are afraid of **…** .
8. I wasn't aware of any romantic **…** .
9. If the main artery **…** he could die.
10. The doctor advised vitamins for normal **…** growth.

Ex. 11. Fill in the gaps with prepositions:

1. Older people are more susceptible **…** the virus.
2. The vaccine gives you lifelong immunity **…** the virus.
3. Once you've had the virus, you are immune **…** it.
4. Fibre is essential **…** a healthy digestive system.
5. lack of exercise increases susceptibility **…** disease
6. The nurse gave the patient an injection **…** insulin.
7. She attached a photograph **…** her letter.
8. He died suddenly **…** an aortic rupture **…** the age of 44, leaving a wife and young children.
9. You attach too much importance **…** money.
10. Residents were forced to leave the village near Warminster when it was taken **…** for training US troops in the Second World War.

Ex. 12. Fill in the text with the words and expressions from Text 2:

Lymph is a clear and colorless **…(1)**; the word "lymph" comes from the Latin word *lympha*, which means "connected to water".

Plasma leaves the body's cells once it has delivered its nutrients. Most of this fluid returns to the venous circulation through venules and continues as venous blood. The remainder becomes lymph.

Unlike blood, which flows throughout the body in a continue loop, lymph flows in only one direction — upward **…(2)** the neck. Lymphatic vessels connect to two subclavian **…(3)**, which are located on either sides of the neck

The lymphatic system is a network of tissues and organs that help rid the body of toxins, waste and other unwanted materials. The primary function of the lymphatic

system is to **…(4)** lymph, a fluid containing infection-fighting white blood cells, throughout the body.

The lymphatic system primarily consists of lymphatic **…(5)**, which are similar to the circulatory system's veins and capillaries. The vessels are connected to lymph **…(6)**, which **…(7)** the lymph. The tonsils, adenoids, spleen and thymus are all part of the lymphatic system.

There are hundreds of lymph nodes in the human body. They are located deep inside the body, such as around the lungs and heart, or closer to the surface, such as under the **…(8)** or groin.

The **…(9)**, which is located on the left side of the body just above the kidney, is the largest lymphatic organ. It controls the amount of red blood cells and blood storage in the body, and helps to **…(10)** infection. If the spleen detects potentially dangerous bacteria, viruses, or other microorganisms in the blood, it — along with the lymph nodes — creates white blood cells called **…(11)**, which act as defenders against invaders. The lymphocytes produce **…(12)** to kill the foreign **…(13)** and stop infections from spreading. Humans can live without a spleen, although people who have lost their spleen to disease or injury are more **…(14)** to infections.

The **…(15)** is located in the chest just above the heart. This small organ **...(16)** immature lymphocytes (specialized white blood cells) and prepares them to become active T cells, which help destroy infected or cancerous cells.

…(17) are large clusters of lymphatic cells found in the pharynx. They are the body's "first line of defense as part of the immune system. They sample bacteria and **…(18)** that enter the body through the mouth or nose."

Ex. 13. Speak on the topic "The lymphatic system"

Text 3. The immune system.

Ex. 1. Before reading the text, study the topical vocabulary.

Professional medical terms:

Word	**Pronunciation**	**Meaning**
immune system	/ɪˈmjuːn ˈsɪstəm/	иммунная система
lymphoid organ	/ˈlɪmfɔɪd ˈɔːg(ə)n/	лимфоидный орган
immunity	/ɪˈmjuːnɪti/	иммунитет
natural immunity	/ˈnætʃərəl ɪˈmjuːnɪti/	врожденный иммунитет
acquired immunity	/əˈkwaɪəd ɪˈmjuːnɪti/	приобретенный иммунитет
toxins	/ˈtɒksɪns/	шлаки, токсины

bacterial protein	/b æ kˈtɪərɪəl ˈprəʊtiːn/	бактериальный белок
debris	/ˈdebriː/	дебрис, обломки
exposure to (an antigen)	/ɪkˈspəʊʒə/	воздействие на
upper respiratory infection	/ˈʌpə ˈrespərətɔːri ɪnˈfekʃən/	инфекция верхних дыхательных путей
cold	/kəʊld/	простуда
flu	/fluː/	острое респираторное заболевание, грипп
vaccination	/ˌvæksɪˈneɪʃən/	вакцинация, прививка
placenta	/pləˈsen.tə/	плацента
breast milk	/brest mɪlk/	грудное молоко
plasma cell	/ˈplæzmə sel/	плазматическая клетка, антителообразующая клетка
thymic hormone	/ˈθaɪmɪk ˈhɔːməʊn/	тимический гормон
skin graft	/ˈskɪn ˌgrɑːft/	пересадка кожи
B cell	/biːˈlɪmfəsaɪt/	В-лимфоцит, костномозговой лимфоцит
T cell	/tiːˈlɪmfəsaɪt/	Т-лимфоцит, тимусзависимый лимфоцит (лимфоцит вилочковой железы)
cytotoxic T cell	/saɪtə(ʊ)ˈtɒksɪk ˈtiː sel/	цитотоксическая Т-клетка
helper T cell	/ˈhelpə ˈtiː sel/	Т-клетка-помощник; Т-клетка-хелпер
suppressor T cell (regulatory T cell)	/səˈpresə ˈtiː sel/ /ˈregjʊlət(ə)ri ˈtiː sel/	Т-супрессорная клетка (регуляторная Т-клетка)
cytokine	/ˈsaɪtəkaɪn/	цитокин
interferon	/ˌɪntəˈfɪərɒn/	интерферон (протеин, защищающий клетки от вирусов)
interleukin	/ˌɪntəˈluːkɪn/	фактор дифференцировки В-клеток
complement system	/ˈkɒmplɪmənt ˌsɪstəm/	система комплемента
dendritic cell	/denˈdrɪtɪk sel/	дендритная клетка

Verbs:

Word	Pronunciation	Meaning
resist smth	/rɪˈzɪst/	противостоять
damage	/ˈdæmɪdʒ/	повредить
remain	/rɪˈmeɪn/	оставаться
counteract	/ˌkaʊntərˈækt/	противодействовать
confront	/kənˈfrʌnt/	противостоять
block smth	/blɒk/	блокировать, приостанавливать
encounter	/ɪnˈkaʊntə/	наталкиваться (на трудности)
multiply	/ˈmʌltɪplaɪ/	размножаются
neutralize	/ˈnjuːtrəlaɪz/	нейтрализовать
mark (antigens for destruction)	/mɑːk/	отмечать
contribute to	/kənˈtrɪbjuːt/	вносить вклад во что-либо

Ex. 2. Read the text and answer the following questions:

1. What is the function of the immune system?
2. What does the immune system consist of?
3. What tissues and organs produce antibodies?
4. What are the types of the immunity? Give characteristics of them?
5. How does natural immunity help to fight localized inflammation?
6. What are the examples of acquired immunity?
7. What are the two disease-fighting cells involved in acquired immunity?
8. What are the differences in the job of B cells and T cells?
9. What are the specific types of T cells? How do they work?

The immune system is specialized to defend the body against **antigens** (such as toxins, bacterial proteins, or foreign blood cells). This system includes **leukocytes** such as **neutrophils**, **monocytes**, and **macrophages**, which are phagocytes found in tissues throughout the body. In addition, **lymphoid organs**, such as the lymph nodes, spleen, and thymus gland, produce lymphocytes and antibodies.

Immunity is the body's ability to resist foreign organisms and toxins (poisons) that damage tissues and organs. **Natural immunity** is protection that is inherited and is present at birth to fight off infection. It is not dependent on previous contact with an

infectious agent. When bacteria enter the body, phagocytes such as neutrophils (white blood cells) migrate to the site of infection and ingest the bacteria. They release proteins that attract other immune system cells and cause localized inflammation. Other white blood cells, such as monocytes and macrophages, then move in to clear away dead cells and debris as the infection subsides.

In addition to natural immunity, a healthy person can develop **acquired immunity**. This is the body's ability to form antibodies and mobilize lymphocytes to fight an infection after exposure to an antigen. An example of acquired immunity is the production of antibodies after exposure to a virus that causes an upper respiratory infection (cold or flu). These antibodies remain in the body to protect against further infection at a later time. Another example of acquired immunity is vaccination. By exposing a person to proteins, killed viruses, or bacterial components, it is possible to stimulate lymphocytes to produce antibodies. These antibodies will protect against an attack of the disease, when the person will be exposed to the virus at a later time.

There are some instances when immediate immunity (protection) is needed. Poisons (toxins) entering the body through snake bites can be counteracted by giving ready-made antibodies produced in another person or animal. These antibodies are antitoxins. Also, injections of antibodies such as immunoglobulins can provide protection against disease and lessen its severity. A further example of acquired immunity is that in newborns receiving maternal antibodies through the placenta or in breast milk after birth. Figure 6-5 reviews the general differences between natural and acquired immunity.

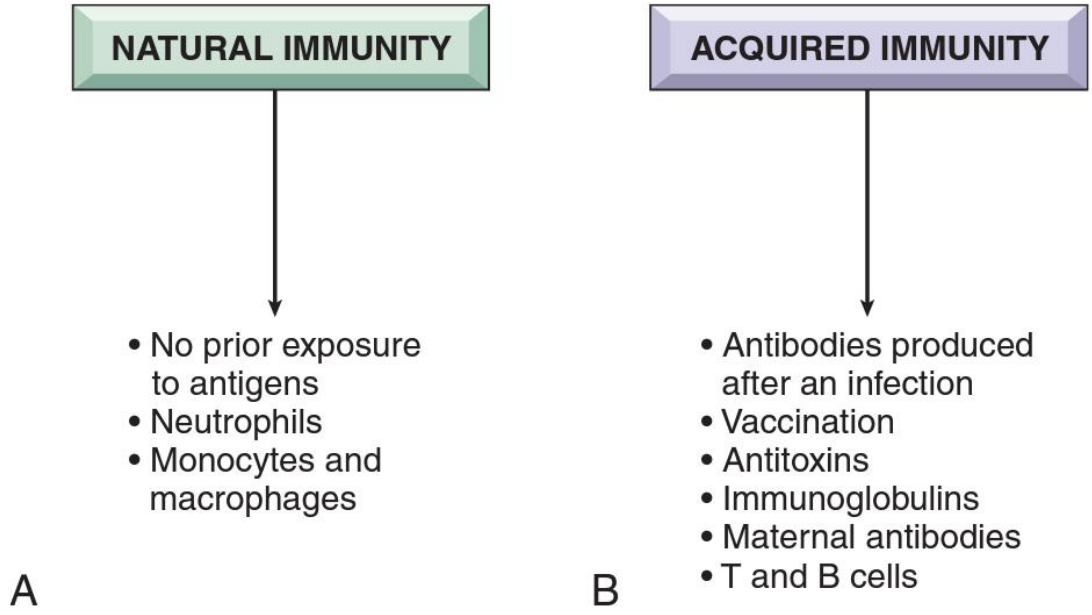


Figure 6-5. Types of immunity

Acquired immunity involves two major disease-fighting cell types: **B lymphocytes (B cells)** and **T lymphocytes (T cells).**

B lymphocytes produce antibodies when exposed to specific antigens, such as viruses and bacteria. B cells originate from bone marrow stem cells. When a B cell is confronted with a specific type of antigen, it transforms into an antibody-producing cell known as a **plasma cell**. Plasma cells produce antibodies called **immunoglobulins**. Examples are IgM, IgA, IgG, IgE, and IgD. Immunoglobulins travel to the site of an infection and block the effect of antigens.

T cells produce a different type of immunity. They also originate from stem cells in the bone marrow, but are further processed in the thymus gland, where they are acted on by thymic hormones. When a T cell **encounters** an antigen, the T cell multiplies rapidly to produce specific types of cells that destroy the antigen. T cells also react to transplanted tissues and skin grafts when rejection occurs in a recipient.

Examples of specific types of T cells are **cytotoxic T cells**, **helper T cells**, and

suppressor T cells. These cells contribute in different ways to the immune response. **Cytotoxic T cells** attach to antigens (bacteria, viruses, or foreign cells, such as skin grafts from another person) and kill the offending organism. They also produce proteins called **cytokines**, such as **interferons** and **interleukins**, that aid other cells in antigen destruction.

Helper T cells promote the responses of B cells and other T cells to neutralize antigens. **Suppressor T cells**, also called **regulatory T cells (Tregs)**, control B cell and T cell activity and stop the immune response when an antigen has been destroyed.

The immune system is helped by a number of other proteins and cells found in circulating blood. These include the **complement system**, a group of proteins in the blood that helps antibodies and T cells kill their target. Another warrior is the **dendritic cell**, which is a specialized macrophage that digests foreign cells. Antigen fragments appear on the surface of dendritic cells, which helps B and T cells to recognize and mark antigens for destruction. Figure 6-6 reviews the roles that B cells, T cells, the complement system, and dendritic cells play in the immune response.

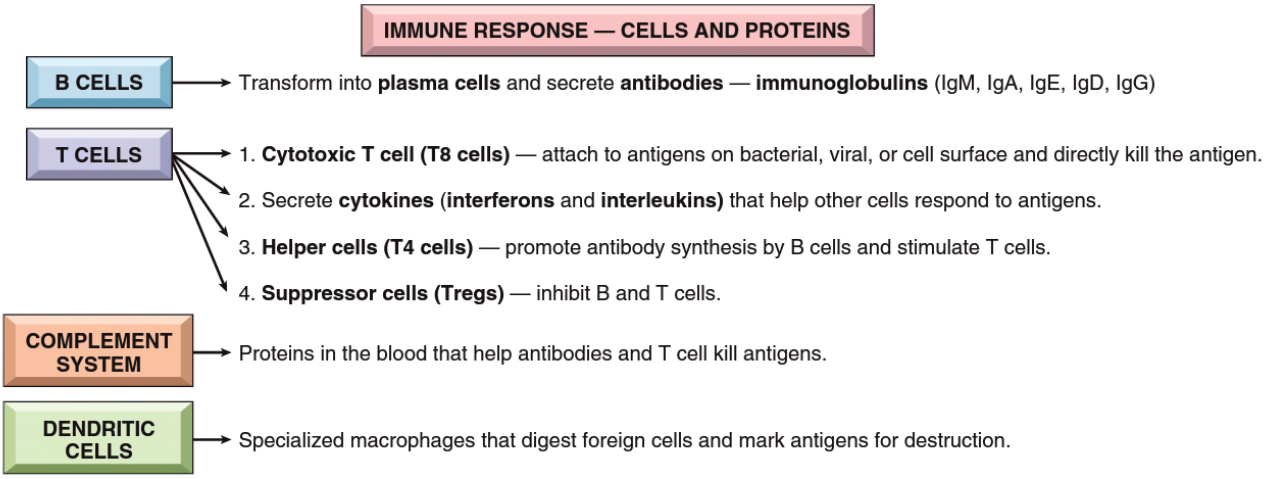


Figure 6-6. Functions of B cell (humoral immunity) and T cell lymphocytes (cell-mediated immunity)

(adapted from Davi-Ellen Chabner, The Language of Medicine, ninth edition – Saunders, Elsevier)

Ex. 3. Agree or disagree with the following:

1. The immune system includes leukocytes, macrophages, lymphoid organs, such as the lymph nodes, spleen, and thymus gland.
2. Foreign organisms and toxins ruin tissues and organs.
3. Acquired immunity is hereditary.
4. Vaccination is an example of natural immunity.
5. Dendritic cells mark antigens for destruction.

Ex. 4. Give English equivalents for:

Присутствовать при рождении; местные воспаления; инфекция спадает; мобилизовать лимфоциты; ОРЗ; простуда; вырабатывать антитела; готовые антитела; уменьшить тяжесть болезни; тип клеток, борящихся с болезнями; антителообразующая клетка; Т-клетка быстро размножается; имунная реакция;

помогать в уничтожении антигена; убивают свою цель.

Ex. 5. Make up sentences of your own using all expressions from ex. 4.

Ex. 6. Arrange the words in pairs of synonyms:

1. poison	a) purpose, aim, goal
2. transform into	b) fade, weaken
3. aid	c) convert into
4. target	d) donate
5. inherited	e) toxin

6. damage — f) harm, spoil
7. subside — g) hereditary
8. contribute — h) help

Ex. 7. Combine the following words into verb combinations:

1. resist — a) antibodies
2. damage — b) an antigen
3. produce — c) by giving ready-made antibodies
4. originate — d) foreign organisms and toxins
5. block — e) the immune response
6. encounter — f) the virus
7. contribute to — g) tissues and organs
8. counteract — h) the effect of antigens
9. be exposed to — i) a specific type of antigen
10. confront — j) from bone marrow stem cells

Ex. 8. Match the terms with their definitions:

acquired immunity	dendritic cell	plasma cell
antibody	helper T cell	suppressor T cell
antigen	immunity	T cell (T lymphocyte)
B cell (B lymphocyte)	immunoglobulins	toxin
complement system	interferons	vaccination
cytokines	interleukins	
cytotoxic T cell	natural immunity	

1. Poison; a protein produced by certain bacteria, animals, or plants.
2. Protein produced by B cell lymphocytes to destroy antigens.
3. Lymphocyte that originates in the bone marrow and transforms into a plasma cell to secrete antibodies.
4. Proteins that aid and regulate the immune response. Examples are interferons and interleukins.
5. Lymphocyte that aids B cells and cytotoxic T cells in recognizing antigens and stimulating antibody production.
6. Body's ability to resist foreign organisms and toxins.
7. Proteins in the blood that help antibodies and T cells kill their target.
8. Antibodies (gamma globulins) that are secreted by plasma cells in response to the presence of an antigen.

9. Exposure of an individual to a foreign protein (antigen) that provokes an immune response. The response will destroy any cell that possesses the antigen on its surface and will protect against infection.
10. Proteins (cytokines) secreted by T cells to aid and regulate the immune response.
11. Proteins (cytokines) that stimulate the growth of B and T lymphocytes.
12. Protection that an individual inherits to fight infection.
13. Lymphocyte that produces and secretes antibodies. It originates from B lymphocytes.
14. Substance that the body recognizes as foreign; evokes an immune response.
15. Lymphocyte that inhibits the activity of B and T lymphocytes. Also called a Treg (regulatory T cell).
16. Lymphocyte that originates in the bone marrow but matures in the thymus gland; it acts directly on antigens to destroy them or produce chemicals (cytokines) such as interferons and interleukins that are toxic to antigens.
17. Specialized macrophage that digests foreign cells and helps B and T cells to mark antigens for destruction.
18. T lymphocyte that directly kills foreign cells.
19. Production of antibodies and lymphocytes after exposure to an antigen.

Ex. 9. Read and translate the words and their derivatives:

to expose – exposing – exposure

to act – counteract – counteractive – action – actor – actress

to receive – received – receiving – receipt – recipient

to contribute – contributed – contributive – contribution

to inherit – inherited – inheritable – inheritance

to acquire – acquired - acquirable – acquisition

toxin – antitoxin – toxic

Ex. 10. Complete the sentences with the appropriate form of the words from exercise 9:

1. Should we **…** global warming?
2. He **…** a reputation for being difficult to work with.
3. Even a brief **…** to radiation is very dangerous.
4. Alcohol is **…** to the ovaries.
5. All her children will **…** equally
6. He was a **…** of the Nobel Prize.
7. Russian scientists made a great **…** to the development of the world science.

Ex. 11. Fill in the gaps with the words from the box:

fights	**leukocytes**		**lymphoid**	**marrow**
response	**swallow**	**targets**	**thymus**	

The immune system is the body's defense against infectious organisms. Through a series of steps called the immune **…(1)**, the immune system attacks organisms and substances that invade body systems and cause disease.

The immune system is made up of a network of cells, tissues, and organs that work together to protect the body. One of the important cells involved are white blood cells, also called **…(2).** Leukocytes are produced or stored in many locations in the body, including the thymus, spleen, and bone marrow. For this reason, they're called the **…(3)** organs.

There are two basic types of leukocytres: phagocytes, cells that **…(4)** invading organisms; and lymphocytes, cells that allow the body to remember and recognize previous invaders and help the body destroy them.

A number of different cells are considered phagocytes. The most common type is the neutrophil, which primarily **…(5)** bacteria

The two kinds of lymphocytes are B lymphocytes and T lymphocytes. Lymphocytes start out in the bone **…(6)** and either stay there and mature into B cells, or they leave for the **…(7)** gland, where they mature into T cells. B lymphocytes and T lymphocytes have separate functions: B lymphocytes are like the body's military intelligence system, identifying their **…(8)** and sending defenses to lock onto them. T cells are like the soldiers, destroying the invaders that the intelligence system has identified.

Ex. 12. Describe the function of the organs of the immune system:

1. Bone marrow
2. Spleen
3. Thymus gland
4. Lymph nodes
5. Leukocytes
6. Macrophages

Ex. 13. Speak about the immune system and how it works.

Ex. 14. Using extra sources make presentations about pathologic conditions of the immune system:

- acquired immunodeficiency syndrome (AIDS)
- allergy
- autoimmune diseases
- lymphoma (Hodgkin disease)
- thymoma

UNIT 6 REVISION

Ex. 1. Name the structure or fluid based on the meaning provided:

1. tiniest lymph vessels

2. mass of lymphatic tissue in the nasopharynx
3. stationary lymphatic tissue along the path of lymph vessels all over the body
4. large lymph vessel in the chest that drains lymph from the lower part and left side of the body above the diaphragm
5. organ near the stomach that produces, stores, and eliminates blood cells
6. organ in the mediastinum that conditions T lymphocytes and helps in the immune response
7. large lymph vessel in the chest that drains lymph from the upper right part of the body
8. fluid present between cells that becomes lymph as it enters lymph capillaries

Ex. 2. Give the locations of the following lymph nodes:

1. axillary nodes
2. cervical nodes
3. inguinal nodes
4. mediastinal nodes

Ex. 3. Match the following cell names with their meanings as given below:

- dendritic cell
- complement system
- helper T cell
- macrophage
- plasma cell
- suppressor T cell

1. cell that originates from a B lymphocyte and secretes antibodies
2. large phagocyte found in lymph nodes and other tissues of the body
3. T4 cell that aids B cells in recognizing antigens
4. Treg cell that inhibits the activity of B and T lymphocytes
5. proteins that help antibodies and T cells kill their target
6. cell that digests foreign cells and helps B and T cells mark antigens for destruction

Ex. 4. Match the terms with their descriptions:

- immunoglobulins
- toxins
- helper T cells
- suppressor T cells
- cytotoxic T cells
- plasma cells
- interferons

1. Antibodies—IgA, IgE, IgG, IgM, IgD
2. Lymphocyte that aids B cells; also called T4
3. Poisons (antigens)
4. T cell lymphocytes that inhibit the activity of B and T cell lymphocytes (Tregs)
5. Antiviral proteins secreted by T cells
6. Transformed B cells that secrete antibodies
7. T lymphocytes that directly kill foreign cells (T8 cells)

GLOSSARY.

A		
Word	**Pronunciation**	**Meaning**
abdominal cavity / abdomen	/æbˈdɒmɪn(ə)l/ /ˈæbdəmən/	брюшная полость
abdominal	/æbˈdɒmɪn(ə)l/	брюшной
abdominopelvic cavity	/æbˈdɒmɪnəˈpelvɪk/	полость живота и таза, брюшно-тазовая полость
absorption	/əbˈzɔːpʃ(ə)n/	всасывание
accept	/əkˈsept/	принимать, допускать
acid	/ˈæsɪd/	кислота
acquired immunity	/əˈkwaɪəd ɪˈmjuːnɪti/	приобретенный иммунитет
acute bronchitis	/əˈkjuːt/ /brɒŋˈkaɪtɪs/	острый бронхит
adenoids	/ˈædɪnɔɪdz/	аденоидная миндалина
adipose (fat) tissue	/ˈædɪpəʊs ˈtɪʃuː/	жировая ткань
adrenal gland	/əˈdriːn(ə)l ˌglænd/	надпочечная железа
affect smth/smb	/əˈfekt/	влиять
aid in something / Ving something	/eɪd/	помогать в чем-либо
air sac	/ˈeə ˌsæk/	альвеолярный мешочек
albumin	/ˈælbjʊmɪn/	альбумин
alkaline/ acidic dye	/ˈælkəlʌɪn/ /əˈsɪdɪk/ /daɪ/	щелочной / кислотный краситель
alveolus (*plural:* alveoli)	/ˌælviˈəʊləs/ plural /ˌælviˈəʊlaɪ /	альвеола (альвеолы)
amylase	/ˈæmɪleɪz/	амилаза
anabolism	/əˈnæbəlɪz(ə)m/	анаболизм
anemia	/əˈniːmiə/	анемия, малокровие
anorexia	/ˌænərˈeksiə/	анорексия, отсутствие аппетита
anterior / ventral	/ænˈtɪərɪə/ /ˈventr(ə)l/	передний, вентральный
antibiotic	/ˌæntibaɪˈɒtɪk/	антибиотик

antibody	/ˈæntɪbɒdi/	антитело
antigen	/ˈæntɪdʒən/	антиген
antrum	/ˈæntrəm/	антральный отдел желудка
anus	/ˈeɪnəs/	анус
aorta	/eɪˈɔːtə/	аорта
aortic valve	/eɪˈɔːtɪk ˌvælv/	аортальный клапан
apex of the lung	/ˈeɪpeks/	верхушка легкого
aplastic anemia	/eɪˈplæstɪk əˌniːmɪə/	апластическая анемия
appendix	/əˈpendɪks/	апендикс
arteriole	/ɑːˈtɪərɪəʊl/	артериола, мелкая артерия
artery	/ˈɑːtəri/	артерия
ascending colon	/əˈsendɪŋ ˈkəʊlɒn/	восходящая ободочная кишка
aspiration (of food)	/æspəˈreɪʃ(ə)n/	проникновение инородного тела в дыхательные пути
asthma	/ˈæsmə/	астма
atrioventricular bundle, or bundle of His	/ˌeɪtrɪə(ʊ)ve nˈtrɪkjʊlə ˈbʌnd(ə)l/	предсердно-желудочковый пучок, пучок Гиса
atrioventricular node (AV node)	/ˌeɪtrɪə(ʊ)ve nˈtrɪkjʊlə nəʊd/	предсердно-желудочковый узел
atrium (right atrium and left atrium); plural – atria	/ˈeɪtriəm/	предсердие
attach to	/əˈtætʃ/	прикреплять, присоединить
attack	/əˈtæk/	нападать, поражать, разрушать
auscultation	/ˌɔːsk(ə)lˈteɪʃ(ə)n/	выслушивание (больного), аускультация
autoimmune disease	/ɔːtəʊɪˈmjuːn dɪˌziːz/	аутоиммунное заболевание
axillary lymph node armpit	/ækˈsɪlərɪ ˈlɪmf ˌnoʊd/ /ˈɑːmpɪt/	подмышечный лимфатический узел подмышечная впадина

B		
Word	**Pronunciation**	**Meaning**
B cell B lymphocyte (bone marrow derived)	/biːˈsel/ /biːˈlɪmfəsaɪt/	В-лимфоцит, костномозговой лимфоцит
bacterium, plural- bacteria	/bakˈtɪərɪəm/ plural /bækˈtɪə.ri.ə/	бактерия
bacterial protein	/b æ kˈtɪərɪəl ˈprəʊtiːn/	бактериальный белок
base of the lung	/beɪs/	основная часть легкого
basophil	/ˈbeɪsə(ʊ)fɪl/	базофил
be broken down (Passive voice)	/ˌbrəʊk(ə)nˈdaʊn/	распадаться, разбиваться
be made up of something (Passive voice)	/ˌmeɪd ˈʌp/	состоять из чего-либо
bile	/baɪl/	желчь
bind (bound) into one organ	/baʊnd/	связывать
blood	/blʌd/	кровь
blood circulation	/blʌd səːkjʊˈleɪʃ(ə)n/	кровообращение
blood clotting	/blʌd klɒtɪŋ/	свертывание крови
blood clot	/blʌd klɒt /	тромб, сгусток крови
bloodstream	/ˈblʌdstriːm/	кровоток
blood vessels	/ˈblʌd ˌves(ə)l/	кровеносные сосуды
body (of stomach)	/ˈbɒdi/	тело желудка
bolus	/ˈbəʊləs/	пищевой комок
bone	/bəʊn/	кость
bone marrow	/ˈbəʊn ˌmærəʊ/	костный мозг
bowel / intestine	/ˈbaʊəl/ /ɪnˈtestɪn/	кишечник
brain	/breɪn/	головной мозг
breast milk	/brest mɪlk/	грудное молоко
breathe in / out	/briːð/	вдыхать, делать вдох / выдыхать
bronchiectasis	/ˌbrɒŋkɪˈektəsɪs/	бронхоэктаз
bronchial edema	/ˈbrɒŋkɪəl/ /ɪˈdiːmə/	бронхиальный отек

bronchial tubes	/ˈbrɒŋkiəl /tʃuːb/	бронхиолы
bronchiole	/ˈbrɒŋkɪəʊl/	бронхиола
bronchus (*plural:* bronchi)	/ˈbrɒŋkəs/ plural /ˈbrɒŋkaɪ/	бронх (бронхи)
(left / right) bundle branch	/ˈbʌnd(ə)l brɑːn(t)ʃ/	левый/ правый пучок Гиса

C		
Word	**Pronunciation**	**Meaning**
capillary	/kəˈpɪləri/	капилляр
carbon dioxide	/ˌkɑːbəndaɪˈɒksaɪd/	углекислый газ
cardiac cycle	/ˈkɑːdiæk ˈsaɪkl/	сердечный цикл
cardiac failure	/ˈkɑːdi.æk ˈfeɪljə/	сердечная недостаточность
cardiovascular/ circulatory system	/ˌkɑːdɪəʊˈvæskjʊlə ˈsɪstəm / /ˈsɝːkjələtɔːri/ /səːkjʊˈleɪt(ə)ri/	сердечно-сосудистая система / кровеносная система
carotid artery	/kəˌrɒt.ɪd ˈɑːtəri /	сонная артерия
carry	/ˈkæri/	нести, переносить
carry on/ out	/ˈkæri ɔn / aʊt/	продолжать / выполнять
cartilage	/ˈkɑːt(ɪ)lɪdʒ/	хрящ
catabolism	/kəˈtæbəlɪz(ə)m/	катаболизм, разложение
cavity	/ˈkævəti/	полость
cecum	/ˈsiːkəm/	слепая кишка
cell	/sel/	клетка
cell division	/dɪˈvɪʒ(ə)n/	деление клеток
cellular	/ˈseljʊlə/	клеточный
cell membrane	/ sel ˈmembreɪn/	клеточная мембрана
cervical lymph node	/ˈsəːvɪk(ə)l ˈlɪmf ˌnoʊd/	шейный лимфатический узел
chamber (heart chamber)	/hɑːt ˈtʃeɪmbə/	камера сердца
chest	/tʃest/	грудная клетка
chew – chewing	/tʃuː/	жевать
choke	/tʃəʊk/	поперхнуться
chromosome	/ˈkrəʊməsəʊm/	хромосома
chronic bronchitis	/ˈkrɒnɪk/ /brɒŋˈkaɪtɪs/	хронический бронхит

chronic obstructive pulmonary disease (COPD)	/ˈkrɒnɪk/ əbˈstrʌktɪv/ /ˈpʊlmən(ə)ri/ /dɪˈziːz/	хроническое обструктивное заболевание легких (ХОЗЛ)
cilia	/ˈsɪlɪə/	реснички
circulatory system	/ˈsɝːkjələtɔːri/ /səːkjʊˈleɪt(ə)ri/	кровеносная система
clot	/klɒt/	свертываться, сгущаться (о крови); сгусток крови
clotting cell = thrombocyte = platelet	/ˈklɒt.ɪŋ ˌsel/ OR /ˈθrɒmbə(ʊ)sʌɪt/ OR /ˈpleɪtlɪt/	тромбоцит
coagulation	/kəʊagjʊˈleɪʃ(ə)n/ /kəʊˌægjəˈleɪ.ʃ(ə)n/	свертывание, коагуляция
cold	/kəʊld/	простуда
common bile duct	/ˈkɒm.ən/ˈbaɪl ˌdʌkt/	общий желчевыносящий проток
complement system	/ˈkɒmplɪmənt ˌsɪstəm/	система комплемента
(be) composed of	/kəmˈpəʊzd/	состоять из
conduct (impulses)	/kənˈdʌkt/	проводить (импульсы)
conduction myofiber	/kənˈdʌkʃ(ə)n ˈmaɪə(ʊ)faɪbə/	мышечные волокна проводимости
conduction system of the heart	/kənˈdʌkʃ(ə)n ˈsɪstəm/	проводящая система сердца
confront	/kənˈfrʌnt/	противостоять
congenital spherocytic anemia	/kənˈdʒenɪt(ə)l sfɪərə(ʊ)ˈsaɪtɪk əˈniːmiə/	врожденная сфероцитарная анемия
congestion	/kənˈdʒestʃ(ə)n/	застой
connective tissue	/kəˈnektɪv ˈtɪʃuː/	соединительная ткань
conscious control	/ˈkɒnʃəs/	сознательный контроль
constrict	/kənˈstrɪkt/	сужаться
contain	/kənˈteɪn/	содержать
contract / contraction	/ˈkɒntrækt/	сжиматься
contribute to	/kənˈtrɪbjuːt/	вносить вклад во что-либо
control	/kənˈtrəʊl/	контролировать

cough	/kɒf/	кашель
cover	/ˈkʌvə/	покрывать
counteract	/ˌkaʊntərˈækt/	противодействовать
cranial cavity	/ˈkreɪnɪəl/	внутричерепная полость
croup	/kruːp/	круп (острый ларингит или ларинготрахеит)
crucial (role)	/ˈkruːʃ(ə)l/	решающий, важный
current (wave) of electricity	/ˈkʌr(ə)nt/ /ˌelɪkˈtrɪsəti/	электрический ток
cusp	/kʌsp/	створка клапана сердца или сосуда
cystic duct	/ˈsɪstɪk	пузырный проток
cytokine	/ˈsaɪtəkaɪn/	цитокин
cytoplasm	/ˈsaɪtə(ʊ)plæz(ə)m/	цитоплазма
cytotoxic T cell	/saɪtə(ʊ)ˈtɒksɪk ˈtiː sel/	цитотоксическая Т-клетка

D

Word	**Pronunciation**	**Meaning**
damage	/ˈdæmɪdʒ/	повредить
debris	/ˈdebriː/	дебрис, обломки
deficient in (oxygen)	/dɪˈfɪʃ(ə)nt/	дефицит кислорода
deflection	/dɪˈflekʃ(ə)n/	отклонение
decrease	/dɪˈkriːs/	уменьшать
deliver (oxygen)	/dɪˈlɪvə/	доставлять
dendritic cell	/denˈdrɪtɪk sel/	дендритная клетка
deoxygenated blood	/diːˈɒksɪdʒəneɪtɪd blʌd/ /	бедная кислородом кровь
deposit	/dɪˈpɒzɪt/	откладывать
descending colon	/dɪˈsen.dɪŋ ˈkəʊlɒn/	нисходящая ободочная кишка
diabetes	/ˌdaɪəˈbiːtiːz/	сахарный диабет
diagnose	/ˈdaɪəgnəʊz/	диагностировать
diagnosis	/ˌdaɪəgˈnəʊsɪs/	диагноз
diaphragm	/ˈdaɪəfræm/	диафрагма
diastole	/daɪˈastəli/	диастола
digest	/daɪˈdʒest/	переваривать

digestive system	/daɪˈdʒestɪv/ /ˈsɪstəm/	пищеварительная система
digestive (gastrointestinal) tract	/daɪˈdʒestɪv/ /ˌgæstrəʊɪnˈtestɪn(ə)l/ /trækt/ OR/ˌgastrəʊɪntesˈtaɪn(ə)l/	желудочно-кишечный тракт
digestion	/daɪˈdʒestʃ(ə)n/	пищеварение
differentiate	/ˌdɪfəˈrenʃɪeɪt/	различать
dispose of	/dɪˈspəʊz/	избавиться, удалить
direct	/dɪˈrekt/ OR /daɪˈrekt/	управлять
divide (subdivide)	/dɪˈvʌɪd/	делить (подразделять)
DNA	/diːenˈeɪ/	ДНК
DNA sequence	/ diːenˈeɪ ˈsiːkwəns/	последовательность ДНК
dorsal / posterior	/ˈdɔːs(ə)l/ /pɒˈstɪərɪə/	тыльный, задний, дорсальный
drain	/dreɪn/	процедить, осушать, дренировать, фильтровать
drainage	/ˈdreɪnɪdʒ/	дренаж
duct	/ˈdʌkt/	проток
duodenum	/ˌdjuːəˈdiːnəm/	двенадцатиперстная кишка
dyspnea	/dɪspˈniːə/	одышка

E		
Word	**Pronunciation**	**Meaning**
electrocardiogram (ECG or EKG)	/ɪˌlektrəʊˈkɑːdɪəgram/ /ˌiːsiːˈdʒiː/ /ˌiːˈkeɪˈdʒiː/	электрокардиограмма, ЭКГ
elimination	/ɪlɪmɪˈneɪʃ(ə)n/	элиминация, выведение
embryo	/ˈembrɪəʊ/	эмбрион
encounter	/ɪnˈkaʊntə/	наталкиваться (на трудности)
endocrine gland	/ˈendə(ʊ)krɪn/ ALSO /ˈendə(ʊ)kraɪn/	эндокринная железа (железа внутренней секреции)
endocrine system	/ˈendə(ʊ)krɪn/ ALSO /ˈendə(ʊ)kraɪn/ /ˈsɪstəm/	эндокринная система

engulf	/ɪnˈgʌlf/	поглощать
endoplasmic reticulum	/ˌendəʊˈplæz.mɪk rəˈtɪkjələm/	эндоплазматический ретикулум
endothelium	/ˌendə(ʊ)ˈθiːlɪəm/	эндотелий
enlarge	/ɪnˈlɑːdʒ/	увеличить, расширять
enzyme	/ˈenzaɪm/	энзим, фермент
eosin	/ˈiːə(ʊ)sɪn/	эозин (краситель)
eosinophil	/ˌiːə(ʊ)ˈsɪnəfɪl/	эозинофил
epiglottis	/ˌepɪˈglɒtɪs/	надгортанник
epithelial tissue	/ˌepɪˈθiːlɪ(ə)l ˈtɪʃuː/	эпителиальная ткань
erythrocyte = red blood cell	/ɪˈrɪθrəʊsaɪt/ OR /ˌred ˈblʌd ˌsel/	эритроцит, красная кровяная клетка
erythremia	/ˌerɪˈθiːmɪə/	эритремия
esophagus	/ɪˈsɒfəgəs/	пищевод
esophageal hiatus	/ɪˌsɒfəˈdʒiəl haɪˈeɪtəs/	пищеводное отверстие диафрагмы
esophageal sphincters (upper and lower)	/ɪˌsɒfəˈdʒiəl ˈsfɪŋktə/	пищеводный сфинктер (нижний и верхний)
essential to life	/ɪˈsenʃ(ə)l/	существенно-важный
excessive	/ɪkˈsesɪv/ ALSO /ekˈsesɪv/	избыточный, чрезмерный
exhale	/eksˈheɪl/	выдыхать
exhalation (expiration)	/eksəˈleɪʃ(ə)n/ /ˌekspɪˈreɪʃ(ə)n/	выдох, выдыхание
exocrine gland	/ˈeksə(ʊ)kraɪn/ ALSO /ˈeksə(ʊ)krɪn/	экзокринная железа (железа с внешней секрецией)
expand	/ɪkˈspænd/	расширять
exposure to (an antigen)	/ɪkˈspəʊʒə/	воздействие на
extend	/ɪkˈstend/	тянуть, протягивать

F

Word	**Pronunciation**	**Meaning**
facilitate	/fəˈsɪlɪteɪt/	способствовать
fat	/fæt/	жир
feces	/ˈfiːsiːz/	стул

fetal life	/ˈfiːt(ə)l laɪf/	эмбриональный период, внутриутробный период развития
fiber fibrous	/ˈfaɪbə/ /ˈfaɪbrəs/	волокно волокнистый
fibrin	/ˈfɪbrɪn/ UK; ALSO /ˈfaɪbrɪn/ US	фибрин
fibrinogen	/faɪˈbrɪnədʒ(ə)n/	фибриноген
fight (infection)	/faɪt/	бороться с
filter (out)	/ˈfɪltə/	отфильтровать
flow (through the capillaries)	/fləʊ/	течь
flu	/fluː/	острое респираторное заболевание, грипп
fluid	/ˈfluːɪd/	жидкость
food bolus	/fuːd ˈbəʊləs/	пищевой комок
force out	/fɔːs/	выкачивать, вытолкнуть
foreign organisms	/ˈfɒrɪn ˈɔːg(ə)nɪz(ə)mz/	инородные организмы
formed elements	/fɔːmd ˈelɪm(ə)nts/	форменные элементы
fragile	/ˈfrædʒaɪl/	хрупкий
fulfill the role/ function	/fʊlˈfɪl/	выполнять
fundus (of stomach)	/ˈfʌndəs/	дно желудка

G		
Word	**Pronunciation**	**Meaning**
gallbladder	/ˈgɔːl ˌblædə/	желчный пузырь
gastroesophageal junction	/ˌgæ.strəʊ.ɪ.sɒf.əˈdʒi.əl/ /ˈdʒʌŋ(k)ʃ(ə)n/	гастроэзофагеальное соединение, желудочно-пищеводное соединение
gastrointestinal tract	/ˌgæstrəʊɪnˈtestɪn(ə)l/ /trækt/	желудочно-кишечный тракт
gelatinous substance	/dʒɪˈlætɪnəs ˈsʌbst(ə)ns/	желатинозное вещество, роландово вещество
gene	/dʒiːn/	ген
gland	/glænd/	железа

globin	/ˈgləʊbɪn/	глобин
globulin	/ˈglɒbjʊlɪn/	глобулин
granulocyte	/ˈgrænjʊlə(ʊ)ˌsaɪt/	гранулоцит
granulocytosis	/ˈgrænjʊlə(ʊ)ˌsaɪtəʊsɪs/	гранулоцитоз (увеличенное содержание в крови всех видов гранулоцитов)

H		
Word	**Pronunciation**	**Meaning**
heart	/hɑːt/	сердце
heartbeat	/ˈhɑːtbiːt/	сердцебиение
helper T cell	/ˈhelpə ˈtiː sel/	Т-клетка-помощник; Т-клетка-хелпер
hematopoietic stem cell	/ˌhiːmætəʊpɔɪˈetɪk ˈstem ˌsel/	гемопоэтическая стволовая клетка
heme	/hiːm/	гем (небелковая часть гемоглобина)
hemochromatosis	/ˈheməkrəʊmətəʊsɪs/	гемохроматоз
hemoglobin (also haemoglobin)	/ˌhiːməˈgləʊbɪn/	гемоглобин
hemolysis	/hiːˈmɒlɪsɪs/	гемолиз
hemolytic anemia	/ˌhiːməˈlɪtɪk əˈniːmiə/	гемолитическая анемия
hemophilia	/ˌhiːməˈfɪlɪə/	гемофилия, кровоточивость
hemorrhage	/ˈhemərɪdʒ/	кровоизлияние; кровотечение
heparin	/ˈhepərɪn/	гепарин
hepatic duct	/hepˈætɪk/	печеночный проток
hepatic flexure	/hepˈætɪk ˈflekʃə/	ˍправый изгиб ободочной кишки (печеночный)
hepatomegaly	/heptəˈmegəlɪ/	гепатомегалия; увеличение печени
hereditary	/hɪˈredɪt(ə)ri/	наследственный
hereditary spherocytosis	/hɪˈredɪt(ə)ri sfɪərə(ʊ)saɪˈtəʊsɪs/	наследственный сфероцитоз
hilum	/ˈhaɪləm/	ворота легкого
histamine	/ˈhɪstəmiːn/	гистамин

histologist	/hɪˈstɒlədʒɪst/	гистолог
hormone	/ˈhɔːməʊn/	гормон
hydrochloric acid	/ˌhaɪdrəˈklɔːrɪk ˈæsɪd/	соляная кислота
hyperplastic	/haɪpəˌplæstɪk/	гиперпластический

I		
Word	**Pronunciation**	**Meaning**
ileum	/ˈɪlɪəm/	подвздошная кишка
immune response	/ɪˈmjuːn rɪˈspɒns/	иммунная реакция
immune system	/ɪˈmjuːn ˈsɪstəm/	иммунная система
immunity	/ɪˈmjuːnəti/	иммунитет
immunoglobulin	/ˌɪmjʊnəʊˈglɒbjʊlɪn/	иммуноглобулин
increase	/ɪnˈkriːs/	увеличивать
infarction	/ɪnˈfɑːkʃən/	инфаркт
inferior vena cava	/ɪnˈfɪərɪə ˌviːnə ˈkeɪvə/	нижняя полая вена
inflammation	/ɪnfləˈmeɪʃ(ə)n/	воспаление
influenza	/ɪnflʊˈenzə/	грипп
ingestion	/ɪnˈdʒestʃ(ə)n/	глотание, прием внутрь
inguinal (groin) lymph node	/ˈɪŋgwɪn(ə)l ˈlɪmf ˌnoʊd/ /grɔɪn/	паховые лимфатические узлы
inhalation (inspiration)	/ɪnhəˈleɪʃ(ə)n/ /ɪnspɪˈreɪʃ(ə)n/	вдох
inhale	/ɪnˈheɪl/	вдыхать, делать вдох
inherit	/ɪnˈherɪt/	наследовать
inherited	/ɪnˈherɪtɪd/	наследственный
initiate (the heartbeat)	/ɪˈnɪʃɪeɪt/	положить начало, запустить
inject	/ɪnˈdʒekt/	ввести, внедрять
injection	/ɪnˈdʒekʃ(ə)n/	укол
insulin	/ˈɪnsjʊlɪn/	инсулин
interferon	/ˌɪntəˈfɪərɒn/	интерферон (протеин, защищающий клетки от вирусов)
interleukin	/ˌɪntəˈluːkɪn/	фактор дифференцировки В-клеток

interstitial fluid	/ˌɪntəˈstɪʃəl ˈfluːɪd/	тканевая жидкость
intestine / bowel	/ɪnˈtestɪn/ /ˈbaʊəl/	кишечник
internal organs	/ɪnˈtɜː.n(ə)l/	внутренние органы
iron deficiency anemia	/aɪən dɪˈfɪʃ(ə)nsi əˈniːmiə/	железодефицитная анемия
ischemia	/ɪˈskiːmiə/	ишемия

J		
Word	**Pronunciation**	**Meaning**
jaundice	/ˈdʒɔːndɪs/	желтуха
jejunum	/dʒɪˈdʒuːnəm/	тощая кишка

K		
Word	**Pronunciation**	**Meaning**
karyotype	/ˈkærɪə(ʊ)taɪp/	кариотип, хромосомный набор клетки
keep Ving	/kiːp/	продолжать что-то делать
kidneys	/ˈkɪdniz/	почки

L		
Word	**Pronunciation**	**Meaning**
lack smth	/læk/	недоставать, отсутствовать
large intestine / bowel	/ˌlɑːdʒ ɪnˈtestɪn/	толстый кишечник
laryngopharynx	/ˌlærɪngəˈfærɪŋks/	ларингофаринкс, гортанная часть глотки
larynx (voice box)	/ˈlærɪŋks/	гортань
lesion (infectious, inflammatory, and cancerous)	/ˈliːʒ(ə)n/	поражение, повреждение
leukemia	/luːˈkiːmɪə/	лейкемия, лейкоз, белокровие
leukocyte = white blood cell	/ˈluːkə(ʊ)saɪt/ OR /ˌwaɪt ˈblʌd ˌsel/	лейкоцит, белая кровяная клетка
liberate hemoglobin	/ˈlɪbəreɪt/	высвобождать

lipase	/ˈlaɪpeɪz/	липаза
lipid	/ˈlɪpɪd/	липид, жир
liver	/ˈlɪvə/	печень
lobe (of the lung)	/ləʊb/	легочная доля
lubricate	/ˈluːbrɪkeɪt/	смазывать
lungs	/lʌŋz/	легкие
lung cancer	/lʌŋ/ /ˈkænsə/	рак легких
lymph	/lɪmf/	лимфа
lymph fluid	/lɪmf ˈfluːɪd/	лимфа, лимфатическая жидкость
lymph node	/ˈlɪmf ˌnoʊd/	лимфатический узел
lymphadenopathy	/ˌlɪmfædɪˈnɒpəθi/	увеличение лимфатических узлов
lymphatic system	/lɪmˈfætɪk ˈsɪstəm/	лимфатическая система
lymphatic vessels	/lɪmˈfætɪk/	лимфатические сосуды
lymphocyte	/ˈlɪmfə(ʊ)saɪt/	лимфоцит
lymphoid organ	/ˈlɪmfɔɪd ˈɔːg(ə)n/	лимфоидный орган

M

Word	**Pronunciation**	**Meaning**
macrophage	/ˈmækrə(ʊ)feɪdʒ/	макрофаг
maintain	/meɪnˈteɪn/	поддерживать
malignant tumor	/məˈlɪgnənt/ /ˈtjuːmə/	злокачественная опухоль
mark (antigens for destruction)	/mɑːk/	отмечать
mastication	/mæstɪˈkeɪʃ(ə)n/	пережевывание
mediastinum	/ˌmiːdɪəˈstaɪnəm/	средостение
mediastinal lymph node	/ˌmiːdɪəsˈtaɪn(ə)l ˈlɪmf ˌnoʊd/	медиастинальный лимфатический узел
megakaryocyte	/ˌmegəˈkærɪə(ʊ)saɪt/	мегакариоцит
metabolism	/mɪˈtæbəlɪz(ə)m/	метаболизм, обмен веществ
mitral valve	/ˈmaɪ.tr(ə)l ˌvælv/	митральный клапан,

		двустворчатый клапан, левый предсердно-желудочковый клапан
mitochondrion / mitochondria	/ˌmaɪtə(ʊ)ˈkɒndrɪən/ /ˌmʌɪtə(ʊ)ˈkɒndrɪə/	митохондрия / митохондрии
mix	/mɪks/	перемешать
moisten (the air)	/ˈmɔɪs(ə)n/	увлажнять (воздух)
molecule	/ˈmɒlɪkjuːl/	молекула
monocyte	/ˈmɒnə(ʊ)saɪt/	моноцит
mononuclear agranulocytic leukocytes	/ˌmɒnə(ʊ)ˈnjuːklɪə əˌgrænjʊləˈsɪtɪk ˈluːkə(ʊ)saɪt/	мононуклеарные агранулоцитарные лейкоциты
mononucleosis	/ˌmɒnə(ʊ)njuːklɪˈəʊsɪs/	мононуклеоз
move	/muːv/	двигаться
multiply	/ˈmʌltɪplaɪ/	размножаются
muscle	/ˈmʌs(ə)l/	мышца
muscle tissue	/ˈmʌs(ə)l ˈtɪʃuː/	мышечная ткань
musculoskeletal system	/ˌmʌskjʊləʊˈskelɪt(ə)l/	опорно-двигательная система, костно-мышечная система
mucous membrane	/ˌmjuːkəs ˈmembreɪn/	слизистая оболочка
multiple myeloma	/ˌmʌltɪpl ˌmaɪəˈləʊmə/	множественная миелома
myocardium	/ˌmaɪə(ʊ)ˈkɑːdɪəm/	миокард, сердечная мышца

N		
Word	**Pronunciation**	**Meaning**
narrow	/ˈnærəʊ/	суживаться, уменьшаться
nasal cavity	/ˈneɪz(ə)l ˈkævəti/	носовая полость
nasopharynx	/ˌneɪzəʊˈfærɪŋks/	носоглотка
natural immunity	/ˈnætʃərəl ɪˈmjuːnɪti/	врожденный иммунитет
nerve	/nɜːv/	нерв
nerve tissue	/nɜːv ˈtɪʃuː/	нервная ткань
nervous system	/ˈnɜːvəs ˌsɪstəm/	нервная система

neutralize	/ˈnjuːtrəlaɪz/	нейтрализовать
neutrophil	/ˈnjuːtrə(ʊ)fɪl/	нейтрофил
normal sinus rhythm (NSR)	/ˈnɔːm(ə)l ˈsʌɪnəs ˈrɪð(ə)m/	нормальный синусовый ритм
nostrils (nares)	/ˈnɒstr(ə)l/ /ˈneːriːz/	ноздри
nucleus, **Plural -** nuclei	/ˈnjuːklɪəs/; Plural /ˈnjuːklɪʌɪ/	ядро
nutrient	/ˈnjuːtrɪənt/	питательное вещество

O		
Word	**Pronunciation**	**Meaning**
obstruct	əbˈstrʌkt/	затруднять проходимость, преграждать
oral cavity	/ˈɔːr(ə)l ˈkævəti/	полость рта
organ	/ˈɔːgən/	орган
originate in	/əˈrɪdʒɪmeɪt/	происходить, брать начало
oropharynx	/ˌɔːrə(ʊ)ˈfærɪŋks/	мезофаринкс, зев, ротовая часть глотки
outer surface	/ˈaʊ.tə ˈsɜːfɪs/	наружная поверхность
oxygen	/ˈɒksɪdʒən/	кислород
oxygenated blood	/ˈɒksɪdʒəneɪtɪd blʌd/	кровь, насыщенная кислородом
oxyhemoglobin	/ˌɒksɪhiːməˈgləʊbɪn/	оксигемоглобин

P		
Word	**Pronunciation**	**Meaning**
palatine tonsils	/ˈpælətaɪn ˈtɒns(ə)l /	нёбная миндалина
pancreas	/ˈpæŋkriəs/	поджелудочная железа
pancreatic duct	/ˌpæŋkriˌætik ˈdʌkt/	проток поджелудочной железы
pancreatic juice	/ˌpæŋkriˌætik ˈdʒuːs/	поджелудочный сок, панкреатический сок
pancytopenia	/ˌpænsaɪtə(ʊ)ˈpiːniə/	панцитопения (низкое содержание всех

		форменных элементов крови)
paranasal sinuses	/ˌpærəˈ neɪz(ə)l ˈsaɪnəsɪz /	околоносовые пазухи, придаточные пазухи носа
parietal pleura	/pəˈraɪɪt(ə)l ˈplʊərə/	париетальная плевра, пристеночная плевра
pass through / from… to… / out of the body	/pɑːs/	переносить через/ от ... к... / из
pelvic cavity	/ˈpelvɪk/	полость таза
pepsin	/ˈpepsɪn/	пепсин
percussion	/pəˈkʌʃ(ə)n/	постукивание
peristalsis	/ˌperɪˈstælsɪs/	перистальтика
peristaltic contractions	/perɪˈstæltɪk/ /kənˈtrækʃ(ə)ns/	перистальтические сокращения
peritoneum	/ˌperɪtəˈniːəm/	брюшина, перитонеальная полость
perform (functions)	/pəˈfɔːm/	выполнять (функции)
pernicious anemia	/pəˈnɪʃəs əˈniːmiə/	пернициозная анемия
pharyngeal tonsil, or adenoid	/fəˈrɪndʒiəl ˈtɒns(ə)l/ /ˈædɪnɔɪdz/	аденоидная миндалина
phagocyte	/ˈfægə(ʊ)saɪt/	фагоцит
phagocytic	/fægə(ʊ)ˈsaɪtɪk/	фагоцитарный
phagocytosis	/ˌfagə(ʊ)saɪˈtəʊsɪs/	фагоцитоз
pharynx	/ˈfærɪŋks/	глотка
phlebotomy	/flɪˈbɒtəmi/	флеботомия, вскрытие вены
pick up (oxygen)	/pɪk ʌp/	забрать кислород
pituitary gland	/pɪˈtjuːɪt(ə)ri ˌglænd/	гипофиз
placenta	/pləˈsen.tə/	плацента
platelet = clotting cell = thrombocyte	/ˈpleɪtlɪt/ OR /ˈklɒt.ɪŋ ˌsel/ OR /ˈθrɒmbə(ʊ)sʌɪt/	тромбоцит
plasma	/ˈplæzmə/	плазма
plasma cell	/ˈplæzmə sel/	плазматическая клетка, антителообразующая клетка

pleural cavity	/ˈplʊərəl/	плевральная полость
pneumonia	/njuːˈməʊnɪə/	пневмония, воспаление легких
polycythemia vera	/ˌpɒlɪsaɪˈθiːmɪə ˈvɪərə/	истинная (первичная) полицитемия
polymorphonuclear granulocytic leukocytes:	/ˌpɒlɪˌmɔːfə(ʊ)ˈnjuːklɪə grænjʊlə(ʊ)ˌˈsɪtɪk ˈluːkə(ʊ)saɪt/	полиморфноядерные гранулоцитарные лейкоциты:
posterior / dorsal	/pɒˈstɪərɪə/ /ˈdɔːs(ə)l/	тыльный, задний, дорсальный
pressure	/ˈpreʃə/	давление
prevent something from Ving	/prɪˈvent/	предотвратить
propel	/prəˈpel/	продвигать, подталкивать
proper	/ˈprɒpə/	надлежащий
protease	/ˈprəʊtiːeɪz/	протеаза
protect	/prəˈtekt/	защищать
protein	/ˈprəʊtiːn/	белок, протеин
prothrombin	/prəʊˈθrɒmbɪn/	протромбин
provide (energy)	/prəˈvaɪd/	снабжать, предоставлять
pulmonary artery	/ˈpʊlmənerɪ ˈɑːtərɪ/ /ˈpʌlmən(ə)ri ˈɑːtəri/	легочная артерия
pulmonary circulation	/ˈpʊlmənerɪ səːkjʊˈleɪʃ(ə)n/ /ˈpʌlmən(ə)ri səːkjʊˈleɪʃ(ə)n/	малый круг кровообращения, лёгочное кровообращение,
pulmonary valve	/ˈpʊlmənerɪ vælv/ /ˈpʌlmən(ə)ri vælv/	легочный клапан
pump	/pʌmp/	насос, качок; качать
purpura	/ˈpəːpjʊrə/	пурпура (геморрагическая сыпь); розовая сыпь
pyloric sphincter	/paɪˈlɒrɪk ˈsfɪŋktə/	сфинктер привратника

R		
Word	**Pronunciation**	**Meaning**
rales	/rɑːl/	хрипы
receive	/rɪˈsiːv/	получать
recognize	/ˈrekəgnaɪz/	распознавать
rectum	/ˈrektəm/	прямая кишка
reduce	/rɪˈdjuːs/	уменьшить
relax / relaxation	/rɪˈlæks/	уменьшать напряжение, расслабляться
release (energy, bile, wastes)	/rɪˈliːs/	высвобождать
remain	/rɪˈmeɪn/	оставаться
reproductive system	/ˌriːprəˈdʌktɪv/	репродуктивная система, половая система
require	/rɪˈkwaɪə/	требовать
resist smth	/rɪˈzɪst/	противостоять
respiration	/respɪˈreɪʃ(ə)n/	дыхание
respiratory system	/ˈrespərətɔːri/ /ˈsɪstəm/	дыхательная система
rhonchi	/ˈrɒŋkaɪ/	сухие хрипы
rhythm	/ˈrɪð(ə)m/	ритм
ribosome	/ˈraɪbəsəʊm/	рибосома
right lymphatic duct	/raɪt lɪmˈfætɪk dʌkt/	правый лимфатический проток
ruga, rugae (plural)	/ˈruːgə/	складка, морщина
rupture of the spleen	/ˈrʌptʃə/	разрыв селезенки

S		
Word	**Pronunciation**	**Meaning**
saliva	/səˈlaɪvə/	слюна
salivary glands	/səˈlaɪv(ə)ri ˌglænd/ ALSO /ˈsæləveri ˌglænd/	слюнные железы
serum	/ˈsɪərəm/	сыворотка крови
sex gland	/seks ˌglænd/	половая железа
sickle cell anemia	/ˌsɪkəl sel əˈniːmiə/	серповидноклеточная

		анемия, дрепаноцитарная анемия
sigmoid colon	/ˈsɪgmɔɪd ˈkəʊlɒn/	сигмовидная кишка
sinoatrial node (SA node) or pacemaker	/ˌsaɪnəʊˈeɪtrɪəl nəʊd/	синусно-предсердный узел, синусный узел
skin graft	/ˈskɪn ˌgrɑːft/	пересадка кожи
small intestine / bowel	/ˌsmɔːl ɪnˈtestɪn/	тонкий кишечник
specializes in	/ˈspeʃ(ə)laɪz/	специализироваться в
spinal cavity	/ˈspaɪn(ə)l/	позвоночный канал
spinal cord	/ˌspaɪn(ə)l ˈkɔːd/	спинной мозг
spleen	/spliːn/	селезенка
splenectomy	/splɪˈnektəmi/	спленэктомия (удаление селезёнки)
splenic flexure	/ˈspliːnɪk ˈflekʃə/	левый изгиб ободочной кишки (селезёночный)
splenomegaly	/ˌspliːnə(ʊ)ˈmɛg(ə)li/	увеличение селезёнки
stem cell	/ˈstem ˌsel/	стволовая клетка
stethoscope	/ˈsteθəskəʊp/	стетоскоп
stomach	/ˈstʌmək/	желудок
sugar	/ˈʃʊgə/	сахар
superior vena cava	/suːˈpɪərɪə ˌviːnə ˈkeɪvə/	верхняя полая вена
supply	/səˈplaɪ/	снабжать, поставлять
suppressor T cell (regulatory T cell)	/səˈpresə ˈtiː sel/ /ˈregjʊlət(ə)ri ˈtiː sel/	Т-супрессорная клетка (регуляторная Т-клетка)
susceptible to smth	/səˈseptəbl/	восприимчивый, впечатлительный
swallow – swallowing	/ˈswɒləʊ/	глотать
swollen	/ˈswəʊlən/	опухший, вздувшийся
synthesis	/ˈsɪnθəsɪs/	синтез
system of Skin and sense organs	/skɪn/ /ˈsens ˌɔː.gən/	система кожи и органов чувств
systemic circulation	/sɪˈstemɪk səːkjʊˈleɪʃ(ə)n	большой круг кровообращения
systole	/ˈsɪstəli/	систола

T		
Word	**Pronunciation**	**Meaning**
T cell T lymphocyte	/tiːˈsel// tiːˈlɪmfəsaɪt/	Т-лимфоцит, тимусзависимый лимфоцит (лимфоцит вилочковой железы)
take over	/teɪk/	перенимать, взять контроль над
take place	/teɪk pleɪs/	происходить, состояться
thalassemia	/ˌθæləˈsiːmɪə/	талассемия, мишеневидно-клеточная гемолитическая анемия
thoracic cavity	/θɔːˈræsɪk/	полость грудной клетки, грудная полость
thoracic duct	/θəˈræsɪk dʌkt/	грудной лимфатический проток
throat	/θrəʊt/	горло
thrombocyte = platelet = clotting cell	/ˈθrɒmbə(ʊ)sʌɪt/ OR /ˈpleɪtlɪt/ OR /ˈklɒt.ɪŋ ˌsel/	тромбоцит
thymic hormone	/ˈθaɪmɪk ˈhɔːməʊn/	тимический гормон
thymus gland	/ˈθaɪ.məs ˌglænd/	тимус, вилочковая железа
thyroid gland	/ˈθɑɪrɔɪd ˌglænd/	щитовидная железа
tiny	/ˈtaɪni/	крошечный
tissue	/ˈtɪʃuː/	ткань
tolerance	/ˈtɒl(ə)r(ə)ns/	переносимость, устойчивость
tonsils	/ˈtɒns(ə)l/	миндалины; гланды
toxins	/ˈtɒksɪns/	шлаки, токсины
trachea (windpipe)	/ˈtreɪkɪə/ OR /trəˈkiːə/ /ˈwɪndpaɪp/	трахея
transport	/tranˈspɔːt/	перевозить
transverse colon	/trænzˈvɜːs ˈkəʊlɒn/	поперечная ободочная кишка
trap	/træp/	поймать в ловушку, поглощать

treat	/triːt/	лечить
tricuspid valve	/traɪˈkʌs.pɪd ˌvælv/	трикуспидальный клапан, трехстворчатый клапан, правый предсердно-желудочковый клапан
trigger (the allergy)	/ˈtrɪgə/	вызвать, инициировать, запускать
tuberculosis (TB)	/tjʊˌbəːkjʊˈləʊsɪs/	туберкулез

U		
Word	**Pronunciation**	**Meaning**
urinary or excretory system	/ˈjʊərɪn(ə)ri/ /ɪkˈskriːtəri/	мочевыделительная система
ureter	/jʊˈriːtə/	мочеточник
urinary bladder	/ˈjʊərɪn(ə)ri ˌblædə/	мочевой пузырь
urethra	/jʊˈriːθrə/	уретра
upper respiratory infection	/ˈʌpə ˈrespərətɔːri ɪnˈfekʃən/	инфекция верхних дыхательных путей

V		
Word	**Pronunciation**	**Meaning**
valve	/vælv/	клапан
vaccination	/ˌvæksɪˈneɪʃən/	вакцинация, прививка
vein	/veɪn/	вена
vena cava (plural - venae cavae)	/ˌviː.nə ˈkeɪvə/ /ˌviːniː ˈkeɪviː/	полая вена
ventral / anterior	/ˈventr(ə)l/ /ænˈtɪərɪə/	передний, вентральный
ventricle (right ventricle and left ventricle)	/ˈventrɪk(ə)l/	желудочек (сердца, мозга)
venule	/ˈvenjuːl/	венула
visceral pleura	/ˈvɪs(ə)r(ə)l ˈplʊərə/	висцеральная плевра, легочная плевра

villi	/ˈvɪlaɪ/	ворсинки
virus	/ˈvaɪərəs/	вирус
viscera (singular: viscus)	/ˈvɪs(ə)rə/	внутренние органы
vitamin	/ˈvaɪtəmɪn/ ALSO /ˈvɪtəmɪn/	витамин
vocal cords	/ˈvəʊ.k(ə)l ˌkɔːdz/	голосовые связки
voluntary / involuntary	/ˈvɒlənt(ə)ri/ /ɪnˈvɒlənt(ə)ri/	добровольный / недобровольный

W		
Word	**Pronunciation**	**Meaning**
waste products	/ˈweɪst ˌprɒdʌkt/	продукты жизнедеятельности, шлаки
windpipe (trachea)	/ˈwɪndpaɪp/ /ˈtreɪkɪə/	трахея

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