

ODESA NATIONAL MEDICAL UNIVERSITY

PHILOSOPHY, BIOETHICS AND FOREIGN LANGUAGES DEPARTMENT

ENGLISH LANGUAGE

of the 1st year of study

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HIGHER EDUCATIONAL MEDICAL INSTITUTIONS

Exercise 1. Topic vocabulary:

nouns	verbs	adjectives/adverbs
admission	allow	entrance
experience	carry out	external
obstetrics	diagnose	separate
psychiatry	treat	
school-leaver		
surgery		
syllabus		
term		

Exercise 2. Read the following word-combinations, guess their meanings.

Procedure: experimental procedure; medical procedure; surgical procedure; Procedure Room. It is a painful procedure.

Admission: admission rules; the procedure of admission; admission board; admission department. The procedure of admission to medical universities has changed greatly recently.

Disease: to treat different diseases; to fight against diseases; disease of the lungs; the symptoms of the disease; the reaction of the body to the disease; a heart disease; a dangerous disease, a prolonged disease. The disease is the natural process.

Institution: medical institution; educational institution; state institutions.

Exercise 3. Form the names of specialists from the names of professional fields

a) with the help of suffix -ist

For example: pharmacology – pharmacologist

Dermatology, physiology, neurology, immunology, gynecology, anesthesiology, pathology, traumatology, neurology, ophthalmology, oncology, urology, endocrinology, venereology, psychiatry.

b) with the help of suffix -ian

For example: paediatrics – paediatrician

Obstetrics, technics, electrics, mathematics.

How will you call these specialists in another way?

Eye doctor –

Ear, nose and throat doctor -

Exercise 4. Read the text.

Medical Universities in Ukraine

Becoming a doctor is a dream for millions of students around the world. Students can get higher medical education in Ukraine at post-secondary higher educational institutions called medical universities, which are separate from traditional universities. The procedure of admission to medical universities has changed greatly recently. Nowadays, Ukrainian school-leavers do not take any entrance exams. Medical universities admit their students on the basis of the results of the External Independent Testing in Biology, Chemistry or Maths and Ukrainian language and literature, which they take after the final school year.

Medical Universities train future doctors, dentists and pharmacists. Doctors' training takes six years but dentists' or pharmacists' training lasts five years. The curriculum and syllabuses for these Institutes are approved by the Ministry of Public Health. The main administrative unit of medical University is the faculty. As a rule, the Medical University may have some faculties (medical, dental and others), headed by the dean. He/She is responsible for administrative affairs of the faculty.

The training course consists of lectures, practical classes, practical work in laboratories and medical practice at different medical institutions. During the first two years the students of the Medical Institutes have so-called pre-clinical training, which includes general subjects, as Physics, Chemistry, Anatomy, Biology and others. In the senior years they study clinical subjects, as Therapy, Surgery, Obstetrics, Gynecology and others. At the clinical subjects, students learn to diagnose different diseases, to carry out laboratory analyses and treat people for different diseases.

Senior students acquire practical skills, working at many hospitals, polyclinics, sanitary epidemiological stations, and pharmacies. They acquire such practical skills as examining patients, making a diagnosis, prescription proper treatment, filling in case histories. A lot of students participate in scientific societies; their dream is to become research workers in future.

Having passed the state examinations, young doctors begin to work as interns during a certain period. After the internship training, they work as different specialists at the medical institutions. The most advanced specialists are engaged in research. They defend theses and obtain degrees of candidates of science (medicine).

All the medical universities in Ukraine teach their courses in English, Ukrainian or Russian. At the end of each course of study or training medical students take final tests, graded tests or exams in different subjects. The students are not allowed to skip classes as they will have to make up the missed ones overtime.

Ukrainian medical universities enroll students from almost every country especially India, Morocco, Tunis, Algeria, Bulgaria, Romania, USA, Syria etc. Most of students come to join their General Medicine program in Ukraine due to high level of training. All applicants who want to study medicine in Ukraine at the national medical universities are supposed to be assessed in Chemistry and Biology at secondary school.

The list of medical universities in Ukraine includes state education institutions of [Ukraine](#) of the 3rd and 4th accreditation levels such as universities, academies, and institutes.

Odesa National Medical University is considered to be one of the top medical universities in Ukraine. It was founded on September 1st, 1900, as the Medical Faculty of Novorossiysky (now Odesa) University thanks to the efforts of a great surgeon N.I. Pirogov. The faculty had brilliant prospects, as

some prominent, world-renowned scientists worked there. This faculty was the most prestigious and most equipped medical educational institution in Russia of those times.

The medical faculty of Novorossiysk University was reformed into an independent higher educational institution – medical institute in 1921, which became the medical university in 1994 and turned into the leading university of the south of the country.

There are seven faculties (three medical ones, the faculty of dentistry, the faculty of pharmacy, an international faculty and the faculty of post-graduate studies), and 55 departments at Odessa National Medical University now. Post-diploma specialization is carried out in internship.

In January 2014 the first medical simulation center in Ukraine was founded at Odesa National Medical University. This center is equipped with modern facilities, that haven't got analogues in Ukraine. New methods and techniques are used for the educational process. The Centre has collaborations with leading medical simulation centers worldwide. Educational process at the Centre has an interdisciplinary approach and is aimed to provide healthcare specialists for Ukraine and other countries in accordance with, modern healthcare requirements.

Exercise 5. Answer the following questions:

1. What educational institutions train future doctors and pharmacists?
2. Who is a medical university headed by?
3. How long does the training course at the medical university last?
4. What does the training course include?
5. What languages is the training course provided in?
6. What do students take at the end of each term?
7. What kind of training do the students have during the first two years?
8. What subjects do they study during pre-clinical training?
9. What subjects do students of medical universities study during the senior years?
10. Where do young medical specialists work after graduation?
11. What specialists are engaged in the research work?
12. When was ONMedU created?
13. How many faculties are there at ONMedU now?
14. What modern facilities is ONMedU equipped with?

Exercise 6. Match the medical specialties to their definitions:

1. psychiatry	a) the medical science that deals with the nervous system and disorders affecting it;
	b) the branch of medicine that deals with the care of women during pregnancy and

	childbirth;
2. pharmacology	c) the branch of medicine dealing with health care for women, especially the diagnosis and treatment of disorders affecting the female reproductive organs;
3. pediatrics	d) the branch of medicine concerned with the study, diagnosis, and treatment of mental disorders;
4. neurology	e) the branch of medicine that deals with the study and application of anesthetics;
5. obstetrics	f) the branch of medicine concerned with treating disease, injuries, etc, by means of manual or operative procedures;
6. gynecology	g) the branch of medical science concerned with children and their diseases;
7. anesthesiology	h) the science of drugs, including their characteristics and uses.
8. surgery	

Exercise 7. Fill in the gaps with the following words or word combinations:

<p>neurology; engage; surgery, obstetrics and pediatrics; academic year; tenure; terms; attend lectures; higher educational institution; gynecology; to gain deep knowledge</p>
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- Each ... is usually divided into two ...
- A medical university is a post –secondary ...
- During their course of studies medical students ... and have practical classes in different subjects.
- Medical students typically ... in both basic science and practical clinical coursework during their ...in medical school.
- Students perform different laboratory works and attend dissecting room... of Anatomy.
- The clinical part of the course includes learning
- ... is the field of medicine dealing with the diseases of the nervous system.
- Gynecologists work in the field of

Exercise 8. Match two parts of the sentences below to make an explanation of what a medical student is:

1. A medical student	a) medical students become doctors;
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2. Medical students study	b) is a student who studies medicine;			
3. They study a lot of subjects,	c) such as Anatomy, Physiology, Biochemistry, Histology and others;			
4. Medical students typically engage	d) at medical universities;			
5. After graduation from the university,	e) in both basic science and practical clinical coursework during their tenure at a medical school.			
1.	2.	3.	4.	5.

Exercise 9. Fill in the gaps with the words from the table below to get an explanation of what is a medical university:

such faculties; teach; post-secondary; future doctors; the course structure

1. A medical university is a ... higher educational institution.
2. It teaches
3. A medical university has ... as medical, dental and pharmaceutical.
4. Medical universities ... subjects such as human anatomy, biochemistry, pharmacology, immunology, neurology, obstetrics and gynecology, anesthesiology, internal medicine, family medicine, surgery, psychiatry, genetics, and pathology.
5. Traditionally, ... at a medical university is divided into a pre-clinical and a clinical part.

Exercise 10. Put the sentences into the correct order to explain the term “ONMedU”:

- ___ In 2010 the university was given the status of National University.
- ___ Odessa National Medical University was founded on September 1st, 1900, as the Medical Faculty of Novorossiysky University thanks to the efforts of the great surgeon N.I. Pirogov.
- ___ Post-diploma specialization is carried out in internship and in Master’s degree programme.
- ___ In 1920 the Medical Academy was organized in Odesa on the basis of the Medical Faculty of Novorossiysky University and became an independent higher educational institution.
- ___ There are seven faculties and 55 departments at the university.

Exercise 11. Complete the following answers:

1. Where do you study? I study at ...
2. What tests do medical students have to pass successfully to enter a medical university?
3. How long does your training take? My training ...
4. What subjects do you learn during the first two years? I learn ...
5. What subjects do the senior medical students learn? They learn ...
6. What practical skills will you acquire being the senior student? I'll acquire ...
7. What do medical students take at the end of each course of study? They take...

8. When do future doctors start working as interns?

Exercise 12. Natalia is a 4th year medical student of ONMedU. She is studying to become a physician. Her father, Viktor Andriyovych is a surgeon at a regional hospital. Natalia's brother Oleksandr is 15, he is still at school, but he wants to become a surgeon like his father.

a) Put the verbs in brackets into the correct forms of Present, Past or Future Simple.

1. Oleksandr ...(study) medicine after he graduates from school.
2. Viktor Andriyovych ...(treat) his patients with great care.
3. Natalia ... (like) Chemistry and Biology when she was at school.
4. Oleksandr ...(not want) to become a physician.
5. Natalia ...(not study) in 5 years' time.
6. Viktor Andriyovych ...(not live) at home with his parents when he was a student.

b) Complete the questions with suitable auxiliary verbs and answer them:

1. ... Viktor Andriyovych study medicine next year? -
2. ... Natalia want to become a surgeon like her father? -
3. ... Oleksandr go to school last year? -
4. Where ... Oleksandr's sister study? -
5. What ... Natalia do after she graduates from the university? -
6. What ... Natalia's father study at university? -

Exercise 13. Put the words in the correct order:

To make a statement:

1. lasts, choice, usually, the, 8 hours, about, multiple.
2. test, medical, is, most, Admission, schools, in, required.

To make a question:

1. Academic, factor, achievement, Is, important, an?
2. sciences, are, When, medical, presented?
3. What, curriculum, clinical, are, subjects, included, into?
4. final, What, during, the, consist, of, the, two, does, curriculum, years?

To make negative sentences:

1. headache, The, complains, of, a, patient. severe.
2. The, give, non-disposable, patients, with, nurses, syringes, injections.

Exercise 14. Put special questions to the words in italics:

1. *We* are taking notes of Anatomy.
2. A member of the staff is interviewing *the students of the second year*.
3. The students are working *at the laboratory* now.

4. He is taking his examination *in History* now.
5. *Students'* total expenses throughout the year are about several thousand dollars.
6. The department provides *instruction* in cell physiology and systems physiology.
7. The laboratory work of the trimester is summarized *in small group conferences*.
8. The students are preparing for a medical school *for 4-5 years*.

MEDICAL INSTITUTIONS

Part I

Exercise 1. Topic vocabulary:

nouns	verbs	adjectives/adverbs
complaint (of)	administer	initial
ENT-doctor	complain (of)	inpatient
(<i>ear-nose-throat-doctor</i>) death	consult	intramuscular
department	fill in	intravenous
dosage	indicate	outpatient
physician	prescribe	
reception ward	prevent	
recovery	relieve	
round		
sick-leave		
urinalysis		

Exercise 2. Form different parts of speech. Explain the meaning of affixes:

1. form **nouns and verbs** with the help of the prefix *over-*: production, heat, dosage, weight, to eat, to sleep, to react, to estimate;
2. form **adjectives** with the help of the prefix *un-*: favourable, clear, likely, conditioned, controllable, duly, safe, comfortable;
3. form **adjectives** with the help of the prefix *intra-*: muscular, venous, abdominal, hepatic, intestinal, nasal, oral;
4. form **the names of specialists (nouns)** with the help of the suffix *-ist*: neurology, gynaecology, physiology, anatomy, dermatology, endocrinology, traumatology, therapy, urology, oncology, ophthalmology.

Exercise 3. Read the following word-combinations.

to consult: to consult a neurologist, to consult an ENT-doctor, to consult the patients, a consulting doctor, consulting hours;

to make: to make a correct diagnosis, to make a procedure, to make a blood test, to make an experiment, to make an exception;

to complain: to complain of poor health, to complain of a headache, to complain of problems, to complain of heart discomfort, to complain of bad care;

to administer: to administer treatment, to administer certain drugs, to administer pain-killers, to administer intramuscular injections, to administer some procedures;

to provide: to provide population with medicines, to provide body with oxygen, to provide the injured people with first aid, to provide hospitals with things for medical care, to provide the patient with pills;

to relieve: to relieve pain, to relieve toothache, to relieve anxiety, to relieve fear, to relieve seizures;

analysis: blood analysis, urinalysis, feces analysis, laboratory analyses, biochemical analyses.

Exercise 4. Complete the table with necessary plural forms of nouns.

Singular endings	Plural endings	Examples	
		singular	plural
a	ae	vertebra	vertebrae
en	ina	lumen	lumina
um	a	septum	septa
us	i	fungus	fungi
ex, ix	ices	index	indices

1. diagnosis	
2. bacterium	
3. analysis	
4. nucleus	
5. streptococcus	
6. alveolus	
7. vertebra	
8. focus	

Exercise 5. Read the text:

Medical institutions in Ukraine

There is a wide network of medical institutions in Ukraine which protect the health of our people: **polyclinics, hospitals, health care centers, first aid stations, dental clinics, pharmacies and medical laboratories.**

A **polyclinic** is health care facility that provides examinations and treatment for different diseases and injuries to outpatients and is usually independent of a hospital.

There are a lot of specialists working at the polyclinics: **family doctors, neurologists, dermatologists, urologists, ophthalmologists, ENT-doctors, traumatologists, endocrinologists, surgeons,** etc. There are specialized polyclinics for the adults and children.

During the medical examination, a physician usually asks the patient what he complains of and according to the **complaints** carries out the medical examination. The physician listens to the patient's heart and lungs and measures his blood pressure and takes the temperature. The **laboratory findings** which include blood analysis, the analysis of urine (urinalysis), feces analysis and other tests help the physician to make a correct diagnosis and administer a proper treatment.

In addition to their consulting hours, family doctors go out to the calls to examine those patients who are on **a sick-leave** and follow **a bed regimen**. If it is necessary, a nurse will come to the patient's house to give him the administered injections or set **droppers**.

There is **a personal patient's card** of every patient at the district polyclinic which includes all the details about the patient: the diagnosis of the disease, the administrations made by the doctor, **the course of the disease**, the changes in the patient's condition after the treatment.²⁰

A hospital is a special medical institution that is aimed at treatment of the sick, injured or dying people with specialized medical and nursing staff and medical equipment. Hospitals typically have emergency departments to treat urgent health problems, such as fire and accident victims.

Hospitals consist of departments, called wards, especially when they have beds for inpatients. Hospitals may have the following departments: Emergency department (Intensive care unit), Cardiology, Neurology, burn unit, surgery, Obstetrics and gynaecology, (maternity ward) and many others. Besides, hospitals have their own medical laboratories, X-ray and physiotherapeutic departments.

A medical laboratory is a medical institution where clinical pathology tests are carried out on clinical specimens to obtain information about the health of a patient to aid in diagnosis, treatment, and prevention of diseases.

Some hospitals have outpatient departments and day-patient departments. Outpatient department is a part of a hospital for the treatment of people with health problems who visit the hospital for diagnosis or treatment and they only stay in hospital during their appointment – for about an hour. A day-patient department is aimed to treat patients who shouldn't be admitted for overnight care. Such patients usually attend for day surgery or for being on a drip.

When patients are admitted to the hospital first of all they are received by a nurse on duty at the reception ward. These patients have already received the direction from the polyclinic. The nurse fills in patients' case histories in which she writes down their name, age, place of work, occupation, address, complaints and the initial diagnosis made by a doctor at the polyclinic.

Then a doctor on duty examines the hospitalized patients and gives his instructions what ward the patients are to be admitted to: Intensive Care Unit, Surgery, Gynecology, Maternity, etc. He also determines if the patient requires inpatient or outpatient treatment.

At the inpatient department of a hospital life begins early in the morning. The nurse on duty carries out various procedures: she takes the patients' temperature, gives them intramuscular and intravenous injections or sets a dropper, takes stomach juice for analysis. Besides, she leads the patients to different instrumental examinations such as gastroscopy or ultrasound of the abdominal cavity organs that are usually carried out on an empty stomach. The nurse also gives all the prescribed remedies in the doses indicated by the ward doctors.

The nurses keep all the drugs in special drug cabinets. All the drugs have special labels which indicate the names of the drugs. Patients are not allowed to take the medicines themselves because some drugs are poisonous, the overdosage of some other drugs may cause unfavourable reactions and even death.

At about nine o'clock in the morning the doctors begin the daily rounds of the wards during which they examine all the patients. After the medical examination, the doctors administer different procedures: electrocardiograms, laboratory analyses, gastroscopy and ultrasound. Some patients are administered a bed regimen; some are to follow a diet to relieve stomachache or prevent stomachache. All doctors always treat their patients with great attention and care that helps much in their recovery.

Exercise 6. Answer the questions:

1. What medical institutions are aimed at the protection of people's health?
3. What is the difference between the hospital and the polyclinic?
4. What specialists work at the polyclinic?
5. What departments are there at the hospital?
6. What is the difference between the in-patient and out-patient department?
7. What does a doctor base his examination on?
8. What does a doctor do during the medical examination?
9. What helps the physician to make a correct diagnosis?
10. Where is information about the patient's condition written down?
11. Who and where are the patients received by when admitted to the hospital?
12. What is usually written in a patient's case history?
13. What are the duties of a nurse?
14. What procedures can be administered to a patient?
15. What are the duties of medical laboratories?

Exercise 7. Match the word to its definition.

1. a therapist	a) a doctor who deals with wounds, injuries, dislocations
2. a urologist	b) a specialist who treats the diseases of glands
3. a traumatologist	c) a person who performs operations
4. ENT-doctor	d) a doctor who treats urinary tract diseases
5. endocrinologist	e) a specialist in mental disorders
6. surgeon	f) a doctor who knows different methods of treatment of infectious and viral diseases by using various medicines
7. psychiatrist	g) a technician who knows how to treat and repair teeth
8. dentist	

	h) a specialist who deals with diseases of ears, nose, throat
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Exercise 8. a) Learn the given expressions. Pay attention to the use of prepositions.

<i>according to</i>
<i>in addition to</i>
<i>to be ill with</i>
<i>to call in a doctor</i>
<i>to carry on</i>
<i>to complain of</i>
<i>to fill in the patient's card</i>
<i>to go out to the calls</i>
<i>to listen to the heart and lungs</i>
be on a drip

b) Supply the necessary prepositions:

1. Listening ... the patient's lungs helps to diagnosis pneumonia.
2. ... night patient Davis complained ... chest pain.
3. He is ... a sick-leave now, because he is ill ... pneumonia.
4. The nurse usually fills ... the patient's cards ... the morning.
5. Medical students study ethics and philosophy in addition ... basic science.
6. The nurse has got a patient on an anesthetic drip, so he won't feel any pain.
7. Pavlov carried ... many experiments to determine the nature of conditioned reflexes.
8. You should take these pills twice ... a day according ... the doctor's administrations.

Exercise 9. a) Join adjectives and nouns to make up word-combinations:

1. initial	a) examination
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2. intramuscular	b) drugs
3. unfavourable	c) trouble
4. instrumental	d) injection
5. poisonous	e) cavity
6. daily	f) diagnosis
7. abdominal	g) rounds
8. stomach	h) results

b) Join verbs and nouns to make up word-combinations:

1. to carry out	a) overdosage
2. to cause	b) injections
3. to administer	c) medicines
4. to require	d) dropper
5. to take	e) procedures
6. to set	f) treatment
7. to give	g) stomachache
8. to relieve	h) surgery

Exercise 10. Guess what word is meant.

1. A person who is treated by the doctor is a _____.
2. A medical document where the patient's information is written down is a _____.
3. A patient who comes to hospital to receive treatment and then returns home is called _____.
4. When a patient shouldn't eat before a procedure is known as _____.
5. To relieve stomachache it's necessary to follow a strict _____.
6. A patient who receives treatment at hospital and stays overnight is called _____.
7. The period when the patient's condition is improving is called a _____.
8. When a nurse slowly (in drops) introduces medicine into the patient's vein, it is called _____.

Exercise 11. Give synonyms to the words in the text.

An establishment, a drug store, stool analysis, to prescribe, to need, to reveal, to aid, to get, resuscitation department, delivery department, sample, admission department, preliminary diagnosis, convalescence.

Exercise 12. Where can you find these patients? Match the patients with the correct wards.

a. Mary who has just delivered a baby	1. Intensive Care Unit
b. John who has broken his leg	2. Orthopaedic department
c. My grandmother who is suffering from pneumonia complications	3. Paediatric Ward
d. Peter who will have his appendix removed	4. burn unit
e. Betty's mother who is suffering from women's disease	5. Casualty and Emergency Department
f. My mother who will be operated on for an eye cataract	6. Surgical Ward
g. Samuel who is unconscious	7. Geriatric Ward
h. Paul who has just been in a car crash	8. Ophthalmic Ward
i. Your son who has measles	9. Gynaecological Ward
l. James who has skin burns on his left arm	10. Maternity unit

Exercise 13. Put questions to the underlined words.

1. There are different departments in hospitals specialized in the treatment of particular diseases.
2. In case of emergency you may dial 103 for the ambulance to come, which operates day and night.
3. Maternity homes, Mother-and-Child Health Care Centers concentrate their efforts on the problems of Pediatrics, Obstetrics and Gynecology.
4. Nowadays a doctor should develop the basic skills to diagnose early, to treat efficiently and to exclude serious complications.
5. The service of epidemic warnings is carried out by WHO.
6. WHO gathers information and broadcasts it daily by radio to health authorities, ports, airports and ships at sea.
7. WHO also informs national health services about outbreaks of viral diseases such as coronavirus and hepatitis C.
8. WHO achieved impressive success in the campaign against small pox and malaria.

Exercise 14. Open the brackets using the verbs in the appropriate form.

The working day of any specialist at the polyclinic (to begin) at 9 o'clock in the morning. But, as a rule, they all (to come) to work at 8:45 a.m. so as to get ready for the reception of their patients. The work of a district doctor at the polyclinic (to last) for 3 hours during which he (to examine) about 10 and sometimes even 15 patients. In the afternoon he (to make) his daily round of visits to the district: if a patient (to be) seriously ill, his district doctor (to examine) him at home. As for other specialists working at the polyclinic their working day (to differ) from the one of a district doctor. They (to work) for 5 hours a day, i.e. from 9 a.m. to 2 p.m. As a rule, it (to take) them 15 to 20 minutes to examine one patient. Thus, a specialist (to receive) about 20 patients a day. So, the working day of any specialist at the polyclinic (to be) quite intense.

Exercise 15. Arrange the following sentences in order to describe the profession of a family doctor:

1. A family doctor is a specialist working at the polyclinic with a definite number of patients.
2. Then he leaves for the seriously ill patients who cannot come to the polyclinic and gives them sick-leaves.
3. The work of family doctors is very intensive, especially during seasonal epidemics such as flu.
4. The work of a family doctor at the polyclinic lasts for 6 hours.
5. His work consists of two parts: examinations at the polyclinic and visits to patients at home.

Exercise 16. Describe the notions a polyclinic, a hospital using the following table:

1. The type of establishment.	
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2. What it supplies people with	
3. Structural units.	
4. Functions	

MEDICAL INSTITUTIONS

Part II

Exercise 1. Topic vocabulary:

nouns	verbs	adjectives/adverbs
adhesive plaster	administer	appropriate
antipyretics	prevent	artificial
chemist's department	provide	corresponding
consequence	rende	immediate
contraindication	require	over-the-counter
dispensing area	suffer	poisonous
disposable syringe	supply with	portable
enema		severe
expiry date		sudden
gauze		wide
injury		
iodine		
label		
laxative		
paramedic		
prescription		
splint		
stretcher		
suppository		
tourniquet		
vial		
warnings		
wound		

Exercise 2. Form different parts of speech. Explain the meaning of affixes:

- 1) form nouns from the verbs with the suffix **-ion**: to consume, to inject, to protect, to consult, to obstruct, to transport, to prescribe, to administer;
- 2) form nouns from the verbs with the suffix **-er**: to consume, to lecture, to write, to read, to work, to help, to examine, to drive;
- 3) form nouns from adjectives with the suffix **-ness**: ill, weak, dark, great, kind, happy, lazy, tough;
- 4) form adjectives from verbs with the suffix **-able**: to consider, to change, to eat, to absorb, to drink, to rely, to reason, to solve.

Exercise 3. Read the following word-combinations. Make up your own sentences:

to contain: to contain first-aid things, to contain narcotic drugs, to contain harmful substances, to contain iodine and brilliant green, to contain masks for personal protection;

to relieve: to relieve pain, to relieve toothache, to relieve nausea and vomiting, to relieve anxiety, to relieve fear, to relieve seizures, to relieve constipation;

to receive: to receive the call, to receive the findings of analyses, to receive the doctor's instructions, to receive symptomatic treatment, to receive antibiotic therapy.

to administer: to administer treatment, to administer surgical operation, to administer over-the-counter drugs, to administer X-ray examination, to administer ultrasound examination, to administer laxatives.

to require: to require stretchers, to require surgery, to require antipyretics, to require vitamin supplements, to require a prescription.

Exercise 4. Read the text:

Pharmacy and Emergency Medical Service

Pharmacy and Emergency Medical Service provide out of hospital medical aid and supply population with medicines.

Pharmacy (drugstore in US, chemist's shop in GB) is an institution of health service where people can buy different drugs and things for medical care. It is a place where a wide variety of medical products are sold and prescription can be made; drugs are dispensed and stored. Each pharmacy has a chemist's department where a consumer can buy ready to use over-the-counter drugs and a dispensing area where drugs are sold by prescription only. All medicines are kept in drug cabinets, open shelves and refrigerators at a pharmacy.

At the pharmacy, a person can buy different medicines that he requires for his treatment such as antipyretics, antibiotics, emetics and anti-emetics, laxatives, sedatives, anti-inflammatory drugs, etc. that are sold in the form of tablets, capsules, drops or dragees. However, poisonous, drastic, narcotic and psychotropic drugs are sold by prescription only at the dispensing area. As they are potent, they can be dangerous if taken in an overdose. Therefore, their use is strictly controlled.

There is also a wide variety of things for medical care sold at the pharmacy: adhesive plasters, cotton wadding, gauze, disposable syringes, inhalers, enemas, hot water bottles, thermometers, tonometers, etc. Besides, a person can find medical herbs, vitamin and mineral supplements, various kinds of phytotea at the pharmacy.

Every small bottle, a tube or a box of medicine has a label on it. The dose to be taken and the directions for the administration are indicated on a label. All medicines have the following information in a drug leaflet: name of the medicine, correct dosage instructions, date of dispensing, expiry date, side effects, warnings or contraindications. The overdosage of drugs may cause dangerous consequences and sometimes even death.

To buy potent drugs it is necessary to receive a special medical document from the doctor, i.e. prescription. As a rule, prescriptions are written out in Latin abbreviations in continental Europe. The only exception is the “signature” section which contains directions to the patients. In Great Britain all prescriptions are written out in the English language only. If they do use any Latin abbreviations, they are quite wide-spread and easy to read (such as *p.o.*, *a.m.*, *p.m.*, *p.c.*, *o.d.*, *nocte* and so on).

Emergency medical service (EMS) also known as *ambulance services* or *paramedic services* is a medical service that provides out-of-hospital medical care and transportation of patients with diseases and injuries to hospitals. It is carried out by the specialized facility called the First Aid Station. It is on duty round the clock. Calls are made to the First Aid Station in case of an accident or a sudden severe illness. All ambulances are equipped with first-aid kits. First-aid kit is a special case which contains the necessary things for rendering the first aid and making a diagnosis. There are ampoules, boxes, vials with different drugs and tubes with liniment; alcohol, cotton wadding, disposable syringes for IV and IM injections; antiseptics, brilliant green, iodine, adhesive plasters to clean and close wounds; bandage and tourniquet to stop bleeding; inhalers for people suffering from respiratory diseases; enemas, probes, hot water bottles for those who have troubles with the gastrointestinal tract; masks and gloves for the first-aid doctors for their personal protection. Among medicines, there are analgesics, tonics, antibiotics, anti-inflammatory remedies, emetics and anti-emetics, antipyretics, sedatives and hypnotics, laxatives and suppositories in the first-aid kit. It may contain even narcotic medicines to relieve pain in severe cases. The ambulances also carry artificial respiration apparatus, sets of splints and stretchers, crutches, thermometers to take the temperature, tonometers to measure blood pressure, portable electrocardiograph to monitor a patient’s heart work.

The duties of an ambulance team include immediate life-saving care in the event of a medical emergency; commonly advanced first aid, oxygen administration, cardio-pulmonary resuscitation (CPR), and automated external defibrillator (AED) usage.

There are several kinds of ambulance teams that are trained to deliver specialized medical aid: cardiac intensive care teams, psychiatric care teams, children’s emergency, etc. Each ambulance is equipped with appropriate instruments according to their qualification.

All ambulances are radio equipped. To call in an ambulance it is necessary to dial up 103. The dispatcher is responsible for the “pre-arrival” instructions: he receives the call, asks for all the important details (e.g., the address of an accident, types of injuries) and then directs the corresponding ambulance.

The ambulance team consists of an ambulance doctor, medical assistant (or paramedic), and non-registered nurse. The main task of the ambulance doctor is to make a correct diagnosis quickly. That’s why he must know emergency surgery, toxicology, emergency therapy, obstetrics and gynecology. The paramedic helps the doctor and prepares the necessary instruments for a certain procedure. The duty of the non-registered nurse is to keep the first-aid kit in order. There is also an ambulance driver who is trained to transport people carefully.

In Ukraine, there are government-financed and private ambulance services. The main function of the latter is mainly to transport a patient to the in-patient department of the hospital.

Exercise 5. Answer the questions:

1. What is a pharmacy?
2. What departments are there at every pharmacy?
3. What can a person buy at the chemist's department?
4. What can a person buy at the dispensing area?
5. Where are all the drugs kept at the pharmacy?
6. Why are some drugs sold by prescription only?
7. What does a drug leaflet consist of?
8. What services does the emergency medical service provide?
9. What things for medical care are all ambulances equipped with?
10. What does the first-aid kit contain?
11. What drugs are there in the first-aid kit?
12. What are the duties of the ambulance team?

Exercise 6. Join the words so as to make up word-combinations.

1. contagious	a) treatment
2. disposable	b) drugs
3. out-patient	c) trial
4. in-patient	d) kits
5. side	e) syringes
6. anti-inflammatory	f) diseases
7. first-aid	g) department
8. intravenous	h) injury
9. maxillofacial	i) injection
10. experimental	k) effect

Exercise 7. a) Open the brackets using the verbs in the appropriate form.

The structure of a complete prescription (to include) six essential parts: the patient's name, the superscription, the inscription, the subscription, the signature and the prescriber's name.

The superscription (to be) the traditional symbol "Rx". It always (to appear) at the beginning of the prescription. "Rx" (to represent) the contraction of the Latin verb "recipe" which (to mean) "to take". In Continental Europe they (to use) the symbol "Rp". It (to be) the analogous of the English "Rx".

Then (to come) the inscription. It (to be) the body of the prescription. This section (to contain) the

ingredients and their quantities, necessary to make a medicine.

The subscription always (to follow) the inscription and (to contain) the writer's instructions to the pharmacist.

The signature (to consist) of the directions for the patient. The pharmacist (to place) this information the label of the container in which the medication is dispensed.

The prescriber's name (to be) the part of the prescription that (to guarantee) its authenticity.

b) Place the parts of the prescription in the correct order and read it. Name each part:

1. For pain, one pill four times a day by mouth
2. Dr Thomas Hood
3. Rx
4. Sevredol, sixty x twenty-milligramme tablets
5. two packages
6. Patient Robert Smith

Exercise 8. Match the terms with their explanations:

1. a pharmacy	a) a case of taking drugs in excessive amount;
2. a pharmacist	b) a special time when a medicine can no longer be used;
3. a medicine	c) a small piece of paper which contains the information about the drug;
4. a prescription	d) pills or tablets used for the treatment of diseases;
5. an overdose	e) a person who is qualified to compose and dispense drugs;
6. a label	f) also called medicine, any substance taken by mouth; injected into a muscle, the skin, a blood vessel, or a cavity of the body; or applied topically to treat or prevent a disease or condition;
7. a drug	g) a medical facility where one can buy drugs and things for medical care;
8. an expiry date	h) a doctor's written instruction for the composition and use of a drug.

Exercise 9. Replace the words in bold type with their equivalents from the texts:

1. Any **medicine** should be taken according to the prescription.
2. **A drugstore provides** people with medicines.
3. Different examinations and analyses help the physician to **prescribe** a proper treatment.
4. **Hospital treatment**, also known as **residential treatment**, requires patients to stay at a clinic with 24-hour medical and emotional support.
5. **An excessive intake of drugs** leads to **bad results**.
6. **Painkillers** are powerful drugs that interfere with the nervous system's transmission of the nerve signals we perceive as pain.
7. Some **unfavourable effects** appear when taking the drug.

8. **A package insert** contains the following sections: Clinical pharmacology, Indications, Contraindications, **Adverse reactions**, Dosage and administration and Physical properties.

Exercise 10. Match the type of medicine and its application or content:

1. A vial	a) solid medicines are inserted into the rectum to melt and affect the body
2. A tube	b) to stop bleeding
3. A box	c) to clean and close wounds
4. An adhesive plaster	d) a device used to protect and immobilize a body part (such as a broken arm)
5. A suppository	e) of suppositories
6. A splint	f) the injection of liquid into the rectum and colon by way of the anus
7. A syrup	g) of cough mixture
8. A tourniquet	h) to explore a wound or body cavity
9. A probe	i) with eye drops
10. An enema	j) of liniment

Exercise 11. Guess the meaning:

1. anti-inflammatory drugs	a) medicines that decrease fever
2. antipyretics	b) medicines that are used to calm down and relax the patient
3. analgesics	c) medicines for relieving constipation
4. emetics	d) to inhibit the growth of microorganisms
5. hypnotics	e) medicines that relieve pain, they are also called pain-killers
6. laxatives	f) medicines that produce vomiting
7. sedatives	g) medicines that help to reduce inflammation
8. Antibiotics	h) medicines that produce sleep

Exercise 12. Insert instead of parentheses the words given in a box:

stretcher, splint, reception ward, drug, suppositories, laxatives, antipyretics, side effects,
wound, enema and hot water bottle,

1. The patient with an open _____ should be injected anti-tetanus vaccine.
2. The man injured in a car accident was carried into the _____ on _____.

3. To arrest severe bleeding from the wound in the femur the nurse applied a _____.
4. The patient suffering from constipation was administered _____ to evacuate the bowels.
5. _____ are applied in treatment of gastrointestinal disorders.
6. As infants can't swallow the tablets, they are administered drugs to subside the fever - _____ by rectal route - in the form of _____.
7. A _____ is a chemical substance used to treat, cure, prevent, or diagnose a disease.
8. _____ of drugs may cause nausea, vomiting, heart and lung problems, etc.

Exercise 13. Change sentences from Active into Passive:

Model:

The doctor will examine you in a minute. – You will be examined by the doctor in a minute.

1. A. Fleming discovered penicillin by chance.
2. The surgeon operated on the patient successfully.
3. Students study basic theoretical subjects in the first term.
4. Scientists introduced new methods of treatment of cancer.
5. The district doctor will prescribe you the proper treatment.
6. The doctor made a correct diagnosis after the physical examination.
7. The doctor will discharge the patient from the hospital in two days.
8. The nurse on duty usually takes the patients to different procedures.

Exercise 14. Put questions to the underlined words:

1. Latin is the language of prescriptions.
2. There are two departments at any pharmacy.
3. The use of potent drugs is strictly controlled.
4. The physician prescribed him mild laxatives.
5. A chemist's supplies population with medicines.
6. In Britain prescriptions are written out in English only.
7. They will take into consideration all the doctor's administration.
8. The pharmacist instructed the patient about the medication's side effects.

Exercise 15. Describe the notions *a pharmacy, a first-aid station* using the following table:

1. The type of establishment.	
2. What it supplies people with	
3. Structural units.	
4. Functions	

Exercise 16. Arrange the following sentences in order to describe *the first-aid kit*:

1. The first-aid kit may also contain narcotic medicines to relieve severe pain.

2. For example, there is alcohol, cotton wadding, and disposable syringes for IV and IM injections.
3. Bandage and tourniquet are applied to stop bleeding.
4. Besides, there are antiseptics, brilliant green, iodine, adhesive plasters used to clean and close wounds.
5. Among medicines, there are pain-killers, antibiotics, emetics and anti-emetics, antipyretics, sedatives, laxatives, etc.
6. First-aid kit is a special case that contains all the necessary things for rendering the first aid.

EXAMINATION OF THE PATIENT

Exercise 1. Topic vocabulary:

nouns	verbs	adjectives/adverbs
breathlessness	apply	mental
cough	estimate	objective
dizziness	reveal	subjective
edema		
fissure		
fracture		
haemorrhage		
headache		
height		
murmur		
palpation		
pathogenesis		
percussion		
rales		
swelling		

Exercise 2. Read correctly:

ture [ʃə]: picture, fracture, nature, mixture, lecture, culture, fixture, creature, temperature;

sure [ʒə]: pleasure, measure, treasure, exposure, seizure, BUT **ssure** [ʃə]: pressure;

(t)ch [tʃ]: chill, chest, chin, cheek, each, much, rich, cheese, torch, touch, match, kitchen;

ch [k]: mechanism, headache, chemistry, stomach, character, technique, scheme, school;

g [g]: gain, gossip, gullet, flag, groin, gold, good, beg, glad, gall-bladder, gut;

g [dʒ]: gem, gin, gym, stage, age, gel, luggage, damage, image, genesis, cage;

BUT g [g]: gift, girl, get, give.

Exercise 3. a) Form the nouns with the term-elements. a) form the nouns with the term-element **-ache**: head, ear, stomach, back, tooth, arm;

b) form the nouns with the term-element **patho-**: genesis, biology, biochemistry, anatomy, metabolism, occlusion, physiology;

c) form the nouns with the term-element **haemo-**: capillary, diagnosis, dynamics, globin, dialysis, angioma.

Exercise 4. Read the following word-combinations. Make your own sentences.

diagnosis: correct diagnosis, incorrect diagnosis, exact diagnosis, the diagnosis of nephritis, to make a diagnosis;

disease: a pulmonary disease, a renal disease, a mental disease, to reveal a disease, to cure a disease;

examination: examination of the patient, proper examination, physical examination, visual examination, instrumental examination;

procedure: an easy procedure, a difficult procedure, a necessary procedure, to administer a procedure, to carry out a procedure on an empty stomach;

symptom: an objective symptom, a subjective symptom, a severe symptom, a mild symptom, the symptoms of pneumonia.

Exercise 5. Read the text:

Examination of the Patient

Before treating the patient, it is necessary to make a correct diagnosis of the disease and to determine its aetiology, i.e. the causes of the disease. The examining doctor must know well the pathogenesis of any disease, i.e. the way and mechanism of its development, as well as the symptoms revealing it.

A number of different procedures is used to establish a diagnosis: history-taking; physical examination, which includes visual examination, palpation, percussion, auscultation; laboratory studies, consisting of urinalysis, blood, sputum and other analyses; instrumental studies, for example, taking electrocardiograms or cystoscopy, X-ray examination and others.

For determining a disease, it is very important to know its symptoms, i.e. the signs of a disease. They are breathlessness, edema, cough, chill, vomiting, fever, haemorrhage, headache, rash, swelling and others. Some of these symptoms are objective, e.g., haemorrhage or vomiting, because they are determined by objective study, while others, such as headache or dizziness are subjective, since they are evident only to the patient.

The physical examination includes three stages: general examination; local examination; examination of body systems.

On general examination, the patient is examined from head to toes: this helps to estimate the physical and mental state of the patient. The doctor also determines the patient's weight and height, observes his facial expression, movements, speech, state of lymphatic nodes, muscles, bones, joints.

On local examination, the doctor examines the patient's head, eyes, nose, ears, oral cavity, neck, thyroid gland, etc. to estimate the functional state of particular parts of the body.

Examination of body systems includes the study of the respiratory, endocrine, nervous and other systems. On this stage, the doctor applies the technique of palpation and percussion to determine whether the borders of internal organs are normal or abnormal. By means of auscultation he can reveal rales in the lungs in case of pneumonia or bronchitis, or heart murmurs if a patient suffers from cardio-vascular diseases.

Laboratory analyses are important as well. Blood analysis revealing leukocytosis immediately indicates the presence of inflammation in the body. Urinalyses help to reveal the presence of urinary tract infections such as cystitis, nephritis or pyelonephritis. Analysis of sputum is performed to confirm the diagnosis of tuberculosis.

Instrumental procedures also help to determine health problems. Electrocardiograms are necessary to monitor the heart work. X-ray usually shows the borders and structure of the internal organs, fractures and fissures, accumulation of liquid in the lungs, etc.

So, examination of the patient is a complex procedure helping to timely reveal diseases or dysfunctions of any organs and start their treatment.

Exercise 6. Answer the questions:

1. What is it necessary to know to make a correct diagnosis?
2. What kind of procedures are used to establish a diagnosis?
3. What groups can symptoms be divided into?
4. What is the difference between the objective and subjective symptoms?
5. What does the scheme of the physical examination include?

6. What is examined during each stage of physical examination?
7. Why are laboratory analyses important?
8. What does X-ray help to reveal?

Exercise 7. Match the symptoms to their explanations:

1. haemorrhage	a) small red spots on the skin
2. cough	b) removal of the contents of the stomach
3. headache	c) feeling of coldness during high fever
4. rash	d) pain in the head
5. fever	e) profuse bleeding from injured blood vessels
6. vomiting	f) accumulation of fluid under the skin or in the body cavities
7. chill	g) high body temperature
8. edema	h) reflex which helps to remove foreign substances and microbes from the airways

Exercise 8. Fill in with the necessary information from the text:

1. The cause of the disease is known as _____.
2. The physical examination includes the following procedures _____.
3. The pathogenesis is known as _____.
4. The instrumental studies may include _____.
5. The laboratory studies consist of _____.
6. To make a diagnosis the doctor should make the following procedures _____.
7. Three stages of physical examination are: _____.
8. The signs of a disease is known as _____.

Exercise 9. Complete the table:

Physical examination	Laboratory examination	Instrumental examination

Exercise 10. Fill in the sentences with the words from the box:

urinalyses, history-taking, subjective, X-ray, palpation, laboratory, symptom, objective

1. Typical signs that can characterize particular disease are called _____.
2. Blood tests and sputum analyses are performed during _____ examination.
3. Haemorrhage, rash, cough are _____ symptom.
4. Breathlessness, dizziness are _____ symptom.
5. The fracture of bones can be revealed by _____.
6. _____ is the first step in patient's examination.
7. _____ is performed to determine to borders of internal organs.
8. The doctors usually administer _____ to reveal urinary tract infections.

Exercise 11. Put the verbs in brackets into the correct tense form.

1. The cause of the disease (to call) aetiology.
2. Yesterday the students (to learn) the pathogenesis of pneumonia.
3. Tomorrow I (to take) the ECG to monitor my heart work.
4. If blood analysis (to reveal) leukocytosis, the patient (to administer) antibiotics.
5. The medical examination (to carry) out twice a year, as a rule.
6. The stomach troubles of the patient (to determine) by vomiting.
7. In a week, students (to observe) the professor examine his patients.
8. Good day light (to allow) to estimate the colour of the patient's skin, conjunctiva, oral cavity.

Exercise 12. Put questions to the underlined words:

1. To make a diagnosis the doctor needs the findings of blood analysis.
2. Any disease is usually revealed by its symptoms.
3. The patient was administered unanalysis to confirm cystitis.
4. Objective symptoms include haemorrhage, vomiting, cough, etc.
5. She felt dizzy and nauseous after taking these pills.
6. Physical examination is the first objective stage in examination of a patient.
7. By means of auscultation the examiner can reveal rales in the lungs and heart murmurs.
8. The diagnosis of tuberculosis will be confirmed after analysis of sputum.

MUSCULOSKELETAL SYSTEM

Exercise 1. Topic vocabulary:

nouns	verbs	adjectives/adverbs
bone marrow	attach	cervical
breastbone	construct	cranial
cartilage	develop	facial
coccyx	make up	lumbar
joint	provide	thoracic
ligament	protect	
marrow cavity		
pelvis		
rib		
spine		
tendon		
vertebra		

Exercise 2. Read the word combinations and sentences with the new words and make your own sentences.

Cranial: cranial bones; cerebro-cranial symptom; cranial nerves; cranial radiograph; cranial X-ray.

The bones of the skull consist of cranial and facial parts.

Facial: anterior facial vein; bones of the facial skeleton; facial bones; facial asymmetry; facial muscles.

The facial bones are the bones of the anterior and lower skull.

Cervical: cervical artery; cervical glands; cervical nerves; cervical vertebra; deep cervical vein.

There are seven cervical vertebrae in the spine.

Thoracic: long thoracic artery; thoracic aorta; thoracic bones; thoracic cavity; thoracic organs.

Thoracic vertebrae compose the middle segment of the spinal column, between the cervical vertebrae and the lumbar vertebrae.

Lumbar: lumbar vein; lumbar part of spinal cord; lumbar puncture; lumbar region; lumbar vertebrae.

The lumbar vertebrae are five vertebrae that make up the spine in the lower back.

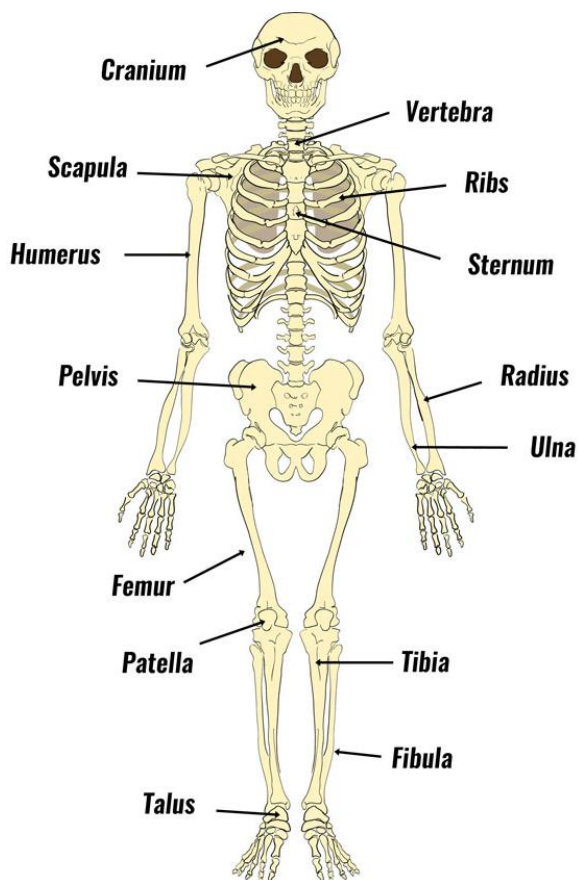
Exercise 3. Give adjectives for the following nouns (you will need to use a dictionary!):

noun	adjective	noun	adjective
bone		cartilage	
spine		ligament	
skeleton		muscle	
vertebra		cell	
pelvis		blood	

Exercise 4. Read the text:

The musculoskeletal system

The musculoskeletal system is composed of two systems – the muscular system and the skeletal system. It is made up of hard and soft tissues. The hard tissue includes bones and cartilages, while the soft tissues are the muscles, tendons, synovial membranes, joint capsules and ligaments.



The skeleton is constructed of bones. A bone is any of the pieces of hard, whitish tissue making up the skeleton in humans. Bones are important in five ways. First, bones are the main support for the body; they give your body shape, the bones that make up your spine allow you to sit up straight, the bones in your legs support the weight of your body so that you can stand up and so on. Another function of your skeleton is movement. Muscles are attached to bones and when muscles move, bones move. Third, bones protect the organs beneath them. The ribs provide protection for the lungs and heart. The skull protects the brain. Fourth, yellow bone marrow stores calcium and fat. Finally, bones are the location where blood cells are produced by the cells of the red bone marrow. Bone marrow is located inside the marrow cavity of bones. So, the major functions of the bones are body support, facilitation of movement, protection of internal organs, storage of minerals and fat, and hematopoiesis.

The skeleton can be divided into three basic parts: skull, axial skeleton, and appendicular skeleton. The bones of the skull consist of cranial and facial parts. There

are 26 bones in the skull.

The axial skeleton is comprised of the bones that support the trunk. The bones of the trunk are the spinal column or the spine and the chest (ribs and the breastbone). The spine of the adult consists of 32 or 34 vertebrae. There are seven cervical vertebrae, twelve thoracic vertebrae, five lumbar, five sacral vertebrae and from one to five vertebrae which form the coccyx. The lumbar vertebrae are the largest vertebrae in the spinal column. The chest is composed of 12 thoracic vertebrae, the breastbone and 12 pairs of ribs.

The appendicular skeleton is formed by the pectoral girdle (shoulder girdle), the pelvic girdle and the bones of the upper and lower limbs. The shoulder girdle is a complex of bones that connects the upper limb to the axial skeleton on each side. It consists of the clavicle (collarbone) and the scapula (shoulder blade). The upper limbs include the bones of the arm (humerus), forearm (radius and ulna), wrist, and hand. The pelvic girdle is a ring of bones attached to the vertebral column that connects the bones of the lower limbs to the axial skeleton. The pelvic girdle consists of the right and left hip bones. The lower limbs include the bones of the thigh, leg, and foot.

The bones of the skeleton are connected together by joints, cartilages, ligaments and tendons.

The biggest bone in the body is the femur in the upper leg, and the smallest is the stapes bone in the middle ear. In an adult, the skeleton comprises around 14% of the total body weight, and half of this weight is water.

The human skeleton takes 20 years before it is fully developed. There are 206 bones in the adult human skeleton, a number which varies between individuals and with age - newborn babies have over 270 bones some of which fuse together.

Exercise 5. Answer the questions:

1. What is the skeleton constructed of?
2. Why are bones important? What are their main functions?
3. What is the function of the skull?
4. Where is bone marrow located?
5. What parts can the skeleton be divided into?
6. What is the axial skeleton?
7. What is the appendicular skeleton formed by?
8. How many bones are there in the skull of an adult?
9. What is the biggest bone in the body?
10. How many bones do newborn babies have? Why do adults have fewer bones?

Exercise 6. Match the words to their definitions:

1. Bone	a) the production of all of the cellular components of blood and blood plasma. It occurs within the hematopoietic system, which includes organs and tissues such as the bone marrow, liver, and spleen;
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2. Muscle	b) a short band of tough, flexible fibrous connective tissue which connects two bones or cartilages or holds together a joint;
3. Tendon	c) a firm, elastic, flexible type of connective tissue of a translucent whitish or yellowish color; gristle;
4. Ligament	d) a ligamentous sac that surrounds the articular cavity of a freely movable joint, is attached to the bones, completely encloses the joint, and is composed of an outer fibrous membrane and an inner <u>synovial membrane</u> ;
5. Cartilage	e) a layer of connective tissue that lines the <u>cavities</u> of joints, tendon sheaths, and bursae and makes synovial fluid, which has a lubricating function;
6. Synovial membrane	f) the hard connective tissue forming the substance of the skeleton of most vertebrates, composed of a collagen-rich organic matrix impregnated with calcium, phosphate, and other minerals;
7. Joint capsule	g) a band or bundle of fibrous tissue in a human or animal body that has the ability to contract, producing movement in or maintaining the position of parts of the body;
8. Hematopoiesis	h) a tough cord or band of dense white fibrous connective tissue that unites a muscle with some other part (such as a bone) and transmits the force which the muscle exerts.

Exercise 7. What terms are described:

1. any of the pieces of hard, whitish tissue making up the skeleton in human;
2. a long flat vertical bone, situated in front of the thorax, to which are attached the collarbone and the first seven pairs of ribs;
3. a small triangular bone at the base of the spinal column in humans consisting of several fused rudimentary vertebrae;
4. one of a series of long curved bones occurring in 12 pairs in humans and extending from the spine to or toward the sternum;
5. a band of strong connective tissue serving to connect bones or hold organs in place;
6. the smallest bone in the human body;
7. a band of tough, fibrous, inelastic tissue that connects a muscle to a bone;
8. the junction between two or more bones.

Exercise 8. Read and remember key facts of musculoskeletal system:

Function	Protection, stability, storage of salts, formation and supply of new blood cells
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Components	<p><i>Skeletal part:</i> bones with associated hard tissues like cartilages and joints</p> <p><i>Muscular part:</i> muscles with associated soft tissue structures like ligaments, tendons, joint capsules and synovial membranes</p>
Muscles	<p><i>Function</i> - producing of movements, body support, joint stability, body heat production</p> <p><i>Groups</i> - skeletal muscle (moves bones and other structures), cardiac muscle (forms walls of the heart), smooth (visceral) muscle (forms walls of vessels and hollow organs)</p> <p><i>Histological types</i> - striated (skeletal and cardiac muscles), non-striated (smooth muscle)</p>
Additional soft tissue structures	<p><i>Tendon</i> - bond of fibrous connective tissue that connects <i>muscle to the bone</i></p> <p><i>Ligament</i> - bond of fibrous connective tissue that connects <i>bone to the bone</i></p> <p><i>Synovial membrane</i> - lines the synovial cavity, secretes synovial fluid that lubricates the joint</p> <p><i>Joint capsule</i> - dense fibrous connective tissue that encloses and protects the joint</p>
Bones	<p><i>Function</i> - body support, shock absorbtion, salts storage, vital organs protection, blood cells production, mechanical basis for movements</p> <p><i>Groups</i> - axial skeleton (head, neck and trunk), appendicular skeleton (limbs, pectoral and pelvic girdles)</p> <p><i>Bone layers</i> - compact bone (most superficial), spongy bone (deep layer); in some bones the spongy layer is replaced with medullary cavity where the bone marrow is found</p> <p><i>Shape classification</i> - long, short, flat, irregular</p>
Additional hard tissue structures	<p><i>Cartilage</i> - dense tissue covering articulating surfaces of bones; main role in weight bearing and reducing the friction inside a joint</p> <p><i>Joints</i> - place of articulation between two bones; types are:</p> <ul style="list-style-type: none"> - <i>fibrous</i> - allows little or no movement (sutures of the <u>skull</u>) - <i>cartilaginous</i> - allows small range of movements (between the bodies of vertebrae) - <i>synovial</i> - allows wide range of movements

Exercise 9. Complete the table with the missing degrees of adjectives:

POSITIVE DEGREE	COMPARATIVE DEGREE	SUPERLATIVE DEGREE
thin		
	easier	
		the worst
	more dangerous	
good		
		the farthest
interesting		

	fatter	
		the softest
happy		
		the sweetest
common		

Exercise 10. Open the brackets using the adjectives in the proper degree of comparison:

1. The lumbar vertebrae are (large) vertebrae in the spinal column.
2. This bone is (long) than that one.
3. He is (experienced) surgeon in this hospital.
4. It is a (good) idea.
5. This exercise is (difficult) than the one we did yesterday.
6. She is the (young) in her family.
7. Is Anatomy (interesting) than Physics for you?
8. That was the (bad) decision he could make.

Exercise 11. Open the brackets using the verb in an appropriate tense (Present, Past, Future Simple Active or Passive Voice):

1. The new equipment (to install) in the emergency room next week.
2. Yellow bone marrow (to store) calcium and fat.
3. The lungs (to protect) by the chest.
4. All the patients at the in-patient department (to examine) two hours ago.
5. The professor (to ask) a lot of questions after his lecture tomorrow.
6. This patient (to complain) of severe headache last week.
7. The doctor (to make) a diagnosis only after he gets the findings of your blood test.
8. The administration (to change), if he doesn't feel better tomorrow.

Exercise 12. Put questions to the underlined words:

1. The chest is composed of 12 thoracic vertebrae, the breastbone and 12 pairs of ribs.
2. He will be administered a bed regimen.

3. Yellow bone marrow stores calcium and fat.
4. The human skeleton takes 20 years before it is fully developed.
5. There are 206 bones in the adult human skeleton.
6. The bones of the skull consist of cranial and facial parts.
7. The upper extremity is formed by the arm, forearm and hand.
8. His temperature will be taken in the morning.

Exercise 13. Make definitions of the terms bone, skeleton, skull using the sentences below:

- a) It protects the brain.
- b) The appendicular skeleton consists of the bones of the arms and legs, along with the bones that attach them to the axial skeleton.
- c) Also, bones protect the organs beneath them.
- d) Bones are the main support for the body.
- e) The skeleton is a hard framework consisting of bones.
- f) The bones of the skull consist of cranial and facial parts.
- g) It supports and protects the soft parts of a human body and provides attachment for muscles.
- h) A bone is any of the pieces of hard, whitish tissue making up the skeleton in humans.
- i) The skull is made of a number of fused flat bones.
- j) The axial skeleton is comprised of the bones that support the trunk.
- k) Bone marrow is located inside the marrow cavity of bones.
- l) There are 26 bones in the skull.
- m) The skeleton can be divided into three basic parts: skull, axial skeleton, and appendicular skeleton.
- n) The skull is the bony skeleton of the head.
- o) Yellow bone marrow stores calcium and fat, red bone marrow produces blood cells.

BONE	SKELETON	SKULL
1.	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	4.
5.	5.	5.

ANATOMY AND PHYSIOLOGY OF THE CARDIOVASCULAR SYSTEM

Exercise 1. Topic vocabulary.

nouns	verbs	adjectives/adverbs
atrium	beat	bicuspid
chamber	carry	extremely
mediastinum	contract	forcibly
rate	enclose	hollow
sac	occupy	oxygenated
valve	oxygenate	semilunar
ventricle	provide	tricuspid
wave	pump	

Exercise 2. Pronounce correctly:

diaphragm [ˈdaɪəfræm], endocardium [endəuˈkɑːdiəm], pericardium [periˈkɑːdiəm], myocardium [maɪəuˈkɑːdiəm], tricuspid [traɪˈkʌspɪd], bicuspid [baɪˈkʌspɪd], mitral [ˈmaɪtrəl], valvesemilunar [semiˈluːnə], chamber [tʃeɪmbə], systole [ˈsɪstəli], diastole [daɪˈastəli].

Exercise 3. Read the text:

Anatomy and physiology of the cardiovascular system

The cardiovascular system or the circulatory system is a vast network of organs and vessels that is responsible for the flow of blood, nutrients, hormones, oxygen and other gases to and from cells. Without the circulatory system, the body would not be able to fight disease or maintain a stable internal environment — such as proper temperature and pH — known as homeostasis. The heart, blood, and blood vessels make up the cardiovascular component of the circulatory system. It includes the pulmonary circulation (the portion of the cardiovascular system which carries deoxygenated blood away from the heart, to the lungs, and returns oxygenated blood back to the heart) and the systemic circulation, which runs through the rest of the body to provide oxygenated blood.

The human heart is a four-chambered muscular organ. It is located on the diaphragm between the lower borders of the lungs, occupying the middle of the mediastinum. The heart is enclosed in a pericardial sac that is lined with a serous membrane. Three layers of tissue form the heart wall. The outer layer of the heart wall is the epicardium, the middle layer is the myocardium, and the inner layer is the endocardium.

The internal cavity of the heart is divided into four chambers: the two atria are thin-walled chambers that receive blood from the veins. The two ventricles are thick-walled chambers that

forcefully pump blood out of the heart. The right atrium receives deoxygenated blood from systemic veins; the left atrium receives oxygenated blood from the pulmonary veins.

The valves of the heart include the tricuspid valve, the bicuspid (mitral) valve, the semilunar aortic valve, and the semilunar pulmonary valve.

The human heart contracts from the first moment of life until the last one. Scientists have determined that the total weight of the blood pumped by the heart daily is about ten tons.

Physiologists have determined that in the adult the heart makes from 60 to 72 beats per minute. In children the rate of heartbeat is much higher.

Each beat of the heart is followed by a period of rest for the cardiac muscle. Each wave of contraction and a period of rest following it compose a cardiac cycle.

Each cardiac cycle consists of three phases: physiologists have called the first phase of short contraction of both atria — the atrial systole. They have called the second phase of a more prolonged contraction of both ventricles — the ventricular systole. The period of rest of the cardiac muscle is called the diastole.

The blood vessels are hollow tubes which carry the blood through the tissues. There are three types of blood vessels:

1. Arteries.
2. Veins.
3. Capillaries

The arteries carry the blood out from the heart to the tissues. One large artery, the aorta, leaves the heart and gives off smaller branch of arteries to the various parts.

The veins carry blood back to the heart from the tissues.

A capillary is an extremely small blood vessel located within the tissues of the body that transports blood from arteries to veins.

Exercise 4. Answer the questions:

1. What is the cardiovascular system?
2. What is the pulmonary circulation/the systemic circulation?
3. What is the heart?
3. Where is the heart located?
4. What is the heart enclosed in?
5. What does each half of the heart consist of?
6. What are the valves of the heart?
7. What is the function of the atria?
8. What is the function of the ventricles?
9. How many beats per min does the heart make?

10. What is a cardiac cycle?
11. What is systole?
11. What is diastole?
12. What is an artery/a vein/a capillary?

Exercise 5. Form the adverb from the adjectives and translate them:

Model: slow – slowly – повільний – повільно

Special, internal, central, large, general, forcible, great, rhythmical, intramuscular, superficial, global, temporary, continuous,

Exercise 6. Make adjectives using the suffix-ant (-ent). Consult a dictionary and translate them:

Model: difference →different (різний)

Significance, dependence independence, frequency, distance, permanence, assistance, absence, presence, depression.

Exercise 7. Divide the given words into the table. Remember that there are words which can be used both as a noun and verb:

Contraction, short, determine, pure, blood, systemic, final, rest, follow, physical, compose, pulmonary, contract, research, regulate, weight, depend, cardiac, cycle, chamber, send, possibility, pump, right, act, different, wave, consist, aorta, considerable.

Noun	Adjective	Verb

Exercise 8. Match the terms to their definitions:

1. atrium	a) the hollow muscular organ in vertebrates whose contractions propel the blood through the circulatory system;
2. diastole	b) a dividing partition between two tissues or cavities;
3. pericardium	c) a cavity or chamber in the body, especially the upper chamber of each half of the heart;
4. myocardium	d) a chamber of the heart, having thick muscular walls, that receives blood from the atrium and pumps it to the arteries;
5. ventricle	e) the part of the thoracic cavity that lies between the lungs, containing the heart and its vessels;
6. septum	f) a structure restricting the flow of fluid in one direction only
7. valve	
8. mediastinum	

9. heart	g) the membrane that lines the cavities of the heart and forms part of the valves and provides protection to the valves and heart chambers;
10. systole	h) the muscle tissue of the heart, which forms a thick middle layer between the outer <u>epicardium</u> layer and the inner <u>endocardium</u> layer;
	i) the period between two contractions of the heart when the muscles of the heart relax;
	j) the period of the cardiac cycle during which the heart contracts;

Exercise 9. Make questions to the underlined words:

1. The heart beats continuously and rhythmically to send blood to the lungs.
2. Much of the heart consists of myocardium.
3. The heart muscle is supplied with oxygen by 2 coronary arteries.
4. The right atrium receives deoxygenated blood from the entire body.
5. The left atrium of the heart receives oxygenated blood from the lungs.
6. Each beat of the heart is followed by a period of rest for the cardiac muscle.
7. Each cardiac cycle consists of three phases.
8. The period of rest is shorter during greater physical exertion.
9. Scientists have determined that the total weight of the blood is about 10 tons.
10. Tricuspid valve lies between the right atrium and the right ventricle.

Exercise 10. Open the brackets using the Perfect Tense. Translate the sentences:

1. You ever (be) to Germany?
2. The young scientist (publish) many article since 2000.
3. Today the surgeon (complete) the operation.
4. You (be) to the dissecting room?
5. Recently his respiratory rate (increase) considerably.
6. The patient's sleep (become) sound since he began to take this medicine.
7. The teacher (finish) to examine students this week.
8. After the patient (to take) this medicine, he feels better.
9. We (to finish) school this year.

Exercise 11. Open the brackets using correct tense form and voice. Translate the sentences:

1. The heartbeat (to produce) the pulsation.
2. On admission to the clinic the physician (to examine) the patient's heart.

3. The patient's blood and urine test (to make) the following day.
4. The pain in the heart (to relieve) by a tablet of nitroglycerin.
5. The pain in his heart (to subside) lately.
6. The nurse (to remove) the dressing carefully.
7. The heart sounds (to determine) by the physician by percussion.
8. The nurse already (to give) an injection of the nicotine acid.
9. Diseases of the heart primarily (to treat) by cardiologists.
10. The blood also (to carry) nutrients from the liver and gastrointestinal tract to various organs of the body.

Exercise 12. Speak about THE HEART, ATRIUM, and VENTRICLE according to the scheme:

- *definition*
- *location*
- *structure*
- *general characteristics*
- *function*

Exercise 13. Arrange the sentences in the correct order to explain the term "heart":

1. It is located on the diaphragm between the lower borders of the lungs, occupying the middle of the mediastinum.
2. The human heart provides the blood circulation through the cardiac cycle and is one of the most vital organs in the human body
3. The organ is about 12 cm long, 8 cm wide at its broadest part, and 6 cm thick, and weights from 230 to 340 g.
4. The heart is the muscular pump in the centre of the chest that beats continuously and rhythmically to send blood to the lungs and the rest of the body.
5. A thick central muscular wall, the septum, divides the heart cavity into right and left halves; each half consists of an upper chamber, called an atrium, and a larger lower chamber, called a ventricle.

BLOOD

Exercise 1. Topic vocabulary:

nouns	verbs	adjectives/adverbs
amino acid	accumulate	against
consequences	agglutinate	<u>aqueous</u>
erythrocyte	clump	compatible (with)
hemoglobin	deliver	dissolved
lactic acid	determine	donated
leukocyte	float	fatal
platelet	increase	responsible
recipient	inherit	successful
rhesus	lead to	various
solution	obstruct	vice versa
thrombocyte	reproduce	
<u>urea</u>	transfuse	

Exercise 2. Read the following paying attention to the rules of reading. Give examples of your own:

th → [θ] – **th**alamus, **th**erapy, **th**ermal, **th**yroid, **th**umb, ery**th**rocyte
 ↘ [ð] – **th**ey, **th**is, **th**at, **th**en, **th**em

sh [ʃ] – **sh**elf life, **sh**oulder, **sh**ape, **sh**ape

i + gh [ai] – **nigh**t, **right**, **high**, **sigh**t, **ligh**t

a + ss, st, sk, ff, ft [a:] – **gla**ss, **ma**sk, **la**st, **sta**ff, **a**fter, **cla**ss, **ca**st

Exercise 3. Remember the rules of word-building in the English language. a) form the Nouns

with the help of suffix – **th** from the adjectives: deep, strong, warm, wide, wealthy, healthy, long

b) form the Nouns with the help of suffix – **cy** from the adjectives: urgent, efficient, frequent, private, legal, accurate, adequate

c) form the Adjectives with the help of suffix – **ous** from the nouns: delirium, cancer, fiber, infection, poison, vein

Exercise 4. Read the word combinations with the new words:

Erythrocyte: erythrocyte deformation; erythrocyte of normal size; erythrocyte sedimentation rate; sickle erythrocyte.

Hemoglobin: total hemoglobin; hemoglobin test; hemoglobin breakdown; adult hemoglobin.

Leukocyte: total leukocyte count; peripheral blood leukocytes; cancer of leukocytes; types of leukocytes.

Platelet: absolute platelet count; anti-platelet therapy; platelet clot; platelet coagulant activity.

Solution: aqueous solution; alcohol solution; nutrient solution; saline solution.

Exercise 5. Read the text:

Blood. Blood Groups and Blood Transfusions

Blood is a reddish bodily fluid that is pumped by the heart through the arteries and veins. It delivers nutrients and oxygen to the body cells and eliminates metabolic waste products. It is composed of blood cells floating in blood plasma. The blood cells are mainly red blood cells, white blood cells and platelets. The average person has about 5 liters of blood.

Red blood cells or erythrocytes are the most numerous cells in the blood. They have no nuclei. The primary function of erythrocytes is to transport oxygen from the lungs to the cells of the body. Red blood cells have an iron-containing protein called hemoglobin. It is hemoglobin that carries the oxygen and gives blood its red color.

White blood cells or leukocytes are a part of the immune system and help human bodies fight infection. When the number of leukocytes in the human blood increases, this is a sign of an infection in the body.

Thrombocytes or platelets are responsible for blood clotting (coagulation). Platelets are formed in the bone marrow. They do not have a nucleus and do not reproduce.

Plasma is the blood's liquid medium. It is plasma that makes 55% of blood. It is a straw-yellow aqueous solution containing 92% water, 8% blood plasma proteins, and a certain amount of other materials. Plasma circulates dissolved nutrients such as glucose, amino acids, and fatty acids, and removes waste products such as carbon dioxide, urea, and lactic acid.

Experiments with blood transfusions have been carried out for centuries. In 1901 the Austrian scientist Karl Landsteiner discovered human blood groups and since then blood transfusions became safer. The two main ways to classify blood groups are the AB0 (A, B, AB, 0) system and the Rh (Rhesus positive +, Rhesus negative -) system. The differences in human blood are due to the presence or absence of certain protein molecules called antigens and antibodies. Antigens are located on the surface of erythrocytes and antibodies are located in blood plasma. Blood clumping is an immunological reaction which occurs when the receiver of a blood transfusion has antibodies against the donor's blood cells. For a blood transfusion to be successful, AB0 and Rh blood groups must be compatible between the donated blood and the recipient. If they are not, the red blood cells from the donated blood will clump or agglutinate, which can have fatal consequences. The accumulated red cells can obstruct blood vessels and stop the circulation of blood to various parts of the body. People with blood group 0 Rh - are called "universal donors" and people with blood group AB Rh+ are called "universal receivers".

Exercise 6. Answer the following questions:

1. What is blood and what is it composed of?
2. What kinds of blood cells are there?
3. What are the functions of red blood cells?
4. What is the function of white blood cells?
5. What is the function of platelets?
6. What is blood plasma?
7. When did the Austrian scientist Karl Landsteiner discover human blood groups?

8. What can mixing of blood from two individuals lead to?
9. What are the two main ways to classify blood groups?
10. What people are called "universal donors" and "universal receivers"?

Exercise 7. Match the terms with their definitions:

1. blood	a) a blood cell that fights bacteria and fungi; an important part of the body's immune system;
2. erythrocyte	b) numerous round small blood cells that clot blood;
3. leukocyte	c) pale yellow protein-containing fluid portion of blood in which the blood cells and platelets are normally suspended;
4. platelet	d) the bodily fluid consisting of plasma, blood cells, and platelets that is circulated by the heart through the vertebrate vascular system, carrying oxygen and nutrients to and waste materials away from all body tissues;
5. blood plasma	e) an iron-containing protein in red blood cells that transports oxygen from the lungs to the tissues of the body;
6. hemoglobin	f) a blood cell that transports oxygen and carbon dioxide, combined with the red pigment hemoglobin, to and from the tissues.

Exercise 8. Fill in the gaps with the missing words/word combinations given below:

1. During childhood, almost every human bone produces
2. ... is the principal determinant of the color of blood.
3. ... contains glucose and other dissolved nutrients.
4. Without ..., you would bleed to death.
5. A hormone called ... regulates the production of erythrocytes.
6. ... enters the blood in the capillaries and is brought back to the lungs.
7. When plasma is allowed to clot, the fluid left behind is called
8. Erythrocytes, leucocytes and platelets ... in plasma.

blood platelets; serum; hemoglobin; float; red blood cells; blood plasma;
erythropoietin*; carbon dioxide

* erythropoietin - a hormone causing an increased production of erythrocytes

Exercise 9. Fill in appropriate prepositions from the box below:

On; from; to; as; against; with

Red blood cell compatibility

Blood group AB individuals have both A and B antigens the surface of their RBCs, and their blood plasma does not contain any antibodies against either A or B antigen. Therefore, an individual with type AB blood can receive blood any group (with AB being preferable), but cannot donate blood any group other than AB. They are known universal recipients.

Blood group A individuals have the A antigen the surface of their RBCs, and blood serum containing IgM (иммуноглобулин класса М) antibodies the B antigen. Therefore, a group A individual can receive blood only individuals of groups A or O (with A being preferable), and can donate blood individuals type A or AB.

Blood group B individuals have the B antigen the surface of their RBCs, and blood

serum containing IgM antibodies the A antigen. Therefore, a group B individual can receive blood only individuals of groups B or O (with B being preferable), and can donate blood to individuals type B or AB.

Blood group O (or blood group zero) individuals do not have either A or B antigens the surface of their RBCs, and their blood serum contains IgM anti-A and anti-B antibodies the A and B blood group antigens. Therefore, a group O individual can receive blood only a group O individual, but can donate blood individuals of any ABO blood group.

If a patient in a hospital situation needs blood transfusion as an emergency O negative blood can be issued. They are known universal donors.

Exercise 10. Read the following sentences and paying attention to the emphatic construction:

1. It is the skeleton that protects inner organs from injuries.
2. It was A. Fleming who discovered penicillin.
3. It was not until 2010 that Odessa State Medical University got the status of a National University.
4. It is the liver which is the largest gland in the human body.
5. It was M.I. Pirogov who first suggested formation of Odessa Medical University.
6. It was not A.Fleming but two other scientists, Howard Florey and Ernst Chain, who developed penicillin further so that it could be produced as a drug.
7. It is complications that make flu a dangerous disease.
8. It was an ambulance that brought the patient to the ward.
9. It is heavy smokers who suffer from attacks of chronic bronchitis and asthma.
10. It is the head surgeon who insisted on removing the tumor as soon as possible.

Exercise 11. Emphasize the underlined parts of sentences using the emphatic construction:

Model: M. Sechenov investigated blood gases in 1858. –

It was M. Sechenov who investigated blood gases in 1858.

1. **The eyes** serve as the organ of sight.
2. **The neck** connects the head and the trunk.
3. **Pirogov** originated the intravenous administration of ether as an anesthetic.
4. **From his work in the Crimea** Pirogov is considered to be the father of field surgery.
5. **By the 1940s** penicillin was mass-produced by the American drugs industry.
6. **Femur** is the biggest bone in the body.
7. The smallest bone in the human body is located **in the middle ear**.
8. Blood cells are suspended **in blood plasma**.
9. **Thanks to the efforts of N. I. Pirogov** surgery was placed on a scientific basis.
10. The respiratory metabolism takes place **in the alveoli**.

Exercise 12. Put questions to the underlined words:

1. Blood transports metabolic waste products away from the cells.
2. The average person has about 5 liters of blood.
3. White blood cells fight infection.
4. In a normal adult body there are 4,000 to 10,000 leucocytes per microliter of blood.
5. Thrombocytes are responsible for blood clotting.
6. Platelets are formed in the bone marrow.
7. Plasma circulates dissolved nutrients, such as glucose, amino acids, and fatty acids.

8. Medical terms related to blood often begin with hemo- or hemato-.

Exercise 13. Open the brackets using the verb in the appropriate form:

Blood pressure (to be) the pressure exerted by circulating blood upon the walls of blood vessels. It (to be) one of the principal vital signs. Blood pressure usually (to refer) to the arterial pressure of the systemic circulation. During each heartbeat, blood pressure (to vary) between a maximum (systolic) and a minimum (diastolic) pressure. The blood pressure in the circulation (to be) due to the pumping action of the heart. A person's blood pressure usually (to express) in terms of the systolic pressure over diastolic pressure. It (to measure) in millimeters of mercury (mmHg), for example 120/80.

Exercise 14. Arrange the following sentences in the correct order to explain the terms:

1. "blood":

___ It delivers necessary substances such as nutrients and oxygen to the body cells and transports metabolic waste products away from the cells.

___ The average person has about 5 liters of blood; it makes up 7 to 8 percent of a person's body weight.

___ Blood is a reddish bodily fluid that is pumped by the heart through the arteries and veins.

___ The blood cells are mainly red blood cells, white blood cells and platelets.

___ It is composed of blood cells floating in blood plasma.

2. "blood groups":

___ Mixing blood from two individuals can lead to blood clumping or agglutination.

___ The differences in human blood are due to the presence or absence of certain protein molecules called antigens and antibodies.

___ In 1901 the Austrian scientist Karl Landsteiner discovered human blood groups

___ Karl Landsteiner discovered that blood clumping was an immunological reaction which occurs when the receiver of a blood transfusion has antibodies against the donor's blood cells.

___ The two main ways to classify blood groups are the ABO (A, B, AB, O) system and the Rh (Rhesus positive +, Rhesus negative -) system.

3. "blood transfusions":

___ Transfusions can spread disease from donor to recipient that is why donors should be periodically tested for infectious diseases.

___ The transfer of blood or blood components from one person (the donor) into the bloodstream of another person (the recipient).

___ For a blood transfusion to be successful, ABO and Rh blood groups must be compatible between the donated blood and the recipient.

___ People with blood group 0 Rh - are called "universal donors" and people with blood group AB Rh+ are called "universal receivers."

___ Blood transfusion is indicated in the treatment of various conditions including trauma, bleeding disorders and blood loss due to surgery.

ANATOMY AND PHYSIOLOGY OF THE RESPIRATORY SYSTEM

Exercise 1. Topic vocabulary:

nouns	verbs	adjectives/adverbs
alveolus	breathe	deep
bronchus	capture	hollow
bronchiole	decrease	longer
carbon dioxide	divide	nasal
cilium	expel	respiratory
cough	moisturize	
ex-, inhalation	sneeze	
oxygen	supplement	
trachea	swallow	

Exercise 2. Read the following paying attention to the rules of reading. Give examples of your own:

ch ↗ [tʃ] – each, **ch**ill, **ch**est
 ↘ [k] – **ch**emistry, **ach**e, **ch**aracter, stomach – Greek origin

ture [tʃə] – sut**ure**, mix**ture**, temper**ature**, fract**ure**

wh ↗ o [h] – **wh**o, **wh**om, **wh**ose, **wh**ole
 ↘ [w] – **wh**en, **wh**y, **wh**ale, **wh**ite

kn [n] – **kn**ee, **kn**uckle, **kn**owledge, **kn**ight

Exercise 3. Remember the rules of word-building in the English language. a) form the Nouns with the help of suffix – **ance (- **ence**) from the verbs: to disturb, to assist, to differ, to persist, to inherit, to resist, to perform**

b) form the Nouns with the help of suffix – **ance** (- **ence**) from the adjectives: patient, tolerant, distant, important, incident, dependent, excellent, constant

c) form the Adjectives with the help of suffix –**ive**, - **itive**, -**ative** from the verbs: to digest, to reproduce, to cure, to compete, to cooperate

Exercise 4. In Column A there are nouns relating to medicine. Find the correct plural form from Column B or Column C.

The first question has been done for you as an example.

Column A (singular)	Column B (plural)	Column C (plural)
bacterium	<i>bacteria</i>	bacteriums
cilium	ciliumea	cilia
alveolus	alveoli	alveolei
trachea	trachei	tracheae
bronchus	bronchi	broncheae
bronchiole	bronchia	bronchioles
fungus	fungi	funguses
diagnosis	diagnosises	diagnoses
atrium	atriums	atria
vertebra	vertebrae	vertebras

Exercise 5. Choose the words and phrases that don't go with the topic "The respiratory system":

Teeth, exhalation, tongue, esophagus; nasal cavity, alveoli, coughing, oxygenated blood, abdominal cavity, thyroid gland, spinal cord, larynx, carbon dioxide, voice box, soft and hard palates, pharynx, mucus membrane; chest; lobes of the lungs; gallbladder, pancreas, bronchioles, breastbone, peritoneum, trachea, collarbone, pulmonary arteries, inhalation, renal capsule.

Exercise 6. Read the text:

Anatomy and Physiology of the Respiratory System

The cells of the human body require a constant stream of oxygen to stay alive. The respiratory system provides oxygen to the body's cells by removing carbon dioxide. It is the respiratory system that is responsible for the respiration, the process by which our organism exchanges gases with its environment. The act of breathing with the lungs is called ventilation and includes inhalation (breathing in) and exhalation (breathing out).

There are 3 major parts of the respiratory system: the airway, the lungs, and the muscles of respiration.

The airway includes the nose, mouth, pharynx, larynx, trachea, bronchi, and bronchioles.

The nose and nasal cavity form the main external opening for the respiratory system through which air moves. The nasal cavity is a hollow space within the nose and skull that is lined with cilia, which are very fine hairs, which warm, moisturize and filter air. These hairs are coated with mucus that captures any germs and pollutants that are in the air we breathe before it enters the lungs. This foreign matter is then expelled from the body through swallowing, coughing or sneezing.

The mouth or the oral cavity is the secondary external opening for the respiratory tract. It can be used to supplement or replace the nasal cavity's functions when needed.

The pharynx, also known as the throat, is a muscular funnel. It extends from the nasal cavity to the larynx and esophagus.

The larynx, also known as the voice box, is a short section between the pharynx and trachea.

The trachea is a tube which extends from the base of the larynx to the lungs, where it divides into two bronchi.

The bronchi are two tubes which begin at the trachea. The left bronchus is longer than the right one as it passes around the heart to reach the left lung. Each bronchus leads into a lung. In the lungs, the bronchi divide into bronchioles. The bronchioles end in fine alveolar ducts leading to the alveoli.

The alveoli, or air sacs, are the ends of the air passages. Each alveolus is closely surrounded by blood capillaries.

The lungs are paired, spongy organs located in the chest. They are not identical in shape and size. The left lung is smaller than the right one because it shares space in the chest with the heart. They are divided into lobes - the right lung has three lobes and the left lung has two lobes. The vital capacity of the lungs in the adult is about 3-4 liters.

When one breathes normally not all the alveoli and capillaries of the lungs are opened. When respiration becomes deep, the number of the opened alveoli and capillaries increases. The flow of blood into the lungs increases when one breathes in and it decreases when one breathes out.

Exercise 7. Answer the questions:

1. What is the respiratory system responsible for?
2. What are the main parts of the respiratory system?
3. What is the nose covered with?
4. What do the cilia do?
5. How do people expel foreign matters from the respiratory tract?
6. What are the pharynx and the larynx?
7. Which bronchus is larger and why?
8. What are alveoli?
9. What are the lungs? What is their vital capacity?

10. When does the number of opened alveoli increase and decrease?

Exercise 8. Match the terms to their definitions:

1. oral cavity	a) either of the two main branches of the trachea that lead to the lungs, where they divide into smaller branches;
2. trachea	b) a membrane that encloses each lung and lines the chest cavity;
3. larynx	c) either of the two saclike respiratory organs in the thorax of humans and the higher vertebrates;
4. bronchus	d) a microscopic hairline process extending from the surface of a cell or unicellular organism;
5. alveolus	e) the opening through which food is taken in and vocalizations emerge;
6. lung	f) any of the tiny air-filled sacs arranged in clusters in the lungs, in which the exchange of oxygen and carbon dioxide takes place;
7. pleura	g) a muscular and cartilaginous structure lined with mucous membrane at the upper part of the trachea in humans, in which the vocal cords are located.
8. cilium	h) a tube that connects the pharynx and larynx to the lungs, allowing the passage of air;

Exercise 9. Approve or contradict the following statements:

1. The respiratory system is responsible for supplying our body with oxygen and removing carbon dioxide.
2. All foreign matters are expelled from the body through swallowing, talking or sneezing.
3. Respiratory system is a biological system consisting of specific organs and structures used for the process of respiration.
4. The larynx is a tube which divides into two bronchi.
5. The right lung is smaller because it shares space in the chest with the heart.
6. When respiration becomes deep, the number of the closed alveoli and capillaries increases.
7. Hairs and mucus lining the nasal cavity help to trap dust, mold, pollen and other environmental contaminants before they can reach the inner portions of the body.
8. Our nose warms, moisturizes, and filters air we breathe out.

Exercise 10. Insert the sentences with the words from the box:

Pleura, bronchioles, lobes, respiration, lungs, trachea, airways, carbon dioxide, alveoli

1. are the main organs of respiration, divided into two
2. Each lung is enclosed in a membranous sac, or
3. is a process which provides body with oxygen for growth and other metabolic activities and

removes waste products in the form of carbon dioxide.

4. is a tube which extends from the base of the larynx to the lungs where it divides into two bronchi.
5. Each bronchus leads into a lung where they divide and subdivide into smaller numerous
6. include the nasal and oral cavities, pharynx, larynx, trachea, bronchi, and bronchioles.
7. The bronchioles end in very fine alveolar ducts leading to the
8. In humans is carried through the venous system and is breathed out through the lungs.

Exercise 11. Fill in prepositions from the box below where necessary:

With; into; in; of; through; for; to; out;
--

1. Respiration is a process which provides body oxygen for growth and other metabolic activities and removes waste products in the form carbon dioxide.
2. The lungs are the main organs involved the respiration process.
3. Air passes the lungs the nostrils and the air flows down the trachea the lungs.
4. The lungs have alveoli which are small air sacs filled tiny capillaries.
5. The respiration process is carried in two ways in living organisms: aerobic and anaerobic respiration.
6. Some the common diseases related respiration are common cold, tonsillitis and laryngitis.
7. Asthma and pneumonia are diseases associated respiration along with lung cancer.
8. The respiratory system is responsible supplying our body with oxygen.

Exercise 12. Read and pay attention to Impersonal Sentences:

1. It is sometimes difficult to make proper diagnosis without laboratory tests.
2. It is always necessary to take an appropriate dosage of the drug.
3. It was nine o'clock when the ambulance arrived.
4. It's impossible for such infection to cause serious complications.
5. It wasn't dangerous for the patient to experience such kind of pain.
6. Is it important for medical students to watch surgical interventions by skilled surgeons?
7. Was it about six o'clock when the temperature decreased?
8. Will the patient be discharged out of the hospital tomorrow?

Exercise 13. Make up interrogative sentences to the underlined words:

1. The respiratory tract is divided into the upper respiratory tract and the lower respiratory tract.
2. Air travels through the pharynx to the larynx.
3. The larynx prevents the passage of food or drink into trachea and lungs.
4. The trachea connects the pharynx and larynx to the lungs.
5. The bronchi are two tubes which end with alveoli where process of gaseous exchange takes place.
6. Students will be delivered a lecture in physiology of respiration in 2 days.
7. Oxygen and carbon dioxide are transported through the body in the blood.
8. Sechenov estimated the role of hemoglobin in the act of respiration.

Exercise 14. Fill in the gaps with the words and word-combinations from the box:

to take in; a stuffy nose; shortness of breath; trachea or bronchi; breathless; to supply; stress

About Respiratory Disorders

When you're short of breath, it's hard or uncomfortable for you the oxygen your body needs. You may feel as if you're not getting enough air. Sometimes mild breathing problems are from or hard exercise. But can also be a sign of a serious disease.

Many conditions can make you feel short of breath. Lung conditions such as asthma, emphysema or pneumonia cause breathing difficulties. So can problems with your, which are part of your airway system. Heart disease can make you feel if your heart cannot pump enough blood oxygen to your body. caused by anxiety can also make it hard for you to breathe. If you often have trouble breathing, it is important to find out the cause.

ANATOMY AND PHYSIOLOGY OF THE NERVOUS SYSTEM

Exercise 1. Topic vocabulary:

nouns	verbs	adjectives/adverbs
brainstem	collect	convoluted
cerebrum	connect	delicate
cerebellum	evaluate	frontal
communication	involve	occipital
decision	maintain	parietal
fiber	monitor	smooth
forebrain	process	temporal
highway	supply	wrinkled
matter		
medulla oblongata		
neuron		
sensory organs		

Exercise 2. Pronounce correctly.

Peripheral [pə'rif(ə)rəl], nerve ['nɜ:v], nervous ['nɜ:vəs], receptor [ri'septə], integration ['intə'greɪʃən], signal ['sɪgn(ə)], motor ['mo:tə].

Exercise 3. Read the following word-combinations, pay attention to the possible use of key words:

Nervous: the nervous system, nervous stimulation, nervous impulses, nervous activities, nervous laughter, central nervous system depressants;

Sensory: sensory organs, sensory receptors, sensory nerves, sensory neurons, sensory stimulation, sensory function;

Matter: the white matter of the brain, the grey matter of the brain; subject matter, spirit and matter, no matter.

Exercise 4. Read the text:

The Nervous System

Nervous system is the vast network of cells specialized to carry information (in the form of nerve impulses) to and from all parts of the body in order to bring about bodily activity. The brain and spinal cord together form the central nervous system. The central nervous system controls the voluntary muscles of the head, trunk, and the limbs, and it is responsible for all movement in them and for all sensation in skin, muscles, bones and joints. The remaining nervous tissue is known as the peripheral nervous system and includes the autonomic nervous system which controls all involuntary muscles. It supplies all the internal organs, and is made up of nerve cells (neurons) supplying the glands and the muscular walls of the internal organs and the blood vessels.

The brain is a soft convoluted mass of nervous tissue within the skull that is the controlling and coordinating centre of the nervous system and the seat of thought, memory, and emotion. The brain is also known as encephalon. It includes the cerebrum, the brainstem, the cerebellum and the cerebral cortex.

The cerebrum denotes the right and left brain hemispheres. Each hemisphere contains four lobes (frontal, temporal, occipital, and parietal) that are responsible for memory, vision, hearing, and speaking. The brainstem is connected to the spinal cord at the back of the brain. The cerebellum means "*little brain*" in Latin, and it controls motor activity and helps a person maintain posture and balance. The cerebral cortex is tissue that covers the cerebrum and is responsible for intellectual brain functions such as thinking, planning and overall behavior.

Approximately 100 billion neurons of the brain form the main control center of the body. Neurons are the basic working units of the brain, specialized cells designed to transmit information to other nerve cells, muscles, or gland cells.

The spinal cord is a long, thin mass of neurons that carries information through the vertebral cavity of the spine. The spinal cord contains the white and grey matter.

The brain and the spinal cord form the control center known as the central nervous system (CNS), where information is evaluated and decisions are made.

The sensory nerves and sense organs of the peripheral nervous system (PNS) monitor conditions inside and outside of the body and send this information to the CNS.

Nerves act as information highways to carry signals between the brain and spinal cord and the rest of the body.

The nervous system has 3 main functions: sensory, integration, and motor.

The sensory function of the nervous system involves collecting information from sensory receptors. These signals are then passed to the central nervous system.

The process of integration is the processing of many sensory signals that are passed into the CNS at any time. Integration takes place in the grey matter of the brain and spinal cord.

Motor neurons carry signals from the grey matter of the CNS through the nerves of the peripheral nervous system to smooth, cardiac, or skeletal muscular tissue or glandular tissue and move a part of the body to respond to the stimulus.

Exercise 5. Answer the questions:

1. What parts is the nervous system composed of?
2. What does the brain consist of?

3. What does the abbreviation CNS mean?
4. What organs does CNS consist of?
5. Which part of the nervous system do the sensory nerves and sense organs compose?
6. What are the nervous cells called?
7. What is the spinal cord?
8. What is the function of the nerves?
9. What are the functions of the nervous system?

Exercise 6. Match the words to their definitions:

1. brain	a) a bundle of fibers that uses electrical and chemical signals to transmit sensory and motor information from one body part to another
2. spinal cord	b) specialized neurons or nerve endings that respond to changes in the environment
3. neuron	c) a part of the brain located in the posterior cranial fossa (<i>черепна ямка</i>) behind the brainstem.
4. brainstem	d) the stemlike part of the brain that connects the cerebral hemispheres with the spinal cord.
5. sensory receptor	e) a nerve cell that receives and sends electrical signals over long distances within the body
6. cerebrum	f) the portion of the central nervous system that is located within the skull. It functions as a primary receiver, organizer, and distributor of information for the body.
7. cerebellum	g) it is the largest part of the brain that constitutes the forebrain and is located on top of the brainstem and is considered the most developed part of the brain.
8. nerve	h) It is a long, thin, tubular bundle of nervous tissue that extends from the medulla oblongata in the brainstem to the lumbar region of the vertebral column.

Exercise 7. What organs and parts of the body do the adjectives below refer to? Make up sentences with them on your own:

Model: cardiac – heart.

The heart pumps blood through the vessels.

Cranial –

Spinal –

Vertebral –

Cervical – Thoracic – Nervous –
Facial – Costal – Oral –
Vascular –

Exercise 8. Guess which term is described:

1. It consists of the brain, spinal cord, sensory organs, and all of the nerves that connect these organs with the rest of the body.
2. It is a soft, wrinkled organ located inside the cranial cavity.
3. It contains the white and grey matter.
4. It consists of the somatic and the autonomic nervous systems.
5. It is the basic unit in the nervous system, a specialized conductor cell that receives and transmits electrochemical nerve impulses.
6. It is a nerve cell cluster located in the peripheral nervous system.

Exercise 12. Choose the proper word from the given below to complete the sentences:

1. The brain and the spinal cord form the ... nervous system.
2. The nerves which connect the brain and structures of the head are
3. An immediate response of the body to a stimulus is a ... action.
4. A stimulus is received by a
5. Nerve cells are known as
6. Normally nerve cells are divided into motor, autonomous and
7. In the spinal cord, neuronal cell bodies are known as
8. A collection of neuronal cell bodies lying outside the CNS is called
9. The internal environment of the body is controlled by the ... nervous system.
10. Nerves which supply the body wall, skeletal muscle and skin are ... nerves.

*Sensory, sympathetic, autonomic, receptor, reflex, neurons, cranial, central,
grey matter, ganglion.*

Exercise 13. Read the sentences and translate them into your native language:

1. In vertebrates the nervous system **must** contain two main parts, the central nervous system and the peripheral nervous system.

2. The CNS **must** consist of the brain and spinal cord.
3. The PNS consists mainly of nerves that **can** connect the CNS to every part of the body.
4. Nerves that **can** transmit signals from the brain are called motor or efferent nerves, while those nerves that **can** transmit information from the body to the CNS are called sensory or afferent.
5. Malfunction of the nervous system **may** be as a result of genetic defects, physical damage, and infection or simply of ageing.
6. In the peripheral nervous system, the most common problem is the failure of nerve conduction, which **may** occur due to diabetic neuropathy.

Exercise 14. Put questions to the underlined words:

1. Neurons communicate within the body by transmitting electrochemical signals.
2. Vital functions are controlled by the brain.
3. Movement of the body is due to nerve stimuli.
4. The spinal cord is enclosed in the vertebral column.
5. There are 12 pairs of cranial nerves.
6. The peripheral nervous system includes all of the parts of the nervous system outside of the brain and spinal cord.
7. Galen saw the spinal cord as an extension of the brain.
8. The term 'neurology' was coined in 1681.

Exercise 15. Open the brackets in the correct tense and form:

1. The Greek philosopher Aristotle (to believe) that the nerves were controlled by the heart.
2. The central nervous system (to include) the brain and the spinal cord.
3. The Roman physician Galen (to contradict) Aristotle and (to conclude) that the brain was the most important organ of the body.
4. Recently the scientists (to find) that nervous cells can restore.
5. The peripheral nervous system (to make up) of the somatic and autonomic nervous systems.
6. I think we (to finish) our experiments with sensory receptors next week.
7. If they (to come) tomorrow I'll explain them the principles of the nervous activities.
8. He just (to phone) his psychotherapist.

EYE

Exercise 1. Topic vocabulary:

nouns	verbs	adjectives/adverbs
bulk	adjust	anterior
choroid	enclose	appropriate
conjunctiva	involve	aqueous
cornea	perceive	dim
fovea	project	posterior
iris	record	sensitive
lens	refract	tough
pupil	suspend	vitreous
retina		
sclera		
sight		
tear		

Exercise 2. Remember words relating to:

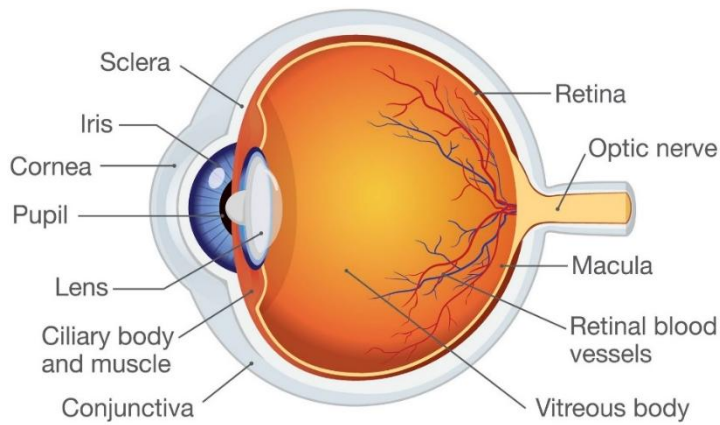
Eye – ocular, ophthalmic, optic, optical, visual, corneal, rod, cone, eyeball, blink, stare, gaze.

Exercise 3. Read the text:

The Sensory System. Eye

A sensory system is a part of the nervous system responsible for processing sensory information. It consists of sensory receptors, neural pathways, and parts of the brain involved in sensory perception. Commonly recognized sensory systems are those for vision, hearing, somatic sensation (touch), taste and olfaction (smell).

A sense organ is any collection of cells which serve to receive sensory information from the environment. Sensory organs – eyes, ears, tongue, skin and nose – help to protect the body. They contain receptors that relay information through sensory neurons to the appropriate places within the nervous system. Each sense organ contains different receptors.



The eye is the organ of vision. The eye consists of conjunctiva, sclera, cornea, lens, retina, iris, pupil, anterior chamber (aqueous humor), canal of Schlemm, posterior chamber (vitreous humor), fovea (focal point), choroids, and optic nerve.

The conjunctiva runs along the inside of the eyelid and the outermost portion of the eye. It meets the sclera, the tough white layer that covers most of the eyeball. Both contain tiny blood vessels

that nourish the eye.

Inside the conjunctiva at the center of the eye the cornea lies. This layer of clear tissue with its film of tears provides about two-thirds of the focusing power of the eye. The cornea refracts light as it enters the eye.

The pupil and iris lie behind the cornea. The pupil is the opening through which light passes to the back of the eye. Muscles controlling the iris (the colored part of the eye) allow it to change the size of the pupil to adjust to the amount of light. The pupil becomes larger in dim light and smaller in bright light to protect the delicate retina from excessive light.

Between the cornea and the iris, the anterior chamber lies. This space is filled with aqueous humor. This fluid is manufactured in the posterior chamber of the eye. The fluid passes into the anterior chamber through the pupil and then is absorbed into the bloodstream through the canal of Schlemm in the angle where the iris meets the cornea.

Behind the iris and anterior chamber, the lens is. This colorless tissue is enclosed in a capsule and suspended in the middle of the eye by a net of fibers. The lens can change shape in order to focus light rays on the retina.

The bulk of the eyeball, which is behind the lens, is formed by the round posterior chamber. It is filled with a colorless, gelatin-like substance known as the vitreous humor.

Retina is located behind the vitreous chamber. The retina of the eye is equivalent to the film of the camera. Composed of 10 layers, the retina processes the light images projected from the cornea and lens.

The retina is nourished primarily by the choroids. This multilayered tissue, which lies between the retina and the sclera, is composed of veins and arteries.

Fovea located in the center of the retina provides the most acute vision. This section is the most visually sensitive part of the eye.

The optic nerve takes the electrical impulses recorded by the retina and transmits them to the brain. The optic nerve interprets these messages into what we perceive as sight.

Exercise 4. Answer the questions:

1. What are the sensory organs?
2. What do the human sensory organs contain?
3. What does the eye consist of?
4. Where is the conjunctiva?
5. What vessels does the conjunctiva contain?
6. What is the cornea?
7. What is its function?
8. Where are the pupil and iris located?
9. What is the function of muscles controlling the iris?
10. What is the anterior chamber filled with?
11. Where is the lens? What is its function?
12. What is the bulk of the eyeball formed by?
13. How many layers is the retina composed by?
14. What is the retina nourished by?
15. What are the choroids composed of?
16. What is fovea?
17. What is the major function of the optic nerves?

Exercise 5. Match the following words and word combinations with their definitions:

1. receptor	a. connected with the sense of smell;
2. perception	b. the ability to feel through the sense of touch;
3. olfactory	c. a cell or organ that is sensitive to chemical stimuli;
4. chemoreceptor	d. a force of energy that causes something to react;
5. sensation	e. irritant, effect;
6. sense organ	f. a group of specialized cells which can detect changes in the environment;
7. impulse	g. feeling, sense;
8. stimulus	h. a structure that receives external or internal stimuli and transmits them in the form of nervous impulses to the brain.

Exercise 6. Complete the sentences with the words from the exercise 6:

1. _____ are specialized extensions of the nervous system that respond to specific stimuli and conduct nerve impulses.
2. A stimulus to a _____ that conduct an impulse to the brain is necessary for perception.
3. Sensory organs act as energy filters that permit _____ of only a narrow range of energy.
4. _____ receptors of the olfactory nerve respond to chemical stimuli and transmit the sensation of olfaction to the cerebral cortex.
5. Taste receptors in taste buds are _____ and transmit the sensation of gustation to the cerebral cortex.
6. The kinds of taste _____ are sweet, salty, sour and bitter.
7. Receptors are the groups of specialized cells which can detect changes in the environment, which are called stimuli and turn them into electrical _____.
8. Receptors are often located in the sense organs; each organ has receptors sensitive to particular kinds of _____.

Exercise 7. Match of the verbs with their synonyms:

to vary	a. to pass, transfer
to relay	b. to assist, support
to contribute	c. to explain, transfer
to interpret	d. to stand out, overhang
to protrude	e. to unite, connect
to combine	f. to reveal, find out.
to detect	g. to cooperate, work
to interact	h. to increase, enlarge
to magnify	i. to speed, extend
to distribute	j. to differ, change

Exercise 8. Read and translate brief description of the eye:

The eye is our organ of sight. The eye has a number of components which include but are not limited to the [cornea](#), [iris](#), pupil, lens, [retina](#), [macula](#), [optic nerve](#), choroid and vitreous.

Cornea: clear front window of the eye that transmits and focuses light into the eye.

Iris: colored part of the eye that helps regulate the amount of light that enters.

Pupil: dark aperture in the iris that determines how much light is let into the eye.

Lens: transparent structure inside the eye that focuses light rays onto the retina.

Retina: nerve layer that lines the back of the eye, senses light, and creates electrical impulses that travel through the optic nerve to the brain.

Macula: small central area in the retina that contains special light-sensitive cells and allows us to see fine details clearly.

Optic nerve: connects the eye to the brain and carries the electrical impulses formed by the retina to the visual cortex of the brain.

Vitreous: clear, jelly-like substance that fills the middle of the eye.

Exercise 19. Read and fill the part of the eye with its definition:

Retina, cornea, iris, sclera, conjunctiva, pupil, lens, eye.

1. - is the transparent structure that is covering the iris and the pupil. It is like a window, it helps to focus light onto the retina.
2. - is the white of the eye that acts as the eye wall. It protects and provides structural support for the inside of the eye and gives eye its shape.
3. - is a thin transparent membrane that covers the sclera and inner surfaces of the eyelids. It secretes oil and mucus to lubricate the eye.
4. - is the colored part of the eye that surrounds a small black hole (pupil) and helps regulate the amount of light that enters the eye.
5. - is the organ of sight.
6. - is a clear and flexible tissue that is located behind the cornea.
7. - is a thin layer of tissue located at the back of the eye which contains million of light-sensitive cells.
8. - is the black spot in the middle of the eye.

Exercise 10. Complete the description using the words and phrases below:

Point, image, clear gel, black circle, clear dome, electrical signals, light waves, sensitive part, visual image.
--

How the Eye Works

Actually, we don't see with our eyes, we see with our brains. When you look at things, _____ from them enter the eye through the cornea, which is a _____ at the front of the eye. The light then goes through the pupil, the _____ in the center of the coloured iris. The light then bends to a _____ behind the lens. There, the _____ is reversed and upside down. The light travels on through a _____ called the vitreous humour and then to a focus on the retina. In the center of retina is the macula, which is very _____ of the retina. It is used when we read or stare at something. The retina converts the light to _____ which travel along the optic nerve to the brain, which turns them back to a _____.

Exercise. 11. Insert the missing words given below:

The eye is composed of three coats or tunics. The fibrous tunic is the outer ___ of the eye. It consists of the ___ and cornea. The sclera is the posterior four fifths of the ____. It is white connective tissue that maintains the ___ of the eye and provides a site for muscle attachment. The ___ is the anterior four fifths of the eye. It is transparent and refracts ___ that enters the eye. The vascular tunic of the eye is the ___ layer. This layer contains most of the blood vessels of the ____. The vascular tunic consists of the ____, ciliary body, and iris.

sclera; eyeball; eye; layer; light; cornea; shape; choroids; middle.

Exercise 12. Read the following text. Write out the key words of it:

Accessory structures

Accessory structures protect, lubricate, move, and in other ways aid in the function of the eye. They include eyebrows, eyelids, lacrimal apparatus, and extrinsic eye muscles. The eyebrows prevent perspiration from entering the eyes and help shade of the eye. The eyelids consist of 5 tissue layers. They protect the eyes from foreign objects and help lubricate the eyes by spreading tears over their surface. During sleep the eyes are protected from drying out by being closed. Lacrimal glands produce tears that flow across the surface of the eye. Excess tears enter the lacrimal canaliculi and reach the nasal cavity through the nasolacrimal canal. Tears lubricate and protect the eye. The extrinsic eye muscles attached to the outside covering (sclera) of the eye move the eyeball. They act on concert to move both eyes up, down, around, and from side to side so that our two eyes will center on exactly the same point.

Exercise 13. Open the brackets with appropriate forms of participles or infinitive with or without to:

1. (Walk) outdoors, never stare into direct sunlight or at any object (reflect) the sun's rays.
2. Even (wear) sunglasses, never look directly at the sun.
3. (Go) to your doctor and (get) a vision test approximately every 6 months, you can (prevent) or (control) a lot of eye conditions.
4. Protect your eyes from eye strain (work) or (play) at the computer or (watch) television.
5. (Watch) TV, you should (be) at a good distance from the screen.
6. A laptop should (be) on the lap or some distance away on a low disk, not close in front of the face (lie) prone on the bed.
7. While (read) keep some distance from a book, which might (reduce) strain.
8. By sure (get) plenty of sleep (help) your eyes (stay) open during the day.

EAR

Exercise 1. Topic vocabulary:

nouns	verbs	adjectives/adverbs
ear	deliver	auditory
auricle	process	tiny
pinna	link	
wax	yawn	
eardrum	equalize	
ossicle	curve	
hammer	strike	
malleus	disseminate	
anvil		
incus		
stirrup		
stapes		
hearing		
Eustachian tube		
cochlea		

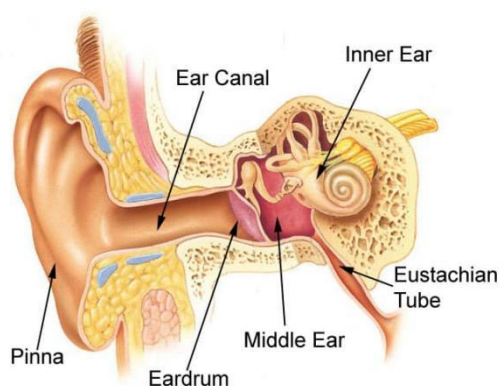
Exercise 2. Remember words relating to:

Ear – audio, auditory, hearing, vibrate, stapes, hammer, anvil, stirrup, earwax, listen, overhear.

Exercise 3. Read the text:

Ear

Ears are the organs of hearing. It has receptors for both hearing and equilibrium. The ear has three parts: outer ear, middle ear, and inner ear. The auricle (pinna) and outer ear canal, which delivers sound to the middle ear, make up the outer ear, the part we see. Within the outer ear wax-producing glands and hairs that protect the middle ear are located.



The function of the middle ear is to deliver sound to the inner ear, where it is processed into a signal that the brain recognizes. The middle ear is a small cavity, with the eardrum (the tympanic membrane) on one side and the entrance to the inner ear on the other side. The tympanic membrane divides the external ear from the middle ear; it is slightly oval in shape and approximately 9-10mm at its

largest diameter. Within the ear there are three small bones (the ossicles) known as the malleus (hammer), incus (anvil), and stapes (stirrup). These bones conduct sound vibrations into the inner ear. The malleus is attached to the lining of the eardrum, the incus is attached to the malleus, and the stapes links the incus to the oval window (the opening to the inner ear).

The middle ear is connected by a narrow channel (the Eustachian tube) to the throat. Ordinarily, the Eustachian tube is closed, but when the person swallows or yawns, it opens to allow an exchange of air, thus equalizing the air pressure within the middle ear and the air pressure outside.

The inner ear contains the most important parts of the hearing mechanism. They are two chambers called the vestibular labyrinth (the peripheral vestibular apparatus) and the cochlea. Tiny hairs line the curves of the cochlea. Both the labyrinth and the cochlea are filled with fluid.

The peripheral vestibular system is responsible for maintaining balance, coordinating the position of the head and eye movement.

Although the ear is a relatively small structure, it is served by five cranial nerves:

- Trigeminal nerve (fifth cranial nerve);
- Facial nerve (seventh cranial nerve);
- Vestibulocochlear (eighth cranial nerve);
- Glossopharyngeal (ninth cranial nerve);
- Vagus (tenth cranial nerve).

When sound waves from the world outside strike the eardrum, it vibrates. These vibrations from the eardrum pass through the bones of the middle ear and into the inner ear through the oval window. Then they disseminate into the cochlea, where they are converted into electrical impulses and are transmitted to the brain by the auditory nerve.

Exercise 4. Answer the questions:

1. What is the ear?
2. What is the most characteristic feature of the ear?
3. What are the main parts of the ear?
4. What is the role of the outer ear?
5. What is the function of the middle ear?
6. What is the function of the tympanic membrane?
7. What bones are there in they middle ear?
8. What does the inner ear contain?
9. What is the peripheral vestibular system responsible for?
10. What nerves is the ear served by?

Exercise 5. Match the following words with their definitions:

1. auricle	1. The bony and membranous labyrinth of the inner ear.
2. auditory ossicle	2. Middle of the three ossicles in the middle ear.
3. eardrum	3. Cellular membrane that separates the outer from the middle ear; it vibrates in response to sound waves.
4. malleus	4. Smallest of the three auditory ossicles.
5. incus	5. Bone of the middle ear: includes the malleus, incus, and stapes.
6. stapes	6. Largest of the three auditory ossicles.
7. labyrinth	7. Part of the outer ear that protrudes from the side of the head

Exercise 6. Fill in the blanks.

Sounds, the ear drum, balance, ear bones, the pinna, the cochlea, the ear canal, ears

You can hear sound around you by your _____. Your ears collect _____, process them, and send sound signals to your brain. Besides hearing your ears also help to keep you _____. So, if you bend over to pick up your book, you will not fall down. The ear is made up of three different sections: the outer ear consists of a) _____, b) _____ and c) _____; the middle ear has d) _____; and the inner ear is made up of e) _____ and f) the auditory nerve. These parts all work together so you can hear sounds.

Exercise 7. What is the function of each part of the ear?

The a) _____ collects sound in the environment.

The b) _____ separates the outer ear from the middle ear. It vibrates when it is hit by sound.

The c) _____ carries the message to the brain.

The d) _____ magnify the vibrations of the eardrum and transmit them to the cochlea.

The e) _____ detects the vibrations and changes them into messages.

The f) _____ directs sound to the middle ear.

Nerve, auditory canal, eardrum, ear bones, cochlea, ear canal, pinna

Exercise 8. Match the terms with their definitions:

1. equilibrium	a. The portion of the inner ear that is concerned with the sense of equilibrium.
2. hearing	b. The tube that connects the middle ear with the nasopharynx and serves

	to equalize pressure between the outer and middle ear.
3. cochlea	c. The smallest bone of the middle ear.
4. pinna	d. The membrane of the middle ear, which vibrates in response to sound waves.
5. vestibular apparatus	e. The capacity to hear.
6. eustachian tube	f. The sense of balance.
7. ossicles	g. The coiled portion of the inner ear that contains the receptors for hearing.
8. eardrum	h. The projecting part of the outer ear; auricle.

Exercise 9. Insert the prepositions:

1. The function ___ the middle ear is to deliver sound to the inner ear.
2. The middle ear is a small cavity, with the eardrum and the entrance ___ the inner ear.
3. These bones conduct sound vibrations ___ the inner ear.
4. The middle ear is connected ___ the Eustachian tube to the throat.
5. The inner ear contains the most important parts ___ the hearing mechanism.
6. When sound waves ___ the world outside strike the eardrum, it vibrates.
7. These vibrations ___ the eardrum pass through the bones of the middle ear and into the inner ear.
8. Then they disseminate into the cochlea, where they are converted into electrical impulses and are transmitted ___ the brain.

Exercise 10. Put questions to the underlined words:

1. In addition to sight, smell, taste, touch and hearing, humans also have awareness of balance, pressure, temperature, pain, and motion.
2. The sense of balance is maintained by a complex interaction of visual inputs, the inner ear, vestibular system and the central nervous system.
3. Disturbances occurring in any part of the balance system, or even within the brain's integration of inputs, can cause the feeling of dizziness and unsteadiness.
4. Kinesthesia is the precise ever awareness of muscle and joint movements that allows us to coordinate our muscles when we walk, talk and use our hands.
5. It is the sense of kinesthesia that enables us to touch the tip of our nose with our eyes closed or to know which part of the body we should scratch when we itch.
6. Some people experience a phenomenon called synesthesia in which one type of stimulation evokes the sensation of another.

7. The hearing of sound may result in the sensation of the visualization of a colour, or shape may be sensed as smell.

8. Synesthesia is hereditary and it is estimated that it occurs in 1 out of 1000 individuals with variations of type and intensity.

THE ENDOCRINE SYSTEM

Exercise 1. Topic vocabulary:

nouns	verbs	adjectives/adverbs
acromegaly	affect	adrenal
band	convert	against
carbohydrate	join	ductless
dwarfism	lie	endocrine
excitement	pour (into)	involuntary
fear	raise	narrow
fuel	release	particularly
masculinity		saccular
medulla		
pineal gland		
pituitary gland		
thyroid		

Exercise 2. Guess the meaning of the following words without using a dictionary:

Endocrine, gland, hypophysis, oversecretion, hormone, base, functioning, peristalsis, adrenalin, glucose, antibody, gigantism, destruction, protein, control, reservoir, manufacture, acromegaly.

Exercise 3. a) Read the word combinations:

Gland: enlarged gland; swollen gland; salivary gland; pituitary gland; glands secrete hormones.

Amount: considerable amount; exact amount; to reduce the amount; limited amount; excessive amount; total amount.

Affect: to affect greatly; to affect indirectly; to affect slightly; to affect significantly.

Circulation: poor circulation; systemic circulation; pulmonary circulation; to improve circulation; to stimulate circulation.

b) Make up short sentences using the above given word combinations:

Exercise 4. Read the text:

The endocrine system

The endocrine system refers to the collection of cells, glands, and tissues of an organism that secrete hormones directly into the blood stream to control the organism's physiological activity.

A hormone is a special chemical released by one or more cells that affects cells in other parts of the organism. Only a small amount of hormone is required to alter cell metabolism. It is a chemical messenger that transports a signal from one cell to another. They affect many different processes in the body including growth and development, metabolism, sexual function, behavior, reproduction, mood. The field of the study dealing with the endocrine system and its disorders is called endocrinology.

A gland is an organ which is able to make substances called secretion of the gland. The glands are the chemical laboratories of the body. All glands in the human body can be divided into glands with ducts and ductless. The glands with ducts produce secretion called external secretion. The examples of these glands are the salivary glands, gastric glands, pancreas and sweat glands.

Ductless glands have no duct but they make a secretion which they pour into the blood stream. These secretions are called internal secretions or hormones, and glands which produce them are also called endocrine glands.

The major endocrine glands are the pituitary (hypophysis), pineal, thymus, thyroid, adrenal glands, and pancreas.

The thyroid gland lies in the front of the neck. It consists of two lobes lying on either side, joined by a narrow band which crosses the trachea immediately below the larynx. The gland is well supplied with blood vessels and consists essentially of secreting cells. The cells secrete thyroxin, which passes into the circulation. Thyroxin controls the general metabolism or activity of the body tissues.

The adrenal glands are two small triangular glands lying one over each kidney. They consist of two parts, cortex and medulla. The outer part produces a secretion which affects sex. Oversecretion produces masculinity in the female and in the male it produces too early development of the male reproductive organs.

The medulla produces a very important secretion called adrenalin. Its secreted amount increases in excitement and strong emotions such as fear or anger.

The pituitary gland (hypophysis) is a small gland about the size of a pea and yet is of great importance. It lies in the pituitary fossa in the base of the skull. It consists of an anterior and a posterior lobe.

The anterior lobe is larger and produces a number of important hormones affecting growth and sexual development and the functioning of the ductless glands, particularly the thyroid and the adrenal glands. Undersecretion of this lobe in childhood causes dwarfism. Oversecretion causes overgrowth or gigantism. In the adult this oversecretion causes overgrowth of the head, hands, and feet, particularly affecting the lower jaw. This condition is known as acromegaly.

The posterior lobe produces the secretion known as pituitrin. This stimulates involuntary muscle and therefore contracts the blood vessels and raises blood pressure, stimulates peristalsis, contracts the uterus; it affects the use of water by the body.

The pineal gland is located deep in the brain in an area called the epithalamus, where the two halves of the brain join. In humans, this is situated in the middle of the brain; it sits in a groove just above the thalamus, which is an area that co-ordinates a variety of functions related to our senses. The pineal gland contains high

levels of calcium and can be used by radiographers to mark the middle of the brain in X-ray images. The pineal gland secretes the hormone melatonin. Melatonin is best known for the role it plays in regulating sleep patterns, that are also called circadian rhythms. The pineal gland also plays a role in the regulation of female hormone levels, and it may affect fertility and the menstrual cycle.

The thymus gland, located behind your sternum and between your lungs, is only active until puberty. After puberty, the thymus starts to slowly shrink and become replaced by fat. Thymosin is the hormone of the thymus, and it stimulates the development of disease-fighting T cells.

The thymus gland will not function throughout a full lifetime, but it has a big responsibility when it's active—helping the body protect itself against autoimmunity, which occurs when the immune system turns against itself. Therefore, the thymus plays a vital role in the lymphatic system and endocrine system.

The *pancreas* is a compound saccular gland lying across the back of the abdomen behind the stomach. It produces both external and internal secretion. The external secretion is the pancreatic juice that plays an important part in the process of digestion. The internal secretion is insulin that controls the metabolism of carbohydrates.

Exercise 5. Answer the questions:

1. What is endocrinology?
2. How are glands in the human body classified?
3. What is hormone?
4. What are the major endocrine glands?
5. What is the structure of the thyroid gland?
6. What does thyroxin control?
7. What is the structure of the adrenal glands?
8. When is adrenalin secreted?
9. What is the structure of the pituitary gland?
10. What does the pituitary gland affect?
11. Where is the pineal gland situated?
12. What is melatonin?
13. Where is the thymus located?
14. What does thymosin stimulate?
15. What is the external secretion of the pancreas?
16. What is the internal secretion of the pancreas?

Exercise 6. Form new words:

a) nouns with the prefix OVER meaning “понад, вверху”. Translate them:

Model: over+ dosage →overdosage (передозування)

weight, cooling, heating, work, salt, sensitive, sleep, use, talkative, curious, load, excitement, dose, estimate, eating, growth, development, action.

b) nouns with the prefix UNDER meaning „під, нижче”. Translate them.

Model: under+ dose →underdose (недостатня доза)

estimate, salted, developed, weight, graduate, ventilation, act, nourished

c) adjectives using the suffix –LESS meaning “відсутність”. Translate them. Model: power + less—powerless (безсилий)

Care, duct, fear, hope, pain, color, taste, use, harm, meaning, shame.

Exercise 7. Match the terms to their definitions:

1. acromegaly	a) triangle-shaped glands located on top of the kidneys;
2. gland	b) a small, somewhat cherry-shaped double-lobed structure attached to the base of the brain, constituting the master endocrine gland affecting all hormonal functions of the body;
3. gigantism	c) a large endocrine gland situated in the base of the neck concerned with regulation of the metabolic rate;
4. adrenal gland	d) Increase in size of the hands, feet and the face due to excessive production of “growth hormone”;
5. thyroid gland	e) an organ or group of cells that is specialized for synthesizing and secreting fluids either for use in the body or for excretion;
6. hypophysis	f) abnormal growth causing excessive height, most commonly due to oversecretion during childhood of “growth hormone”.

Exercise 8. Put the words from the table into an appropriate gap:

Influence; controlling; eight major glands; diabetes; supplements; a hormone disorder; hormones

Your endocrine system includes ... throughout your body. These glands make If your hormone levels are too high or too low, you may have Hormone diseases also occur if your body does not respond to hormones the way it is supposed to. Stress, infection and changes in your blood's fluid and electrolyte balance can also ... hormone levels. In the United States, the most common endocrine disease is There are many others. They are usually treated by ... how much hormone your body makes. Hormone ... can help if the problem is too little of a hormone.

Exercise 9. Say whether the following statements are true or false. Comment on your answer.

1. A hormone is a chemical released by a cell or a gland in one part of the body that sends forth messages that affect cells in other parts of the organism.
2. Some non-endocrine organs such as the brain, heart, lungs also produce and release hormones.
3. The thyroid gland secretes hormones which are necessary for normal digestion.
4. The thyroid is generally asymmetric, with the right lobe being significantly larger than the left one.
5. The posterior lobe of the hypophysis produces the secretion known as thyroxin.
6. The hypophysis and the gall-bladder are of the size of a pea.
7. The amount of adrenalin increases in excitement and strong emotions.
8. The thyroid gland is well supplied with blood vessels and consists mainly of secreting cells.
9. Oversection of the adrenal gland cortex does not affect sex.

Exercise 10. Open the brackets using the correct form of the verb. Translate the sentences:

1. Thyroxin (to control) the general metabolism or activity of the body tissues
2. The patient already (to treat) by the doctor from pneumonia.
3. The wound (to be) usually dressed by the nurse.
4. Blood pressure (to take) now.
5. Skin irritation (to cause) by overdosage of the drug.
6. The anterior lobe of the hypophysis (to produce) a number of important hormones
7. I (to treat) at this clinic for acute pneumonia last week.
8. We were told that the direction of the nerve fibers already (to establish) experimentally.
9. The thyroid gland (to supply) well with blood vessels.

Exercise 11. Make up questions to the underlined words:

1. The hormones are delivered to various organs.
2. The thyroid gland is well supplied with blood vessels.
3. The patient has been recommended to consult his pharmacist for professional advice on medicines.
4. Many hormones affect metabolism.
5. The chemical composition of some hormones is well-known.
6. Each gland consists of the glandular epithelial tissue.
7. The hormones affect the functions of the different parts of the nervous system.
8. The pituitary gland is about the size of a pea.
9. The outer part of the adrenal glands produces a secretion which affects sex.

Exercise 12. Arrange the following sentences in a correct order to describe the following terms.

A) The endocrine glands

1. Glands which produce internal secretions or hormones are called endocrine glands.
2. Ductless glands make a secretion which they pour into the blood stream.

3. The endocrine glands regulate all functions of the body.
4. All glands in the human body can be divided into glands with ducts and ductless.
5. The chief ductless glands are: the thyroid gland, the adrenal glands and the pituitary gland.

B) The thyroid gland

1. The cells of the thyroid secrete thyroxin, which passes into the circulation.
2. The thyroid gland lies in the front of the neck.
3. The gland is well supplied with blood vessels and consists essentially of secreting cells.
4. Thyroxin controls the general metabolism or activity of the body tissues.
5. The thyroid consists of two lobes lying on either side of the neck.

C) Adrenal glands

1. The adrenal glands consist of two parts, cortex and medulla.
2. Adrenalin increases in excitement and strong emotions such as fear or anger.
3. The adrenal glands are two small triangular glands lying one over each kidney.
4. The medulla produces a very important secretion called adrenalin
5. The outer part produces a secretion which affects sex.

D) The pituitary gland

1. The pituitary gland lies in the pituitary fossa in the base of the skull.
2. The anterior lobe produces a number of important hormones affecting growth and sexual development and the functioning of the thyroid and the adrenal glands.
3. The pituitary gland (hypophysis) is a small gland about the size of a pea.
4. Pituitrin stimulates involuntary muscle and therefore contracts the blood vessels and raises blood pressure, stimulates peristalsis.
5. The posterior lobe produces the secretion known as pituitrin.

MICROORGANISMS

Exercise 1. Topic vocabulary:

nouns	verbs	adjectives/adverbs
algae	encompass	capable
archaea	prevalent	irregular
bacteria	replicate	lobed
fungi	responsible for	rectangular
habitat		rod
protozoa		salty
viruses		spherical
yeast		spiral
		visible

Exercise 2. Remember:

Singular	Plural
alga	algae
archaeon	archaea
bacterium	bacteria
coccus	cocci
eukaryote	eukarya
flagellum	<u>flagella</u>
fungus	fungi
hypha	<u>hyphae</u>
medium	media
mitochondrion	mitochondria
nucleus	nuclei

protozoan	protozoa
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Exercise 3. Read the following paying attention to the rules of reading:

[əʊ] – filamentous, infectious, dangerous, numerous, previous, fibrous, nervous, various

[ə] – medium, fungus, nucleus, bacterium, asexual, archaeon, flagellum, spirillum, alga

[ə] – contain, consists, comprise, concern, control, correct, complete,

[s] – cocci, actinomycete, multicellular, absence, bacillus, mycelium, resistance, acid

[k] – coccus, cycling, nuclei, mitochondria, archaea, bacteria, actinomycete, microbe

Exercise 4. Study the elements of medical terminology. Read the following words and give more examples of your own:

a – asexual, acellular, abacterial, abiotic, avascular, avirulent, atoxic

multi – multicellular, multicapsular, multichamber, multivitamins, multipurpose

uni – unicellular, unicameral, unilateral, uninuclear, unioocular, unigravida

Exercise 5. Group the following words according to the parts of speech using the table:

Noun	Verb	Adjective	Adverb
------	------	-----------	--------

Harmless, helpful, asexual, umbrella, generally, microbe, through, colony, replication, fungi, host, algae, major, unicellular, differ, nucleus, variety, encompass, individual, domain, width, habitat, reproduce, appear, external, rod-shaped, exist, gram-negative, membrane-bound, propel, urogenital, archaeal, absence, typically, filamentous, within, superficially, hyphal, form, namely, contain, resistance, human, compose, unusually, instead, endure, solvent, survive, known, harsh, particularly, exploit, extremely, characteristic.

Exercise 6. Read the text:

Microorganisms

A microorganism or microbe is any microscopic organism too small to be visible to the naked eye which may exist in its single-celled form or in a colony of cells (multicellular form). Microorganisms is an umbrella term used to encompass bacteria, yeast, fungi, and in some definition. The classification is broad and includes both microorganisms that are capable of replication outside of any host and those that require a host to survive.

Microorganisms differ from each other not only in size, but also in structure, habitat, metabolism, and many other characteristics. The major groups of microorganisms – namely bacteria, archaea, fungi (yeasts and molds), algae and protozoa are usually found in each of the three domains of life: Archaea, Bacteria, and Eukarya. Microbes within the domains Bacteria and Archaea are all *prokaryotes* whereas microbes in the domain Eukarya are *eukaryotes*. Some microorganisms, such as viruses, do not fall within any of the three domains of life.

A **prokaryote** is a unicellular organism that lacks a membrane bound nucleus, mitochondria, or any other membrane-bound organelle. Prokaryotes are asexual, reproducing without fusion of gametes.

Eukaryotes are organisms whose cells have a nucleus enclosed within membranes. Eukaryotic cells typically contain other membrane-bound organelles such as mitochondria and the Golgi apparatus, and in addition, some cells of plants and algae contain chloroplasts.

Eukaryotes can reproduce both asexually through mitosis and sexually through meiosis and gamete fusion.

Bacteria are microorganisms that do not have a true nucleus; their genetic material is free floating within the cell. Bacteria are very small one-celled organisms and do not contain very complex cell structures. Generally, bacteria come in three varieties: *bacilli* (rod-shaped), *cocci* (sphere-shaped), and *spirilla* (spiral-shaped). Bacteria are prevalent in all environments and are important members of an ecosystem. They are responsible for the breakdown of dead organic matter into its constituent molecules. For this reason, we call bacteria decomposers. They also can be eaten by other organisms and are thus valuable in food-chain relationships. Since bacteria are small, can divide asexually very rapidly, can live practically anywhere, and have great metabolic versatility, they are the most numerous organisms on Earth. Many bacteria, when placed in good conditions, can reproduce every 20 or 30 minutes, each doubling its population after each reproduction.

Archaea are a group of microorganisms that are similar to, but evolutionarily distinct from bacteria. They are eukaryotes and contain the green pigment chlorophyll, carry out photosynthesis, and have rigid cell walls. Archaea can be spherical, rod, spiral, lobed, rectangular or irregular in shape. An unusual flat, square-shaped species that lives in salty pools has also been discovered. Some exist as single cells, others form filaments or clusters.

Many archaea have been found living in extreme environments, for example at high pressures, salt concentrations or temperatures. These types of organisms are called extremophiles. Their cell wall differs in structure from that of bacteria and is thought to be more stable in extreme conditions, helping to explain why some archaea can live in many of the most hostile environments on Earth.

Exercise 7. Answer the questions:

1. What is a microorganism?
2. What are the forms of microorganisms?
3. What is the classification of microorganisms and what microorganisms does it include?
4. What do microorganisms differ from each other?
5. What are the major groups of microorganisms?
6. What are the three domains of life of microbes?
7. What domains do prokaryotes and eukaryotes belong to?
8. What microorganisms do not fall within any of the three domains of life?
9. What unicellular organism do we call a prokaryote?
10. How can eukaryotes reproduce?
11. What shapes may all bacteria have?
12. What is the major characteristic of bacteria?
13. Where may bacteria be usually found?
14. What are Archaea?
15. What shape can Archaea be?
16. Where do Archaea live?

Exercise 8. Complete the sentences:

Microscopy

The previously mentioned will often rely on microscopic examination for identification of the microbe. Instruments such as ... can be used to view the specimen under ordinary illumination to assess critical aspects of the organism. This can be performed immediately after the ... is taken from the patient and is used in conjunction with biochemical ... techniques, allowing for resolution of cellular features. are also used for observing ... in greater detail.

electron microscopes and fluorescence microscopes; sample; staining; microbes; culture techniques; compound light microscopes

***Using your knowledge of Physics, argue your answer to the following question:** What microscope is more precise: electron or light?

Exercise 9. Fill in the gaps with prepositions from the box below:

in, by, of, for; on

Microbiological culture is the primary method used ____ isolating infectious disease ____ study _____ the laboratory. Tissue or fluid samples are tested ____ the presence ____ a specific pathogen, which is determined _____ growth in a selective or differential medium.

The 3 main types ____ media used ____ testing are:

1. A solid surface is created using a mixture of nutrients, salts and agar. A single microbe on an agar plate can then grow into colonies (clones where cells are identical to each other) containing thousands _____ cells. These are primarily used bacteria and fungi.
2. Cells are grown inside a liquid media. Microbial growth is determined by the time taken for the liquid to form a colloidal suspension. This technique is used _____ diagnosing parasites and detecting mycobacteria.
3. Human or animal cell cultures are infected with the microbe of interest. These cultures are then observed to determine the effect this new microbe has _____ the cell. This technique is used for identifying viruses.

***Find the answers to the following questions:**

1. In what cases is the microbiological culture used?
2. What materials are usually tested?
3. What types of media are used for testing?

Exercise 10. Make the sentences interrogative and negative paying attention to Modal Verbs. Translate them:

1. A microorganism, or microbe is a microscopic organism, which **may** exist in its single-celled form or in a colony of cells.
2. Microorganisms **could** live in almost every habitat from the poles to the equator, deserts, geysers, rocks and the deep sea.

3. The scientists **must** identify many disease-causing microorganisms.
4. Microbes are important in human culture and health in many ways, they **may** serve to ferment foods, treat sewage, produce fuel, enzymes and other bioactive compounds.
5. Medical microbiologists **must** serve as consultants for physicians, suggesting treatment options.
6. A microbiologist **may** also assist in preventing or controlling epidemics and outbreaks of disease.
7. There are four kinds of microorganisms that **can** cause infectious disease; bacteria, fungi, parasites and viruses.
8. Fleming **might** interest biologists and mould experts in production of penicillin.

Exercise 11. Read and translate the sentences. Put the predicates into the Past:

1. A single microbe on an agar plate can grow into colonies.
2. Fluid samples may be tested for the presence of a specific pathogen.
3. Microbial growth must be determined by the time taken for the liquid to form a colloidal suspension.
4. Certain technique may be used for diagnosing parasites and detecting mycobacteria.
5. Instruments such as compound light microscopes can be used to assess critical aspects of the organism.
6. Diagnosis of infectious disease may be nearly always initiated by consulting the patient's medical history and conducting a physical examination.
7. More detailed identification techniques can involve microbial culture, microscopy, biochemical test and genotyping.
8. Other less common techniques must be used to produce images of internal abnormalities resulting from the growth of an infectious agent.

Exercise 12. Open the brackets using the verbs in the appropriate form. Translate the sentences into Ukrainian:

History of Medical Microbiology

Anton van Leeuwenhoek is considered to be the one of the first to observe microorganisms using a microscope. In 1676, he (**to observe**) bacteria and other microorganisms, using a single-lens microscope of his own design.

In 1796, using an ancient Chinese technique for smallpox vaccination, Edward Jenner (**to develop**) a method using cowpox a to successfully immunize a child against smallpox. The same principles (**to use**) for developing vaccines today.

Following on from this, in 1857 Louis Pasteur also (**to design**) vaccines against several diseases as well as pasteurization for food preservation.

Joseph Lister is considered to be the father of antiseptic surgery. By sterilizing the instruments with diluted carbolic acid and using it to clean wounds, post-operative infections (**to reduce**) making surgery safer for patients.

In the years between 1876-1884 Robert Koch provided much insight into infectious disease. He (**to be**) one of the first scientists to focus on the isolation of bacteria in pure culture. This (**to give**) rise to germ

theory, a certain microorganism being responsible for a certain disease. He (**to develop**) a series of criteria around this that have become known as the Koch's postulates.

In 1884 Hans Christian Gram developed the method of staining bacteria, to make them more visible and differentiable under a microscope. This technique (**to use**) widely today.

In 1929 Alexander Fleming developed the most commonly used antibiotic substance both at the time and now: penicillin.

Exercise 13. Put questions to the underlined words:

CASE

Joaquim, a 45-year-old journalist, has just returned to the U.S. from travels in China and Africa. He is not feeling well, so he goes to his general practitioner complaining of weakness in his arms and legs, fever, headache, noticeable agitation, and minor discomfort. He thinks it may be related to a dog bite he suffered while interviewing a Chinese farmer. He is experiencing some prickling and itching sensations at the site of the bite wound, but he tells the doctor that the dog seemed healthy and that he had not been concerned until now. The doctor ordered a culture and sensitivity test to rule out bacterial infection of the wound, and the results came back negative for any possible pathogenic bacteria.

CELL

Exercise 1. Topic Vocabulary

nouns	verbs	adjectives/adverbs
division	carry out	jelly-like
fiber	digest	hereditary
filament	provide	permeable
flagella	surround	self-replicating

Exercise 2. Pronounce correctly.

Cytoplasm ['sʌɪtə(ʊ)pləzəm], cytoskeleton [sʌɪtə(ʊ)'skɛlɪt(ə)n], endoplasmic reticulum ['ɪndəplæzmi:k rɪ'tɪkjʊləm], Golgi apparatus ['gɒldʒi ˌapə'reɪtəs], lysosome ['lɪsəsəʊm], peroxisome [pɛz'rɒksɪˌsəʊm], mitochondrion [ˌmɪtə(ʊ)'kɒndrɪən], nucleus ['nju:kliəs], plasma membrane ['pləzmə 'mɛmbreɪn], ribosome ['rɪbə(ʊ)səʊm], prokaryote [prəʊ'kærɪəʊt], eukaryote [ju:'kærɪəʊt], multicellular [mʌltɪ'seljʊlə(r)], deoxyribonucleic acid [dɪˌɒksɪrɪbəʊnju:'kleɪk 'æsɪd], Archaea [ɑ:'ki:ə]

Exercise 3. A) Make the adjectives from the nouns below by adding the suffix -al.

Structure, biology, function, nutrition, bacteria, ribosome, environment, clostridium, virus, nature, mitochondrion, fungus, centre, profession, option, season, chromosome.

B) Make the adjectives from the nouns below by adding the suffix -ic.

Cytoplasm, eukaryote, prokaryote, history, anatomy, endoplasm, cycle, rhythm, basis.

Exercise 4. Remember the Plural forms of the following key terms of the lesson. Write the Plurals of the words given below.

<i>Singular</i>	<i>Plural</i>	<i>Singular</i>	<i>Plural</i>
bacterium	bacteria	nucleus	nuclei
flagellum	flagella	apparatus	apparatus <i>or</i> apparatuses
reticulum	reticula	mitochondrion	mitochondria
fungus	fungi	archaeon	archaea
pilus	pili	synthesis	syntheses

Bacillus, spirillum, coccus, clostridium, ganglion, criterion, diagnosis, focus, medium, analysis.

Exercise 5. Read the text.

CELL

In biology, a cell is defined as the structural, functional, and biological unit of all organisms. It is an autonomous self-replicating unit that may exist as functional independent unit of life (as in the case of unicellular organism), or as sub-unit in a multicellular organism that is specialized into carrying out particular functions towards the organism as a whole.

The term “cell” came from Latin “cella”, “cellula”, meaning “a small room”. Robert Hooke suggested the name ‘cell’ in 1665.

The human body is composed of trillions of cells. They provide structure for the body, take in nutrients from food, convert those nutrients into energy, and carry out specialized functions. Cells also contain the body’s hereditary material and can make copies of themselves.

A cell consists of three principal parts: *the cell membrane, the nucleus*, and, between the two, *the cytoplasm*. Within the cytoplasm lie minuscule but distinct structures called *organelles*. Organelles are specialized structures that perform certain tasks within the cell.

Human cells contain the following major parts (in alphabetical order):

Cytoplasm. Within cells, the cytoplasm is made up of a jelly-like fluid (called the *cytosol*, also known as intracellular fluid or cytoplasmic matrix) and other structures that surround the nucleus. The cytoplasm is mainly composed of water, salts, and proteins.

Cytoskeleton. The cytoskeleton is a network of long fibers that make up the cell’s structural framework. The cytoskeleton has several functions, including determining cell shape, participating in cell division, and allowing cells to move.

Endoplasmic reticulum (ER). This organelle helps process molecules created by the cell. The endoplasmic reticulum also transports these molecules to their specific destinations either inside or outside the cell.

Golgi apparatus (Golgi body, Golgi complex). The Golgi apparatus packages molecules processed by the endoplasmic reticulum to be transported out of the cell.

Lysosomes and peroxisomes. These organelles are the recycling center of the cell. They digest foreign bacteria that invade the cell, rid the cell of toxic substances, and recycle cell wastes.

Mitochondria. Mitochondria are complex organelles that are responsible for energy production. They convert energy from food into a form that the cell can use. They have their own genetic material, separate from the DNA in the nucleus.

Nucleus. The nucleus serves as the cell’s command center, sending directions to the cell to grow, mature, divide, or die. It also houses DNA (deoxyribonucleic acid), the cell’s hereditary material. The nucleus is surrounded by a membrane called the nuclear envelope, which protects the DNA and separates the nucleus from the rest of the cell.

Cell membrane (Plasma membrane). The plasma membrane is the outer lining of the cell. It separates the cell from its environment and allows materials to enter and leave the cell. All the exchanges between the cell and its environment have to pass through the cell membrane. The cell membrane is selectively permeable to ions (e.g. hydrogen, sodium), small molecules (oxygen, carbon dioxide) and larger molecules (glucose and amino acids) and controls the movement of substances in and out of the cells.

Ribosomes. Ribosomes are organelles responsible for protein synthesis. These organelles can float freely in the cytoplasm or be connected to the endoplasmic reticulum.

A typical prokaryotic cell might contain the following parts:

Cell wall: the membrane surrounding and protecting the cell

Cytoplasm: all of the material inside a cell except the nucleus

Flagella and pili: protein-based filaments found on the outside of some prokaryotic cells

Nucleoid: a nucleus-like region of the cell where genetic material is kept

Plasmid: a small molecule of DNA that can reproduce independently

Exercise 6. Answer the questions.

1. What is a cell?
2. What three principal parts are there in a cell?
3. What are organelles?
4. What is the cytoplasm composed of?
5. What are the functions of the cytoskeleton?
6. What does the abbreviation *ER* stand for?
7. Which organelles serve as the recycling center of the cell?
8. Which organelles provide a cell with energy?
9. What are the functions of the nucleus?
10. What is plasma membrane?
11. Which organelles provide protein synthesis?
12. What are the key differences between prokaryotic and eukaryotic cells?
13. What are the parts of a typical prokaryotic cell?

Exercise 7. Match the terms to the definitions.

Cytoplasm	a) a membrane-bound organelle of eukaryotic cells that is responsible for packaging proteins and lipids into vesicles for delivery to targeted destinations.
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Cytoskeleton	b) a cell organelle containing enzymes that digest particles and that disintegrate the cell after its death.
Endoplasmic reticulum	c) a membrane-bound structure that contains a cell's hereditary information and controls its growth and reproduction.
Golgi apparatus	d) a biological structure that separates the interior of all cells from the outside environment (the extracellular space) which protects the cell from its environment.
Lysosome	e) a system of fibres that is present in the cytoplasm of eukaryotic cells to maintain the cell's shape.
Mitochondrion	f) a sphere-shaped structure within the cytoplasm of a cell that is composed of RNA and protein and is the site of protein synthesis.
Nucleus	g) all of the material within a cell, enclosed by the cell membrane, except for the cell nucleus.
Plasma membrane	h) the cell's hereditary material and contains instructions for development, growth and reproduction.
Ribosome	i) an organelle in the cytoplasm of cells that functions in energy production.
DNA	j) a network of tubes within a cell that transports substances inside the cell.

Exercise 8. Fill in the table by comparing eukaryotic and prokaryotic cells. Say about differences between the two using the table.

	Eukaryotic cell	Prokaryotic cell
Size		
Nucleus	Present	
Cytoplasm		
Cell type	Usually multicellular	
Lysosomes and peroxisomes		Absent
Endoplasmic reticulum		Absent
Mitochondria		Absent
DNA location		

Exercise 11. Find in the text synonyms to the words and word-combinations below.

Cell membrane, Golgi apparatus, external membrane, unicellular, nuclear membrane, intracellular fluid, to grow up, liquid, penetrable, self-reproducing.

Exercise 9. Put questions to the underlined words. Translate.

- 1) The Golgi apparatus or Golgi complex was named after Camillo Golgi, an Italian biologist.
- 2) Eukaryotic cells have a nucleus and membrane bound organelles.
- 3) If you have a microscope of a higher magnification, you can see a smaller spherical body found in the nucleus called the nucleolus.
- 4) Cells were discovered by Robert Hooke in 1665.
- 5) The DNA of a prokaryotic cell consists of a single circular chromosome.
- 6) The eukaryotic DNA is organized in one or more linear molecules, called chromosomes.
- 7) Motile eukaryotes can move using motile cilia or flagella.
- 8) In 1855, Rudolf Virchow stated that new cells come from pre-existing cells by cell division.

Exercise 10. Open the brackets using the verbs in the appropriate form. Translate the sentences into Ukrainian.

- 1) In 1632–1723, Antonie van Leeuwenhoek (to teach) himself to make lenses, (to construct) basic optical microscopes and (to isolate) protozoa from rain water, and bacteria from his own mouth.
- 2) The study of cells (to call) cell biology, cellular biology, or cytology.
- 3) The cell theory (to develop) in 1839 by microbiologists Schleiden and Schwann.
- 4) The activity of an organism (to depend) on the total activity of independent cells.
- 5) The Golgi body (to find) near the nucleus and endoplasmic reticulum.
- 6) Over the past 30 years, numerous studies (to conduct) to explain processes such as membrane traffic and organelle biogenesis.
- 7) Organelle biogenesis (to be) the process by which new organelles (to make).
- 8) The belief that life forms (can, to occur) spontaneously (to contradict) by Louis Pasteur.

Exercise 11. Rewrite the sentences in Active Voice.

- 1) Archaea were first classified separately from bacteria in 1977 by Carl Woese and George E. Fox.
- 2) The cytoplasm is composed of water, salts, and proteins.
- 3) The cell was first discovered by Robert Hooke in 1665 using a microscope.
- 4) The DNA in eukaryotes is protected by a membrane called the nuclear envelope.
- 5) The term *eukaryote* was coined by the French biologist Edouard Chatton in 1925.
- 6) Nutrients are chemical compounds in food that are used by the body to function properly and maintain health.
- 7) More accurate concepts have been proposed by scientists for the last decades.
- 8) Flagella are used by cells for locomotion.

Exercise 12. Fill in the gaps with the appropriate preposition.

- 1) All living organisms can be sorted ... one of two groups depending ... the fundamental structure of their cells: the prokaryotes and the eukaryotes.
- 2) One of the main differences ... prokaryotic and eukaryotic cells is the nucleus.
- 3) Prokaryotes also differ ... eukaryotes in that they contain only a single loop ... stable chromosomal DNA stored ... an area named the nucleoid,
- 4) Eukaryotic cells have a true nucleus, which means the cell's DNA is surrounded ... a membrane.
- 5) The nucleus is responsible ... storing chromatin (DNA plus proteins) ... a gel-like substance called the nucleoplasm.

- 6) Flagella are used ... locomotion, while most pili are used to exchange genetic material during a type ... reproduction called conjugation.
- 7) Organelle is a specialized structure found ... cells that carries ... a specific life process.
- 8) Lysosomes are organelles that contain enzymes capable ... breaking down all types ... biological polymers—proteins, nucleic acids, carbohydrates, and lipids.

TISSUES

Exercise 1. Topic Vocabulary:

nouns	verbs	adjectives/adverbs
cavity	aggregation	columnar
epithelium	allow	cuboidal
fiber	embed	fibrous
glia	exchange	loose
<u>lamina</u>	line	moisture
layer	lose	neural
loss	support	rigid
passageway		squamous
refinement		striated
stratum		urogenital
tissue		visceral

Exercise 2. Read correctly:

- **ous** [ɔs] – fibrous, nervous, numerous, venous, dangerous, infectious, continuous
- **ure** [tʃə] – moisture, moisturize, future, fracture, fractured, suture, lecture
- **o** [ʌ] – other, come, become, some, among, another, accompany, accomplish
- **tion** [ʃn] – aggregation, protection, secretion, absorption, connection, addition
- **um** [əm] – stratum, caecum, rectum, peritoneum, atrium, curriculum, palladium

Exercise 3. Read the following words and word-combinations:

Tissue: epithelial tissues, connective tissue, loose connective tissue, smooth tissue.

Cell: cells, cellular, unicellular, multicellular organisms, intercellular substances.

Protect: protection, health protection, protected, to protect from injury.

Lining: covering and lining epithelium, to line, lined, to line the internal organs.

Histology, histologist, histologic, histologic anatomy, to study histopathology.

Support: the support to the body, supportive personnel, supporting treatment.

Voluntary muscle, involuntary muscle, voluntary and involuntary movements

Exercise 4. Read the text:

Tissues

The term **tissue** is used to describe an aggregation of cells that are similar in structure and perform a specific function. **Histology** is the field of study that involves the microscopic examination of tissue appearance, organization, and function.

All tissues of the body develop from the three primary **germ** cell layers that form the embryo:

Mesoderm – develops into epithelial tissue, connective tissue and muscle tissue.

Ectoderm - develops into nervous tissue and epithelial tissue.

Endoderm – develops into epithelial tissue. Different kinds of tissue have different physical properties.

Tissues may be hard (bone), soft (muscle), or even liquid (blood).

Tissues are organized into four broad categories based on structural and functional similarities. These categories are epithelial, connective, muscle, and nervous. The primary tissue types work together to contribute to the overall health and maintenance of the human body.

Epithelial tissue provides a covering for deeper body layers and protects our body from moisture loss, bacteria, and internal injury. There are two kinds of epithelial tissues:

- **Covering and lining epithelium** covers or lines almost all of our internal and external organismal surfaces such as the skin, the airways, the lymph vessels and the digestive tract. It serves functions of protection, secretion, and absorption, and is separated from other tissues below by a basal lamina.
- **Glandular epithelium** secretes hormones or other products such as stomach acid, sweat, saliva, and milk.

Connective tissue generally provides structure and support to the body. There are two types of connective tissue:

- **Loose connective tissue** holds structures together. For example, loose connective tissue holds the outer layer of skin to the underlying muscle tissue. This tissue is also found in your fat layers, lymph nodes, and red bone marrow.
- **Fibrous connective tissue** also holds body parts together, but its structure is a bit more rigid than loose connective tissue. Fibrous connective tissue is found in ligaments, tendons, cartilages, and bones.

Nervous tissue forms the nervous system, which is responsible for coordinating the activities and movements of your body through its network of nerves. Parts of the nervous system include the brain, spinal cord, and nerves. **Nervous tissue** consists of two kinds of nerve cells **neurons** and **neuroglia, or glial** cells.

Muscle tissue contracts forcefully when excited, providing movement. There are three kinds of muscle tissues:

- **Skeletal (striated) muscle** tissue is attached to bones and move the skeleton (also called voluntary muscle)
- **Cardiac muscle** tissue makes up most of the heart wall allowing the heart to contract and pump blood throughout an organism (also involuntary muscle).
- **Smooth (visceral) muscle** tissue lines the walls of blood vessels and certain organs such as the digestive and urogenital tracts.

A **tissue membrane** is a thin layer of cells that covers the outside of the body (for example, skin), the organs (for example, pericardium), internal passageways that lead to the exterior of the body (for example, abdominal mesenteries), and the lining of the moveable joint cavities. There are two basic types of tissue membranes: connective tissue and epithelial membranes.

The **connective tissue membrane** is formed solely from connective tissue. These membranes encapsulate organs, such as the kidneys, and line our movable joints. A **synovial membrane** is a type of connective tissue membrane that lines the cavity of a freely movable joint. For example, synovial membranes surround the joints of the shoulder, elbow, and knee.

The **epithelial membrane** is composed of epithelium attached to a layer of connective tissue, for example, your skin. The **mucous membrane** is also a composite of connective and epithelial tissues. It lines the body cavities and hollow passageways that open to the external environment, and include the digestive, respiratory, excretory, and reproductive tracts.

A **serous membrane** is an epithelial membrane that lines those cavities that do not open to the outside, and they cover the organs located within those cavities. They are essentially membranous bags, with mesothelium lining the inside and connective tissue on the outside.

The skin is an epithelial membrane also called the **cutaneous membrane**. It is a stratified squamous epithelial membrane resting on top of connective tissue. The apical surface of this membrane is exposed to the external environment and is covered with dead, keratinized cells that help protect the body from desiccation and pathogens.

Fibroblasts in the inner layer of the synovial membrane release hyaluronan into the joint cavity. The hyaluronan effectively traps available water to form the synovial fluid, a natural lubricant that enables the bones of a joint to move freely against one another without much friction. This synovial fluid readily exchanges water and nutrients with blood, as do all body fluids.

Mucous, produced by the epithelial exocrine glands, covers the epithelial layer. The underlying connective tissue, called the **lamina propria** (literally “own layer”), help support the fragile epithelial layer.

Exercise 5. Answer the questions:

1. What is a tissue?
2. What are the main tissues in the human body?
3. What kind of tissues protects our body from moisture loss, bacteria, and internal injury?
4. What are the main functions of covering and lining epithelium?
5. Where can a loose connective tissue be found in our body?
6. What differs a muscle tissue from other tissue types?
7. What are the main three kinds of muscle tissues?
8. What is a tissue membrane?
9. What does connective tissue membrane encapsulate?
10. What does mucous membrane line?

11. What is a serous membrane?
12. How is cutaneous membrane also called?
13. What is the function of the hyaluronan?
14. What is histology?

Exercise 6. Match the terms with their definitions:

1. gland	a) the delicate web (network) of connective tissue that surrounds and supports nerve cells;
2. glia	b) an animal tissue consisting of one or more layers of closely packed cells covering the external and internal surfaces of the body;
3. layer	c) any thread-shaped structure, such as a nerve fibre;
4. hyaluronan	d) a cell or organ in man and other animals that synthesizes chemical substances and secretes them for the body to use or eliminate, either through a duct or directly into the bloodstream;
5. fiber	e) a thickness of some homogeneous substance, such as a stratum (слой, пласт) or a coating on a surface;
6. muscle	f) a cell specialized to conduct nerve impulses: consists of a cell body, axon, and dendrites;
7. fibroblast	g) a part of an organism consisting of a large number of cells having a similar structure and function;
8. neuron(e)	h) a tissue composed of bundles of elongated (продолговатый) cells capable of contraction and relaxation to produce movement in an organ or part;
9. epithelium	i) a cell in connective tissue which produces collagen and other fibers;
10. tissue	j) is a clear, gooey substance that is naturally produced by your body.

Exercise 7. Crossword:

1.				t						
2.				i						
		3.		s						
			4.	s						
	5.			u						

6.		e		
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1. One of the types of tissue, which can be simple, stratified, pseudostratified, and transitional.
2. Noncellular substance surrounding the cells of connective tissue.
3. Bone-forming cell.
4. One of the types of muscular tissue.
5. Cells in the nervous system other than neurons.
6. The fundamental unit of every living organism.

Exercise 8. Memorize the following terms:

Classification of Epithelium

Types of epithelium	Shape of cells
Simple (single layer of cells)	Squamous Cuboidal Columnar
Stratified (more than one layer of cells)	Squamous Cuboidal Columnar
Pseudostratified (modification of simple epithelium)	Columnar
Transitional (modification of stratified epithelium)	Roughly cuboidal or many surfaced

Exercise 9. Read additional information about tissue:

1. The major types of epithelia are simple and stratified squamous epithelia, simple and stratified cuboidal epithelia, simple, pseudostratified and stratified columnar epithelia, and transitional epithelium.
2. Simple epithelium generally is involved in diffusion, filtration, secretion, or absorption.
3. Squamous cells function in diffusion and filtration.
4. Cuboidal or columnar cells secrete or absorb.
5. Connective tissue cells are blast cells (form the matrix), cyte cells (maintain it), and clast cells (break it down for remodeling).
6. The cells' names end with suffixes according to the cells' functions as blasts, cytes, or clasts.
7. Fibroblasts are cells that form fibrous connective tissue, and chondrocytes are cells that maintain cartilage (chondromean cartilage).
8. Osteoblasts form bone (osteo- means bone), osteocytes maintain it, and osteoclasts break it down.

Exercise 10. Read the text and insert words from the brackets into the gaps.

*Tissue, skin, connective, muscle, walls, cells, impulses,
organ, epithelial, protection, smooth, internal.*

Many different tissues grouped together create an 1. _____, which has a specific job. An example of an organ would be the stomach. Epithelial 2. _____ covers the body surface and forms the lining for most internal cavities. The major function of 3. _____ tissue includes protection, secretion, absorption, and filtration. The 4. _____ is an organ made up of epithelial tissue which protects the body from dirt, dust, bacteria and other microbes that may be harmful. Connective tissues perform a variety of functions including support and 5. _____. Fat tissue, dense fibrous tissue, cartilage, bone, blood, and lymph are all considered 6. _____ tissue. There are three types of muscle tissue: skeletal, 7. _____ and cardiac. Skeletal 8. _____ is a voluntary type of muscle tissue that is used in the contraction of skeletal parts. Smooth muscle is found in the walls of 9. _____ organs and blood vessels. It is an involuntary type. The cardiac muscle is found only in the 10. _____ of the heart and is involuntary in nature. Nerve tissue is composed of specialized 11. _____ and conducts 12. _____ to and from all parts of the body. Nerve cells or neurons are long and string-like.

Exercise 11. Open the brackets using the verbs in an appropriate tense and voice and translate:

1. Histology (**to study**) the microscopic anatomy of cells and tissues of plants and animals.
2. The microscopic anatomy of cells and tissues of plants and animals (**to perform**) by examining a thin slice of tissue under a light microscope or electron microscope.
3. Recently the use of histological stains (**to enhance**) the ability to visualize and differentially identify the microscopic structures.
4. Histology is known (**to be**) an essential tool of biology and medicine.
5. In the 19th century, histology (**to be**) as an academic discipline in its own right.
6. The 1906 Nobel Prize in Physiology or Medicine (**to award**) to histologists Camillo Golgi and Santiago Ramon y Cajal.
7. Camillo Golgi and Santiago Ramon y Cajal (**to have**) dueling interpretations of the neural structure of the brain.
8. Cajal (**to win**) the prize for his correct theory and Golgi for the staining technique he invented to make it possible.

Exercise 12. Put questions to underlined words:

1. Histopathology refers to the microscopic examination of tissue in order to study the manifestations of disease.
2. Specifically, in clinical medicine, histopathology refers to the examination of a biopsy or surgical specimen by a pathologist.

3. In contrast, cytopathology examines free cells or tissue fragments.
4. Histopathology deals with the microscopic study of diseased tissue.
5. Accurate diagnosis of cancer and other diseases usually requires histopathological examination of samples.
6. Trained medical doctors perform histopathological examination and provide diagnostic information based on their observations.
7. The trained personnel who prepare histological specimens for examination are histotechnicians, histology technicians (HT), histology technologists (HTL), medical scientists, medical laboratory technicians, or biomedical scientists.
8. The field of study of technologists, medical laboratory technicians, or biomedical scientists is called histotechnology.

Exercise 13. Translate the sentences paying attention to Emphatic Constructions *It is (was, will be)...* *that (who, which)* and *It was not until ... (any date) that*:

In 1906 the Nobel Prize in Physiology was awarded to a great histologist Camillo Golgi.

*It was **the Nobel Prize in Physiology** that was awarded to a great histologist Camillo Golgi.*

1. It is histopathological examination of tissues that starts with surgery, biopsy, or autopsy.
2. It was the tissue that was removed from the body or plant, and then placed in a fixative which stabilized the tissues to prevent decay.
3. It will be formalin (10% formaldehyde in water) that will be the most common fixative.
4. It is under a microscope that the tissue is then prepared for viewing using either chemical fixation or frozen section.
5. It is a pathologist who examines the histological slides under a microscope by, a medically qualified specialist who has completed a recognised training program (5 - 5.5 years in the United Kingdom).
6. It is as a *pathology report* that describes the histological findings and the opinion of the pathologist, the medical diagnosis was formulated.
7. It is in the removal of cancer that the pathologist will indicate whether the surgical margin is cleared, or is involved.
8. It was not until 1839 that the German biologist T. Schwann substantiated (обґрунтував) the cell theory that became the methodological basis of histology.