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ТЕХНОЛОГИЧЕСКИЙ УНИВЕРСИТЕТ»

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7-07-0711-01 «Технология лекарственных препаратов»,
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Учебно-методическое пособие представляет собой комплекс текстов и упражнений по химико-технологической тематике из оригинальных англоязычных источников и имеет целью формирование и совершенствование у студентов специальностей 7-07-0711-01 «Технология лекарственных препаратов», 7-07-0711-02 «Промышленная биотехнология» навыков научно-технического перевода, а также усвоение определенного запаса специальных терминов и использование их в устной речи.

Издание предназначено как для аудиторных занятий, так и для организации самостоятельной работы студентов.

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ПРЕДИСЛОВИЕ

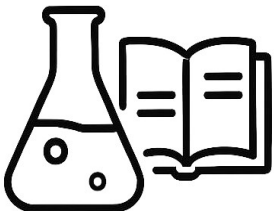
Учебно-методическое пособие представляет собой комплекс текстов и упражнений по фармакологии, технологии лекарственных препаратов и биотехнологии из оригинальных англоязычных источников.

Целью настоящего учебно-методического пособия является формирование и совершенствование у студентов умений работы с профессионально-ориентированной лексикой, навыков научно-технического перевода литературы и употребления специальных терминов в устной речи.

Пособие состоит из двух частей. Первая часть «Technology of Medicines» включает шесть разделов, в которых рассматривается история фармакологии, классификация лекарственных средств, использование в медицине лекарственных растений и фармакогнозия. Вторая часть «Biotechnology» содержит шесть разделов, посвященных биотехнологии, классификации микроорганизмов, изучению строения и химических свойств белков, жиров и углеводов.

Содержание текстового материала соответствует действующей программе по английскому языку для неязыковых учреждений высшего образования. Предтекстовые упражнения направлены на формирование потенциального словаря студентов. Материал подобран с учетом лексических трудностей, которые снимаются по мере прохождения темы, и на основании таких принципов, как информативность, предметная связность, доступность. Каждый раздел заканчивается блоком лексических заданий, направленных на закрепление полученных навыков работы с профессионально-ориентированным текстом по специальности, что способствует формированию профессиональной иноязычной компетенции.

Порядок подачи материала соответствует изучаемым темам по специальности. Повторяемость ключевых слов и выражений, наличие проблемных заданий призваны вырабатывать у студентов навыки монологической речи, а также обучать составлению аннотаций и рефератов.



Part I
TECHNOLOGY OF MEDICINES

Unit I
HISTORY OF PHARMACOLOGY

Exercise 1. Read and memorize the following words.

To treat – лечить, обращаться; disease – заболевание; medication – лекарственное средство, лечение; pharmaceuticals – лекарственные препараты; pharmacy – фармацевтика; prescription – рецепт, предписание, назначение врача; to counter – противостоять; Hippocratic oath – клятва Гиппократа; physician – врач, медик; quinine – хинин; to emerge – появляться, возникать; inflammation – воспаление, воспалительное заболевание; to apply – применять; observation – наблюдение; pain reliever – обезболивающее; significant – существенный, значительный; cornerstone – краеугольный камень, основа; treatise – трактат, научный труд; apothecary – аптекарь, фармацевт; emphasis – особое внимание; array – множество; to prevent – предотвращать, предупреждать; to dispense – распределять, дозировать; exhaustive – полный, всесторонний; regulation – нормативный документ.

Exercise 2. Match the words with their definitions.

1. Hippocratic oath	a) a substance used for medical treatment, especially a medicine or drug
2. Regulation	
3. Apothecary	b) to do something to improve the condition of an ill or injured person, or to try to cure a disease
4. Medication	
5. Array	c) to react to something with an opposing opinion or action, to defend yourself against something
6. Pain reliever	
7. Counter	d) a promise made by people when they become doctors to do everything possible to help their patients and to have high moral standards in their work
8. Inflammation	
9. To treat	
10. Cornerstone	e) a localized physical condition in which part of the body becomes reddened, swollen, hot, and often painful, especially as a reaction to injury or infection

f) something of great importance that everything else depends on
g) a person who in the past made and sold medicines
h) a large group of people or things that are related in some way
i) an official rule or the act of controlling something
j) a medication that alleviates pain

Exercise 3. Translate the words in italics from Russian into English.

Pharmacology is the study of drugs including their origins, history, uses, and *свойства*. It mainly focuses on the actions of *лекарство* on the body. A drug is a substance that is used to *лечить* or *противостоять* the *заболевание*. Pharmacology *появилась* as its own discipline in the 19th century. Pharmacy is the science and art concerned with the preparation and standardization of *лекарственные препараты*. The beginnings of *фармацевтика* are ancient. When the first person expressed juice from a succulent leaf to *применять* to a wound, this art was being practiced. Pharmacology and pharmacy may sound and look similar to each other, but pharmacologists are *врачи* and pharmacists are medical professionals and they have different roles. Pharmacologists study the effects that *лекарственные средства* have on the human body, and pharmacists fill the *предписания* that medical doctors write with no right to prescribe drugs.

Exercise 4. Choose the words with similar meaning from the two groups and arrange them in pairs.

A. To treat, disease, pharmaceuticals, physician, to emerge, significant, cornerstone, apothecary, array, regulation.

B. Considerable, to cure, ailment, to appear, foundation, pharmacist, multitude, doctor, instruction, medications.

Exercise 5. Read and translate the following text.

Pharmacology is the science of medical drugs and medications, including a substance's origin, composition, pharmacokinetics, therapeutic use, and toxicology. More specifically, it is the study of the interactions that occur between a living organism and chemicals that affect normal or abnormal biochemical function.

Using plants and plant substances to treat all kinds of diseases and medical conditions is believed to date back to prehistoric medicine. The Kahun Gynaecological Papyrus, the oldest known medical text of any kind, dates

to about 1800 BC and represents the first documented use of any kind of medication. It and other medical papyri describe Ancient Egyptian medical practices, such as using honey to treat infections.

Ancient Babylonian medicines demonstrate the use of prescriptions in the first half of the second millennium BC. Medicinal creams and pills were employed as treatments.

On the Indian subcontinent, the Atharvaveda, a sacred text of Hin-duism whose core dates from the 2nd millennium BC is the first Indic text dealing with medicine. It describes plant-based medications to counter diseases.

The use of plant-based medicines has a long history in Europe as well. The Greek physician Hippocrates, who lived in the 5th century BC, is often referred to as "the father of medicine" and is credited with introducing the concept of using plants for medicinal purposes. The Hippocratic Oath for physicians refers to the existence of "deadly drugs" and describes the ethics of medical practice and the moral code of doctors.

During the middle Ages, the use of plants and herbs for medicinal purposes became widespread, with the establishment of botanical gardens and the publication of numerous herbals. One of the key figures in the development of modern pharmacology was the Swiss physician Paracelsus, who lived in the 16th century. Paracelsus rejected many of the traditional beliefs about medicine and instead emphasized the importance of empirical observation and experimentation. He also introduced the idea of using specific chemical compounds for medicinal purposes, rather than relying on whole plants or other natural substances.

However, it was not until the 19th century that modern pharmacology began to emerge as a distinct discipline and chemists began to isolate and synthesize various compounds from natural sources, leading to the development of new drugs. The discovery of the first modern drug, morphine, in 1804, revolutionized the treatment of pain. Other significant developments during this period included the discovery of quinine, which was used to treat malaria, and the development of aspirin, which is still widely used today as a pain reliever.

The 20th century saw significant advancements in pharmacology, with the development of antibiotics, antiviral drugs, and other life-saving medications. The discovery of insulin in 1921 revolutionized the treatment of diabetes, while the development of penicillin in 1928 marked the beginning of the antibiotic era.

Today, pharmacology is a rapidly evolving field that continues to make significant contributions to medicine and healthcare.

Exercise 6. Answer the following questions.

1. What is pharmacology? 2. What manuscript represents the first documented use of any kind of medication? 3. Why is Greek physician Hippocrates often referred to as the "father of medicine"? 4. What does the Hippocratic Oath for physicians describe? 5. What is the merit of the Swiss physician Paracelsus in the development of modern pharmacology? 6. When did modern pharmacology begin to emerge as a distinct discipline? 7. What were the first modern drugs discovered in the 19th century? 8.What do we consider as significant advancements in 20th century pharmacology?

Exercise 7. Complete the sentences with the words below.

Pharmaceuticals, apothecaries, therapeutic, array, dispensing, significant, treatise, cornerstones

1. Pharmacology is one of the … of the drug discovery process. 2. Pharmacology deals with the … and other uses of the drug. 3. The first Western pharmacological … was made in the 1st century AD. 4. The medical discipline of pharmacology derives from the medieval … who both prepared and prescribed drugs. 5. Pharmacological research has developed a vast … of new drugs. 6. Pharmacology is a research-based science where new findings can have … impacts on our understanding of human health. 7. Pharmacy studies compounding and … all medicinal substances. 8. Pharmacy is the science which studies … used for treating and preventing different diseases.

Exercise 8. Match the sentence halves.

1. Using plants and plant substances to treat	a) the existence of "deadly drugs."
2. The Kahun Gynaecological Papyrus, the oldest known medical text, represents	b) beyond opium and quinine.
3. The earliest foundations of Ayurveda included ancient practices together with	c) all kinds of diseases dates back to prehistoric medicine.
4. The Hippocratic oath, written in the 5th century BC, refers to	d) corticosteroids for inflammation and typical antipsychotics for psychosis emerged.
5. The student of Ayurveda had to know ten arts that	e) the first documented use of any kind of medication.
6. Medieval medicine saw advances of surgery, but few truly effective drugs existed,	f) new nosologies from about 400 BC onwards.
7. During the First World War method of treating wounds with	g) penicillin and other antibiotics.

8. In the 1930s antibiotics emerged: first sulfa drugs, then	h) irrigation of germicide that helped to prevent gangrene was developed.
9. In the 1950s other drugs including	i) were indispensable in the preparation and application of his medicines.

Exercise 9. Read and translate the following text. Give it the most appropriate title.

Pharmacology has been defined as "an experimental science which has for its purpose the study of changes brought about in living organisms by chemically acting substances (with the exception of foods), whether used for therapeutic purposes or not."

Pharmacology is one of the cornerstones of the drug discovery process. The first Western pharmacological treatise, a listing of herbal plants used in classical medicine, was made in the 1st century AD by the Greek physician Dioscorides. The medical discipline of pharmacology derives from the medieval apothecaries, who both prepared and prescribed drugs. In the early 19th century a split developed between apothecaries who treated patients and those whose interest was primarily in the preparation of medicinal compounds; the latter formed the basis of the developing specialty of pharmacology.

A truly scientific pharmacology developed only after advances in chemistry and biology in the late 18th century enabled drugs to be standardized and purified. By the early 19th century, French and German chemists had isolated many active substances – morphine, strychnine, atropine, quinine, and many others from their crude plant sources. Pharmacology was firmly established in the late 19th century by the German Oswald Schmeiderberg (1838–1921). He defined its purpose, wrote a textbook of pharmacology, helped to found the first pharmacological journal, and, most importantly, headed a school at Strasbourg that became the nucleus from which independent departments of pharmacology were established in universities throughout the world.

In the 20th century, and particularly in the years since World War II, pharmacological research has developed a vast array of new drugs, including antibiotics, such as penicillin, and many hormonal drugs, such as insulin and cortisone. Pharmacology is presently involved in the development of more effective versions of these and a vast array of other drugs through chemical synthesis in the laboratory. Pharmacology also seeks more efficient and effective ways of administering drugs through clinical research on large numbers of patients.

During the early 20th century, pharmacologists became aware that a relation exists between the chemical structure of a compound and the effects it produces in the body. Since that time, increasing emphasis has been placed on this aspect of pharmacology. Because most medical compounds are organic chemicals, pharmacologists who engage in such studies must necessarily have an understanding of organic chemistry. The work of pharmacologists in industry deals also with the exhaustive tests that must be made before promising new drugs can be introduced into medical use.

Exercise 10. Say whether the following statements are true or false.

1. Pharmacology is the study of changes brought about in living organisms by chemically acting substances including foods. 2. The first Western pharmacological treatise was made in the 1st century AD by the Greek physician Hippocrates. 3. In the early 17th century a split developed between apothecaries who treated patients and those whose interest was primarily in the preparation of medicinal compounds. 4. A truly scientific pharmacology developed only after advances in chemistry and biology in the late 18th century. 5. Pharmacology was firmly established in the late 19th century by the German Oswald Schmeiderberg. 6. In the 20th century pharmacological research has developed a vast array of new drugs including antibiotics and many pain relievers. 7. Pharmacologists who engage in studies of medical compounds must necessarily have an understanding of organic chemistry.

Exercise 11. Match English expressions to their Russian equivalents.

1. Brought about in living organisms	a) приготовление лекарственных соединений
2. With the exception of foods	b) обязательно иметь представление об органической химии
3. Pharmacological treatise	c) искать более эффективные и действенные способы введения лекарств
4. Preparation of medicinal compounds	d) фармакологический трактат
5. Advances in chemistry and biology	e) осознать
6. A vast array of new drugs	f) все большее внимание уделяется
7. To seek more efficient and effective ways of administering drugs	g) возникший в живых организмах
8. To become aware	h) достижения в области химии и биологии
9. Increasing emphasis has been placed	i) широкий спектр новых лекарств
10. Necessarily to have an understanding of organic chemistry	j) за исключением продуктов питания

Exercise 12. Agree or refute the statements, arguing your point of view.

1. Originating in the 17th century, pharmacology makes drug development possible. 2. A truly scientific pharmacology developed only after advances in chemistry and astronomy. 3. The medicinal chemist may create the candidate compound, but the physician is the one who tests it for physiologic activity. 4. A promising compound is investigated by many scientists – toxicologists, microbiologists, clinicians. 5. Detailed observations of a drug's effects on all systems and organs of laboratory animals are necessary. 6. The pharmacologist himself tests the effects of drugs in patients. 7. The science that embraces knowledge of drugs with special reference to the mechanism of their action in the treatment of disease is pharmacy. 8. Pharmacy is the science and art concerned with the preparation and standardization of drugs. 9. Pharmacy studies recognizing, identifying, collecting, selecting, preparing, storing, testing, compounding and dispensing all medicinal substances. 10. Pharmacists are not responsible for the preparation of the dosage forms of drugs, such as tablets, capsules, and sterile solutions for injection.

Exercise 13. Translate from Russian into English.

1. Фармакология – наука и учебная дисциплина о лекарственных средствах, их свойствах и применении. 2. Фармакология отвечает за производство любых лекарств от обезболивающих до антибиотиков. 3. Фармаколог – это ученый-медик, который занимается исследованиями и проводит эксперименты по разработке новых лекарств. 4. Фармацевтика – это наука, изучающая лекарственные вещества, используемые для лечения и профилактики различных заболеваний. 5. Фармацевт – это лицензированный медицинский работник, который консультирует по поводу уже имеющихся лекарств, готовит и отпускает лекарственные препараты.

Unit II
PHARMACEUTICAL DRUGS

Exercise 1. Read and memorize the following words.

To cure – излечивать; to alleviate – смягчить, облегчить, ослаблять; administration – введение (вещества, лекарства); to deal with – заниматься (чем-л.); delivery – доставка; efficacy – эффективность препарата; bloodstream – кровоток; safety – безопасность; over-the-counter drug – безрецептурный препарат; drug screening – лекарственный скрининг; clinical trial – клиническое испытание; intervention – вмешательство; restriction – ограничение; accidentally – случайно; dietary supplement – пищевая добавка; interaction – взаимодействие; contraindication – противопоказание; essential – существенный, важный; to satisfy – удовлетворять; appropriate – соответствующий; to afford – позволить себе; available – имеющийся в распоряжении; to revolve around – быть так или иначе связанным с; side effect – побочный эффект; crude drug – лекарственное сырье.

Exercise 2. Match the words with their definitions.

1. To cure	a) the state of being protected from danger or harm
2. Administration	b) occurring unexpectedly or by chance, inadvertently
3. Safety	c) to relieve (a person or animal) of the symptoms of a disease or condition
4. Restriction	
5. Accidentally	d) a manufactured product intended to supplement a person's diet by taking a pill, capsule, tablet, powder, or liquid
6. Dietary supplement	
7. Essential	e) the way by which a drug, fluid, poison, or other substance is taken into the body
8. To satisfy	
9. Appropriate	f) the limitation or control of someone or something, or the state of being restricted
10. To afford	g) suitable or right for a particular situation or occasion
	h) to be able to buy or do something because you have enough money or time
	i) absolutely necessary; extremely important
	j) to meet the expectations, needs, or desires of (someone)

Exercise 3. Insert the necessary word.

Available, contraindications, over-the-counter drugs, dietary supplements, bloodstream, alleviate, efficacy, clinical trial

1. The doctor has prescribed some drugs to … the pain. 2. The efficacy of this drug was checked through … … . 3. … … are selected to ensure that their ingredients are safe and effective when used without a physician's care. 4. Traces of illegal drugs were found in his … . 5. Many adults and children in the United States take one or more vitamins or other … … . 6. There is no data on … for administration in children under 1 year of age. 7. This drug should be … in any pharmacy. 8. The … of the medical procedure has not been proven.

Exercise 4. Choose the words with similar meaning from the two groups and arrange them in pairs.

A. To alleviate, side-effects, accidentally, to satisfy, to afford, essential, efficacy, restriction, appropriate, intervention.

B. Suitable, limitation, to relieve, to allow, to gratify, effectiveness, vital, adverse reactions, invasion, inadvertently.

Exercise 5. Read and translate the following text.

A medication (also referred to as medicine, pharmaceutical drug, or simply drug) is a drug used to diagnose, cure, treat, or prevent disease.

Essential medicines as defined by the World Health Organization (WHO) are "those drugs that satisfy the health care needs of the majority of the population. They should therefore be available at all times in adequate amounts and in appropriate dosage forms, at a price the community can afford."

The pharmaceutical industry discovers, develops, produces, and markets pharmaceutical drugs for use as medications to be administered (or self-administered) to patients, with the aim to cure them, vaccinate them, or alleviate the symptoms. Pharmaceutical companies may deal with generic or brand medications and medical devices. They are subject to a variety of laws and regulations that govern the patenting, testing, safety, efficacy and marketing of drugs.

Pharmaceuticals, known as medicine or drug, are a principal component of traditional medicine and include a broad spectrum of medicines. They come from chemicals. In fact, they make up over 90% of the drugs on the market. Virtually every chemical and pharmaceutical company in

the world has a library of chemical compounds that have been synthesized over many decades. Historically, many diverse chemicals have been derived from natural products such as plants, animals, and microorganisms. Many more chemical compounds are available from university chemists. Additionally, automated, high-output, combinatorial chemistry methods have added hundreds of thousands of new compounds. Whether any of these millions of compounds have the characteristics that will allow them to become drugs remains to be discovered through rapid, high-efficiency drug screening. Drug screening is the process by which potential drugs are identified and optimized before selection of a candidate drug to progress to clinical trials. Clinical trials are experiments done in clinical research designed to answer specific questions about biomedical or behavioral interventions, including new treatments (such as novel vaccines, drugs, dietary supplements, and medical devices).

Another very important way to create new drugs is to produce them with the means of biotechnology. Unlike traditional pharmaceuticals, which are chemically synthesized, biopharmaceuticals are medicinal products derived from living organisms or cells. The key distinction between them and other drugs is that they are not extracted from a native source or synthesized with chemical reactions. Instead, they are created with the use of living organisms which may have been modified to produce the desired compound.

Testing new drugs revolves around the process of scientifically investigating a drug's safety, efficacy, side-effects, and optimal dosage through various phases of clinical trials before it can be approved for general public use. Behind the phrase "testing new drugs" lies a complex and systematic process that involves many stages, from initial laboratory experiments to actual human trials. Each of these stages is designed to answer specific questions about the new drug, such as how it interacts with the body, what's its optimal dosage, and how effective and safe it is.

Exercise 6. Answer the following questions.

1. What is a medication? 2. What are essential medicines as defined by the World Health Organization (WHO)? 3. What is pharmaceutical industry aimed at? 4. Where do pharmaceuticals come from? 5. What may be discovered through high-efficiency drug screening? 6. What is drug screening? 7. What are clinical trials? 8. What are biopharmaceuticals? 9. What is the difference between traditional pharmaceuticals and biopharmaceuticals? 10.What lies behind the phrase "testing new drugs"?

Exercise 7. Say whether the following statements are true or false.

1. A medication is a drug used to diagnose, cure, treat, or prevent disease. 2. Essential medicines are drugs that satisfy the health care needs of the majority of the population. 3. The pharmaceutical industry develops but doesn't market. 4. Pharmaceutical companies don't deal with generic medications and medical devices. 5. Pharmaceuticals come from chemicals and make up over 90% of the drugs on the market. 6. Only few chemicals have been derived from natural products such as plants, animals, and microorganisms. 7. Drug screening and clinical trials are the same processes aimed at identifying a drug candidate. 8. Biopharmaceuticals are medicinal products which are chemically synthesized. 9. Testing new drugs involves many stages, from initial laboratory experiments to actual human trials.

Exercise 8. Match the sentence halves.

1. The pharmaceutical industry discovers, develops, produces, and markets	a) entails genetic manipulation of cells for making their biotechnological products.
2. Pharmaceutical companies may deal with	b) a large molecule is typically injected.
3. Clinical trials are experiments done in clinical research designed to answer	c) treat or alleviate the symptoms of a disease or illness.
4. A medication is a drug used to	d) the health care needs of the majority of the population.
5. Essential medicines are those drugs that satisfy	e) they can be traditional drugs and biopharmaceuticals.
6. Medications can be classified in various ways, in origin	f) derived from living organisms or cells.
7. Traditional pharmaceutical drugs are relatively simple molecules that	g) generic or brand medications and medical devices.
8. Biopharmaceuticals are large biological molecules	h) diagnose, cure, treat, or prevent disease.

9. A patient typically is dosed with a small molecule via a tablet while	i) specific questions about biomedical or behavioral interventions.
10. Pharmaceutical biotech companies use recombinant DNA technology, which	j) pharmaceutical drugs for use as medications to be administered to patients.

Exercise 9. Give the Russian equivalents for the following word combinations.

Essential medicines, World Health Organization, adequate amounts, appropriate dosage forms, pharmaceutical industry, pharmaceutical drugs, generic or brand medications, medical devices, high-efficiency drug screening, selection of a candidate drug, to progress to clinical trials, unlike traditional pharmaceuticals, the key distinction of biopharmaceuticals, to produce the desired compound, various phases of clinical trials, to be approved for general public use, actual human trials.

Exercise 10. Insert the necessary word.

Availability, beneficial, over the counter, synthesis, treatment, therapeutics, occurring, drugs, pharmaceutical, properties, genetic, infect, action, intervention, substance

Drug, any chemical … that affects the functioning of living things and the organisms (such as bacteria, fungi, and viruses) that … them. Pharmacology, the science of … , deals with all aspects of drugs in medicine, including their mechanism of action, physical and chemical … , metabolism, therapeutics, and toxicity. This article focuses on the principles of drug action and includes an overview of the different types of drugs that are used in the … and prevention of human diseases.

Until the mid-19th century the approach to drug … was entirely empirical. This thinking changed when the mechanism of drug … began to be analyzed in physiological terms and when some of the first chemical analyses of naturally … drugs were performed. The end of the 19th century signaled the growth of the … industry and the production of the first synthetic drugs. Chemical … has become the most important source of therapeutic drugs. A number of therapeutic proteins, including certain antibodies, have been developed through … engineering.

Drugs produce harmful as well as … effects, and decisions about when and how to use them therapeutically always involve the balancing of benefits and risks. Drugs approved for human use are divided into those

available only with a prescription and those that can be bought freely … … … . The … of drugs for medical use is regulated by law.

Drug treatment is the most frequently used type of therapeutic … in medicine.

Exercise 11. Translate into English.

1. Лекарственное вещество – это отдельное химическое соединение или биологически активное вещество, которое при введении в организм способно предотвращать возникновение заболевания. 2. Лекарственный препарат – это лекарственное средство в виде определенной лекарственной формы (таблетки, драже, мазь и т. д.). 3. Лекарственное сырье – это материал бактериального, растительного, минерального, животного или синтетического происхождения, из которого изготовляют лекарственные препараты. 4. Биофармацевтические препараты – это терапевтические препараты на основе макромолекул, которые производятся или извлекаются из биологических источников.

Unit III
CLASSIFICATION OF MEDICATIONS

Exercise 1. Read and memorize the following words.

Enteral – пероральный, для приема внутрь; parenteral – вводимый в организм парентерально (подкожно, внутримышечно, внутривенно, внутриартериально); topical – для наружного применения; prescription only medicine – лекарственное средство, отпускаемое только по рецептам; complementary – дополнительный, вспомогательный; nasal mucosa – слизистая оболочка носа; cardiovascular – сердечнососудистый; sensation – чувство, ощущение; blood vessel – кровеносный сосуд; to inhibit – подавлять; blood clot – сгусток крови, тромб; digestive – пищеварительный; antidiarrhoeal – противодиарейный; laxative – слабительное; emetic – рвотный; substitution therapy – заместительная терапия; greasy – жирный, маслянистый; ointment – мазь, притирание; rash – сыпь, высыпание; diuretic – мочегонное средство; kidney – почка; excess – избыток, излишек; remedy – средство лечения; copious – обильный; vasoconstrictor – сосудосуживающее средство; runny nose – ринит, насморк; nasal congestion – заложенность носа; cough – кашель; emollient – смягчающее средство; dizziness – головокружение.

Exercise 2. Match the words with their definitions.

1. Sensation	a) blood that has been converted from a liquid to a solid state, also called a thrombus
2. Blood vessel	
3. Blood clot	b) treatment to replace deficient formation or loss of body products by administration of the natural body products or synthetic substitutes
4. Substitution therapy	
5. Ointment	c) a physical feeling or perception resulting from something that happens to or comes into contact with the body
6. Rash	
7. Kidney	d) a tubular structure carrying blood through the tissues and organs; a vein, artery, or capillary
8. Nasal congestion	
9. Complementary	e) a medicine or treatment for a disease or injury
10. Remedy	f) swelling (edema) of the mucous membrane lining the nose, usually as a result of inflammation from a common cold virus infection or from histamine released as an allergic response to tree or grass pollen grains

g) combining in such a way as to enhance or emphasize the qualities of each other or another
h) a visible lesion or group of lesions on the skin, caused by any of numerous factors including infectious agents, drugs, and allergies
i) either of the two bean-shaped organs in the lumbar region that filter the blood, excreting the end-products of body metabolism in the form of urine
j) a semisolid preparation for external application to the skin or mucous membranes

Exercise 3. Insert the necessary words.

To inhibit, diuretic, cardiovascular, antidiarrhoeal, digestive, ointment, nasal congestion, emetic

1. … disease (CVD) is a class of diseases that involve the heart or blood vessels. 2. When seasons change, a lot of people suffer from … … and other common allergy symptoms. 3. Drugs also are used to … enzymes needed for the survival of pathogens. 4. The … system is a group of organs working together to convert food into energy and basic nutrients to feed the entire body. 5. … drug is any drug that relieves symptoms of diarrhea. 6. An … is used medically when a substance has been ingested and must be expelled from the body immediately. 7. Do not apply cream or … to broken skin and always follow the instructions on the packet. 8. A … is any substance that promotes diuresis, the increased production of urine.

Exercise 4. Translate from Russian into English.

1. Потенциальные пути введения лекарств включают пероральный, парентеральный, назальный, местный и ингаляционный. 2. Пероральное введение, как правило, предпочтительнее, как наиболее удобное. 3. Назальное введение считается потенциально привлекательным, поскольку носовые полости имеют высокую плотность кровеносных сосудов. 4. Наружное применение (через кожу) уменьшает нагрузку на пищеварительный тракт и печень. 5. Подавляющее большинство биофармацевтических препаратов вводятся парентеральным путем. 6. Ингаляционная терапия уже давно доказала свою результативность как один из наиболее эффективных способов введения лекарственных средств при лечении заболеваний дыхательных путей.

Exercise 5. Read and translate the following text.

Medications can be classified in various ways, such as by chemical properties, mode or route of administration, biological system affected, or therapeutic effects.

Administration is the delivery of a pharmaceutical drug to a patient. There are basic categories of drug administration: enteral (through the mouth), parenteral (into the bloodstream), intranasal (absorbed through the thin mucous membrane inside of the nose), topical (applied to the skin directly), inhalation (inhaled and acts directly on the lungs) and some others.

Depending upon the jurisdiction, medications may be divided into over-the-counter drugs (OTC) which may be available without special restrictions, and prescription only medicine (POM), which must be prescribed by a physician. OTC medications are sold without restriction as they are considered safe enough that most people will not hurt themselves accidentally by taking it as instructed. These include aspirin and other pain relievers, laxatives, allergy, and cough and cold medicines.

Drugs which are prescription only are regulated because they can impose adverse effects and should not be used unless necessary. Reasons to not prescribe drugs such as interactions or side effects are called contraindications.

A third category, behind-the-counter medications (BTMs), is implemented in some jurisdictions. BTMs do not require a prescription, but must be kept in the dispensary, not visible to the public, and only be sold by a pharmacist or pharmacy technician.

There are also controlled drugs which are the most powerful category of drugs. These drugs have similar or more effects than prescription only medicines. They include hallucinogens, opioids, stimulants, depressants, and anabolic steroids.

These medicines also need a prescription from a dentist or doctor. In addition, they have some restrictions on how to store, dispense and administer them. You should remember that these drugs can become an addiction if you misuse them.

Herbs and supplements may include a wide variety of substances including vitamins, minerals, enzymes, and botanicals. Herbals and supplements are often considered complementary and alternative medications (CAM). Complementary and alternative medications (CAM) are types of therapies that are commonly used in conjunction with or as an alternate to traditional medical therapies. These herbal and supplement substances are not regulated, and most have not undergone rigorous scientific testing for safety for the public. While clients may be tempted to try these herbals and supplements,

there is no guarantee that they contain the ingredients listed on the label. It is also important to remember that there is a potential for adverse effects or even overdose if the herbal or supplement contains some of the same drug that was also prescribed to a patient.

Pharmaceutical drugs on the whole greatly improve patient outcomes and quality of life when used as prescribed.

Exercise 6. Answer the questions.

1. How can medications be classified? 2. What is drug administration? 3. What are basic categories of drug administration? Describe each of them. 4. How may medications be divided upon the jurisdiction? 5. Why are OTC medications sold without restriction? 6. What are examples of over-the-counter drugs? 7. What are the reasons not to prescribe drugs? 8. What are behind-the-counter medications? 9. Why do controlled drugs need a prescription from a dentist or doctor as POM do? 10. What are complementary and alternative medications (CAM)? 11. In what case do pharmaceutical drugs greatly improve patient outcomes?

Exercise 7. Say whether the following statements are true or false.

1. Medications can be classified only by chemical properties and mode or route of administration. 2. There are 5 basic categories of drug administration: enteral, parenteral, intranasal, topical and inhalation. 3. Depending upon the jurisdiction, medications may be divided into over-the-counter drugs (OTC), prescription only medicine (POM) and behind-the-counter medications (BTMs). 4. Drugs which are prescription only are regulated because they are very expensive. 5. BTMs implemented in some jurisdictions require a physician's prescription. 6. Controlled drugs include hallucinogens, opioids, stimulants, depressants, and anabolic steroids. 7. Controlled drugs have no restrictions on how to store, dispense and administer them. 8. Herbals and supplements are often considered complementary and alternative medications (CAM). 9. Complementary and alternative medications have undergone rigorous scientific testing for safety for the public. 10. Pharmaceutical drugs are not able to improve patient outcomes and quality of life even when used as prescribed.

Exercise 8. Read and translate the following text.

Drugs used in medicine are usually divided into classes or groups depending on their application, their chemical structure or mechanisms of action.

Antimicrobial medications can be used to prevent or treat diseases caused by bacteria, fungi, or parasites. Antimicrobial agents are often effective against a specific microorganism or group of closely related microorganisms, and they often do not affect host cells.

Several major groups of medications, such as anesthetics and psychiatric medications, affect the central nervous system. These agents are often administered to cause changes in physical sensation, behavior, or mental state.

Cardiovascular drugs affect the function of the heart and blood vessels. Medications can also affect the blood itself , for example, by activating or inhibiting enzymes involved in the formation of clots (blood clots) in blood vessels.

Medications can affect the digestive system. Some examples of major digestive drug groups include antidiarrhoeal drugs, laxatives, antiemetics, and emetics.

The therapeutic use of hormones concerns, first of all, substitution therapy for deficient conditions.

Local application of drugs provides a direct, localized effect on a specific area of the skin. When medications are applied topically to the skin, they can be dissolved in various products, ranging from simple solutions to greasy ointments.

Agents that prevent allergic reactions that occur when a substance called histamine is released in the body are called antihistamines. Antihistamines are taken orally or in the form of ointments or aerosols applied to the skin at the site of rashes.

Diuretics are medications that promote the formation of urine in the kidneys and remove it from the body and thereby liberate the body from excess fluid.

Although there are no remedies that can cure a cold, you can alleviate the patient's condition by taking antipyretics such as aspirin or ibuprofen (which are also the oldest pain relievers used to reduce pain, swelling and fever) in combination with copious drinking.

Vasoconstrictors (of local action) are medications that affect the nasal mucosa. They reduce the formation of mucus and thereby reduce runny nose and nasal congestion in common colds and allergies.

There are medications that reduce coughing which usually occurs with colds. A large number of over-the-counter cough remedies are available, including tablets and syrups that contain upper respiratory tract emollients as well as pleasant flavorings and small doses of antiseptics.

No drug is completely non-toxic or completely safe. Side effects can range from minor reactions, such as dizziness or skin reactions, to serious and even fatal consequences.

Exercise 9. Answer the following questions.

1. How are drugs used in medicine divided into classes or groups? 2. What medications can be used to prevent or treat diseases caused by bacteria? 3. What agents are often administered to cause changes in physical sensation, behavior, or mental state? 4. What drugs affect the function of the heart and blood vessels? 5. What do examples of major digestive drug groups include? 6. What does the therapeutic use of hormones concern? 7. What does local application of drugs provide? 8. When do allergic reactions occur and what agents can prevent them? 9. What are diuretics used for? 10. How can you alleviate the patient's condition if there is no remedies that can cure a cold? 11. What are medications that can reduce runny nose and nasal congestion? 12. Are there any over-the-counter cough remedies available?

Exercise 10. Match English expressions to their Russian equivalents.

1. Antimicrobial medications	a) на месте высыпаний
2. Closely related microorganisms	b) основные группы лекарственных средств для улучшения пищеварения
3. Changes in physical sensation, behavior, or mental state	c) путем активации или подавления ферментов
4. By activating or inhibiting enzymes	d) изменения в физических ощущениях, поведении или психическом состоянии
5. Major digestive drug groups	e) близкородственные микроорганизмы
6. Medications applied topically to the skin	f) для уменьшения боли, отека и лихорадки
7. At the site of rashes	g) антимикробные препараты
8. To liberate the body from excess fluid	h) уменьшить образование слизи
9. To reduce pain, swelling and fever	i) лекарственные препараты, применяемые местно на кожу
10. To reduce the formation of mucus	j) освободить организм от лишней жидкости
11. Upper respiratory tract emollients	k) незначительные реакции
12. Pleasant flavorings	l) абсолютно нетоксичен или абсолютно безопасен
13. Minor reactions	m) смягчающие средства для верхних дыхательных путей
14. Completely non-toxic or completely safe	n) приятные вкусовые добавки

Exercise 11. Translate from Russian into English.

1. Мази для местного применения могут оставлять жирные следы на одежде. 2. Употребление слишком большого количества воды может привести к избытку жидкости в вашем организме. 3. Я знаю хорошее средство лечения зубной боли. 4. Если у вас лихорадка, распространенный симптом гриппа, обильное питье восполняет жидкость, потерянную из-за повышенного потоотделения. 5. Кашель можно вылечить с помощью смягчающих травяных препаратов. 6. Слизистая оболочка носа выстилает носовую полость. 7. Головокружение – это общий термин, который описывает ощущения дисбаланса и неустойчивости.

Exercise 12. Guess what type of drugs it is. Match the words with their definitions.

1. Tablet	a) the medicine's active ingredient is combined with another chemical substance to make it simpler to use on the skin
2. Liquid (syrup, mixture or solution)	b) the active chemical component works best if it directly reaches the affected area to treat ear, nose or eye issues
3. Capsule	c) the active part of the drug is discharged by air pressure directly into the lungs
4. Topical medicines (lotions, creams or ointments)	d) the chemical ingredients are blended with another substance and pressed into an oval solid or round shape
5. Drops	e) the chemical part of the medicine is mixed with a liquid to make it better absorbed or easier to take
6. Injection	f) a type of drug delivery systems used to introduce the doses into the bloodstream through the skin in a controlled manner
7. Inhaler	g) a plastic shell which contains the chemical part of the medicine inside that dissolves slowly in the stomach
8. Transdermal patches	h) a shot, or a dose of medicine given by way of a syringe and a needle

Exercise 13. Insert the necessary word.

Antihypertensives, therapeutic, essential, side effects, relief, guidelines, medical conditions

1. Medicines can be classified into various categories based on their … effects and mode of action. 2. Common types of medicine include analgesics, antacids, antianxiety drugs, antibiotics, antidepressants, antihistamines, … , and antipyretics. 3. Each type of medicine serves a specific purpose, whether it's pain … , reducing fever, suppressing anxiety, fighting infections, or counteracting allergic reactions. 4. Consulting healthcare professionals and following proper … are essential for the safe and effective use of medications. 5. With the right medication options, we can address various … … and improve our overall health and well-being. 6. Besides, you should remember that each category of medication has … … so you need to be careful. 7. It is … to think about these risks before you take medicine.

Unit IV
HERBALISM: HISTORY AND BIOLOGICAL BACKGROUND

Exercise 1. Read and memorize the following words.

Herbal medicine, herbalism – фитотерапия, траволечение; conventional – обычный, стандартный, традиционный; Sumerians – шумеры (древнее население Южной Месопотамии); well-established – общепризнанный, испытанный; laurel – лавр; caraway – тмин; thyme – тимьян, чабрец; garlic – чеснок; mint – мята; turmeric – куркума; ephedra – хвойник, эфедра; disorder – расстройство, нарушение, заболевание; wandering – странствующий, скитающийся; settled – оседлый; folk medicine – народная медицина; spell – заклинание, заклятие; enchantment – колдовство, магия, волшебство; nun – монахиня; advanced – передовой, прогрессивный, современный; healing properties – лечебные свойства, целительные свойства; nutmeg – мускатный орех; rhubarb – ревень; cinnamon – корица; preeminent – главенствующий, превосходящий; arsenic – мышьяк; copper sulfate – медный купорос; mercury – ртуть; sulfur (sulphur) – сера.

Exercise 2. Match the words with their definitions.

1. Turmeric	a) the people of southern Mesopotamia who developed a civilization that lasted for centuries, and its culture and legacy is known as the earliest on Earth
2. Advanced	b) a round white vegetable with small sections called cloves which you add to food for a strong savoury flavour
3. Sumerians	c) a yellow powder used when cooking for adding flavour and colour to food, especially curry
4. Arsenic	d) an illness or medical condition
5. Rhubarb	e) words or actions that are intended to make magic things happen
6. Garlic	f) based on the most recent methods or ideas
7. Disorder	g) a woman who belongs to a religious community of women and who lives in a convent
8. Preeminent	h) a plant that has long, sour-tasting red and green stems that can be cooked and eaten as a fruit
9. Enchantment	i) more important or powerful than all others
10. Nun	j) a chemical element that is a brittle grey semimetal used in industry and as a poison for killing pests and weeds

Exercise 3. Insert the necessary word.

Well-established, conventional, folk medicine, mercury, cinnamon, arsenic, caraway, healing properties, settled

1. Today, many patients seek healing through both alternative and … medicine. 2. The pungent seeds of the … are used in seasoning and medicine. 3. If you have a … way of life, you stay permanently in one place. 4. … … is practiced nonprofessionally especially by people isolated from modern medical services and usually involving the use of plant-derived remedies. 5. It is important to study composition of the medication, its origin, efficacy and … … . 6. The bark of a tropical tree is used to produce brown powder called … to give a particular taste to sweet food. 7. The toxic effects of … , … and lead can be very harmful for human health. 8. … use of a medicinal product means that the active substance has already been in medical use for at least 10 years.

Exercise 4. Complete the sentences with the correct preposition (from, of, within, to, in, with, by, for) where necessary.

1. The practice of herbalism refers … folk and traditional medicinal practices based on the use of plants and plant extracts. 2. Wandering herbalists explored the lands … search … plants, fungus, insects as well as minerals and certain animal parts for healing. 3. A laurel is a type of tree … dark, glossy green leaves. 4. For folk healers herbal recipes were accompanied … incantations and spells as well as rituals. 5. Nutmeg is the seed, or the ground spice derived … that seed, of several tree species. 6. Medications containing ephedrine and the ephedra plant are still available … purchase. 7. Copper sulfate is used in medicines as an additive that prevents microbial growth and acidity … the medicine. 8. Thyme contains chemicals that might help … bacterial and fungal infections.

Exercise 5. Read and translate the following text.

Herbal medicine also called botanical medicine or phytomedicine refers to using a plant's seeds, berries, roots, leaves, bark, or flowers for medicinal purposes. Herbalism has a long tradition of use outside of conventional medicine.

In the written record, the study of herbs dates back over 5,000 years to the Sumerians, who described well-established medicinal uses for such plants as laurel, caraway, and thyme. Ancient Egyptians of 1000 BC are known to have used garlic, opium, castor oil, coriander, mint, indigo, and

other herbs for medicine. Indian Ayurveda medicine used herbs such as turmeric possibly as early as 1900 BC. The first Chinese herbal book, dating back to 2700 BC, lists 365 medicinal plants and their uses including ephedra (Ma-Huang), the shrub that introduced the drug ephedrine to modern medicine.

The uses of plants for medicine and other purposes changed little in early medieval Europe. Many Greek and Roman writings on medicine were preserved by hand copying of manuscripts in monasteries. The monasteries thus tended to become local centers of medical knowledge, and their herb gardens provided the raw materials for simple treatment of common disorders. At the same time, folk medicine supported numerous wandering and settled herbalists. Among these were the "wise-women," who prescribed herbal remedies often along with spells and enchantments. One of the most famous women in the herbal tradition was Hildegard of Bingen. A twelfth century Benedictine nun, she wrote a medical text called Causes and Cures. She described extensively the cause and symptoms of a variety of health conditions and provided guidance for treating the pathologies with natural remedies.

Medical schools appeared from the 9th century in the medieval Islamic world, were more advanced than in medieval Europe at the time. Avicenna's Canon of Medicine (1025) lists 800 tested drugs, plants and minerals. Book Two is devoted to a discussion of the healing properties of herbs, including nutmeg, senna, sandalwood, rhubarb, myrrh, cinnamon, and rosewater. The Canon introduced clinical trials and efficacy tests.

The fifteenth, sixteenth, and seventeenth centuries were the great age of herbalism. The continuing importance of herbs for the centuries following the Middle Ages is indicated by the hundreds of pharmacopoeias published after the invention of printing in the fifteenth century.

The second millennium, however, saw the beginning of a slow erosion of the preeminent position held by plants as sources of therapeutic effects. This began with the advent of the physician, the introduction of active chemical drugs (like arsenic, copper sulfate, iron, mercury, and sulfur), followed by the rapid development of chemistry and the other natural sciences, led to the dominance of chemical medicine.

Exercise 6. Answer the questions.

1. What does herbal medicine refer to? 2. What period of time does the study of herbs date back to in the written record? 3. What plants and their derivatives did ancient Egyptians use for medicine? 4. Indian Ayurveda medicine didn't use any plants, did it? 5. What shrub introduced the drug

ephedrine to modern medicine? 6. Why did monasteries tend to become local centers of medical knowledge in early medieval Europe? 7. Who was Hildegard of Bingen? 8. Who else introduced folk medicine to medieval Europe? 9. What is the importance of Avicenna's Canon of Medicine? 10. What was the great age of herbalism? 11. Why did plants lose the preeminent position as sources of therapeutic effects in the second millennium?

Exercise 7. Translate from Russian into English.

1. Фитотерапия относится к лечению травами и зародилась более 5000 лет назад у шумеров. 2. Известно, что в древнеегипетской, индийской, китайской медицине использовались чеснок, тмин, лавр, тимьян, куркума, эфедра. 3. В «Каноне врачебной науки» Авиценны перечислены 800 испытанных лекарств, растений и минералов, включая мускатный орех, ревень, корицу. 4. В Европе в раннем средневековье растения удерживали главенствующее положение благодаря своим целебным свойствам. 5. Множество странствующих и оседлых травников пропагандировали народную медицину. 6. Заклинания и чары считались хорошо зарекомендовавшим себя средством от некоторых расстройств. 7. Во втором тысячелетии появились активные химические препараты, содержащие мышьяк, сульфат меди, ртуть и серу.

Exercise 8. Match the sentence halves.

1. Did you know that about 25 percent of the drugs	a) from opium extracted from the seed pods of the poppy flower.
2. Of the 252 drugs in the World Health Organization's essential medicine list,	b) looking for promising medicinal herbs.
3. In fact, about 200 years ago the first pharmacological compound, morphine, was produced	c) prescribed worldwide are derived from plants?
4. Millions of dollars have recently been invested in	d) 11 percent are exclusively of plant origin.
5. Researchers are beginning to steer away from conventional drug development and	e) that there should be an emphasis on health rather than on disease.
6. Today, plants are being used to treat a number of health concerns and conditions, including	f) treatment than conventional medications.

7. Herbs are less expensive and they're a safer means of	g) allergies, arthritis, migraines, fatigue, skin infections, wounds, burns, gastrointestinal issues and even cancer.
8. Well-known systems of herbal medicine like Traditional Chinese Medicine and Ayurvedic Medicine believe	h) look toward more alternative and natural forms of treatment.
9. Although botanical medicine has been practiced for thousands of years, it continues	i) on herbal medicines for some part of their primary health care.
10. The World Health Organization recently estimated that 80 percent of people worldwide rely	j) to be of use in the modern, Western world.

Exercise 9. Read and translate the following text.

All plants produce chemical compounds as part of their normal metabolic activities. The compounds include primary metabolites, such as sugars and fats, found in all plants, and secondary metabolites found in a smaller range of plants. Some useful ones are found only in a particular genus or species. The useful phytochemicals of pharmaceutical interest include phenolics and polyphenols, flavonoids and flavones, tannins, alkaloids, coumarins, quinones, terpenoids.

Phenolics possess an aromatic ring bearing one or more hydroxyl groups. Phenolics are widespread groups of substances in flowering plants, occurring in all vegetative organs, as well as in flowers and fruits, vegetables, cereals, grains, seeds. Aside with being responsible for the colour (such as yellow, orange, red, and blue pigments), taste and flavour (such as vanillin) of foods one of the major polyphenol characteristics involves antioxidant properties and the ability to interact with proteins.

Flavonoids are the most abundant polyphenols in human diets, accounting for over half of the eight thousand naturally occurring phenolic compounds found mainly in blackberries, black currant, blueberries, grape, strawberries, cherries, plums, cranberry, pomegranate, and raspberry. Flavonoids are considered as therapeutic agents in studies focused on degenerative diseases and brain aging processes, and serve as possible neuroprotective agents in progressive neurodegenerative disorders such as Parkinson's and Alzheimer's diseases.

Tannins, the relatively high molecular weight compounds found in complexes with alkaloids, polysaccharides and proteins, are a group of

water-soluble polyphenols. Tannins have been reported to accelerate blood clotting, reduce blood pressure, and modulate immune responses.

Phenolic acids, tannins, and flavonoids have anticarcinogenic and antimutagenic effects since they act as protective agents of DNA against free radicals.

Alkaloids are a class of basic, naturally occurring organic compounds that contain at least one nitrogen atom. Alkaloids have a wide range of pharmacological activities including antimalarial (e.g. quinine), antiasthma (e.g. ephedrine), analgesic (e.g. morphine), anticancer and antibacterial.

Coumarins are a class of secondary metabolites and naturally occurring benzopyrone derivatives. Several efforts have been made mainly in developing coumarin-based anticoagulant, antioxidant, antimicrobial (anti-viral, antifungal, and anti-parasitic), anticancer, anti-diabetic, analgesic, anti-neurodegenerative, and anti-inflammatory agents.

Quinones are oxidized derivatives of aromatic compounds. Several quinones are of pharmacological interest. These applications include antimicrobial and antiparasitic, anti-tumor and anti-cardiovascular agents.

Terpenes are simple hydrocarbons, while terpenoids are modified class of terpenes with different functional groups and oxidized methyl group. Terpenoids are volatile substances which give plants and flowers their fragrance. They occur widely in the leaves and fruits of higher plants, conifers, citrus and eucalyptus. Currently, terpenoids are being investigated as anticancer agents in clinical studies.

Exercise 10. Answer the questions.

1. What are two types of metabolites that plants produce? Which of them are of pharmaceutical interest? 2. What are phenolics and polyphenols being responsible for? 3. What are the most abundant polyphenols in human diets? 4. What diseases are flavonoids considered as therapeutic agents for? 5. What phytochemicals account a group of water-soluble polyphenols? 6. What phytochemicals possess anticarcinogenic and antimutagenic effects? 7. What phytochemicals contain at least one nitrogen atom? 8. What pharmacological activities do coumarins have? 9. What are quinones? What are their applications in medicine? 10. What is the difference betweeen terpenes and terpenoids?

Exercise 11. Say whether the following statements are true or false.

1. Phytochemicals are chemical compounds all plants produce as part of their normal metabolic activities. 2. Secondary metabolites are found in all plants. 3. Phenolics are widespread groups of substances occurring only

in flowers. 4. One of the major polyphenol characteristics involves antioxidant properties and the ability to interact with proteins. 5. Flavonoids are quite rare polyphenols in human diets. 6. Tannins are a group of water-soluble polyphenols. 7. Alkaloids are a class of basic, naturally occurring organic compounds that contain at least one hydrogen atom. 8. Coumarins are a class of primary metabolites and naturally occurring benzopyrone derivatives. 9. Quinones are oxidized derivatives of aromatic compounds. 10. Currently, terpenoids are being investigated as anti-inflammatory agents in clinical studies.

Exercise 12. Put the words in the right order.

1. a variety / is / compound / a naturally / properties / occurring / with / of / pharmacological / Coumarin. 2. is / field / well / the antioxidant / the medical / In / effect / of tannins / known. 3. are / for / their / known / and / anti-inflammatory / Flavonoids / health / antioxidant / benefits. 4. activity / are / antioxidant / natural / Phenolics / compounds / with / and / antimicrobial. 5. have / in / use / been / since / ages / for / various / ancient / medicinal / Alkaloids / purposes. 6. quinones / a major / Several / class / of anticancer / form / cytotoxins. 7. used / products / are / as / Terpenes / fragrances / and / widely / flavors / in consumer.

Unit V
HERBAL PREPARATIONS

Exercise 1. Read and memorize the following words.

Purified – очищенный; chopped – рубленый, измельченный; powdered – истолченный; to swallow – глотать; to brew – заваривать; echinacea (coneflower) – эхинацея; ginger – имбирь; marigold – календула; sage – шалфей; St. John's wort – зверобой; entire – весь, целый; tincture – настойка; salve – целебная мазь, бальзам; lotion – лосьон; to enhance – усилить, улучшить, увеличить; acute – острый, резкий; ailment – недуг; tisane – травяной чай; infusion – настой; decoction – отвар; maceration – вымачивание, мацерация; poultice – горячий компресс, припарка; chapped – потрескавшийся, обветренный; to soothe – успокоить, смягчить; sore throat – боль в горле; to gargle – полоскать (горло); to self-medicate – заниматься самолечением; long-term use – длительное применение; relevant – относящийся к делу, актуальный.

Exercise 2. Match the words with their definitions.

1. Tincture	a) to prepare (a drink or other liquid) by infusion in hot water
2. To self-medicate	b) a thickened pungent aromatic rhizome that is used as a spice and sometimes medicinally
3. Poultice	c) a plant with yellow flowers, that can be used to treat depression
4. To brew	d) a liquid made by boiling something such a plant in water
5. To gargle	e) a medicine that consists of a mixture of alcohol and a small amount of a drug
6. Ginger	f) a piece of cloth covered with a thick, often warm substance, wrapped around an injury to reduce pain or swelling
7. Lotion	g) to move a liquid around in your throat without swallowing, especially to clean it or stop it feeling painful
8. Decoction	h) to take medicine or drugs to help you with a condition without asking a doctor
9. St. John's wort	i) correct or suitable for a particular purpose
10. Relevant	j) a liquid that is put on your skin in order to protect it, improve its condition, or make it smell pleasant

Exercise 3. Choose the words with similar meaning from the two groups and arrange them in pairs.

A. Purified, chopped, echinacea, to brew, to enhance, acute, ailment, relevant, powdered, tisane.

B. Minced, refined, to infuse, to intensify, disorder, corresponding, pulverized, herbal tea, coneflower, sudden.

Exercise 4. Insert the necessary word.

Influence, acute, efficacy, St. John's wort, herbal supplement, chopped, over-the-counter, phytomedicines, entire, regulations, treating, prescription, inflammation, purified, swallowed, clinical trials, ailments, enhances

Products made from plants that are used to treat diseases or to maintain health are called herbal products, or … . A product made from plants and used solely for internal use is called an … … .

Many prescription drugs and … medicines are also made from plant products, but these products contain only … ingredients. Herbal supplements may contain … plants or plant parts.

Herbal supplements come in all forms: dried, …, powdered, capsule, or liquid, and can be used in various ways, including: … as pills, powders, or tinctures, brewed as tea, applied to the skin as gels, lotions, or creams, added to bath water. They are not subject to the same testing, manufacturing, and labeling standards and … as drugs.

You can now see labels that explain how herbs can … different actions in the body. However, herbal supplement labels can't refer to … specific medical conditions. This is because herbal supplements are not subject to … … or to the same manufacturing standards as … or traditional over-the-counter drugs. For example, … is a popular herbal supplement thought to be useful for treating depression in some cases. A product label on St. John's wort might say "… mood."

Herbs are used for the treatment of chronic and … conditions and various …, including major health concerns like cardiovascular disease, prostate problems, depression, … and weakened immune system. Herbs are used around the world to treat conditions and diseases, and many studies prove their … .

Exercise 5. Read and translate the following text.

There are many forms in which herbs can be administered, the most common of which is a liquid consumed as a herbal tea or a (possibly diluted) plant extract though they are made in few different ways.

Herbal teas (less commonly called tisanes) are beverages made from the infusion or decoction of herbs, spices, or other plant material in hot water. Tisanes are often consumed for their physical or medicinal effects, especially for their stimulant, relaxant or sedative properties. While many tisanes are high in antioxidants and nutrients, some have long histories of medicinal use; others are typically consumed for simple enjoyment.

Most tisanes should be prepared as an infusion or a decoction. Infusions are how we make tea – pouring boiling water over plant matter, also called steeping. Decoction is the method of placing the plant material in boiling water, which releases more essential oils and flavour. Decoctions are often used for plant matter with tough surfaces. For this reason, leaf, flower, and seed tisanes are generally steeped (infusions), whereas bark, root, and berry tisanes are generally prepared as decoctions. An herbal syrup is prepared by combining a concentrated decoction with either honey or sugar, and sometimes alcohol. Mixing a decoction with honey or sugar helps to thicken and preserve the decoction. This increases the shelf life of the decoction and often creates a soothing application that benefits situations such as sore throat, cough, dry irritated tissues, and digestive issues.

Maceration is the old infusion of plants with high mucilage content, such as sage or thyme. To make macerates, plants are chopped and added to cold water. They are then left to stand for 7 to 12 hours (depending on herb used).

A tincture is typically an extract of plant or animal material dissolved in ethanol (ethyl alcohol). A completed tincture has an ethanol percentage of at least 25% (sometimes up to 90%). As an antimicrobial, alcohol also acts as a preservative. Due to the alcohol in tinctures, the herbal extracts are more quickly absorbed into the bloodstream, with the effects being noticeable within about an hour. Because they're fast-acting, tinctures are perfect for things like pain, tummy troubles, anxiety, and insomnia. A downside of using alcohol as a solvent is that ethanol has a tendency to denature some organic compounds, reducing or destroying their effectiveness. Alcohol can also have damaging effects on some aromatic compounds.

Herbal wine and elixirs are alcoholic extract of herbs, usually with an ethanol percentage of 12–38%. Herbal wine is a maceration of herbs in wine, while an elixir is a maceration of herbs in spirits.

Extracts include liquid extracts, dry extracts and nebulisates. Liquid extracts are herbal formulations that are similar in form to tinctures but differ primarily in concentration of both alcohol and herbs. They are liquids with a lower ethanol percentage and higher phytochemical content than tinctures. Extracts are usually prepared using non-alcoholic solvents such as vinegar, glycerin, or water. Occasionally, alcohol may be used. Dry extracts

are extracts of plant material which are evaporated into a dry mass. They can then be further refined to a capsule or tablet. A nebulisate is a dry extract created by freeze-drying. Dry extracts may be used for inhalations. Inhalation as in aromatherapy can be used as a mood changing treatment, to fight a sinus infection or cough, or to cleanse the skin on a deeper level (steam rather than direct inhalation here).

Exercise 6. Answer the following questions.

1. What is the most common form in which herbs can be administered? 2. What are herbal teas? 3. What are tisanes often consumed for? 4. What is the difference between infusions and decoctions? 5. How is an herbal syrup prepared? 6. How to make macerates? 7. What is a tincture? 8. Why are tinctures perfect for things like pain, tummy troubles, anxiety, and insomnia? 9. What is a downside of using alcohol as a solvent in tinctures? 10. Are there any herbal alcohol extracts other than tinctures? 11. Is there any difference between liquid extracts and tinctures? 12. What are dry extracts and how can they be used?

Exercise 7. Match English expressions to their Russian equivalents.

1. Beverages made from the infusion or decoction	a) стимулирующие, расслабляющие или седативные свойства
2. Stimulant, relaxant or sedative properties	b) напитки, приготовленные из настоя или отвара
3. To pour boiling water over plant matter	c) для более глубокого очищения кожи
4. Bark, root, and berry tisanes	d) боль, проблемы с животом, беспокойство и бессонница
5. To thicken and preserve the decoction	e) вымачивание трав в крепких спиртных напитках
6. Dry irritated tissues, and digestive issues	f) отвары из коры, корней и ягод
7. High mucilage content	g) высокое содержание слизи
8. Pain, tummy troubles, anxiety, and insomnia	h) сухие раздраженные ткани и проблемы с пищеварением
9. Maceration of herbs in spirits	i) для загустения и сохранения отвара
10. Created by freeze-drying	j) для борьбы с инфекцией придаточных пазух носа или кашлем
11. To fight a sinus infection or cough	k) созданный методом сублимационной сушки
12. To cleanse the skin on a deeper level	l) залить растительную массу кипятком

Exercise 8. Say whether the following statements are true or false.

1. There are only a few forms in which herbs can be administered. 2. Tisanes are typically consumed for simple enjoyment. 3. Most tisanes should be prepared as an infusion or a decoction. 4. An herbal syrup is prepared by combining a concentrated decoction with alcohol. 5. A tincture is typically an extract of plant or animal material dis-solved in ethanol. 6. A downside of using alcohol as a solvent is that ethanol has a tendency to denature some organic compounds. 7. Herbal wine is a maceration of herbs in vinegar. 8. Liquid extracts are herbal formulations that are similar in composition to tinctures. 9. Dry extracts are extracts of plant material which are evaporated into a dry mass. 10. Dry extracts may not be used for inhalations.

Exercise 9. Read and translate the following text.

Herbal remedies come in many forms and can be used both internally and externally. External application includes herbal salves, lotions, poultices, essential oils, herbal soaps, bath salts and some others.

Herbal lotions and salves are a refreshing and all-natural way for you to treat your skin. Lotions are a great option if you're looking to moisturize your skin, while salves can have some great medicinal uses. A salve is a topical preparation that is used to soothe, heal, or protect the skin. It is typically a semi-solid mixture of oils, waxes, and other ingredients that are designed to be applied directly to the skin. Salves are often used to treat minor skin irritations, such as cuts, scrapes, and burns. They can also be used to moisturize dry or chapped skin, or to provide a barrier against environmental irritants.

A poultice is nothing more than a direct way to apply herbs to the skin. For making a poultice, herbs are usually crushed into a pulp or made into a paste that is spread directly onto the surface of the skin and held in place with cheesecloth wrapped around the area. A very basic poultice can even be made with a whole leaf held in place with an adhesive bandage. By changing the temperature of the poultice, the healing actions can be altered. A warm or hot poultice will help to increase circulation to the area, and a cold poultice can help soothe inflammation.

Essential oils are the highly concentrated version of the natural oils in plants. Getting essential oils from plants is done with a process called distillation, most commonly distillation by steam or water, where many parts of the plants are being used, including the plant roots, leaves, stems, flowers, or bark. After distillation, the outcome is a highly concentrated portion of essential oil, which will have the characteristic fragrance and properties

of the plant from which it was extracted, and contain the true essence of the plant it came from.

Essential oils have been used throughout history in many cultures for their medicinal and therapeutic benefits. Folk medicine since ancient times has made use of essential oils in medicinal practices. The most common therapeutic application of essential oils is that of aromatherapy, where healing effects are achieved through the aromas of the essential oils. Many essential oils are believed to have an uplifting effect on the human's mind; and many essential oils also have antiseptic properties, which means they reduce the possibility of infection when applied to the human skin. Often made with herbal infused oil, a herbal soap is also used topically to disinfect or treat skin conditions.

Bath salts are one large group of herbal preparations that are used for taking a bath with an herbal infusion. Bathing helps relax tense muscles, opens pores, encourages digestion, softens the skin, and promotes restful sleep.

For centuries, cultures around the world have relied on the wisdom of plant-based remedies to address a wide range of health concerns. This eco-friendly approach not only reduces the environmental impact but also supports the preservation of traditional herbal knowledge and cultivation practices.

Exercise 10. Answer the questions.

1. How can herbal remedies be used? 2. What are herbal lotions and salves used for? Is there any difference between them? 3. How can you make a poultice? 4. What is a link between a process called distillation and essential oils? 5. What are the most common therapeutic application of essential oils? 6. Why is bathing with an herbal infusion beneficial for our health? 7. Do you consider plant-based remedies to be still relevant?

Exercise 11. Translate the words in italics from Russian into English.

Chamomile provides prevention and *лечение* of many diseases. In the treatment of *недуги* flowers are usually used – their composition is extremely rich in nutrients. They contain *эфирные масла*, carotene and vitamin C, glucose, tannins, acids.

Chamomile has antimicrobial effects and can *смягчить* headaches, reduces fermentation processes. It helps in the treatment of diseases of the gastrointestinal tract, liver and *почки*. Chamomile has proven itself in the treatment of *простуда* and a variety of allergies. Chamomile-based *препараты* have a disinfectant and analgesic effect. For example, in the treatment of angina, stomatitis, and other inflammatory diseases of the oral cavity, *полоскание* with chamomile helps a lot.

Despite the multiple beneficial properties possessed by chamomile, it, like other *средства лечения*, has contraindications to use. For example, a *противопоказание* may be an allergy to chamomile. In the manufacture of medicinal *отвары* using chamomile, you must be more careful with the dosage. *Избыточный* amounts of chamomile when consumed can cause headache and decrease in muscle tone.

Exercise 12. Match a type of medical preparation with its right definition.

1. Elixir	a) fresh herbs moistened or boiled briefly and applied externally, often wrapped in cheesecloth
2. Tisane	b) an alcoholic or aqueous alcoholic solution of an animal or vegetable drug or a chemical substance
3. Decoction	c) concentrated volatile aromatic oils distilled from herbs
4. Essential oils	d) herbal bark or root boiled in liquid, usually 10–50 minutes
5. Tincture	e) herbal flowers, stems, or leaves covered with lightly boiled water and allowed to steep for 5–10 minutes
6. Dry extract	f) a liquid typically boiled (or brought to another appropriate temperature) and poured over the herb to steep in the liquid for an appropriate period of time
7. Poultice	g) a maceration of herbs in spirits
8. Infusion	h) a concentrated plant or animal preparation obtained by evaporation into a dry mass
9. Bath salts	i) a mixture of herbal infused oils that are thickened with some sort of wax (most commonly beeswax) so that it will be in a solid form at room temperature
10. Syrup	j) a liquid that you put on your skin in order to protect it, improve its condition, or make it smell pleasant
11. Salve	k) herbal preparations that are used for taking a bath with an herbal infusion
12. Lotion	l) an herbal decoction that is sweetened with a large amount of honey or some other sugar

Unit VI
PHARMACOGNOSY

Exercise 1. Read and memorize the following words.

Fungus (pl. fungi) – гриб, плесень; merger – слияние, объединение; to acquire – получить, приобрести; excipient – наполнитель, вспомогательное вещество; to screen – сортировать, проводить отбор; biosimilar – биоаналог; identification – выявление; insect – насекомое; marine – морской, водный; crude drugs – лекарственное сырье; to encompass – охватывать, включать; for medicinal purposes – в лечебных, медицинских целях; to encourage – поощрять, стимулировать; mindful – заботливый, внимательный; conservation – сохранение; sufficient – достаточный, адекватный; extract – вытяжка, извлечение; purity – чистота, очищенность; accurate – верный, правильный; to estimate – оценивать, подсчитывать приблизительно; consideration – фактор, который необходимо принимать во внимание; to accept – принимать, усваивать.

Exercise 2. Match the words with their definitions.

1. Consideration	a) the act of recognizing and naming someone or something
2. To estimate	b) a type of very small animal with six legs, a body divided into three parts and usually two pairs of wing
3. Excipient	c) the protection of plants and animals, natural areas, and interesting and important structures and buildings, especially from the damaging effects of human activity
4. Purity	d) as much as is needed, enough for a particular purpose
5. Sufficient	e) a substance taken from a plant, flower, etc. and used especially in food or medicine
6. Extract	f) the fact of being clean or free from harmful substances
7. Identification	g) a particular subject or fact that needs to be thought about when judging something
8. To acquire	h) to get or obtain something
9. Insect	i) to guess or calculate the cost, size, value, etc. of something
10. Conservation	j) a pharmacologically inactive substance used as a carrier for the active ingredients of a medication

Exercise 3. Insert the necessary words.

Marine, encompasses, for medicinal purposes, insects, biosimilars, extracts, screen, treatment, identification, self-medicate

Pharmacognosy is used by pharmaceutical companies to … , characterize and produce new drugs for the … of human disease. Often, naturally occurring drugs cannot be mass produced, so they must be studied in order to develop synthetic … .

Pharmacognosy … a broad spectrum of biological subjects: medical ethnobotany, the study of the traditional use of plants … … … ; phytotherapy (the medicinal use of plant …); phytochemistry, the study of chemicals derived from plants (including the … of new drug candidates derived from plant sources); zoopharmacognosy, the process by which animals … , by selecting and using plants, soils, and … to treat and prevent disease; … pharmacognosy, the study of chemicals derived from sea organisms.

Exercise 4. Match the sentence halves.

1. Pharmacognosy is still a relevant science for	a) people outside of medical or pharmaceutical organizations.
2. Researchers are encouraged to be mindful of the ethical issues	b) identified and any drugs derived from them are of sufficient purity.
3. Consideration has to be given to conservation of different plants to make sure that	c) always be accurate or safe.
4. High standards of quality control ensure plants used for medicinal purposes are correctly	d) with using natural products as medicines.
5. It is suggested that periods of review are put in place to properly	e) identify risks of long-term use of natural medicines and assess their toxicity.
6. Medicines derived from natural sources are also often prescribed or administered by	f) the discovery of future medicines.
7. It means that advice given by them may not	g) specific plants and organisms are not put at risk.

Exercise 5. Read and translate the following text.

Pharmacognosy is the study of crude drugs obtained from medicinal plants, animals, fungi, and other natural sources. The American Society of Pharmacognosy defines pharmacognosy as "the study of the physical, chemical, biochemical, and biological properties of drugs, drug substances, or potential drugs or drug substances of natural origin as well as the search for new drugs from natural sources."

The term "pharmacognosy" was derived by the merger of two Greek words (e.g., pharmakon – drug and gnosis – knowledge of) to mean the knowledge of drugs. It was introduced and used for the first time by J. A. Schmidt, the Australian physician, (1811) and C. A. Seydler, the German botanist, (1815), respectively, to define the branch of medicine and science which deals with crude drugs. Thus pharmacognosy may be defined as the objective study of crude drugs and related substances of natural origin to acquire knowledge about their nature and properties. It may also be defined as an applied science which is concerned with acquiring knowledge of all aspects of crude drugs and other natural substances of pharmaceutical importance by the application of various scientific disciplines.

Studies of physical, chemical, biochemical, and biological properties of drugs, drug substances, or potential drugs or drug substances of natural origin as well as the search for new drugs from natural sources are now included in pharmacognosy. Pharmacognosy was developed as a descriptive botanical subject in early days (nineteenth and during the last half of the twentieth century), and currently, pharmacognosy has been playing a significant role in the discovery, characterization, production, and standardization of natural drugs. Therefore, the scope of pharmacognosy is broad and includes the scientific study of crude drugs, medicinal products (e.g., enzymes, vitamins, antibiotics, pesticides, allergens), and excipients (e.g., colouring, flavouring, sweeteners, binders, adhesives, solidifiers) and also the research problems in different areas of biological and chemical sciences.

Pharmacognosy is interdisciplinary, drawing on a broad spectrum of biological and socio-scientific subjects. The contemporary study of pharmacognosy can be divided into the fields of medical ethnobotany (the study of the traditional use of plants for medicinal purposes); ethnopharmacology (the study of the pharmacological qualities of traditional medicinal substances); phytotherapy (the study of the medicinal use of plant extracts); phytochemistry (the study of chemicals derived from plants including the identification of new drug candidates derived from plant sources). It also includes zoopharmacognosy, the process by which animals self-medicate,

by selecting and using plants, soils, and insects to treat and prevent disease and marine pharmacognosy, the study of chemicals derived from marine organisms. Pharmacognosy and biotechnology cooperation implies the synthesis of natural bioactive molecules. Herbal interactions, the interactions of herbs with other drugs and body are the areas of interest of pharmacognosists.

Pharmacognosy deals with the collection, identification, preparation, and extraction of a large group of drugs obtained from natural sources and forms an important part of pharmaceutical research and development, particularly in the development of synthetic biosimilar drugs.

Exercise 6. Answer the questions.

1. What is pharmacognosy? 2. What is the origin of the word "pharmacognosy"? 3. Who introduced and used the term "pharmacognosy" for the first time? 4. What studies are now included in pharmacognosy? 5. Why do we say that pharmacognosy is interdisciplinary? 6. What fields can the contemporary study of pharmacognosy be divided into? Describe each of them. 7. Do you agree that pharmacognosy forms an important part of pharmaceutical research and development? Explain your point of view.

Exercise 7. Complete the sentences with the correct preposition (in, on, of, for, at, to) where necessary.

For students embarking … a journey in pharmacognosy, the fusion of scientific inquiry and the timeless wisdom of nature offers a rich avenue … exploration. Understanding the medicinal potential … natural products empowers future healthcare professionals to innovate and contribute … the ever-evolving landscape of medicine. As we continue to uncover the mysteries of the natural world, pharmacognosy remains … the forefront of developing safe, effective, and sustainable healthcare solutions. Whether you aspire to be a researcher, pharmacist, or healthcare provider, a grounding … pharmacognosy will enhance your understanding of how we harness … the power of nature to improve human health.

Exercise 8. Complete each sentence using a word derivationally related to the word given in brackets.

1. Pharmacognosy plays a crucial role in drug (discover) and (develop). 2. (History), many of our modern medicines were derived from natural products. 3. By (investigate) the properties and potential applications of bioactive compounds in plants, scientists can (veil) new therapeutic agents.

4. (Addition), pharmacognosy encompasses essential practices such as the standardization of herbal products, (ensure) quality, safety, and efficacy. 5. Understanding the chemistry, pharmacology, and botany of (medicine) plants is crucial for developing (rely) and effective natural drugs. 6. In recent years, the demand for (nature) products in medicine has increased, fueled by a growing trend towards complementary and (alter) medicine (CAM). 7. Pharmacognosy not only contributes to the (understand) of herbal medicines but also complements (synthesis) drug development by offering leads for new pharmaceuticals.

Exercise 9. Choose the answer (A, B, C, or D) that best fits each space.

1. Crude drugs of natural origin obtained from plants, animals, and mineral sources and their active chemical constituents are the core subject of … . 2. They are also used for the … of various diseases besides being used in cosmetic, textile and food industries. 3. During the first half of the nineteenth-century … stocked the crude drugs for the preparation of herbal tea mixtures, all kinds of tinctures, extracts, and juices which in turn were employed in preparing medicinal drops, syrups, infusions and ointments. 4. The second half of the nineteenth century brought several important … in the newly developing fields of chemistry. 5. Medicinal plants became one of its major objects of interest and in time, phytochemists … in isolating the pure active constituents. 6. These active constituents replaced the crude drugs, they became predominant and … pushed the herbal drugs. 7. Today applied science of pharmacognosy has a far better knowledge of the active constituents and their prominent … activity on human beings. 8. An enormous number of alkaloids, glycosides, and antibiotics have been isolated, identified, and used as … agents.

No.	A	B	C	D
1	pharmacy	pharmacology	pharmacognosy	biology
2	elimination	treatment	prevention	dissemination
3	apothecaries	physicians	pharmacists	herbalists
4	challenges	considerations	inventions	discoveries
5	succeeded	managed	coped	dealt
6	drastically	gradually	radically	slowly
7	sanative	invigorating	stimulating	therapeutic
8	infecting	health	curative	beneficial

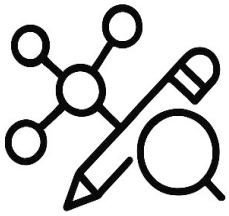
Exercise 10. Translate into English.

Эхинацея является одной из самых популярных трав во всем мире. Люди веками использовали ее для лечения различных недугов.

Сегодня эхинацея наиболее известна как растительное средство от обычной простуды или гриппа, отпускаемое без рецепта. Она также используется для смягчения боли, воспаления и других проблем со здоровьем.

Эхинацея оказывает благотворное воздействие на иммунную систему. Многочисленные исследования показали, что это растение может помочь вашей иммунной системе бороться с инфекциями и вирусами, что позволяет быстрее восстановиться после болезни.

Однако были случаи, когда люди испытывали побочные эффекты, такие как аллергия, сыпь, боли в животе, головокружение.



Part II
BIOTECHNOLOGY

Unit I
BIOTECHNOLOGY: HISTORY AND DEVELOPMENT

Exercise 1. Read and memorize the following words.

Selective breeding – селекционное разведение; offspring – потомство, приплод; artificial intelligence – искусственный интеллект; to evolve – развиваться; to elucidate – разъяснять, освещать; tissue culture – выращивание живой ткани; spoilage – ухудшение качества, порча; approval – одобрение, согласование; yield – урожайность, выход продукта; pest – паразит, вредитель; inadvertently – непреднамеренно, нечаянно, случайно; fermentation – брожение; brewing – пивоварение; yeast – дрожжи, закваска; to splice – сращивать, соединять; crop – сельскохозяйственная культура; livestock – сельскохозяйственные животные; inheritance – наследование, врожденность; groundbreaking – поворотный, инновационный; to pave – проложить (путь); to herald – объявить, провозгласить.

Exercise 2. Match the words and word combinations with their definitions.

1. Selective breeding	a) a profit or an amount especially of a crop produced
2. Tissue culture	b) without intention, accidentally
3. Pest	c) the occupation or business of producing beer, ale, etc.
4. Fermentation	d) the process of the sugar in food or drink changing into alcohol because of a chemical process
5. Yield	e) the process of choosing particular animals to produce offspring or plants to produce new plants
6. Inadvertently	f) the scientific process of growing tissue (= cells) outside an organism, in a substance containing the necessary nutrients
7. Brewing	g) an insect or small animal that is harmful or damages crops
8. Gene splicing	
9. To herald	
10. Yeast	

h) a type of fungus that is used in making alcoholic drinks such as beer and wine, and for making bread swell
i) recombinant DNA technology when the DNA of an organism is cut and a gene, perhaps from another organism, is inserted
j) to be a sign that something important, and often good, is starting to happen, or to make something publicly known

Exercise 3. Choose the words with similar meaning from the two groups and arrange them in pairs.

A. Selective breeding, inheritance, inadvertently, spoilage, crop, groundbreaking, to pave, to evolve, yield, offspring.

B. Output, accidentally, agricultural plant, innovative, to develop, heredity, artificial selection, deterioration, to prepare, young.

Exercise 4. Read and translate the following text.

Biotechnology, in its broadest sense, refers to the use of living systems and organisms to develop or create products, improve plants or animals, or develop microorganisms for specific uses. The history of biotechnology is as old as human civilization itself, evolving significantly over millennia, influenced by advancements in science, technology, and societal needs.

The roots of biotechnology can be traced back to ancient civilizations. Fermentation, a fundamental biotechnological process, was practiced as early as 7000 BC, with evidence of wine and beer production found in archaeological sites. The Egyptians utilized yeast for brewing and developed breadmaking techniques. Additionally, fermentation was crucial for preserving food, leading to the production of yogurt and cheese.

During the Middle Ages, advancements in agricultural practices saw the selection and cross-breeding of crops and livestock, laying the groundwork for selective breeding. By the 17th century, scientists began to study microorganisms, but it wasn't until the 19th century that significant strides were made in understanding the role of bacteria and fermentation. In 1857, Louis Pasteur demonstrated that microorganisms were responsible for fermentation and spoilage, leading to pasteurization, a process that revolutionized food safety.

The term "biotechnology" was first used in the 1910s by Hungarian engineer Karl Ereky, who described it as the process of using raw materials to produce beneficial products through biological means. However, the real

transformation began in the late 19th and early 20th centuries with the advent of genetics.

Gregor Mendel's work on inheritance patterns laid the foundation for the field of genetics, and in the early 20th century, scientists began to elucidate the structure of DNA. The discovery of the double helix structure of DNA by James Watson and Francis Crick in 1953 was a pivotal moment in biotechnology, enabling a deeper understanding of genetics and heredity.

The latter half of the 20th century saw significant advancements in biotechnology, particularly in the field of molecular biology and genetics. In 1973, Paul Berg and his colleagues developed recombinant DNA technology, allowing scientists to splice genes from one organism into another. This groundbreaking technology paved the way for the development of genetically modified organisms (GMOs) and numerous medical and agricultural applications.

The first genetically engineered organism was created in 1974, leading to a wave of research and development in biotechnology. In 1982, the first genetically engineered drug, insulin produced by E. coli, was approved for human use, revolutionizing diabetes treatment.

The 1990s marked the launch of the Human Genome Project, an international research effort aimed at mapping all the genes in the human genome. Completed in 2003, this monumental achievement provided invaluable insights into genetics, paving the way for personalized medicine and gene therapy.

Looking forward, biotechnology promises to address some of the most pressing challenges facing humanity, from food security and sustainable agriculture to healthcare and environmental conservation. The integration of biotechnology with artificial intelligence and other emerging technologies could further accelerate innovations, heralding a new era of scientific and societal evolution.

Exercise 5. Answer the following questions.

1. What is biotechnology and what are its primary applications? 2. How far back can the roots of biotechnology be traced, particularly regarding fermentation? 3. What role did ancient Egyptians play in the early development of biotechnology? 4. How did the practices of agriculture in the Middle Ages contribute to biotechnology? 5. Who was Louis Pasteur, and what was his contribution to the field of fermentation and food safety? 6. When was the term "biotechnology" first introduced, and who coined it? 7. What were the significant advancements in genetics during the late 19th and early 20th centuries? 8. What breakthrough in biotechnology occurred in 1973, and how did it impact the field? 9. How did the Human Genome

Project contribute to our understanding of genetics? 10. What future challenges can biotechnology help address, according to the text?

Exercise 6. Say whether the following statements are true or false.

1. Biotechnology has been practiced since the dawn of human civilization. 2. The fermentation process was first documented in the 18th century. 3. Louis Pasteur was the first to demonstrate the role of microorganisms in fermentation. 4. The term "biotechnology" was coined in the early 1800s. 5. Gregor Mendel is known for his work on inheritance patterns, which contributed to the field of genetics. 6. The double helix structure of DNA was discovered in 1963. 7. Recombinant DNA technology was developed in 1973. 8. The first genetically engineered organism was created in 1982. 9. The Human Genome Project was completed in 2003. 10. Future advancements in biotechnology may include integration with artificial intelligence.

Exercise 7. Match the sentence halves.

1. Biotechnology is the technology based on biology related to the application of	a) fermentation for the production of biofuels, enzymes and other chemicals.
2. In medicine biotechnology helps with the production of	b) interpret biological data such as DNA sequences and protein structures.
3. In agriculture biotechnology is used to enhance crop yields, improve	c) various aspects of our lives, from healthcare to agriculture and beyond.
4. Industrial biotechnology plays a role in industrial processes like	d) living organisms and their components to develop, modify, and provide a useful product for human welfare.
5. Bioinformatics combines biology, computer science and mathematics to analyze and	e) vaccines, antibiotics, and artificial hormones, using plants.
6. Biotechnology raises ethical safety and regulatory considerations when	f) polluted environments by breaking down or removing contaminants.
7. Environmental biotechnology involves using living organisms to clean up	g) it comes to genetic modification and gene editing.
8. Biotechnology continues to have a profound impact on	h) pest and disease resistance and develop genetically modified organisms.

Exercise 8. Insert the necessary word.

Inheritance, groundbreaking, tissue culture, yeast, offspring, fermentation, livestock, to splice, selective breeding, yield

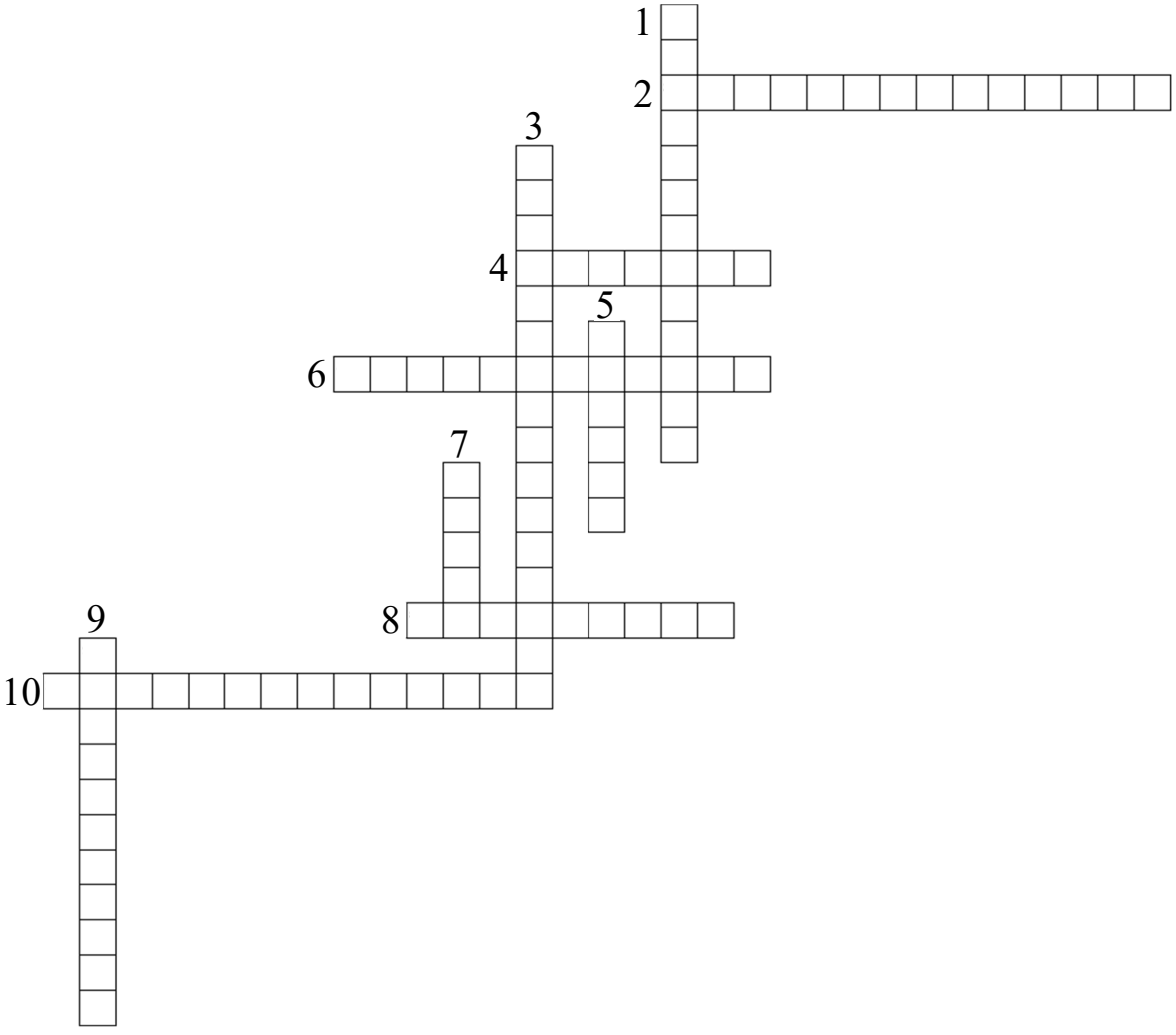
1. One of the fundamental techniques in biotechnology is … … , which allows scientists to choose specific traits in … to enhance desirable characteristics. 2. By carefully selecting parent organisms, breeders can produce … with improved traits such as increased disease resistance or faster growth rates. 3. Another crucial area of biotechnology is … … , a method used to grow plant cells in a controlled environment. 4. This technique has allowed for the rapid propagation of plants with high … , ensuring a reliable supply of crops. 5. The process of … utilizes … to convert sugars into alcohol, playing a vital role in the production of various beverages and biofuels. 6. Genetic engineering has enabled scientists … DNA from different organisms, leading to … advancements in medicine, such as the development of genetically modified organisms (GMOs). 7. These modifications can enhance agricultural productivity and address issues related to … , ensuring that beneficial traits are passed down through generations.

Unit II
BIOTECHNOLOGY APPLICATION

Exercise 1. Read and memorize the following words.

To harness – использовать; mining industry – горнодобывающая промышленность; bioleaching – биовыщелачивание; bioremediation – биологическая очистка; micropropagation – микроразмножение; malady – расстройство, недуг; disease – болезнь, заболевание; domestication – одомашнивание; to entwine – переплетаться; well suited – особенно пригодный; to restore – восстанавливать; to alter – менять; preservation – сохранение; desirable – желательный; available – доступный; to wreak havoc – наносить ущерб; to recycle – перерабатывать; waste – отходы, мусор; response – ответ, реакция; makeup – структура, состав.

Exercise 2. Solve the crossword puzzle.



Across

2. The industry involved in extracting mineral resources

4. The act of reusing materials to reduce waste

6. The state of being kept in good condition

8. Something that is wanted or sought after

10. The treatment of contaminated environments using biological agents

Down

1. The process of improving wild species for human use

3. The act of growing plant tissues in controlled conditions

5. An illness or disease

7. Any unwanted or unusable material

9. Process of extracting metals from ores using microorganisms

Exercise 3. Match the words to their definitions.

1. Waste	a) to make use of (natural resources)
2. Domestication	b) the process of extracting metals from ores or waste by using microorganisms
3. To harness	c) the use of either naturally occurring or deliberately introduced microorganisms to consume and break down environmental pollutants, in order to clean up a polluted site
4. To alter	d) a method of plant propagation using extremely small pieces of plant tissue taken from a carefully chosen and prepared mother plant, and growing these under laboratory conditions to produce new plants
5. Micropropagation	e) the process of taming an animal and keeping it as a pet or on a farm
6. Bioleaching	f) to change something, usually slightly, or to cause the characteristics of something to change;
7. Makeup	g) appropriate for a particular purpose
8. Bioremediation	h) a material, substance, or byproduct) eliminated or discarded as no longer useful or required after the completion of a process
9. Well suited	i) the composition or constitution of something

Exercise 4. Read and translate the following text.

Biotechnology is a diverse field that intertwines biological sciences with technological applications, paving the way for innovative solutions across

various industries. One of the most remarkable aspects of biotechnology is its capacity to harness biological processes for practical use. This capability is especially pronounced in the mining industry, where traditional extraction methods can be detrimental to the environment. Enter bioleaching, a biotechnology-driven method that utilizes microorganisms to extract valuable metals from ores. By harnessing the power of these tiny organisms, the mining industry can significantly reduce the environmental impact and increase the efficiency of metal recovery processes.

Bioleaching has gained prominence as an eco-friendly alternative to conventional mining techniques. In this process, specific bacteria are employed to oxidize metal sulfides, thereby releasing valuable metals such as copper, gold, and nickel into a soluble form. This not only leads to higher extraction rates but also minimizes the need for harsh chemicals that are typically used in conventional mining. Consequently, bioleaching represents a sustainable pathway for resource recovery, highlighting how biotechnology can contribute to a greener future.

Another critical application of biotechnology lies in the domain of environmental cleanup through bioremediation. This innovative strategy employs microorganisms to detoxify polluted environments by breaking down hazardous substances into less toxic or non-toxic forms. Contaminants such as heavy metals, oil spills, and pesticides can wreak havoc on ecosystems, leading to significant long-term effects on biodiversity and human health. By utilizing bioremediation techniques, affected areas can be rehabilitated more efficiently, reducing waste and restoring ecological balance. This underscores the vital role biotechnology plays in preserving natural resources and promoting a cleaner environment.

The impact of biotechnology extends beyond environmental applications and includes agricultural advancements, particularly in the areas of micropropagation and domestication. Micropropagation is a biotechnological technique used to rapidly propagate plants under controlled conditions, ensuring the production of disease-free plantlets. This method is particularly beneficial for the large-scale production of desirable plant species, allowing for uniformity and consistency in crop quality. It also supports the conservation of endangered plant species, providing a means for preservation that was previously unattainable through conventional farming practices.

Furthermore, domestication processes have been revolutionized by biotechnological advancements. Through techniques such as genetic modification and selective breeding, researchers can create crops that are more resilient to diseases, pests, and climate change. This is particularly crucial in addressing agricultural challenges posed by malady and adverse environmental

conditions. As global populations continue to grow, the need for sustainable and efficient food production systems becomes increasingly pressing. Biotechnology provides the tools to meet these challenges head-on, enabling the development of crops that can thrive in less than ideal conditions while still providing desirable yields.

An additional benefit of biotechnology in agriculture is its potential to recycle waste materials. By utilizing organic waste, such as food scraps or agricultural byproducts, biotechnology can produce biofuels, fertilizers, and other valuable products. This not only reduces waste but also transforms it into valuable resources, contributing to a circular economy. Recycling not only mitigates environmental pollution but also promotes sustainable practices that are essential for long-term ecological health.

Exercise 5. Answer the questions.

1. What is biotechnology and how does it integrate biological sciences with technology? 2. In what ways does bioleaching represent a sustainable alternative to traditional mining methods? 3. What role do microorganisms play in the bioleaching process for extracting metals? 4. How does the implementation of bioleaching reduce the environmental impact of mining activities? 5. Describe the process of bioremediation and its significance in environmental cleanup. 6. What types of contaminants can be addressed through bioremediation techniques? 7. How does micropropagation benefit agricultural production and species conservation? 8. What advancements in biotechnology have improved the domestication of crops? 9. How can biotechnology contribute to recycling waste materials in agriculture? 10. In what ways does biotechnology support sustainable food production in the face of global challenges?

Exercise 6. Say whether the following statements are true or false.

1. Biotechnology combines biological sciences with technological applications. 2. Bioleaching is a biotechnology-driven method used in the mining industry. 3. Bioleaching is a method that increases the environmental impact of mining. 4. Microorganisms used in bioleaching can extract metals like copper, gold, and nickel. 5. Bioremediation is a method that introduces toxic substances into polluted environments. 6. Micropropagation allows for the rapid propagation of disease-free plantlets. 7. Biotechnology can help create crops that are more resilient to diseases and climate change. 8. Biotechnology does not play a role in recycling waste materials. 9. Agricultural advancements through biotechnology support conservation efforts for endangered plant species. 10. Biotechnology contributes to a circular economy by turning organic waste into valuable products.

Exercise 7. Replace words in italics with their synonyms.

Productivity, garbage, contamination, microbes, destinations, milk, uses, maladies, to evolve, treatments

1. Biotechnology is technology based on biology that *harnesses* cellular and biomolecular processes *to develop* technologies and products that help improve our lives and the health of our planet. 2. We have used the biological processes of microorganisms for more than 6,000 years to make useful food products, such as bread and cheese, and to preserve *dairy* products. 3. Medical biotechnology is the use of living cells for finding *cures* as well as getting rid of and preventing *diseases*. 4. Agricultural biotechnology focuses on developing genetically modified plants to increase crop *yields*. 5. Industrial biotechnology is the application of biotechnology for industrial *purposes* that also include industrial fermentation. 6. Environmental biotechnology is the technology used in waste treatment and *pollution* prevention. 7. The *bacteria* help in digesting the *waste* right at the site, thereby turning it into harmless byproducts.

Exercise 8. Read and translate the following text.

Biotechnology is a diverse and rapidly evolving field that harnesses biological processes for various applications across multiple sectors, including healthcare, agriculture, environmental management, and industrial processes. This diversity is often classified into "colours" of biotechnology, each representing distinct areas of application and focus. Here's an overview of the different spectra, including White, Green, Blue, Red, Dark, Grey, Violet, Yellow, and Gold biotechnology, along with relevant examples.

Red biotechnology pertains to medical processes and applications. It encompasses the development of pharmaceuticals, genetic therapies, and diagnostics. A prime example is the use of recombinant DNA technology to produce insulin, which has transformed diabetes management. Another notable application is CAR-T cell therapy, where a patient's T cells are genetically modified to better target and destroy cancer cells, showcasing the potential of genetic engineering in therapeutics.

Green biotechnology focuses on agricultural processes and aims to improve crop yields, enhance resistance to pests and diseases, and reduce environmental impacts. One of the most famous examples is genetically modified organisms (GMOs), such as Bt cotton and Roundup Ready soybeans, which are engineered for pest resistance and herbicide tolerance, respectively. Additionally, biotechnology in agriculture includes the use of biofertilizers and biopesticides derived from natural organisms to support sustainable farming practices.

Blue biotechnology applies to the marine ecosystem and utilizes aquatic organisms for various applications, notably in biotechnology and pharmacology. An example is the extraction of bioactive compounds from marine sponges and algae, which can lead to the development of new pharmaceuticals. Furthermore, blue biotechnology encompasses aquaculture techniques that enhance fish farming efficiency and sustainability, integrating biotechnological innovations to support food security.

White biotechnology, or industrial biotechnology, involves the use of enzymes and microorganisms in industrial processes. It focuses on the production of chemicals, materials, and energy from renewable biological resources. For instance, biofuels like ethanol produced from fermentation of sugarcane or corn showcase white biotechnology applications. Additionally, enzymes are utilized in detergent formulation to increase cleaning efficacy at lower temperatures, reducing energy consumption, and improving environmental sustainability.

Grey biotechnology refers to biotechnological applications related to waste management and environmental cleanup. It plays a vital role in bioremediation, where microorganisms are utilized to degrade pollutants in contaminated environments. For instance, oil-eating bacteria are employed to clean up oil spills, converting toxic compounds into harmless byproducts. Moreover, wastewater treatment facilities often utilize microbial processes to break down organic pollutants, showcasing the importance of grey biotechnology in maintaining ecological balance.

Dark biotechnology can refer to the unethical use of biotechnological advancements, particularly in the context of bioweapons and biological warfare. This branch of biotechnology raises significant ethical concerns about the potential for misuse, such as manipulating pathogens to create harmful agents. While darker applications are discouraged and regulated, they underscore the importance of ethical frameworks and international regulation to prevent bioterrorism and ensure biotechnological safety.

Violet biotechnology is quite unique in that it concentrates on the study of legal aspects that affect biotechnology. It also deals with ethical and philosophical issues. Violet biotechnology will study the moral impact of some technologies, such as gene therapy, and biosecurity.

Yellow biotechnology deals with the production of bioproducts for food and nutrition, emphasizing the enhancement of food quality and safety. This includes the development of probiotics, functional foods, and plant-based proteins. Fermentation technology, used to produce yogurt and cheeses, is a classic example of yellow biotechnology. Additionally, advances in food safety through biotechnology ensure that products are free from pathogens and contaminants.

Gold biotechnology or Bioinformatics is referred to computational biology and can be defined as "conceptualizing biology" to address biological problems using computational techniques and makes the rapid organization as well as analysis of biological data possible.

The spectrum of biotechnology encompasses a rich scope of disciplines, each with unique applications and implications. Each colour of biotechnology plays a vital role in shaping the future of medicine, agriculture, industry, and environment.

Exercise 9. Answer the questions.

1. What are the primary sectors where biotechnology is applied, as mentioned in the text? 2. Define red biotechnology and provide two examples of its applications. 3. How does green biotechnology contribute to agricultural practices? 4. What is the focus of blue biotechnology, and what is one application mentioned in the text? 5. Explain the role of white biotechnology in industrial processes, including an example of its application. 6. What is grey biotechnology, and how does it assist in waste management and environmental cleanup? 7. Describe the ethical concerns associated with dark biotechnology as presented in the text. 8. What does violet biotechnology study, and why is it important to the field? 9. How does yellow biotechnology enhance food safety and quality? 10. Briefly explain what gold biotechnology entails and its significance in the analysis of biological data.

Exercise 10. Complete the sentences with the correct preposition (into, with, in, on, for, to, from, of, across) where necessary.

1. Biotechnology harnesses biological processes for various applications … multiple sectors. 2. Red biotechnology pertains … medical processes and applications. 3. Green biotechnology focuses … agricultural processes. 4. Blue biotechnology utilizes aquatic organisms … various applications. 5. White biotechnology involves the use of enzymes and microorganisms … industrial processes. 6. Oil-eating bacteria are employed to convert toxic compounds … harmless byproducts. 7. Dark biotechnology can refer to the unethical use … biotechnolog-ical advancements. 8. Violet biotechnology deals … ethical and philosophical issues. 9. Advances in food safety through biotechnology ensure that products are free … pathogens and contaminants. 10. Gold biotechnology addresses … biological problems using computational techniques.

Exercise 11. Match English expressions to their Russian equivalents.

1. Rapidly evolving field	a) возобновляемые биологические ресурсы
2. Study of legal aspects	b) для повышения устойчивости к вредителям и болезням
3. CAR-T cell therapy	c) вычислительная биология
4. To enhance resistance to pests and diseases	d) изучение правовых аспектов
5. Marine sponges and algae	e) утилизация отходов
6. Renewable biological resources	f) возможность неправильного использования
7. Waste management	g) морские губки и водоросли
8. Potential for misuse	h) повышение качества пищевых продуктов
9. Enhancement of food quality	i) быстро развивающаяся область
10. Computational biology	j) клеточная терапия CAR-T

Exercise 12. Choose the answer (A, B, C, or D) that best fits each space.

1. Biotechnology is a diverse and … evolving field. 2. Green biotechnology aims to improve crop yields, enhance resistance to pests and diseases, and … environmental impacts. 3. Blue biotechnology encompasses … techniques that enhance fish farming efficiency and sustainability. 4. … like ethanol produced from fermentation of sugarcane or corn showcase white biotechnology applications. 5. Wastewater treatment … often utilize microbial processes to break down organic pollutants. 6. Violet biotechnology is quite … in that it concentrates on the study of legal aspects that affect biotechnology. 7. Fermentation technology, used to produce yogurt and cheeses, is a classic example of … biotechnology. 8. Biotechnology has revolutionized agriculture by enabling the development of genetically modified crops that are resistant to pests and diseases, resulting in … for farmers. 9. In the field of medicine, biotechnology plays a crucial role in producing biopharmaceuticals, which can lead to … in the treatment of various diseases.

No.	A	B	C	D
1	steadily	rapidly	drastically	properly
2	reducible	reduced	reduction	reduce
3	aquaculture	agriculture	horticulture	multiculture
4	solid fuels	hydrocarbon fuels	fossil fuels	biofuels
5	facilities	facilitates	facilitation	facilitating
6	unique	common	strange	extraordinary
7	gold	dark	yellow	green
8	increased yields	higher costs	reduced demand	limited options
9	complications	innovative therapies	fewer choices	increased side effects

Unit III
MICROORGANISMS

Exercise 1. Read and memorize the following words.

Naked eye – невооруженный глаз; habitat – среда обитания; unicellular – одноклеточный; multicellular – многоклеточный; archaea – археи; eukaryote – эукариот; prokaryote – прокариот; self-sufficient – независимый, самостоятельный; harmless – безвредный; neatly – аккуратно; algae (singular: alga) – морские водоросли; protozoa (singular: protozoan) – простейшие, протозоа; fungi (singular: fungus) – грибы, грибок; mould – плесень; beverage – напиток; to spoil (spoiled/spoilt) – портить; to be composed of – состоять из; responsible – ответственный; numerous – многочисленный, большой; host – хозяин; common cold – простуда; domain – область, сфера; gut – кишечник.

Exercise 2. Match the words with their definitions.

1. Unicellular	a) the eye unaided by any optical instrument that alters the power of vision or alters the apparent size or distance of objects
2. Fungi	b) having or consisting of a single cell
3. Self-sufficient	c) a unicellular organism that doesn't have a membrane-bound nucleus and other organelles
4. To spoil	d) primitive chlorophyll-containing mainly aquatic eukaryotic organisms lacking true stems and roots and leaves
5. Naked eye	e) a group of spore-producing organisms feeding on organic matter, including moulds, yeasts, mushrooms, and toadstools
6. Eukaryote	f) a group of single-celled eukaryotes, either free-living or parasitic, that feed on organic matter such as other microorganisms or organic tissues and debris
7. Beverage	g) an organism with a nucleus and other membrane-bound organelles inside the cell(s)
8. Prokaryote	h) able to provide what is necessary without the help of others
9. Algae	i) to decay or lose freshness especially because of being kept too long
10. Protozoa	j) a drink of any type

Exercise 3. Insert the necessary word.

common cold, habitat, naked eye, composed, numerous, spoil, host, fungi, harmless, responsible

1. There are … types of viruses. 2. Some viruses are … for human diseases. 3. Others are quite … . 4. Some virus-caused diseases include the … … . 5. Viruses infect all living things, including … and even bacteria. 6. Bacteria are tiny microorganisms that are … of a single cell. 7. Bacteria can live in almost every … . 8. Unlike viruses, bacteria do not need a … cell. 9. Parasites are usually larger than most bacteria, and can be seen sometimes with the … … . 10. Some fungi such as yeasts or molds can cause food to … .

Exercise 4. Read and translate the following text.

A microorganism is a living thing that is too small to be seen with the naked eye. Microorganisms differ from each other not only in size, but also in structure, habitat, metabolism, and many other characteristics.

While we typically think of microorganisms as being unicellular, there are also many multicellular organisms that are too small to be seen without a microscope. Microorganisms may be composed of prokaryotic or eukaryotic cells. Viruses are even acellular (not composed of cells).

Prokaryotes are unicellular organisms that lack a membrane-bound nucleus. This kingdom is primarily divided into two domains: bacteria and archaea. Bacteria are the most well-known prokaryotes and can be found in a variety of environments, ranging from the human gut to extreme conditions like hot springs. Bacteria can be classified based on shape – such as cocci (spherical), bacilli (rod-shaped), and spirilla (spiral) – as well as their metabolic processes (autotrophic or heterotrophic), and Gram staining characteristics (Gram-positive or Gram-negative).

Archaea, while similar to bacteria in terms of structure, have distinct biochemical and genetic properties that set them apart. They often thrive in extreme environments such as high-salinity, high-temperature, or acidic conditions where most other life forms cannot survive. The unique adaptations of archaea, along with the molecular differences in their ribosomal RNA and membrane lipids, underscore their classification as a separate domain of life.

Eukaryotic microorganisms are characterized by having a defined nucleus enclosed within a nuclear membrane. This group includes protists, fungi and algae. Protists are a diverse group of microorganisms that can be found in a variety of environments, from freshwater ponds to the human gut. Protozoa are a specific type of protist that are characterized by their

ability to move using cilia, flagella, or pseudopods. Fungi, a distinct group of eukaryotic microorganisms, include yeasts and molds. They are heterotrophic organisms that absorb nutrients from their environment through external digestion. Moulds are multicellular fungi that grow in the form of a network of filaments called hyphae. They play essential roles in decomposing organic matter, helping recycle nutrients in ecosystems. Yeasts are unicellular fungi widely utilized in brewing and baking due to their fermentation abilities. Algae, on the other hand, are primarily photosynthetic organisms that can range from single-celled phytoplankton to large multicellular seaweeds. Algae play a vital role in aquatic ecosystems as primary producers.

Viruses are unique entities that straddle the line between living and nonliving. They consist of a core of genetic material (either DNA or RNA) encased in a protein coat and, in some cases, an additional lipid envelope. Viruses lack cellular structure and cannot carry out metabolic processes independently; they rely on host cells for replication and propagation. While viruses can cause diseases in humans, animals, and plants, they also have beneficial applications in gene therapy and biotechnology.

In summary, the classification of microorganisms provides insight into their structural, functional, and ecological diversity. Understanding these groups – prokaryotes, eukaryotic microorganisms, and viruses – allows scientists and researchers to explore their roles in ecosystems, their interactions with other organisms, and their applications in medicine and industry. The world of microorganisms is vast and continues to be an area of active study, revealing intricate connections among all forms of life.

Exercise 5. Answer the questions.

1. What are the main characteristics that differentiate microorganisms from one another? 2. What is the primary distinction between prokaryotic and eukaryotic cells? 3. How are bacteria classified based on their shape? Provide examples. 4. What environments do archaea typically thrive in, and how do their adaptations contribute to their survival? 5. What are protists, and how do protozoa specifically differ from other types of protists? 6. Describe the role of fungi in ecosystems and explain the difference between molds and yeasts. 7. In what ways do algae contribute to aquatic ecosystems, and how do they differ from other eukaryotic microorganisms? 8. What distinguishes viruses from other microorganisms in terms of structure and function? 9. How do viruses reproduce, and what is their relationship with host cells? 10. What does the classification of microorganisms provide?

Exercise 6. Say whether the following statements are true or false.

1. Microorganisms are too small to be seen with the naked eye. 2. Microorganisms can be unicellular or multicellular. 3. All microorganisms have a membrane-bound nucleus. 4. Prokaryotes lack a membrane-bound nucleus and are primarily divided into bacteria and archaea. 5. Bacteria can be classified based on their shape and metabolic processes. 6. Archaea and bacteria are classified as the same domain of life due to their similarities. 7. Eukaryotic microorganisms include protists, fungi, and algae. 8. Yeasts are unicellular fungi that are important in brewing and baking. 9. Viruses are considered fully living organisms because they can carry out metabolic processes independently. 10. Understanding microorganisms helps scientists explore their roles in ecosystems and their applications in medicine and industry.

Exercise 7. Match the sentence halves.

1. A microorganism is a living thing that is too	a) many diseases were caused by microorganisms and to the practice of pasteurization.
2. Examples of microorganisms include	b) environments that have been made artificially sterile by humans.
3. Leeuwenhoek's invention of the microscope soon led Louis Pasteur to realize that	c) small to be seen with the naked eye.
4. Microorganisms are found virtually everywhere, except for	d) bacteria, archaea, algae, protozoa, and microscopic animals such as the dust mite.
5. Bacteria and archaea are two types of	e) to synthesize their own nucleic acids and proteins.
6. Algae are a type of microorganisms that performs	f) microorganisms such as yeasts and moulds, as well as the more familiar mushrooms.
7. Protists include single-celled eukaryotic organisms with	g) exist among a variety of living forms that inhabit the planet.
8. A fungus is any member of a large group of eukaryotic organisms that includes	h) oxygenic photosynthesis, much like plants.
9. Viruses depend on the host cell and use its nucleotides and amino acids	i) well-defined nuclear membrane and cell organelles.
10. Biologic classification helps to understand the relationships that	j) unicellular and prokaryotic living beings (which do not have a genetic nucleus).

Exercise 8. Insert the necessary words.

Detergents, lactic acid, nitrogen, moulds, vital, therapeutic enzymes, decomposers, extensive, solvent, humans, biofertilizers, fermentation, impact, naked eye

The term microorganisms usually refer to those tiny organisms that cannot be seen with the … … such as bacteria, fungi, algae, and protozoa. They have a great … on people's lives and are used in biotechnology for a variety of purposes.

Microorganisms are very friendly to … and help us in many ways. For instance yogurt is a dairy product derived from the … of milk. The gel-like appearance and taste of yogurt are due to the fermentation of lactose into … … .

Many important therapeutic compounds are found in microorganisms such as insulin, penicillin, antibodies, … … , steroids, vaccines, etc.

Bacteria play a … role in producing many metabolites such as ethanol. Bacterial Ethanol is widely used as a … and antifreeze. It is also used in the manufacture of many dyes, cosmetics, … , pesticides, explosives, plastics, and synthetic fibers.

Bacteria can also be used as … in the soil to improve plant growth by providing essential nutrients to the plant. Bacteria are the only organisms that aid in the recycling of … and make it viable for plant use.

Some bacteria also act as … and help to keep the environment clean by digesting pollutants and releasing environmentally friendly nutrients. … eat dead organisms such as leaves, soil, manure, wood, and dead animals.

Biotechnology is the only industry that has made … use of microorganisms.

Unit IV
PROTEINS

Exercise 1. Read and memorize the following words.

Sequence – последовательность; quaternary – четвертичный; linear – линейный; consequence – последствие; to fold – сложить, согнуть; primarily – преимущественно; due to – из-за, благодаря; alpha helix – альфа-спираль; beta pleated sheet – бета-складка (складчатый лист); hydrophobic interaction – гидрофобное взаимодействие; crucial – ключевой; myriad – множество; tissue – ткань (организма); to facilitate – содействовать, способствовать; immense – огромный; alteration – изменение; to elucidate – разъяснить; intervention – вмешательство; intricate – замысловатый, сложный; to highlight – выделить, подчеркнуть; backbone – каркас (макромолекулы); to tailor – приспособить; saliva – слюна; tendon – сухожилие; ligaments – связки; tumor suppressor – опухолевый супрессор; counterpart – аналог.

Exercise 2. Match the words with the definitions below.

1. Myriad	a) relating to, or consisting of four units or members
2. To highlight	b) something produced by a cause or necessarily following from a set of conditions
3. Beta pleated sheet	c) for the most part, mainly
4. Intricate	d) a common motif of the regular protein secondary structure which resembles the pleated folds of drapery
5. Quaternary	e) a sequence of amino acids in a protein that are twisted into a coil (a helix)
6. Alteration	f) extremely important or necessary
7. Alpha helix	g) a very large number of something
8. Primarily	h) a change, usually a slight change, in the appearance, character, or structure of something
9. Crucial	i) having a lot of small parts or pieces arranged in a complicated way, and therefore sometimes difficult to understand in detail
10. Consequence	j) to attract attention to or emphasize something important

Exercise 3. Choose the words with opposite meaning from the two groups and arrange them in pairs.

A. Consequence, to fold, alteration, crucial, to facilitate, immense, to elucidate, intervention, intricate, to highlight.

B. To confuse, reason, to complicate, insignificant, permanence, tiny, simple, to sidetrack, to unfurl, non-interference.

Exercise 4. Complete the sentences with the words below.

Hemoglobin, backbone, determined, quaternary, levels, fold, beta pleated, coil, polypeptide, alpha helix, intricate, sequence, subunit

Proteins have four … of structure. The four levels are known as the primary, secondary, tertiary and … structure of a protein.

The primary structure is the specific … of amino acids, i.e. the order that they are bonded together. The exact order that amino acids are bonded together is … by the information stored in genes.

The secondary structure of a protein is formed by hydrogen bonds between atoms along the … of the polypeptide chain.

The hydrogen bonds cause the polypeptide backbone to … and coil into two possible forms – the alpha helix and the beta pleated sheets. An … … is a spiral, similar to the double helix of the iconic DNA strand but with only one … , and is formed by hydrogen bonds between every fourth amino acid. The … … sheets are formed when hydrogen bonds occur between two or more adjacent polypeptide chains and are common in globular proteins.

The tertiary structure is the final shape that the … chain takes and is determined by the R groups, or side chains.

A quaternary structure only results when multiple polypeptide chains combine together to form a large … protein. In such cases, each polypeptide is referred to as a … . … is an example of a protein with quaternary structure.

Exercise 5. Read and translate the following text.

Proteins are complex biomolecules that play crucial roles in virtually every biological process. They are composed of long chains of amino acids, which are organic compounds made up of carbon, hydrogen, oxygen, nitrogen, and sometimes sulfur. The sequence and number of these amino acids determine a protein's unique structure and function.

The structure of proteins can be described at four different levels: primary, secondary, tertiary, and quaternary.

1. Primary Structure. This level refers to the linear sequence of amino acids in a polypeptide chain. The specific order of amino acids is determined

by the genetic code within an organism's DNA. Even a small change in this sequence can significantly affect a protein's functionality, leading to various physiological consequences.

2. Secondary Structure. At this level, the amino acid chain begins to fold into distinct shapes, primarily due to hydrogen bonding between the backbone atoms of the polypeptide. Common secondary structures include alpha helices and beta-pleated sheets. These formations give the protein structural stability and contribute to its overall shape.

3. Tertiary Structure. The tertiary structure is the overall three-dimensional shape of a single polypeptide chain, resulting from interactions among the side chains of the amino acids. These interactions include hydrophobic interactions, ionic bonds, hydrogen bonds, and disulfide bridges. The tertiary structure is crucial for the protein's functionality, as it affects the protein's stability and its ability to interact with other molecules.

4. Quaternary Structure. Some proteins are composed of multiple polypeptide chains, or subunits, which come together to form a functional protein. This arrangement is referred to as quaternary structure. Hemoglobin, for instance, consists of four subunits and carries oxygen in the blood. The interactions between subunits can affect the protein's activity, as seen in cooperative binding phenomena.

Proteins serve a myriad of functions, including catalyzing biochemical reactions as enzymes, providing structural support in cells and tissues, regulating biological processes, and facilitating communication and transport within and between cells. The diversity in protein structure allows for an immense variety of functions; even minor alterations in structure can lead to significant differences in activity.

Moreover, understanding protein structure is vital for fields like biotechnology and medicine. Structural biology techniques, such as X-ray crystallography and nuclear magnetic resonance (NMR) spectroscopy, allow scientists to elucidate protein structures, aiding in drug design and the development of therapeutic interventions for various diseases.

In summary, proteins are essential macromolecules with intricate structures that determine their vital roles in life processes, highlighting the complexity and beauty of biological systems.

Exercise 6. Answer the following questions.

1. What are proteins composed of, and what elements are commonly found in amino acids? 2. How does the primary structure of a protein influence its functionality? 3. Describe the role of hydrogen bonding in the formation of a protein's secondary structure. 4. What are the two common

types of secondary structures mentioned in the text? 5. How does a protein's tertiary structure affect its stability and interactions with other molecules? 6. What distinguishes quaternary structure from primary, secondary, and tertiary structures in proteins? 7. Provide an example of a protein with quaternary structure and explain its biological function. 8. In what ways do proteins contribute to biological processes as highlighted in the text? 9. Why is it important to understand protein structure in fields such as biotechnology and medicine? 10. What structural biology techniques are mentioned as tools for elucidating protein structures, and how do they aid scientific research?

Exercise 7. Choose the best option to the following statements.

1. Amino acids are the building blocks of … .

a) fats;

b) carbohydrates;

c) proteins.

2. The chemical structure of amino acids is the key to why proteins have become the … of life.

a) background;

b) foundation;

c) origination.

3. An amino acid consists of a … group (chemical structure -COOH), an amine group ($-NH_2$), and a side chain made mostly from carbon and hydrogen.

a) hydroxyl;

b) phenyl;

c) carboxyl.

4. The … chain is often referred to as the R group.

a) side;

b) linear;

c) transverse.

5. … in the R group is what makes the 20 amino acids different from each other.

a) Similarities;

b) Differences;

c) Mismatches.

6. All 20 amino acids are … for good health.

a) necessary;

b) excessive;

c) not very important.

7. Some amino acids can be … by the body using other molecules while other amino acids must be sourced from food.

a) received;

b) acquired;

c) created.

Exercise 8. Complete each sentence using a word derivationally related to the word given in brackets.

1. Protein, (high) complex substance that is present in all living organisms. 2. Proteins are of great (nutrition) value and are directly involved in the chemical processes essential for life. 3. The (important) of proteins was recognized by chemists in the early 19th century, including Swedish chemist Jöns Jacob Berzelius, who in 1838 coined the term protein. 4. Proteins are species-specific; that is, the proteins of one species (different) from those of another species. 5. They are also organ-specific; for instance, within a (singleness) organism, muscle proteins differ from those of the brain and liver. 6. Proteins are macromolecules (composer) of amino acid subunits. 7. These amino acids are covalently attached to one another to form long (line) chains called polypeptides, which then fold into a specific three-dimensional shape.

Exercise 9. Match the sentence halves.

1. A polypeptide is a chain of	a) the carboxyl group (-COOH) of a second amino acid.
2. Amino acids bond together to form long, linear	b) as a peptide bond.
3. The order that amino acids are linked together determines	c) together to form large, complex proteins.
4. A protein will contain one polypeptide or multiple polypeptides bonded	d) the final shape and structure of the polypeptide chain.
5. Amino acids are bonded together between the amine group ($-NH_2$) of one amino acid and	e) amino acids and is the simplest form of a protein.
6. The bond is known	f) chains that can be more than 2000 amino acids long.

Exercise 10. Read and translate the following text.

Proteins, the fundamental building blocks of life, come in various structural forms, each tailored to perform specific functions within biological systems. Among the myriad classifications of proteins, four distinct types stand out: globular, fibrous, membrane, and disordered proteins. Each category reflects unique structural characteristics and roles within cellular environments.

Globular proteins are typically spherical or globular in shape, showcasing a compact, highly folded structure. These proteins are soluble in water, thanks to their hydrophilic exterior, which often facilitates interactions with other molecules. Enzymes like lysozyme, a globular protein found in egg whites and saliva, exemplify this category. Lysozyme acts as a defense mechanism against bacterial infections by hydrolyzing the polysaccharide components of bacterial cell walls. Another prominent example is hemoglobin, the protein responsible for transporting oxygen in red blood cells. Hemoglobin's quaternary structure, composed of four polypeptide chains, allows for cooperative binding of oxygen, showcasing how globular proteins can evolve diverse, specialized functionalities.

Fibrous proteins, in contrast to their globular counterparts, are elongated and thread-like, often forming structural components in organisms. These proteins are generally insoluble in water and provide support and strength to various biological structures. A quintessential example of fibrous proteins is collagen, which is a major component of connective tissues such as tendons, ligaments, and skin. Collagen forms a triple helix structure that imparts tensile strength and durability. Another member of this category is keratin, found in hair, nails, and the outer layer of skin. Keratin provides mechanical resilience and protection; its fibrous nature allows it to withstand physical stress, thereby maintaining the integrity of various tissues.

Membrane proteins are unique in their location and function, residing within or associated with cellular membranes. These proteins are crucial for a myriad of processes, including signal transduction, transport, and cell-cell communication. Membrane proteins can be classified into two main categories: integral (or intrinsic) proteins and peripheral (or extrinsic) proteins. An example of an integral membrane protein is the sodium-potassium pump, which actively transports ions across the plasma membrane, helping to maintain the electrochemical gradient essential for cell function. Peripheral membrane proteins, such as spectrin, provide structural support and play roles in maintaining the shape and integrity of cells without penetrating the lipid bilayer.

Disordered proteins, or intrinsically disordered proteins (IDPs), are characterized by their lack of a stable, defined structure. These proteins can exist in multiple conformations and are often involved in dynamic biological processes. The flexibility of disordered proteins allows them to interact with multiple partners, making them essential for cellular signaling and regulation. A notable example is the tumor suppressor protein p53, which plays a critical role in preventing cancer. While IDPs were once thought to be non-functional due to their lack of defined structure, their importance in cellular function is now widely recognized.

In conclusion, the diversity of protein structures – globular, fibrous, membrane, and disordered – highlights the intricate nature of biological molecules. Each category has evolved to fulfill distinct roles, reflecting the complexity and adaptability of life at the molecular level. Understanding these protein types not only enhances our knowledge of biology but also paves the way for medical advances and biotechnological applications.

Exercise 11. Say whether the statements are true or false. Correct if necessary.

1. Fibrous proteins are typically spherical in shape and are soluble in water. 2. Globular proteins have a compact, highly folded structure and are soluble in water. 3. Membrane proteins reside exclusively within the nucleus of the cell. 4. Collagen, a fibrous protein, plays a significant role in providing tensile strength to connective tissues. 5. Globular proteins include examples such as collagen, which is primarily found in connective tissues. 6. Membrane proteins include integral proteins, like the sodium-potassium pump, and peripheral proteins, such as spectrin. 7. Disordered proteins are characterized by a stable, well-defined structure that allows them to interact with fewer partners. 8. The primary function of hemoglobin is to provide structural support to cells rather than to transport oxygen. 9. Keratin is known for its soluble nature, making it easy to extract from biological tissues. 10. Intrinsically disordered proteins can exist in multiple conformations and are important for cellular signaling and regulation.

Exercise 12. Choose the answer (A, B, C, or D) that best fits each space.

1. Proteins serve as the fundamental … blocks of life, playing crucial roles in various biological processes. 2. Among the many classifications of proteins, four … types stand out: globular, fibrous, membrane, and disordered proteins. 3. Globular proteins are generally … in shape, which

allows them to perform various functions within the body. 4. Fibrous proteins, such as collagen, provide … and strength to biological structures like tendons and ligaments. 5. Membrane proteins are crucial for processes including signal … and transport within cells. 6. An example of an integral membrane protein is the sodium-potassium … , which helps maintain the electrochemical gradient. 7. Disordered proteins can exist in … conformations, contributing to their versatility in biological interactions. 8. The flexibility of disordered proteins is essential for … with various cellular partners involved in signaling. 9. The tumor suppressor protein p53, an example of an intrinsically disordered protein, plays a critical role in … cancer. 10. Understanding the different types of proteins not only enhances our knowledge of biology but also paves the way for medical and biological … and advancements.

No.	A	B	C	D
1	building	creating	devising	forming
2	distinct	different	unique	separate
3	cubic	elongated	spherical	irregular
4	flexibility	support	mobility	colour
5	transference	transduction	transformation	communication
6	channel	pump	filter	barrier
7	fixed	rigid	multiple	singular
8	interacting	isolating	avoiding	interrupting
9	promoting	preventing	diagnosing	detecting
10	experiments	practices	failures	applications

Exercise 13. Complete the sentences with the correct preposition (for, of, in, by, on, to, from, with) where necessary.

1. Proteins play various roles in biological systems, and they can be categorized into different types based … their structure and function. 2. Globular proteins are generally spherical … shape and are soluble in water. 3. They tend to have a compact structure … a hydrophilic exterior and a hydrophobic interior. 4. Fibrous proteins usually provide structural support and give structure … skin, bones, and connective tissues. 5. Membrane proteins receive signals … the environment and transmit them into the cell. 6. Membrane proteins can help cells recognize each other so they are important … immune response. 7. Disordered proteins often play regulatory roles … interacting with multiple protein partners. 8. Their flexibility allows … them to participate in signaling pathways. 9. Each type … protein has unique structural characteristics that allow it to fulfill specific functions in biological systems.

Exercise 14. Translate from Russian into English.

Существует четыре основных типа белков. Наиболее известными являются глобулярные белки. Остальные три типа белков – фибриллярные, мембранные и неупорядоченные белки.

Глобулярный белок – это любой белок, который в своей третичной структуре имеет сферическую форму. К ним относятся многие ферменты, антитела и гемоглобин. Глобулярные белки растворимы в воде и образуются за счет притяжения и отталкивания различных R-групп с водой.

Фибриллярные белки – это удлиненные белки, у которых отсутствует какая-либо третичная структура. Вместо того чтобы изгибаться и сворачиваться с образованием глобулярного белка, фибриллярные белки сохраняют свою линейную вторичную структуру. Они часто являются важными структурными и вспомогательными белками. Фибриллярные белки нерастворимы в воде и часто имеют повторяющийся состав аминокислот в своей полипептидной цепи. Примеры фибриллярных волокнистых белков включают коллаген, кератин и шелк.

Мембранные белки – это любые белки, находящиеся внутри клеточной мембраны или прикрепленные к ней. Они уникальны благодаря уникальной среде, в которой существуют. Мембранные белки отвечают за такие процессы, как транспорт веществ и передача информации из клетки и в клетку.

Открытие неупорядоченных белков в начале 2000-х годов бросило вызов историческим представлениям о белках. До этого считалось, что функция белка зависит от его фиксированной трехмерной структуры. Однако неупорядоченные белки не имеют упорядоченной структуры в своей форме.

Unit V
FATS

Exercise 1. Read and memorize the following words.

To consume – потреблять, съедать; saturation – насыщенность; greasy – жирный, маслянистый; fatty acid – жирная кислота; essential oil – эфирное масло; heating oil – топочное масло, мазут; pancreas – поджелудочная железа; peanut – арахис; sunflower – подсолнечник, подсолнух; sesame – кунжут; satiety – сытость, чувство сытости; rancid – прогорклый; lard – сало, шпик; ruminant – жвачный; conjugated linoleic acid – сопряженная линолевая кислота; hazardous – опасный, вредный; shelf life – срок годности; shortening – кулинарный жир; pizza dough – основа для пиццы; doughnut – пончик, пышка; french fries – картофель фри; multifaceted – многогранный; connotation – значение, скрытый смысл; fasting – голодание.

Exercise 2. Match the words with the definitions.

1. Greasy	a) a plant, usually having a very tall stem and a single large, round, flat, yellow flower
2. Essential oil	b) long, thin pieces of potato that are fried and eaten hot
3. Pancreas	c) dangerous and involving risk, especially to someone's health
4. Sunflower	d) (of butter, oil, etc.) tasting or smelling unpleasant because of not being fresh
5. Satiety	e) a type of animal that brings up food from its stomach and chews it again, for example a cow, sheep, or deer;
6. Rancid	f) covered with or full of fat or oil
7. Lard	g) a white substance made from pig fat and used in cooking
8. Ruminant	h) the state of being completely satisfied, especially with food or pleasure, so that you could not have any more
9. Hazardous	i) an organ in the body that produces insulin (a chemical substance that controls the amount of sugar in the blood)
10. French fries	j) an oil, usually with a strong smell, that is taken from a plant and is used to make perfume

Exercise 3. Using a dictionary add as many words as possible into the table.

No.	Verbs	Adjectives	Nouns
1			saturation
2	to consume		
3			fasting
4		hazardous	
5			conformity
6	to contribute		
7		greasy	

Exercise 4. Choose the words with similar meaning from the two groups and arrange them in pairs.

A. To consume, greasy, satiety, hazardous, shelf life, doughnut, shortening, essential oil, peanut, heating oil.

B. Harmful, fuel oil, ether oil, confectionery fat, earth-nut, fullness, oily, to devour, expiration date, crumpet.

Exercise 5. Complete the sentences with the words below.

Essential oils, shortening, rancid, heating oil, consume, greasy, lard, conjugated linoleic acid, saturation, fatty acids

1. When oils become … , they develop an unpleasant smell and can be harmful to health. 2. Many people choose to … healthy fats to support their overall well-being. 3. Essential … … are crucial for many bodily functions and cannot be produced by the body itself. 4. … … is any petroleum product or other oil used for heating; it is a fuel oil. 5. … is often used in cooking as an alternative to butter due to its high melting point. 6. Many people take supplements containing … … … , as it is thought to help with weight management and improve body composition. 7. The concept of … refers to the number of double bonds in the fatty acids within a fat. 8. … … are aromatic, volatile liquids obtained from plant material through steam distillation. 9. The word "…" refers to a surface or substance that is covered in oil or fat, giving it a slick and oily texture. 10. … is commonly used in many processed foods and can alter the texture and flavor of baked goods.

Exercise 6. Read and translate the following text.

Fat, any substance of plant or animal origin that is insoluble in water, and oily or greasy to the touch. Fats may be either solid or liquid at room

temperature, depending on their structure and composition. Fats are usually solid at ordinary temperatures, but they begin to liquefy at higher temperatures.

Although the words "oils", "fats", and "lipids" are all used to refer to fats, "oils" is usually used to refer to fats that are liquids at normal room temperature, while "fats" is usually used to refer to fats that are solids at normal room temperature. "Lipids" is used to refer to both liquid and solid fats, along with other related substances, usually in a medical or biochemical context. The word "oil" is also used for any substance that does not mix with water and has a greasy feel, such as petroleum (or crude oil), heating oil, and essential oils, regardless of its chemical structure.

Chemically, fats are identical to animal and vegetable oils, consisting primarily of glycerides, which are esters formed by the reaction of three molecules of fatty acids with one molecule of glycerol.

There are three main classes of fats that we will ideally consume. Technically they are called "fatty acids" and are identified by their degree of "saturation." Saturation refers to whether or not the carbon atoms in each fat molecule are attached to hydrogen atoms or attached to other carbon atoms with double bonds.

Saturated fats are the most stable class since they lack double bonds between carbon atoms and have the maximum number of bonded hydrogen atoms. This class of fats is usually found in animal products and tropical oils, is solid at room temperature, does not go rancid easily, and is the safest choice for cooking. They are saturated with hydrogen. Hence the name, saturated fat.

The first form of unsaturated fat we'll mention are monounsaturated fats. They are less stable than saturated fats since they have one (mono) double bond and less hydrogen atoms. Hence, they are less saturated with hydrogen. This class of fats is found in olives, avocados, and various nuts, and tends to be liquid at room temperature. Monounsaturated fats are safe for low-temperature cooking but should not be used with higher heat. They should also be stored in dark containers to avoid going rancid.

Polyunsaturated fats are the second form of unsaturated fat. They have two double (poly, or more than one) bonds and even less hydrogen and saturation. Because of this, it makes these fats very unstable and highly reactive to light, heat, and oxygen. They should not be used for cooking and always stored away from heat and light to help prevent rancidity. Polyunsaturates can be found in fish, flax, nuts, and seeds, and are best eaten raw. These fats are not suitable for cooking.

It's important to understand that none of these fat classes are "good" or "bad" per se. Each type serves an important purpose for the body and have pros and cons depending on the context. It's also key to understand that fat containing foods usually include a combination of saturated,

monounsaturated, and polyunsaturated fats, so not just one class. Lard, for example, a fat commonly thought of as saturated, actually contains more monounsaturated than saturated fat.

Trans fats, or trans-fatty acids, are a form of unsaturated fat. They come in both natural and artificial forms. Natural, or ruminant, trans fats occur in the meat and dairy from ruminant animals, such as cattle, sheep, and goats. They form naturally when bacteria in these animals' stomachs digest grass. The best-known ruminant trans fat is conjugated linoleic acid (CLA), which is found in dairy fat. It is believed to be beneficial and is marketed as a dietary supplement. However, artificial trans fats – otherwise known as industrial trans fats or partially hydrogenated fats – fats produced from the industrial process of hydrogenation, in which molecular hydrogen (H_2) is added to vegetable oil, thereby converting liquid fat to semisolid fat are hazardous to your health. These fats occur when vegetable oils are chemically altered to stay solid at room temperature, which gives them a much longer shelf life. Trans fats occur in a number of manufactured foods, including margarine, potato chips, pizza dough, and crackers. Because shortening often contains trans fats, baked foods such as pie crusts, cookies, and doughnuts usually contain trans fats. These fats are also found in deep-fried foods, such as french fries and fried chicken.

Exercise 7. Answer the following questions.

1. What is fat? 2. What is the difference between the terms "oils", "fats", and "lipids"? 3. What do fats consist of chemically? 4. What are three main classes of fats that we will ideally consume? 5. What does fat saturation refer to? 6. What are saturated fats and where are they found? 7. What are two main forms of unsaturated fats and in what way do they differ? 8. Is any of fat classes "good" or "bad" per se? 9. What are two forms of trans fats? 10. What is the origin of natural, or ruminant, trans fats? 11. How are artificial trans fats produced? 12. In what products do artificial trans fats occur?

Exercise 8. Match the sentence halves.

1. Together with oils, fats comprise one of the three principal	a) basic substances.
2. Nearly all cells contain these	b) peanut, soya bean, sunflower, sesame, coconut and olive oils, and cocoa butter.
3. Fat is sometimes called nature's storehouse of energy because on a weight basis	c) fish oil, butter/ghee and lard.

4. Fats or lipids are broken down in the body by enzymes called	d) lipases produced in the pancreas.
5. Examples of edible animal fats are	e) energy it contains more than twice as much as does carbohydrate or protein.
6. They are obtained from fats in the milk and meat,	f) classes of foodstuffs, the others being proteins and carbohydrates.
7. Examples of edible plant fats include	g) as well as from under the skin of an animal.

Exercise 9. Say whether the statements are true or false. Correct if necessary.

1. All fats are solid at room temperature regardless of their structure and composition. 2. Fats consist primarily of glycerides, which are esters formed by the reaction of fatty acids with glycerol. 3. Saturated fats are usually solid at room temperature and are the most stable class of fats. 4. Polyunsaturated fats have multiple double bonds and are not suitable for cooking. 5. Polyunsaturated fats are usually found in animal products such as beef and pork. 6. Monounsaturated fats are known for being the most stable class of fats. 7. Trans fats can occur naturally in the meat and dairy of ruminant animals. 8. Saturated fats are characterized by having double bonds between carbon atoms. 9. Trans fats are always beneficial for health and promote overall well-being. 10. Oils refer solely to solid fats, whereas fats refer only to liquid substances.

Exercise 10. You are going to read an article about fat functions in the body. 5 sentences have been removed from the article. Choose from the sentences A–F the one, which fits each gap (1–5). There is one extra sentence, which you do not need to use.

A. Cholesterol, a type of fat, is a precursor for several hormones, including steroid hormones such as cortisol, estrogen, and testosterone.

B. However, some types of fats, especially those found in processed foods, are not good for us.

C. Fatty acids, derived from dietary fats or stored body fat, are metabolized to provide energy for cellular activities.

D. In addition to serving as an energy reserve, fat plays a critical role in the absorption of fat-soluble vitamins, namely vitamins A, D, E, and K.

E. Lastly, fats can influence satiety and taste in foods, which is important for dietary satisfaction.

F. Phospholipids, a type of fat, form the basic framework of cell membranes, allowing for the separation of the cell's interior from the external environment.

Fat functions in the body are multifaceted and crucial for maintaining overall health and well-being. While often associated with negative connotations, especially in the context of body image and weight management, fats actually play essential roles in various biological processes.

One of the primary functions of fat in the body is to serve as a source of energy. (1) Unlike carbohydrates, which are utilized quickly, fats supply a concentrated energy source, yielding more than double the calories per gram. This makes them particularly vital during prolonged periods of physical exertion or times of fasting when the body relies on stored fats to fuel its functions.

(2) These vitamins are essential for various bodily functions, including vision, bone health, immune function, and blood clotting. Consuming healthy fats alongside these vitamins enhances their absorption in the intestines, highlighting the importance of dietary fat in a balanced diet.

Fat also contributes to the structure and function of cell membranes. (3) This structural integrity is vital for maintaining cellular homeostasis and facilitating communication between cells.

Moreover, fats are integral to hormone production. (4) These hormones play significant roles in regulating metabolism, immune response, and reproduction, underscoring the importance of adequate fat intake for hormonal balance.

Furthermore, fats contribute to thermal insulation and protection of vital organs. Adipose tissue, or body fat, acts as a cushion for organs, shielding them from physical trauma and helping to regulate body temperature by providing insulation.

(5) Foods rich in healthy fats can promote a feeling of fullness, helping to regulate appetite and potentially supporting weight management.

In summary, fats are indeed essential to human health, providing energy, aiding in nutrient absorption, contributing to cellular structure, facilitating hormone production, and offering protection to organs. Recognizing the beneficial aspects of healthy fats encourages a more comprehensive understanding of nutrition and its impact on the body.

Exercise 11. Choose the best option to the following statements.

1. One of the primary functions of fat in the body is to serve as a source of … .

a) glucose;
b) energy;
c) protein.

2. Fats supply a concentrated energy source, yielding more than double the … per gram compared to carbohydrates.

a) fiber;

b) vitamins;

c) calories.

3. Fat plays a critical role in the absorption of … vitamins, which include A, D, E, and K.

a) water-soluble;

b) fat-soluble;

c) protein-based.

4. Phospholipids, a type of fat, form the basic … of cell membranes.

a) structure;

b) energy source;

c) signal.

5. Cholesterol is a type of fat that serves as a precursor for several … , including cortisol and estrogen.

a) enzymes;

b) vitamins;

c) hormones.

6. Adipose tissue, or body fat, acts as a … for organs, helping to regulate body temperature.

a) source of energy;

b) cushion;

c) transporter.

7. Foods rich in healthy fats can promote a feeling of … , helping to regulate appetite.

a) emptiness;

b) fullness;

c) hunger.

Exercise 12. Match English expressions to their Russian equivalents.

1. Physical exertion	a) удовлетворенность питанием
2. Overall health	b) всестороннее понимание питания
3. Negative connotation	c) внутреннее пространство клетки
4. Dietary satisfaction	d) физические нагрузки
5. Weight management	e) предшественник нескольких гормонов
6. Blood clotting	f) жировая ткань
7. Absorption in the intestines	g) «подушка безопасности» для органов
8. Cell’s interior	h) отрицательный подтекст
9. Precursor for several hormones	i) контроль веса

10. Cushion for organs	j) общее состояние здоровья
11. Comprehensive understanding of nutrition	k) всасывание в кишечнике l) теплоизоляция
12. Feeling of fullness	m) структурная целостность
13. Thermal insulation	n) многогранный и решающий
14. Adipose tissue	o) свертываемость крови
15. Structural integrity	p) чувство сытости
16. Multifaceted and crucial	

Exercise 13. Complete the sentences with the correct preposition (in addition to, during, around, on, for, without, in, beneath) where necessary.

1. Fat serves as a critical source of energy during prolonged periods … food. 2. … energy storage, fat provides insulation to maintain body temperature. 3. Fat functions as a cushion … vital organs, protecting them from injury. 4. Essential fatty acids found in fat are necessary … various cellular processes. 5. Hormones related to fat metabolism play important roles … regulating appetite and energy balance. 6. … exercise, the body utilizes stored fat to fuel muscle activity. 7. In the presence of carbohydrates, fat can be mobilized … more efficiently for energy. 8. Fat deposits … the skin contribute to the overall structure and appearance of the body. 9. Certain vitamins, like A, D, E, and K, require … fat for proper absorption and utilization. 10. Imbalances in fat levels can have significant effects … overall health and well-being.

Exercise 14. Translate from Russian into English.

1. Насыщенные жиры обычно содержатся в продуктах животного происхождения, таких как мясо и молочные изделия. 2. Ненасыщенные жиры, включая моно- и полиненасыщенные, полезны для сердца и находятся в растительных маслах. 3. Трансжиры образуются в процессе гидрогенизации и могут повышать уровень холестерина в крови. 4. Омега-3 жирные кислоты, содержащиеся в рыбе и семенах льна, полезны для мозга и сердца. 5. Оливковое масло является отличным источником мононенасыщенных жиров и хорошо подходит для готовки. 6. Кокосовое масло содержит насыщенные жиры, которые быстро усваиваются и могут быть использованы в качестве источника энергии. 7. Плоды авокадо имеют высокий уровень ненасыщенных жирных кислот.

Unit VI
CARBOHYDRATES

Exercise 1. Read and memorize the following words.

Carbohydrate – углевод; starch – крахмал; complexity – сложность; glycosidic – гликозидный; sugar cane – сахарный тростник; sugar beet – сахарная свекла; malted – солодовый; digestion – пищеварение; legumes – бобовые; predominantly – преимущественно; liver – печень; pancreas – поджелудочная железа; rigidity – жесткость; crustaceans – ракообразные; appreciation – признательность, оценка; incorporating – включение; intake – потребление; fiber – волокно, клетчатка; to facilitate – содействовать; bowel – кишка; drawback – недостаток; weight gain – набор веса; nutritionist – диетолог; conversely – наоборот; to reap the benefits – пожинать плоды.

Exercise 2. Match the words with the definitions.

1. Appreciation	a) a white substance that exists in large amounts in potatoes and particular grains such as rice
2. Drawback	b) a plant from whose white root sugar can be produced
3. Bowel	c) softened by steeping in water, allowed to germinate, and used especially in brewing and distilling
4. To facilitate	d) a large organ in the body that cleans the blood and produces bile
5. Starch	e) the act of recognizing or understanding that something is valuable, important, or as described
6. Nutritionist	f) to make something possible or easier
7. Glycosidic	g) the long tube that carries solid waste from the stomach out of the body
8. Sugar beet	h) a disadvantage or the negative part of a situation
9. Liver	i) an expert on the subject of nutrition
10. Malted	j) relating to connections that involve sugar molecules

Exercise 3. Read the following sentences and fill in the gaps.

Carbohydrates, legumes, rigidity, crustaceans, fibers, complexity, sugar cane, digestion, predominantly, intake

1. The … of carbohydrates can vary widely, with simple sugars like glucose and fructose contrasting with more complex forms like starches

and fiber. 2. … are essential macronutrients that provide energy for the body and play a crucial role in overall health. 3. White sugar is produced from … … in specialized mill factories. 4. The … of carbohydrates begins in the mouth and continues in the small intestine, where enzymes break them down into simpler sugars. 5. A group of plants that includes beans, peas, chickpeas, lentils is called … . 6. Foods that are … rich in carbohydrates, like whole grains and fruits, are beneficial for a balanced diet. 7. The … of plant cell walls is largely attributed to fiber, a type of carbohydrate that aids in digestion and promotes gut health. 8. Some … , such as shrimp and crabs, have exoskeletons made of chitin, which is a type of carbohydrates. 9. A higher … of fiber-rich carbohydrates can help regulate blood sugar levels and improve digestive health. 10. Understanding the various forms and functions of carbohydrates, from simple sugars to complex … , is vital for making informed dietary choices.

Exercise 4. Read and translate the following text.

Carbohydrates, often referred to as "sugars" or "starches", are one of the fundamental macronutrients essential for human health. They serve as a primary energy source, playing a critical role in various biological functions. Structurally, carbohydrates are composed of carbon, hydrogen, and oxygen, typically in a ratio of 1:2:1. This group of organic compounds can be classified into three main categories: monosaccharides, disaccharides, and polysaccharides, each differing in complexity and function.

Monosaccharides are the simplest form of carbohydrates, consisting of single sugar units. Key examples include glucose, fructose, and galactose. These sugars are the building blocks for more complex carbohydrates and are characterized by their sweet taste and solubility in water. Monosaccharides can vary in the number of carbon atoms they contain; the most common monosaccharides have three to seven carbons, which are referred to as trioses, pentoses, and hexoses, respectively. Glucose, a six-carbon (hexose) sugar, is a vital source of energy for the body's cells. It is primarily found in fruits, honey, and root vegetables, whereas fructose, found in fruits and some vegetables, is sweeter than glucose and often used in processed foods as a sweetener.

Disaccharides are carbohydrates formed by the combination of two monosaccharide molecules linked by a glycosidic bond. The most common disaccharides include sucrose, lactose, and maltose. Sucrose, commonly known as table sugar, is composed of glucose and fructose; it is naturally present in many plants, particularly in sugar cane and sugar beets. Lactose, the sugar found in milk, is formed from glucose and galactose, making it vital for

energy in infants and a significant component of dairy products. Maltose, which consists of two glucose units, is primarily produced during the digestion of starch and is found in malted foods and beverages, such as beer.

Polysaccharides are complex carbohydrates formed by long chains of monosaccharide units. They can be classified further into storage polysaccharides and structural polysaccharides. Storage polysaccharides include starch and glycogen. Starch, found in high amounts in foods such as potatoes, grains, and legumes, serves as the primary energy reserve for plants. In humans, starch is broken down into glucose for immediate energy. Glycogen, the storage form of glucose in animals, is predominantly found in the liver and muscle tissues. During times of energy need, glycogen can be quickly converted back into glucose.

Structural polysaccharides, on the other hand, include cellulose and chitin. Cellulose, a major component of plant cell walls, provides rigidity and structural support. It is not digestible by humans; however, it plays a crucial role in dietary fiber, aiding in digestive health. Chitin, which is found in the exoskeletons of crustaceans and insects, also serves a protective function.

In conclusion, carbohydrates are vital to human health, providing energy, supporting metabolism, and contributing to overall well-being. Understanding the classification of carbohydrates – monosaccharides, disaccharides, and polysaccharides – allows for better nutritional choices and an appreciation of the role these macronutrients play in our daily diets. By incorporating a variety of carbohydrate sources, individuals can ensure a balanced intake that supports both energy needs and digestive health.

Exercise 5. Answer the following questions.

1. What are the three main categories of carbohydrates mentioned in the text? 2. How are monosaccharides defined and what are some key examples? 3. What is the significance of glucose in human health? 4. Explain the process by which disaccharides are formed and provide examples of common disaccharides. 5. How does the composition of sucrose differ from that of lactose and maltose? 6. What are storage polysaccharides, and what roles do starch and glycogen play in nutrition? 7. Describe the structure and function of cellulose as a structural polysaccharide. 8. Why is chitin important in the context of structural polysaccharides? 9. Discuss the role of carbohydrates in human health as outlined in the text. 10. How can a better understanding of carbohydrate classification contribute to improved nutritional choices?

Exercise 6. Complete the sentences with the correct preposition (for, in, down, with, by, due to, of) where necessary.

1. Found in fruits and dairy products, simple carbohydrates are more easily digested … the body. 2. The body breaks … simple carbs to be used for energy, which is used up very quickly. 3. They are also often found … processed, refined foods such as white sugar, pastas, and white bread. 4. Another type of carbs, called complex carbohydrates, take longer … the body to digest and are most commonly found in vegetables (cellulose), whole grain breads and pasta, brown rice, and legumes. 5. Foods … unrefined grains, such as brown rice, retain complex carbs, unlike refined grains, such as white rice. 6. This is because the refining process removes some … the grain's fiber and nutrients. 7. Eating … a serving of whole grain cereal such as oatmeal will fill you up and give you longer lasting energy than a bowl of sugary cereal … the way the body processes and uses … the carbohydrates.

Exercise 7. Complete each sentence using a word derivationally related to the word given in brackets.

1. The liver (digestion) carbohydrates by breaking them down into simple sugars, or glucose, which stimulates the production of insulin in the pancreas. 2. The insulin functions to get the sugar into the body's cells to be used as (energetic). 3. The two different types of carbs affect the (produce) of insulin differently – when digesting simple carbohydrates, insulin levels spike faster, and the carbs are used up more quickly for energy. 4. This explains why many who turn to a candy bar for a quick (supplier) of energy find that their energy levels crash when the "sugar high" comes to an end. 5. (Complexity) carbohydrates take longer to digest, resulting in longer lasting energy, and less of an insulin reaction in the body. 6. If the body produces too much glucose, it will be (storage) in the liver and muscle cells as glycogen. 7. Any leftover glycogen that isn't stored in liver and (muscularity) cells is stored as fat.

Exercise 8. Read and translate the following text.

Carbohydrates are one of the three macronutrients essential to human health, alongside proteins and fats. They serve as a primary source of energy for the body and play a crucial role in various physiological functions. Understanding the functions, advantages, and disadvantages of carbohydrates can help individuals make informed dietary choices.

Carbohydrates can be classified into three main categories: sugars, starches, and fiber. Sugars, such as glucose and fructose, are simple carbohydrates

that provide immediate energy. Starches, complex carbohydrates found in foods like grains and legumes, consist of long chains of glucose molecules, which the body can break down into glucose for energy. Fiber, another vital component found in fruits, vegetables, and whole grains, is not digestible by the body but is essential for digestive health.

One of the primary functions of carbohydrates is to provide energy. The body converts consumed carbohydrates into glucose, which fuels every cell, tissue, and organ. This is especially critical for the brain, which relies heavily on glucose for optimal function. In fact, the brain's high energy demand is met almost exclusively through carbohydrates, making them indispensable for cognitive processes, including concentration, memory, and mood regulation.

Additionally, carbohydrates facilitate the storage of energy. The body can store excess glucose in the liver and muscles in the form of glycogen. This stored glycogen can be converted back into glucose when the body requires a quick energy source, such as during exercise or periods of fasting. Carbohydrates, specifically fiber, also play a vital role in promoting digestive health. Dietary fiber aids in regular bowel movements, prevents constipation, and may lower the risk of gastrointestinal disorders. Moreover, fiber contributes to satiety, helping to manage appetite and weight control.

Despite their numerous benefits, not all carbohydrates are created equal, leading to the necessity of discerning the pros and cons of their consumption. The advantages of consuming carbohydrates, particularly whole-food sources like fruits, vegetables, and whole grains, include their high nutrient density, rich fiber content, and lower glycemic indices, which contribute to sustained energy levels and improved blood sugar control.

Conversely, the drawbacks of carbohydrates often stem from the consumption of refined carbohydrates and added sugars found in processed foods. These types of carbohydrates are quickly digested and can lead to rapid spikes in blood sugar levels, promoting insulin resistance and increasing the risk of type 2 diabetes. Additionally, excessive consumption of refined carbohydrates can contribute to weight gain, as they are typically low in fiber and other nutrients, leading to less satiety and overeating.

Furthermore, certain diets have risen in popularity, advocating for low-carbohydrate or ketogenic eating patterns. While these diets may lead to short-term weight loss and improved metabolic markers in some individuals, their long-term sustainability and health impacts remain subjects of debate among nutritionists and healthcare professionals.

In conclusion, carbohydrates are a vital part of a balanced diet, serving essential functions in energy production and digestive health. Their pros are evident in the form of immediate energy, muscle glycogen storage, and

gastrointestinal benefits. However, the consumption of refined carbohydrates can pose risks, emphasizing the importance of choosing whole, unprocessed carbohydrate sources for optimal health. Making informed choices regarding carbohydrate intake can support overall well-being while ensuring that one reaps the benefits they offer.

Exercise 9. Say whether the statements are true or false. Correct if necessary.

1. Carbohydrates are one of the three macronutrients essential to human health, alongside proteins and fats. 2. Carbohydrates are not necessary for brain function. 3. Carbohydrates play a crucial role in promoting digestive health, particularly through the action of dietary fiber. 4. Refined carbohydrates contribute to weight loss and improved metabolic health. 5. Fiber is digestible by the body and provides energy. 6. Low-carbohydrate diets are universally recommended for all individuals. 7. Carbohydrates are primarily found in meat and dairy products. 8. Sugars, starches, and fiber are the three main categories of carbohydrates. 9. All carbohydrates have the same effects on blood sugar levels. 10. The body cannot store carbohydrates in any form.

Exercise 10. Choose the answer (A, B, C, or D) that best fits each space.

1. Carbohydrates are one of the three main macronutrients, alongside … and fats. 2. They are primarily found in foods such as bread, pasta, fruits, and … . 3. Carbohydrates are classified into two main types: simple carbohydrates and … carbohydrates. 4. Simple carbohydrates, often referred to as sugars, provide quick energy but can lead to … if consumed in excess. 5. Complex carbohydrates, like those found in whole grains, are digested more … and provide sustained energy. 6. The body breaks down carbohydrates into … , which is used for energy by our cells. 7. A balanced diet should include an appropriate amount of carbohydrates to support … and overall health.

No.	A	B	C	D
1	vitamins	proteins	minerals	fibers
2	vegetables	dairy	meats	nuts
3	complex	advanced	refined	combined
4	fatigue	weight gain	dehydration	muscle loss
5	slowly	quickly	irregularly	inefficiently
6	glucose	amino acids	fatty acids	cholesterol
7	digestion	satiety	energy levels	hydration

Exercise 11. Here are 10 facts about carbohydrates. Agree or disagree with them and explain your choice.

1. When carbohydrates are consumed in the right quantity, it will help lose weight. 2. Carbohydrates not only provide energy but also help in absorbing calcium. 3. The human body cannot produce carbohydrates. 4. The only organ in the body that is highly dependent on carbohydrates is the brain. 5. Fungi have a structural carbohydrate molecule called chitin. 6. It is possible to live on healthy diet with zero or low carbs by using proteins for energy. 7. Consuming too many bad carbohydrates like processed and refined foods will lead to obesity. 8. Fibers help in lowering blood cholesterol and are also involved in maintaining a healthy digestive system. 9. Many cultural and traditional diets around the world are centered around carbohydrate-rich foods such as rice, corn, potatoes, and legumes. 10. Carbohydrates contribute to the palatability and texture of many foods, providing sweetness, crunchiness, and structure.

Exercise 12. Find the lost 10 words and write them down. Use these words to compose sentences on your own.

I	R	I	G	I	D	I	T	Y	N	T	D	Y	O
N	A	B	D	I	T	I	O	N	N	M	I	K	Q
T	R	N	C	R	U	S	T	A	C	E	A	N	S
A	S	T	L	U	T	I	O	N	T	Y	F	I	C
K	R	A	G	R	G	L	Y	C	O	G	E	N	B
E	V	E	N	E	R	G	Y	I	N	G	R	U	O
S	E	F	P	E	S	T	A	R	C	H	Y	T	W
G	P	S	O	D	P	A	N	C	R	E	A	S	E
R	L	E	G	U	M	E	S	I	B	L	E	Q	L
D	I	S	A	C	C	H	A	R	I	D	E	L	Z

Exercise 13. Choose the best continuation for each of the following sentences.

1. Carbohydrates are one of the three macronutrients essential to human health, alongside … .

a) enzymes and minerals;

b) vitamins and hormones;

c) proteins and fats.

2. Sugars, such as glucose and fructose, are simple carbohydrates that provide … .

a) structural support;

b) immediate energy;

c) transmitting signals.

3. Fiber is not digestible by the body but is essential for … .
a) digestive health;
b) mental health;
c) immune response.
4. In fact, the brain's high energy demand is met almost exclusively … .
a) through fats;
b) through proteins;
c) through carbohydrates.
5. The body can store excess glucose in the liver and muscles … .
a) as starch;
b) in the form of glycogen;
c) by means of other saccharides.
6. Fiber contributes to satiety, helping to manage … .
a) appetite and weight control;
b) blood sugar control;
c) water balance.
7. The advantages of consuming carbohydrates include their high nutrient density, rich fiber content, and … .
a) variety of saccharides;
b) enhanced immunity;
c) lower glycemic indices.
8. Excessive consumption of refined carbohydrates can contribute to … .
a) weight gain;
b) worsening bone health;
c) poor eye, and skin health.

Exercise 14. Translate from Russian into English.

1. Углеводы являются основным источником энергии для организма человека. 2. Крахмал – это сложный углевод, который содержится в картофеле, рисе и хлебе. 3. Простые углеводы, такие как сахар, быстро усваиваются и обеспечивают мгновенный прилив энергии. 4. Клетчатка, содержащаяся в фруктах, овощах и цельнозерновых продуктах, полезна для пищеварения. 5. Растворимая клетчатка помогает снизить уровень холестерина в крови. 6. Нерастворимая клетчатка способствует нормальной работе кишечника и предотвращает запоры. 7. Лактоза является углеводом, содержащимся в молоке и молочных продуктах. 8. Гликоген – это запасной углевод, который хранится в печени и мышцах организма. 9. Фрукты содержат натуральные сахара и витамины, что делает их полезным источником углеводов. 10. Избыток углеводов в рационе может привести к набору веса, поэтому важно контролировать их потребление.

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