Федеральное государственное бюджетное образовательное учреждение
высшего образования
«Сибирский государственный медицинский университет»
Министерства здравоохранения Российской Федерации

**А.А. Абрамова, М.В. Власова, Н.А. Дмитриенко,
А.А. Меньшикова, Н.Г. Новикова, О.В. Петухова**

АНГЛИЙСКИЙ ЯЗЫК ДЛЯ СТУДЕНТОВ МЕДИЦИНСКИХ СПЕЦИАЛЬНОСТЕЙ

ЧАСТЬ II

учебное пособие

**ТОМСК
Издательство СибГМУ
2024**

УДК 61:81’276.6(075.8)
ББК Ш143.21-9
А 647

Авторы:

А.А. Абрамова, М.В. Власова, Н.А. Дмитриенко,
А.А. Меньшикова, Н.Г. Новикова, О.В. Петухова

А 647 Английский язык для студентов медицинских специальностей: учебное пособие. В 2-х частях. Часть II / А. А. Абрамова и [др.] – Томск: Издательство СибГМУ, 2024. – 133 с.

Учебное пособие по английскому языку для студентов медицинских специальностей предназначено для студентов медицинских вузов 1–2 курсов, обучающихся по направлениям «Лечебное дело» и «Педиатрия». Данное пособие имеет своей целью формирование и совершенствование лексических и грамматических навыков, а также развитие умений чтения, говорения, аудирования и письма на английском языке.

Пособие может помочь обучающимся значительно расширить словарный запас, научит их применять полученные знания как при выполнении заданий в рамках учебного процесса, так и в ситуациях реального общения.

Учебное пособие составлено на основе Федерального государственного образовательного стандарта высшего профессионального образования по дисциплине «Иностранный язык» и рабочей программы для специальностей «Лечебное дело» и «Педиатрия».

УДК 61:81’276.6(075.8)
ББК Ш143.21-9

Рецензенты:
А.Г. Богданова – кандидат филологических наук, доцент, директор ИЯМС ТГПУ.
В.М. Лемская – кандидат филологических наук, заместитель директора ИЯМС ТГПУ, доцент кафедры перевода и переводоведения ИЯМС ТГПУ

Утверждено и рекомендовано к печати Центральным методическим советом ФГБОУ ВО СибГМУ Минздрава России (протокол № 7 от 01.11.2024).

Contents

LESSON 1. MICROORGANISMS

SECTION 1: VOCABULARY

Nouns and noun phrases: spread, bacterium/-a, virus, fungus/-i, protozoa (pl.), anthrax, germ, cold, influenza, chickenpox, dysentery, athlete's foot, severity, transmission, toxin, enzyme, vaccination, overuse, strain, delay, rate, data *мн.от* datum, quarantine.
Verbs: to spread, to reduce, to be referred, to transmit, to target, to damage, to invade, to reproduce, to destroy, to predict, to affect, to bind, to eliminate, to implement, to anticipate.
Adjective/participle: current, tiny, pathogenic, single-celled, high-profile, multi-cellular, transplant(patients), notable, resistant, attenuated, novel, responsible, relevant.
Adverb: specifically, commonly, generally, unfortunately, clearly, unnecessarily, steadily, significantly, sharply, dramatically.
Phrases: infectious agent /pathogene, disease-causing microorganisms, by the naked eye, to be beneficial to humans, to focus on smth, to result from smth, to have a large impact on human health, lowered immune system, via the air or through contaminated food, in recent times, responses from smth, to get rid of smth, key strategy, a full-blown response, to have access to smth, to be at risk of, to limit the spread of the disease, to create a background level of immunity, to put it another way, target cells, excretory system, disease carriers, the crux of the matter.

EXERCISE 1. READ THE TEXT AND DO EXERCISES THAT FOLLOW

Microorganisms

A great variety of microscopic organisms thrive on earth. The main groups of microorganisms are bacteria, fungi, viruses, algae, protozoa, and archaea.

Bacteria that are often called as workhorses of biotechnology are the most numerous. Thanks to skilled efforts from microbiologists, bacteria are used in miraculous ways. Having always been good at domesticating plants and animals, humans are capturing microorganisms nowadays.

Some of them serve as factories to produce medicines, pesticides, solvents and plastics. Some help make the snow at a ski resort. Some sep-

arate gold and copper from ores, reducing the need for chemicals like cyanide. Some regenerate tired oil wells. Some make the enzymes to cut DNA, the first step in genetic engineering. Some are our fermenters, turning sugar into bread, beer, sauerkraut, cheese, yoghurt, vinegar and wine.

And some microbes, of course, are ancient enemies, the invisible messengers of tuberculosis, cholera and other disasters. But these are relatively few. Only one in a thousand microbes is a pathogen – what we call a germ. Without the rest, neither we nor the planet could live. They do what we want, and they dispose of what we don't want.

These small workhorses of biotechnology have a common characteristic feature, i.e. they can live as a single cell. Having been the only life on earth for two billion years, they are structurally the simplest, lacking the cell nucleus found in other microbes. Most reproduce by division. Bacteria flourish as the planet's most abundant, most varied, most versatile, and most useful organisms – and among us most deadly. They may be in different forms. We can see yeasts as the plump spheroids, whereas molds are presented as the hairy cells. On the one hand, fungi decompose our compost and forest floor, on the other hand, they can lead to cereal diseases and human cancer. These microbes live among us and within us in huge numbers.

Microorganisms can exist in nature independently. Unlike them, viruses are parasites, they cannot exist and reproduce without a host cell. Viruses can infect absolutely all kinds of living beings, from humans to plants and even bacteria. A virus is an infectious agent of small size and facile composition that can multiply only in living cells of animals, plants, or bacteria. A virus is a tiny parasite living, growing and reproducing inside a host cell. When viruses damage or destroy the cells they intrude causing virus diseases; polio, smallpox and rabies being characteristic examples. Viruses are the smallest microbes. In 1892, viruses were first discovered by a Russian scientist D. Iwanowski who noticed infective agents that would pass through a filter that obstructed ordinary bacteria. Consequently they were originally called “filterable viruses”. The tobacco mosaic virus was the first one to be discovered, a plant virus putting **s**pot**s** on tobacco leaves. Since then, a great many viruses, all para**s**ite**s** on the cells of plants, lower animals or human beings, have been identified. Viruses that are parasites on bacteria are called bacteriophage. Bacteriophages are in common use in genetic studies.

Viruses may be in all kinds of shapes – spheres, balls, ovals (egg-shaped), cubes, rhomboids, commas, and rods. They are unbelievably

small – millionths of an inch in length, breadth, and thickness. The largest known virus, that of parrot fever (psittacosis) – measuring 450 millimicrons – is only about 1/20-th the size of a red blood cell. The smallest virus causing hoof-and-mouth disease measures only 10 millimicrons.

The human immunodeficiency virus (HIV), which causes AIDS, is one of the well-known viruses. By itself, it is not responsible for most of the illness and death associated with acquired immunodeficiency syndrome (AIDS). This virus directly affects the organs, thus weakening the body's defenses. The human immunodeficiency virus contributes to the development of various infections due to invasions of pathogenic microorganisms that actively multiply because the immune system is malfunctioning. Such infections account for up to 90 percent of deaths from AIDS, which is the final stage of HIV infection.

Scientists are trying to find ways to use viruses to kill bad bacteria instead of using antibiotics. They might yet find wonderful uses for viruses.

So there we have the wonderful world of microbes. We absolutely could not survive without them. Yes, some do cause disease and illness, but they can also cure disease, produce oxygen energy and food.

I. A. What is missing? Guess what nouns have been missed

1. Some _____serve as factories – making pharmaceuticals, pesticides, solvents, and plastics.
2. Some make the_____for snipping DNA, the first step in genetic engineering.
3. And some microbes, of course, are age-old enemies, the invisible messengers of tuberculosis and cholera and other_____.
4. They are the workhorses of_____.
5. The plump_____you see are yeasts.
6. These tiny _____share a common characteristic: They can live as a single.
7. These microbes dwell among us – and within us – in astronomical____.
8. Billions are helping digest your last meal and, perhaps, excavating _____ where your toothbrush fails to reach.

B. What is missing? Guess what adverbs have been missed

9. Microorganisms can exist in nature _____, unlike viruses.
10. Hence they were_____ called filterable viruses.
11. Viruses can infect _____all kinds of living beings.

12.The smallest virus, that of hoof-and-mouth disease, measures_____10 millimicrons.
13.One of the _____known viruses is the AIDS-causing human immunodeficiency virus (HIV).
14. HIV can damage organs _____.
15. Such infections, which _____cause disease – impairment of organ function – in people with a healthy immune system, account for as much as 90 percent of the mortality of AIDS.

EXERCISE 2. A. CHOOSE THE BEST WORD FOR EACH SENTENCE. USE EACH WORD ONLY ONCE

fermenters	invisible	wondrous	separate
convenient	digest	characteristic	sample

1. … bacteria and other «bugs» are being put to work in_____ ways.
2. A mere 10,000 protozoans inhabit your _____, though not the most notorious.
3. Some_____gold and copper from ores.
4. … the_____messengers of tuberculosis and cholera and other scourges.
5. Some are our ____, converting sugars into bread, beer, sauerkraut, etc.
6. These tiny workhorses share a common_____.

B. Choose the best word for each sentence. Use each word only once

Fashionable	damage	bacteriophage	nature
originally	minor	associates	nucleus
parsite	infective	closely	

7. “Virus” has also become a_____medical diagnosis.
8. It is usually applied to_____disturbances of the stomach…
9…. who noted_____agents that would pass through a filter that stopped ordinary bacteria.
10. Hence they were_____called filterable viruses.
11. In 1901 Walter Reed and his_____found the virus that causes yellow fever in man.
12. Viruses that are parasites on bacteria are called_____.
13._____related to viruses are Rickettsia…

14. The exact of the viruses has not yet been settled.
15. The crux of the matter appears to lie in the____of the virus…

EXERCISE 3. MATCH THE WORDS AND DEFINITIONS

1. species	**a.** Plant without leaves, flowers or green coloring matter, growing on other plants or on decaying matter.
2. soil	
3. enzyme	
4. bacteria	**b.** Single-celled organisms that can cause diseases the most common of them are malaria and toxoplasmosis.
5. fungus	
6. yeast	
7. mold	**c.** Biological group having some common characteristics (division of a genus) able to breed with each other but not with other groups.
8. protozoa	
9. parasite	
10. stomach	**d.** Organic chemical substance (a catalyst) formed in living cells, able to cause changes in other substances without being changed itself.
11. fever	
12. protein	
13. chromosome	**e.** Non-cellular, microscopic infectious agents that can only replicate inside a host cell.
14. chemical	
15. viruses	**f.** A fungal growth that forms and spreads on various kinds of damp or decaying organic matter.
	g. Microscopic, unicellular, independently reproducing, and mostly free-living organisms.
	h. A mass of rock particles and humus from which plants obtain essential materials.
	i. Substance used in brewing beer, and in the making of bread.
	j. One of the minute threads in every nucleus in animal and plant cells, carrying genes.
	k. Animal or plant living on or in another and getting its food from it.
	l. Condition of the human body with temperature higher than usual, especially is a sign of illness.
	m. Substance used in, or obtained by, chemistry.
	n. Bag-like part of the alimentary canal into which food passes to be digested.
	o. Body-building substance essential to good health, in such foods as milk, eggs, meat.

EXERCISE 4. REARRANGE THESE SERIES OF WORDS TO FORM SENTENCES

1. plants / domesticate / people / always / and / animals.
2. we / bacteria / learning / domesticate / to / now / are.
3. under / you / a / put / it / microscope.
4. are / molds / hairy / the / cells.
5. crop / those / lead / diseases / filaments / can / to.
6. these / dwell / us / microbes / among.
7. tailor / scientists / can / microbes / now / create / to / products / medical.
8. pharmaceutical / was / the / factory / erecting / new / a / facility.
9. smallest / viruses / the / are / microbes.
10. become / fashionable / a / diagnosis / has / “virus” / medical.
11. they / identified / ever / have / virus / that?
12. act / bacteria / where / usually / do?
13. the / damaged / has / the / kidneys / already / virus.
14. survival / depend / only / will / on / time / the / therapies.
15. leaves /the / tobacco/ virus/ on/ puts/ mosaic/ spots/tobacco.

EXERCISE 5. CORRECT MISTAKES IN THE FOLLOWING SENTENCES

1. Some bacteria help make the snow at our sky resort.
2. He reads the book about enzymes at the moment.
3. Microbes can live as a single sell.
4. They by fission reproduce.
5. Was Susan really have a headache last Sunday?
6. Students examined molds under the microscope from 9 to 10 yesterday.
7. They wanted an information.
8. How microbes are small?
9. What did stop ordinary bacteria?
10. These hairy cells was called molds.
11. We have knowed this disease for ages.
12. A virus lives inside a houst cell.
13. I feel mizerable today.
14. There isn't many news.
15. I never have talked to the Queen.

SECTION 2: GRAMMAR
MODAL VERBS

Functions of Modal Verbs

Ability	**Possibility Probabil-ity**	**Permission ask/refuse**		**Request**	**Offer**
can could was able to couldn't won't be able to	might may must could can't be	can could may might	mustn't can't	can could will('ll)	Would you like Shall I/we Will …?
Suggestion	**Advice Strong obligation**	**Obligation Necessity**		**Absence of neces-sity**	**Prohibi-tion**
could shall I/we	should ought to had better	must have to have got to		needn't don't need/ don't have to	mustn't can't

EXERCISE 1. FIND A MODAL VERB IN EACH SENTENCE, DEFINE ITS FUNCTION. TRANSLATE THE SENTENCES

1. The digestive system may be affected by suspected Crohn's disease.
2. A condition like angina can seriously affect the circulatory system.
3. This might require a lab technician to check cholesterol levels in order to control medication.
4. Part of the treatment plan could require a radiographer to calculate correct dosages of radiation in the X-ray procedure for imaging.
5. The injection of vaccine must be administered every year if it is to have any effect.
6. This might require a lab technician to check cholesterol levels in order to control medication.
7. This will help doctors choose the correct drug dosage in the treatment.
8. I'd like you to do some research on that before you come.
9. A hematologist will need to check the white blood cell count to find out whether medicines have weakened the immune system when treating the condition.

10. You needn’t come this evening if you don’t want to.
11. I don’t feel well. What shall I do? Do you think I should go to the doctor?
12. You must try harder than that if you are going to pass this exam.
13. I think you ought to be more attentive at the lectures to realize the subject matter.
14. The doctor you are waiting for must be in consulting room 2.
15. When I was at the university, I would sometimes work all night.
16. Waste products need to be transported out of the body by the excretory system.

EXERCISE 2. WATCH THE VIDEO ABOUT MICROORGANISMS AND DO EXERCISES

https://www.youtube.com/watch?v=YSitT0oOoyc

Answer the questions to the video:

1. What percentage of life on earth are microorganisms?
2. What do microorganisms generate in atmosphere?
3. Why is it important for the nitrogen to be fixed by microorganisms in soil?
4. What groups are microorganisms divided into?
5. What group of microorganisms is acellular?
6. Are protozoa unicellular or multicellular?
7. Where are protozoa usually found?
8. What causes yeast infections in your body?
9. Can you tell me what types of fungi are too small to be seen by a naked eye?
10. Are bacteria harmful or beneficial?
11. Do you know if bacteria can help boost our immune system and aid digestion?
12. What should we thank for a process called nitrogen fixation?
13. Do you know why algae are photosynthetic?
14. Which microbes carry out decomposition of organic matter and material wastes into simpler substances?
15. Where have all new antibiotics come from in the past 50 years?
16. Are scientists trying to find ways to use viruses to kill bad bacteria instead of using antibiotics?
17. How do you think whether we could survive without microorganisms?

LESSON 2. IMMUNOLOGY AND ALLERGIC REACTIONS

SECTION 1: VOCABULARY

Nouns and noun phrases: immunity, immunodeficiency, immunology, anaphylaxis, allergy, antibody, antigen, complement, cytokine, synthesis. protein, malnutrition, (anti)histamine, pollen, pollinosis, recipient, mold (mould), mediator, adenoids, appendix, spleen, thymus, tonsils, lymph nodes, sweating, hives, culprits, wasps, bees, hornets, midgets, defense, cilia.
Verbs: to overreact, to disrupt, to launch, to weaken, to activate, to replicate, to trap, to encounter, to mount, to secrete, to lubricate, to defend, to line.
Adjective/ participle: immunodeficient, immunological, compromised, perennial, misidentified, targeted, innate, acquired, adaptive, downward, defensive, lymphatic.
Adverb: (un)controllably, properly.
Phrases: compromised immunity, key metabolic pathways, impaired development, armpit/neck/groin lymph nodes, chemical mediator, sesame seeds, insect stings, surface barriers, to inhibit synthesis, Peyer's patches, eyelid swelling, allergic rhinitis, hay fever, middle ear effusion, thymus gland, immunodeficiency disorders, to lunch an immune response, common autoimmune disease, primary immunodeficiency diseases = (PIDD), downward spiral of events, to end in, to prevent failed transplant (rejection), to filter germs, stem cells, spongy center, to release into the bloodstream, to stick to, to reside in a tissue, to trap foreign invaders, subsequent exposure.

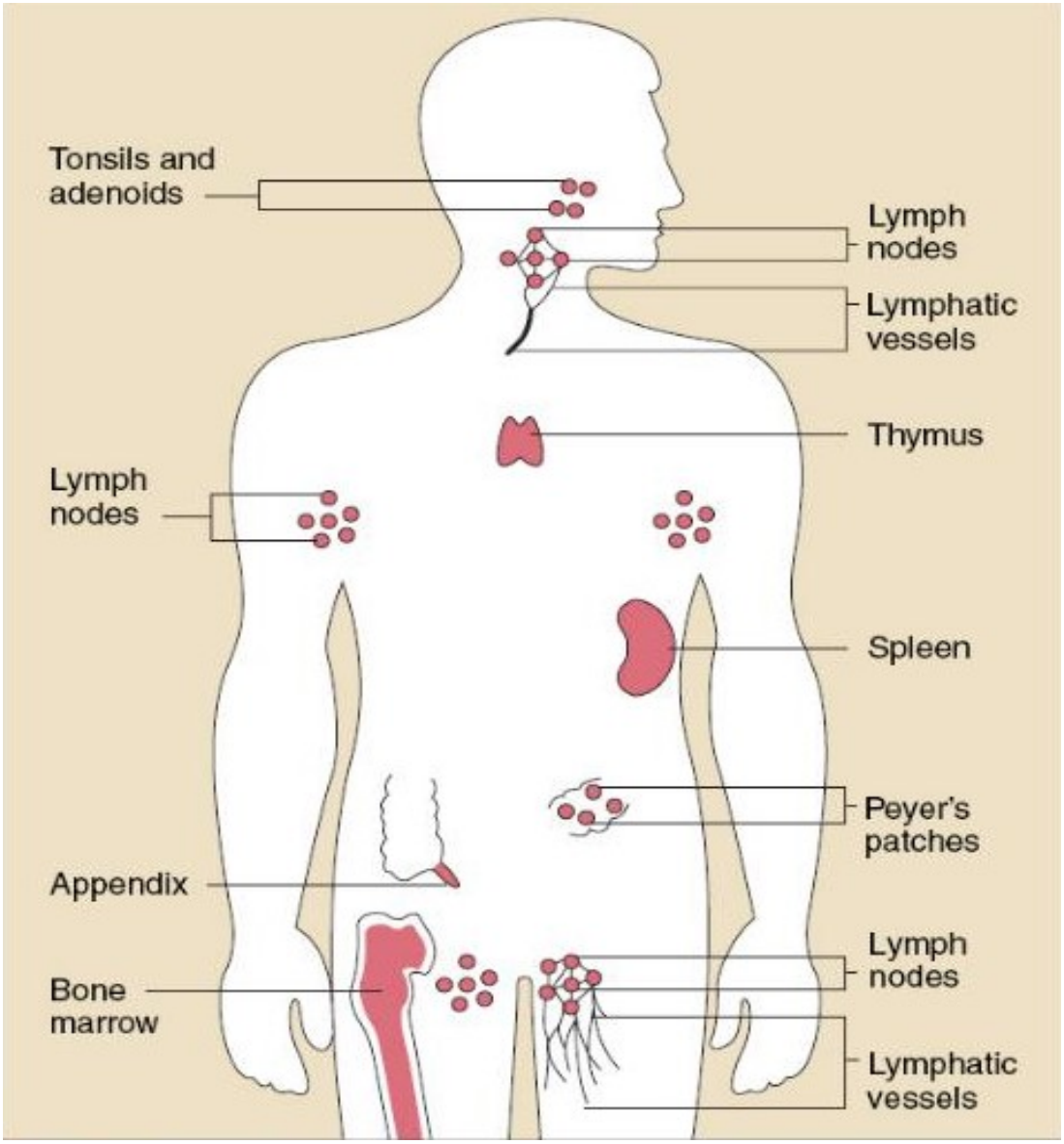


Рисунок 1

EXERCISE 1. READ THE TEXT AND ANSWER THE FOLLOWING QUESTIONS ACCORDING TO THE TEXT

The Immune system

The term "immune system" means a system made up of a network of special cells, proteins, tissues and organs, which work together in order to protect people against the germs and microorganisms present both inside and outside the human body in everyday life. One of the key cells of the immune system is the white blood cell consisting of two basic types that work together to seek out and destroy infectious organisms - harmful "invaders". The immune system attacks pathogens in the human body through a series of steps known as the immune response.

There are 2 main parts of the immune system. **The innate immune system** is a child's rapid response system. It is the first to respond when it finds an invader. It creates physical barriers to help protect a child's body against harmful germs, parasites (such as worms), or cells (such as cancer). The innate immune system is inherited and is active from the moment a child is born. When this system recognizes an invader, it goes into action right away. The cells of this immune system surround and cover the invader. The invader is killed inside the immune system cells (called phagocytes).

The acquired immune system, with the help from the innate system, makes special proteins (called antibodies) to protect a human body from a specific invader. These antibodies are developed by cells called B lymphocytes after the body has been exposed to the invader. The antibodies stay in a child's body. It can take several days for antibodies to form. The immune system will always recognize the invader and defend against it after the first exposure. The acquired immune system usually changes during a child's life. Immunization trains the immune system to make antibodies to provide protection from dangerous or harmful diseases.

In comparison with the nervous system, the body's immune system is more complex as its cells are made and located all over the body, including: digestive system, throat tonsils, lymph nodes, bone marrow, spleen, skin, lymphatic vessels, Peyer’s patches, thymus, eye’s cornea and inner mucous membranes lining respiratory, gastrointestinal and genitourinary tracts.

Such distribution in many locations helps the immune system to form and store cells, to maintain the whole body in a healthy condition. The immune system serves as the body's natural defense system. A healthy immune system protects people by means of creating a barrier that must prevent foreign pathogens or antigens from entering the body. If they can avoid the barrier, the immune system continues to produce white blood cells, chemicals and proteins to attack and destroy these potentially harmful foreign elements. The immune system will try to find and eliminate antigens before they begin to divide.

In case of a failure, the human body's defense system works even harder not to let pathogens develop. The immune system can identify millions of various antigens and will fulfill all its necessary functions to eliminate most invaders. If this complex defense system functions properly, it can solve health problems ranging from the widely spread cold to dangerous diseases.

Humans are born with a certain level of immunity and resistance, which can improve over time. In case children have frequent colds, the immune system creates a "bank" of antibodies the first time they are exposed to the disease and builds up resistance to them in the future. The vaccines work bringing weakened pathogens into the body for the immune system to win, to create antibodies and to prevent disease recurrence.

The immune system becomes not so effective as people become older. When the body's immune system is attenuated, toxins, viruses and bacteria can attack humans and result in a number of diseases.

Immunodeficiency can cause their weakness and higher susceptibility to diseases, commonly arthritis and even certain cancer types.

It is believed that allergies and hypersensitivity to certain substances are caused by disorders of the immune system. At this time, the faulty immune system automatically fights against elements that are not too dangerous, such as pollen or animal hair, therefore making the body more sensitive when exposed to them.

Moreover, the immune system also plays the main role in the rejection process in patients who undergo transplant surgery to replace organs or tissues.

Immune disorders also cause *autoimmune diseases* such as juvenile diabetes, rheumatoid arthritis; *immunodeficiency diseases*: HIV/AIDS (syndrome) human acquired immunodeficiency) and severe combined immunodeficiency SCID.

There are no drugs or supplements that work to strengthen the immune system. Instead, healthy everyday habits can help improve the immune system function:

1. **Making physical exercises**: serious physical activity makes the body feel tired, it can also weaken the immune system, while gentle exercises such as walking or jogging help stimulate white blood cells to work better, releasing the endorphin which has the ability to reduce pain, decrease stress and make sleep better, as a result it improves immunity.

2. **Eating healthily**: overweight has a direct influence on person's health and immune system. Thus, proper nutrition has an important role in helping the immune system and resistance to work properly. Ecologically-clean vegetables and fruits rich in vitamins and antioxidants, garlic and some mushrooms also have antibiotic and resistance-enhancing effects. On the contrary, malnutrition causes a negative effect.

3. **Sleeping enough**: cells damage can be prevented by sleep. Lack of sleep makes the body exhausted and more susceptible to diseases. A good and sufficient sleep serves as a great cure for the human body.

4. **Managing stress**: when the person is stressed, his body releases hormones like cortisol and adrenaline weakening the immune system. Long-term stress can lead to serious diseases, including heart disease and high blood pressure. Yoga and meditation are capable of reducing stress, improving health and quality of life.

5. **Not abusing alcohol and drugs**: it is supposed that drinking alcohol can have health benefits if it is drunk in limited amounts. But if alcohol and stimulants are abused, it may inhibit the function of white blood cells, reduce resistance to infections.

6. **Living happily**: people living a happy life with good friendship and love have a tendency of being healthier. The levels of a protein in the immune system, called immunoglobulin A (IgA) were found to be higher in healthy and active adults. Living a happy life supports the immune system protecting the body from diseases naturally without any drugs. Thus it can be concluded that the role of the immune system is to provide rapid and specialized responses to protect the body against foreign pathogens. The importance of the immune system is shown by the resistance of the body to common cold and some serious illnesses. Without contradictions disorders related to the immune system and resistance are difficult to prevent, but people can develop a stronger immune system by a healthy lifestyle and close cooperation with a doctor if they become sick.

1. What does the term “immune system” mean?
2. What is the function of the immune system?
3. What does the immune system consist of?
4. What helps the immune system to perform its function?
5. Why is the immune system more complicated than the nervous system?
6. Why is the immune system the body’s natural defense?
7. What does the immune system create when it detects an invader?
8. Humans are born with a definite level of immunity, aren’t they?
9. How can the immune system improve?
10. What happens when the immune system becomes attenuated?
11. How do vaccines work?
12. What can cause an allergy?
13. What is the immune system role in the rejection process of transplant patients?

14. What diseases are caused by immune disorders?
15. How can the immune system be strengthened and supported?

EXERCISE 2. MATCH THE WORDS WITH THE DEFINITIONS

1. adenoids
2. allergy
3. antibodies
4. histamine
5. bone marrow
6. immunity
7. lymph nodes
8. lymphatic vessels
9. lymphocytes
10. Peyer's patches
11. phagocytes
12. spleen
13. tonsils
14. thymus
15. venom

a. certain living cells which ingest or engulf other cells or particles.
b. lymphoid tissue in the small intestine.
c. small organs shaped like beans, which are located all over the body and connect via the lymphatic vessels
d. a fist-sized organ located in the belly (abdominal) cavity.
e. the soft, spongy tissue found in bone cavities.
f. two glands located at the back of the nasal passage.
g. an irregular-shaped gland located in the upper part of the chest, between the lungs where T lymphocytes develop and mature.
h. protein components of the immune system that circulate in the blood, recognize foreign substances and neutralize them.
i. the ability of the body to protect against all types of foreign bodies like bacteria, virus, toxic substances, etc. which enter the body.
j. an organic nitrogenous compound involved in local immune responses, as well as regulating physiological functions in the gut and acting as a neurotransmitter for the brain, spinal cord, and uterus.
k. two oval masses in the back of the throat.
l. a network of channels all over the body that carries lymphocytes to the lymphoid organs and bloodstream.
m. a toxic substance produced by some animals that is injected into prey or an enemy chiefly by biting or stinging and has an injurious or lethal effect.

n. a type of white blood cell (leukocyte) in the immune system of most vertebrates.
o. an immune system reaction to something that is normally harmless.

EXERCISE 3. MAKE SURE YOU KNOW THE MEANING OF THE FOLLOWING WORDS. FILL THE GAPS WITH THE SUITABLE WORDS AND TRANSLATE THE SENTENCES INTO RUSSIAN

adaptive	allergen	antibodies	antigen	anaphylaxis
complement	cytokines	defenses	exposure	hives
immunity	innate	pollen	response	susceptibility

1. To produce an allergic reaction against a given antigen, an individual must first be exposed to the antigen under conditions that result in the production of IgE _____.
2. Allergic symptoms occur when an individual who has been sensitized in this fashion has subsequent _____ to the antigen.
3. The most common forms of allergic_____ in developed countries are to airborne allergens, causing symptoms that affect predominantly the nasal passages (allergic rhinitis), the eyes (allergic conjunctivitis), or the lower airways and lungs (asthma).
4. Ingested _____ can lead to food allergy, sometimes affecting only the gastrointestinal tract (for example, eosinophilic esophagitis).
5. Reactions that occur at locations distant from the site of entry of the challenging antigen are considered to be systemic reactions, and are thought to occur because of spread of the _____ throughout the body via the blood circulation.
6. Systemic reactions can be limited to a single distant organ, causing _____ (also called urticaria) when they target the skin, wheezing (or bronchospasms) when they involve the lungs, and life-threatening lowering of the blood pressure when they target the vascular system.
7. Serious systemic reactions are designated by the term _____.
8. Immune _____ against multicellular parasites are found mainly at the sites of parasite entry, namely, under the skin and in the mucosal tissues of the airways and the gut.

9. Cells of the innate and adaptive immune systems at these sites are specialized to secrete _____ that promote a type 2 response to parasitic infection.
10. Most airborne allergens are relatively small, highly soluble proteins that are carried on dry particles such as _____ grains or mite feces.
11. _____to development of allergic disease has both genetic and environmental components.
12. While an innate immune response may eliminate some infections, an _____ immune response can target particular strains and variants of pathogens and protect the host against reinfection.
13. Disease occurs when a microorganism succeeds in evading or overwhelming _____ host defenses to establish a local site of infection, and then replicates there to allow its further transmission within our bodies.
14. A system of plasma proteins known as the _____ system targets pathogens both for lysis and for phagocytosis by cells of the innate immune system such as macrophages.
15. This leads to the formation of memory cells that provide long-lasting specific _____.

EXERCISE 4. REARRANGE THE WORDS IN THE CORRECT ORDER

1. main/ the/ immune/ 3/ functions/ system/ has/ adaptive.
2. immune/ an/ in/ researchers/ improved/ both/ documented/ cases/ have/ system.
3. body/ nutrition/ and/ can/ diet/ the/ affect.
4. body/ reaction/ starts/ mediators/ chemical/ are/ into/ the/ and/ an/ released/ allergic.
5. agents/ treatment/ pharmacological/ antihistamine/ other/ used/ be/ for/ and/ will.
6. bodies/ particles/ our/ pollen/ are/ such/ as/ and/ mold/ challenged/ by/ microscopic.
7. some/ may/ people/ an/ causing/ allergic/ an/ have/ over-reaction/ reaction.
8. pathogen/ initiated/ activation/ is/ usually/ on/ a/ complement/ surface.
9. to/ these/ antigens/ proteins/ specific/ precisely-shaped/ respond.
10. both/ cells/ we/ processes/ systems/ should/ look/ some/ and/ involved/ at/ in.

11. the/ cells/ communicate/ tissue/ with/ antibodies/ the/ of/ to/ by/ ensure/ the/ blood/ antigen/ removal.
12. the/ phagocytes/ pathogens/ body/ specialized/ leukocytes/ are/ that/ ingest/ in/ the.
13. cells/ the/ the/ body/ mechanisms/ pathogens/ involves/ innate/ system/ and/ protect/ that/ from.
14. the/ capable/ and / cells/ are/ of/ identifying/ eliminating/ invading/ pathogens.
15. of/ a/ the/ in/ the/ of/ proteins/ complement/ system/ consists/ series/ produced/ liver.

EXERCISE 5. MAKE WORD COMBINATIONS (EACH WORD CAN BE USED ONLY ONCE)

1. chemical	**a.** transplant
2. enlarged	**b.** barriers
3. recipient	**c.** agent
4. subsequent	**d.** mediators
5. stem	**e.** antibody
6. immune	**f.** response
7. thymus	**g.** disease
8. surface	**h.** fever
9. failed	**i.** spleen
10. hay	**j.** gland
11. autoimmune	**k.** cells
12. allergic	**l.** exposure

EXERCISE 6. TRANSLATE THE FOLLOWING SENTENCES INTO ENGLISH

А) Иммунитет – защитная система организма, которая поддерживает в нем генетическое постоянство. Она оберегает его от проникновения вирусов, бактерий, грибков, простейших, ядов и аллергенов окружающей среды. Также иммунитет человека защищает организм от вредного воздействия изнутри. Другими словами, он поддерживает здоровье человека. Чтобы иммунная система работала качественно, необходимо регулярно ее поддерживать и устранять нарушения.
В) Иммунная система – система биологических структур и процессов организма, обеспечивающая его защиту от инфекций, токсинов и злокачественных клеток.

Для правильной работы иммунной системы необходимо, чтобы она умела распознавать широкий спектр патогенов – от вирусов до многоклеточных червей – и отличать их от собственных здоровых тканей организма. У многих видов имеются две подсистемы: врожденная иммунная система и приобретенная. Обе подсистемы используют гуморальные и клеточные механизмы.

EXERCISE 7. FILL EACH GAP WITH A SUITABLE WORD

Whereas most infections 1) _____ protective immunity, successful pathogens have developed some means of at least partly resisting the immune 2) _____ and can cause serious, sometimes persistent, disease. Some individuals have inherited 3) _____ in different components of the immune system, making them highly 4) _____ to certain classes of infectious agents.
5) _____ infections and inherited immunodeficiency diseases illustrate the 6) _____ of innate and adaptive immunity in effective host defense, and present ongoing challenges for 7) _____ research. The human immunodeficiency virus (HIV) leads to 8) _____ immune deficiency syndrome (AIDS). It 9) _____ the characteristics of a persistent infectious agent with the ability to create 10) _____ in its human host, a combination that is usually slowly lethal to the patient. The key to fighting new 11) _____ such as HIV is to increase our understanding of the basic 12)_____ of the immune system and its role in combating infection.

1.	**a.** request	**b.** find	**c.** elicit
2.	**a.** quality	**b.** facility	**c.** response
3.	**a.** patients	**b.** deficiencies	**c.** features
4.	**a.** effective	**b.** susceptible	**c.** infectious
5.	**a.** responsible	**b.** Ineffective	**c.** persistent
6.	**a.** importance	**b.** intelligence	**c.** seriousness
7.	**a.** biological	**b.** immunological	**c.** ethical
8.	**a.** acquired	**b.** accepted	**c.** established
9.	**a.** protects	**b.** leads	**c.** combines

10. **a.** immunodeficiency **b.** proficiency **c.** efficiency
11. **a.** hosts **b.** pathogens **c.** agents
12. **a.** properties **b.** findings **c.** diseases

SECTION 2: GRAMMAR

EXERCISE 1. STUDY THE TABLE AND TRANSLATE THE FOLLOWING SENTENCES INTO RUSSIAN

Noun Pronoun	can (am/is/are able to) cannot / can't could (was/were able to) could not / couldn't may may not might might not must (have/ has to / had to) must not / mustn't am/ is /are /was /were to need / needn't	V be + V + ing have + V_3 (Ved) have been + V + ing	be + V_3 (Ved) have been + V_3 (Ved)

1. She **can tell** all the truth.
2. The truth **can be told** immediately.
3. She **could announce** the findings without any doubts.
4. The findings **could be announced** at the congress.
5. She **can (could) be waiting** for them in the laboratory.
6. She **could have finished** the experiment but she decided to wait for the colleagues.
7. The experiment **could have been finished** before they got into the research center.
8. She **could not have done** that. It could not have been done.
9. She **can have been waiting** for us all the time. **Can** she **have been waiting** for us all the time?
10. She **cannot have been waiting** for us all the time.
11. She **could not have come** because she was ill.
12. I **was not able to come** because I felt unwell.
13. I **had not been able to see** how weakened he was until I met him.

14. You **may visit** him in his ward from 4 p.m. to 6 p.m.
15. The patients **may be visited** if the doctor allows.
16. He **might come** if he wished.
17. He **might be living** at work.
18. It **may have been** the cause.
19. He could not tell how long it lasted, as it **might have been** an instant or an eternity.
20. As far as we know she **may have been waited** for hours.
21. He didn't say a word. He **might have been day-dreaming**.
22. You **might have told** me about an accident.
23. It **may be announced** after the conference.
24. She **might have been told** about the meeting, but she forgot.
25. We **must know** theory well before we start practicing.
26. The standards of the procedure **must be learnt** first.
27. She **mustn't tell** anyone what I said.
28. Poor women! She **must be suffering** a lot!
29. He **must have provided** a great support for them.
30. Is he still there? He **must have been learning** this chapter for the whole day!
31. The presence of the bacterial infection **must have been proved** before starting an aggressive round of antibiotics.
32. They **should (ought to) do** their best to save her life!
33. We have a colloquium tomorrow. They **should be learning** histology.
34. You **should have helped** him last night when the shift was very tough.
35. It is rather difficult for her. She **ought not to have entered** this university.
36. Everything **should be done** in time.
37. All possible preventive measures **should have been taken** to avoid complications.
38. I **am to be examined** next week.
39. I **was to pass** the required tests.
40. They **were to have** residency in one of the hospitals.
42. The blood tests **were to be passed** after hospitalization.
43. Many new medical technologies **were to have been developed** since the discovery of the nucleus.
44. They were wondering what they **were to become**.
45. The causes of the immunological disorder **need to be found** immediately.

EXERCISE 2. WATCH THE VIDEO, LISTEN ATTENTIVELY AND FILL THE GAPS WITH THE MISSING WORDS

https://www.ted.com/talks/emma_bryce_how_does_the_immune_system_work/transcript?subtitle=en

A mosquito lands on your arm, 1) _____ its chemicals into your skin and begins to feed. You would not notice, if not for the red 2) _____ that appears as a result. The bump is an important signal that you are 3) _____ by your immune system. This system is a 4) _____ network of cells, tissues and organs that manage your body's defenses against any 5) _____ to your health. Without it you could be at risk of billions of bacteria, viruses and toxins that could make a minor cut or cold fatal.

The immune system relies on 6) _____ of defensive leukocytes that originate in the bone marrow. These cells get into the bloodstream and the lymphatic system which helps to clear 7)_____ toxins and waste.

Our bodies are full of leukocytes: there are between 8) _____ in every microliter of blood.

When they move, they work like security personnel which screens the blood, tissues and organs for 9)_____signs. The system mainly relies on cues called antigens. These molecular 10) _____ on the surface of pathogens and foreign substances give out the presence of invaders. When leukocytes detect them, it takes only minutes for the immune response to kick in.

Threats to our bodies are hugely 11) _____ and the immune response has to be equally adaptable. It must rely on many different types of leukocytes to remove threats in different ways.

Despite this diversity we classify leukocytes in two main 12) _____ groups, which coordinate an attack. First, phagocytes trigger the immune response sending macrophages and dendritic cells into the blood. They circulate and destroy foreign cells they 13) _____ consuming them. That allows phagocytes to identify the antigen on the invaders which were ingested and transmit this information to the lymphocytes.

A group of lymphocyte cells called T-cells 14) _____ search of infected body cells and kill them off. B-cells and helper T-cells use the information gathered from the unique antigens to start producing special proteins called antibodies. Each antigen has a unique, matching antibody

that can destroy the invading cells. B-cells can produce millions of these, which cycle through the body and attack the invaders until the 15) _____ of the threat is neutralized.

During this process symptoms like high temperatures and swelling are processed to aid the immune response. A warmer body makes it difficult for bacteria and viruses to reproduce and 16) _____because they are temperature-sensitive. When the body cells are damaged, they release chemicals that make fluid 17)_____the surrounding tissues and cause swelling. This attracts phagocytes, which consume the invaders and the damaged cells.

Usually an immune response will eliminate a threat within a few days. It will not stop you from getting ill, but 18)_____its purpose. The actual job is to stop a threat escalating to hazardous levels inside your body.

Through surveillance over time, the immune system helps us develop long-term immunity. When B- and T-cells identify antigens, they can use that information to recognize invaders in the future. So, when a threat 19) _____, the cells deploy the right antibodies to destroy it before it affects any more cells. That is how immunity to certain diseases can develop.

It doesn't always work well. Some people have autoimmune diseases, which make the immune system attack the body's own healthy cells. No one knows what causes them, but such disorders sabotage the immune system to different degrees and underline problems like arthritis, type I diabetes and sclerosis.

For most people a healthy immune system will successfully fight off about 300 colds and 20)_____other potential infections during the lifetime. Without it the threats would develop into something more dangerous. So the next time you catch a cold or scratch a mosquito bite, think of the immune system. We owe it our lives.

LESSON 3. FOOD SAFETY

SECTION 1: VOCABULARY

Nouns: stabilizer, preservative, additive, pesticides, herbicides, radioactivity, contamination, contaminant, sample (food, stool), (good, poor) hygiene, packaging, pasteurization, outbreak, dehydration, nausea, adulteration, (in)tolerance, complication.
Verbs: to contaminate, to transfer, to pick up.
Adjectives/participles: (un)acceptable, immunological, biochemical, (in)accurate, potential, beneficial, immunocompromised, sufficient, nutritious, food borne, antimicrobial.
Adverb: sharply, constantly, thoroughly, properly.
Phrases: transmission route, cross contamination, quality control, food poisoning, bacterial gastrointestinal infection, regulate with strict guidelines, cause harm to consumers, detection and enumeration of the pathogens, detect and quantify pathogens, food borne organisms, submit samples, grow in food, be destroyed by heat, be reduced sharply by freezing the foods, adverse effect on, run quality control checks, food industry, absorption of harmful substances, food production and distribution, plate count, polymer chain reaction test, provide an accurate and specific microbe count, prolong the shelf life, potential hazard, food production, storage and consumption, prevent from decomposing, active ingredient, cook at appropriate temperatures, fluid intake, abdominal pain, food handling, damage DNA or alter body cells, sanitize food preparation surfaces and utensils.

Food safety is a growing concern around the world.

Margaret Chan

Food safety is a scientific discipline describing handling, preparation, and storage of food in ways that prevent foodborne illness.

World Health Organization

EXERCISE 1. READ THE FOLLOWING SENTENCES. DISCUSS WITH YOUR CLASSMATES IF THEY ARE TRUE OR FALSE

1. Symptoms of foodborne illnesses can range from mild stomach discomfort to death.
2. Food safety regulations vary between countries and regions.
3. Proper cooking temperatures can prevent foodborne illness.
4. Freezing food kills all bacteria and makes it safe to eat.
5. Cross-contamination can occur when handling raw meat and other foods.
6. Hand sanitizer can be used as a substitute for washing hands before handling food.
7. All food-borne illnesses can be cured with antibiotics.
8. The World Health Organization estimates that over 600 million people worldwide fall ill from contaminated food each year.
9. Common causes of food contamination are bacteria, viruses, parasites and environmental toxins.

EXERCISE 2. CROSS OUT PHRASES THAT ARE NOT CONNECTED WITH THE FOOD SAFETY TOPIC

1. foodborne illness
2. personal hygiene
3. food intolerance
4. pathogens
5. cross-contamination
6. poor sanitation
7. prolong the shelf life
8. nutritious food
9. quality control
10. check expiration date
11. food inspection
12. food poisoning
13. food safety regulations
14. food safety standards
15. food storage
16. poor hygiene
17. raw meat
18. safety glasses
19. cleanliness is next to godliness
20. better safe than sorry

EXERCISE 3. NAME THE WORDS THAT COLLOCATE (GO WITH) WITH THE PHRASE “FOOD SAFETY”

Food safety + e.g. regulations

Standards, packaging, requirements, measures, consumption, guidelines, inspections, ingredients, risks, management, concerns, procedures, outbreak, certification, education, university.

EXERCISE 4. A) MATCH THE WORDS AND FIXED PHRASES WITH THE DEFINITIONS

1. food-borne infections	**a.** the length of time that a product, especially food, can be kept in a shop or at home before it becomes too old to sell or use
2. side effect	**b.** the way an infectious agent, also called a pathogen, can be transferred from one person, object, or animal, to another
3. gastrointestinal infection	**c.** illnesses caused by consuming food or beverages that are contaminated with harmful bacteria, viruses, parasites, or toxins
4. shelf life	**d.** an unwanted or unexpected result or condition that comes along with the desired effects that a drug has on you
5. pathogen	**e.** a sudden rise in the number of cases of a disease
6. cross contamination	**f.** the substance which is pharmaceutically active, the chemical responsible for the drug effects
7. active ingredient	**g.** a substance that is added to food in order to improve its taste or appearance or to keep it fresh
8. transmission route	**h.** the transfer of harmful bacteria or other pathogens from one surface or food item to another
9. infection outbreak	**i.** viral, bacterial or parasitic infections that cause gastroenteritis, an inflammation of the gastrointestinal tract involving both the stomach and the small intestine, including such symptoms as diarrhea, vomiting, and abdominal pain.
10. additive	**j.** a microorganism that causes, or can cause, a disease

B) FILL IN THE GAPS WITH THE WORDS AND PHRASES FROM THE EXERCISE ABOVE. THEY CAN BE SINGULAR OR PLURAL

1. A _____ is a microorganism that can cause disease in humans or animals.
2. The _____ of certain foods can be extended by adding preservatives or other additives.
3. Some medications may have _____ that can cause gastrointestinal discomfort and complications.
4. An _____ is a substance in a medication or medical treatment that produces a desired physiological effect to ensure effectiveness and safety for treating a specific condition or disease.
5. _____ can occur when a large number of people are exposed to a foodborne pathogen, resulting in a widespread illness.
6. _____ are substances added to food to enhance flavor, texture, or shelf life.
7. _____ are caused by consuming contaminated food or water, leading to illnesses and sometimes even death.
8. _____ can occur when bacteria from one food item is transferred to another.
9. _____ can cause symptoms such as abdominal pain, nausea, vomiting, and diarrhea.
10. The _____ of the virus can vary depending on the mode of exposure, such as direct contact or airborne transmission.

EXERCISE 5. READ THE TEXT AND CHOOSE THE TITLE THAT FITS THE BEST

1. Does the Gut Microbiome Influence the Development of Chronic Diseases?
2. The Impact of Foodborne Bacterial Pathogens on Public Health
3. Major Concerns in the Food Safety
4. The Risk of Antibiotic Resistance

Foodborne illnesses are a significant public health concern worldwide. Recent investigations reveal that foodborne bacterial pathogens are accountable for a considerable number of cases resulting in illness, hospitalization, and even death annually. The World Health Organization (WHO) estimates that approximately 600 million people worldwide fall ill due to contaminated food, leading to 420,000 deaths annually.

Foodborne bacterial pathogens such as *Salmonella*, *Listeria*, *Campylobacter and E. coli* are the most commonly reported causes of foodborne illnesses. These bacteria may lead to nausea, diarrhea, vomiting, abdominal pain, and fever and, in more severe cases, dehydration, bloody stools, kidney failure and meningitis.

Another area of concern is the development of toxicological evaluation methods to assess the safety of food additives and contaminants. A study published in the journal Food Additives & Contaminants found that current methods for evaluating the safety of food additives may not be sufficient to detect potential health risks. Some types of seafood, such as mussels and oysters, may contain high levels of emerging contaminants. These contaminants may negatively affect human health, casing hormonal imbalance and antibiotic resistance.

Antimicrobial resistance (AMR) is a major concern in the treatment of foodborne illnesses. AMR occurs when bacteria develop resistance to antibiotics, making it difficult to treat infections effectively. The overuse and misuse of antibiotics in both human and animal health have contributed to the emergence of AMR in bacterial pathogens. Recent research has shown that the use of antibiotics in animal farming is a significant contributor to the emergence of AMR. Antibiotics are often used in animal feed to promote growth and prevent disease. This practice leads to the development of antibiotic-resistant bacteria that can spread to humans through the consumption of contaminated food.

In addition to emerging contaminants and additives, there is also a growing concern about the impact of food on our gut microbiome. The diet high in fiber and fermented foods can promote a healthy gut microbiome, which is important for overall health and disease prevention. The diet containing excessive amount of processed food, red meat, and sugary drinks was associated with an increased risk of heart disease, stroke, and type 2 diabetes. On the other hand, a diet rich in fruits, vegetables, whole grains, fatty fish and lean proteins was associated with a lower risk of these diseases.

There are several strategies that can be employed to reduce the incidence of foodborne illnesses caused by bacterial pathogens. These strategies comprise enhancing food safety practices during the production, processing, and preparation of food, improving surveillance systems to detect outbreaks early, reducing the use of antibiotics in animal farming, and increasing public awareness of safe food handling practices. Regular hand and surface washing, proper raw meat separation, cooking at appropriate

temperatures, and prompt refrigeration of leftovers are all recommended practices to prevent foodborne illnesses.

EXERCISE 6. ANSWER THE QUESTIONS ACCORDING TO THE TEXT

1. What are the most commonly reported causes of food borne illnesses?
2. How can food additives and contaminants negatively affect human health?
3. How does the overuse and misuse of antibiotics contribute to antimicrobial resistance?
4. What impact does diet have on our gut microbiome and overall health?
5. What strategies can be employed to reduce the incidence of food borne illnesses caused by bacterial pathogens?
6. How many people worldwide fall ill due to contaminated food each year, according to the World Health Organization?
7. What are some symptoms that may be caused by food borne bacterial pathogens?

EXERCISE 7. TRANSLATE INTO ENGLISH

1. Правильная обработка пищевых продуктов помогает предотвратить передающиеся с пищей заболевания.
2. Добавки и загрязнители пищевых продуктов могут негативно влиять на здоровье человека.
3. Обезвоживание - распространенный симптом пищевых заболеваний, к которому следует относиться серьезно.
4. Кровавый стул является признаком тяжелого заболевания пищевого происхождения и требует немедленной медицинской помощи. Охлаждение остатков пищи важно для предотвращения роста бактерий, которые могут вызывать пищевые заболевания.
5. Приготовление пищи при соответствующих температурах имеет решающее значение для уничтожения вредных бактерий и предотвращения пищевых заболеваний.
6. Лечение болезней пищевого происхождения часто предполагает прием антибиотиков и жидкости, помогающей справиться с обезвоживанием.
7. Тошнота, рвота и боль в животе могут быть симптомами заболевания пищевого происхождения, вызванного такими патогенами, как сальмонелла, листерия, кампилобактер и кишечная палочка.

Interesting facts

1. Pesticides are the most common type of food contaminant, affecting 82 % of fruits and vegetables.
2. Bacteria such as E.coli and Salmonella are responsible for 90 % of food poisoning cases worldwide.
3. China is the largest producer of food contaminants, accounting for 20 % of global total.
4. Arsenic, a toxic metal, can be found in rice due to contaminated soil from industrial pollution.
5. Plastic microfibers, from clothing and packaging, have been found in seafood and salt.
6. Heavy metals like lead and cadmium can be found in spices, with as much as 10 times more than recommended levels.
7. Radon, a radioactive gas, can contaminate drinking water and seep into foods grown in the soil.
8. More than 50 % of antibiotics used in animal agriculture end up in the environment, increasing the risk of antibiotic resistance.

EXERCISE 8. ANSWER THE FOLLOWING QUESTIONS BEFORE READING THE TEXT. DID YOU LEARN SOMETHING NEW?

1. What are the most common types of food contamination? Give examples
2. Can you give an example of the common food contaminants and their potential health risks?
3. In what ways can food processing and packaging contribute to the presence of contaminants in our food?
4. Is it possible for consumers to completely avoid exposure to food contaminants, and if so, how?
5. Can you discuss the role of agriculture and farming practices in preventing or contributing to food contamination?

Food Contamination

There are three most common types of food contamination: physical contamination, biological contamination and chemical contamination.

Physical contamination refers to food that has been contaminated by a foreign object at some stage of the food preparation and production.

These objects could seriously harm the consumer and cause illness. Some examples are hair, fingernails, metal, broken glass, plastic, dirt, etc. Cross-contamination occurs when bacteria or other harmful substances from one food item are transferred to another food item, usually through contact with contaminated surfaces, utensils, or hands. Temperature abuse happens when food is not stored, transported, or cooked at the correct temperature, allowing harmful bacteria to grow and contaminate the food.

Biological contamination of food can occur in several ways and there are numerous elements that can make it happen. Bacteria and other hazardous microorganisms may come into contact with food and lead to food spoilage or food poisoning. Biological hazards such as bacteria, fungi, viruses, parasites, protozoa, cat saliva, house dust, mites, cockroaches, and pollen contaminate the food even to the extent that can lead to death. One common food contaminant is Salmonella, a type of bacteria typically found in raw or undercooked poultry, eggs, and other meat products. If consumed, Salmonella can cause symptoms such as diarrhea, abdominal pain, fever, and vomiting. In severe cases, it can lead to hospitalization and even death, especially among vulnerable populations like the elderly, infants, and immunocompromised individuals.

Chemical elements contaminate food and in most cases the effects are deadly. A few of the common chemical contaminants are chemical cleaning agents, mycotoxins, dioxins, non-safe plastics, pest control products, pesticides, herbicides, heavy metals – lead and mercury. The problem with this type of contamination is that you cannot see them with your eyes. Radiation contamination occurs when food is exposed to high levels of radiation, which can cause changes in the chemical composition.

Environmental contamination happens when food is grown or produced in areas with high levels of pollution or toxins, which can be transferred to the food and make it unsafe for consumption. Poor farming practices, such as using contaminated irrigation water or improper handling of animal waste, can contribute to food contamination. Maintaining proper hygiene, regular monitoring for pests and diseases, and managing the use of pesticides and fertilizers, can significantly reduce the risk of contamination from farm to fork.

Food processing and packaging can introduce contaminants into our food through various means. Examples include inadequate sanitation practices during food processing, equipment inadequately cleaned, improper temperature control during storage and transportation, and the use of contaminated ingredients. Additionally, packaging materials may con-

tain chemicals that can leach into the food, especially when exposed to heat or acidic substances.

It is challenging for consumers to completely avoid exposure to food contaminants due to their widespread presence. However, certain practices can help minimize the risk. These include properly washing fruits and vegetables, ensuring adequate cooking of meat and eggs, adhering to food expiration dates, practicing good hygiene during food preparation, and storing food properly. Additionally, avoiding risky food sources can further reduce the exposure.

Answer the question: Have you known something new reading the text?

EXERCISE 9. READ THE TEXT AND ANSWER THE QUESTIONS GIVEN BELOW

Food Additives

Food additives are substances added to food to preserve flavor or enhance its taste, appearance, or other qualities. They can also extend the shelf life of food products. The use of food additives has become very common in recent years, due to the increased production of prepared, processed, and convenience foods.

Some common examples of food additives include preservatives, colorings, flavor enhancers, and sweeteners. Preservatives are used to prevent food from spoiling due to bacteria, mold, or yeast. Examples of preservatives include sodium nitrite, which is used in cured meats, and potassium sorbate, which is used in cheese and yogurt.

Colorings are added to food to give it a specific color or to enhance its natural color. Examples of colorings include tartrazine, which is a yellow dye used in beverages and candy, and caramel color, which is used in colas and other dark-colored beverages. Many processed food items such as juices contain added color.

Flavor enhancers are added to food to improve its taste and aroma. Examples of flavor enhancers include monosodium glutamate (MSG), which is used in savory snacks and processed foods, and aspartame, which is used as a sugar substitute in diet products.

Anti-caking agents keep ingredients from getting lumpy before use. Pancake mixes and other mixes have anti-caking agents. Emulsifiers prevent fats from clumping together. Dressings have emulsifiers. Glazing

agents make foods look prettier and can also protect the food item. Apples often come with a glazing agent.

Sweeteners are added to food to provide a sweet taste without adding calories. Examples of sweeteners include sucralose, which is used in diet sodas and sugar-free desserts, and stevia, which is used in natural sweeteners.

The safety of food additives has always been a concern for consumers. In Russia, food additives are regulated by the Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing (Rospotrebnadzor). This agency is responsible for ensuring the safety and quality of food products, including the use of additives.

Similar to other countries, Russia has established regulations and standards for the use of food additives, including permissible types and maximum allowable levels. These regulations are outlined in the "Sanitary Rules and Norms" (SanPiN) and the "Technical Regulations on Food Safety" (TR TS).

Food manufacturers in Russia are required to comply with these regulations and obtain approval for the use of specific additives in their products. Additionally, similar to other countries, food products in Russia must list all additives on the product label, along with their respective E-numbers or names, so consumers can make informed choices.

Choose the correct answers to the following questions:

1. What is the purpose of using food additives?
a. to improve the nutritional value of food.
b. to increase the production of food.
c. to preserve flavor and enhance taste.
d. to reduce the shelf life of food products.

2. What is the function of preservatives?
a. to enhance the natural color of food.
b. to improve the taste and aroma of food.
c. to extend the shelf life of food.
d. to prevent ingredients from clumping together.

3. Why are colorings added to food?
a. to prevent food from spoiling.
b. to improve the taste and aroma of food.
c. to provide a specific color or enhance natural color.

d. to prevent fats from clumping together.

4. How are food additives regulated in Russia?
a. by the federal service for surveillance on consumer rights protection and human wellbeing.
b. by the sanitary rules and norms.
c. by the technical regulations on food safety.
d. by food manufacturers themselves.

5. What do food manufacturers in Russia need to do regarding food additives?
a. comply with regulations and obtain approval for their use.
b. list all additives on the product label.
c. conduct safety testing on food additives.
d. increase the maximum allowable levels of additives.

6. What information must be included on the product label in Russia?
a. the nutritional value of the food.
b. the maximum allowable levels of additives.
c. the country of origin of the food.
d. the e-numbers or names of additives.

7. Why is it important for food products in Russia to list additives on the product label?
a. to improve the taste and aroma of food.
b. to allow consumers to make informed choices.
c. to comply with international standards.
d. to inform consumers about the nutritional value of food

EXERCISE 10. MATCH THE FOLLOWING QUESTIONS WITH THE POSSIBLE ANSWERS

1. What are the common causes of foodborne illnesses and how can they be prevented?
2. What are the most common transmission routes for foodborne illnesses?
3. What are the most effective methods for cleaning and sanitizing food preparation surfaces and utensils?
4. What is quality control?

5. What role do food safety regulations and inspections play in protecting public health?

A. The most effective methods for cleaning and sanitizing food preparation surfaces and utensils include using hot water and soap to wash surfaces and utensils, followed by sanitizing with a solution of water and bleach or a commercial sanitizer.

B. It is the process of inspecting, testing, and verifying that the product or service meets the necessary quality standards.

C. Common causes of foodborne illnesses include improper food handling and storage, cross-contamination, consuming raw or undercooked foods, and exposure to harmful bacteria such as E. coli and salmonella. These can be prevented by washing hands and surfaces frequently, cooking foods to their proper temperatures, separating raw meats from other foods, and storing foods at appropriate temperatures.

D. The most common transmission routes for foodborne illnesses include consuming contaminated food or water, contact with contaminated surfaces or utensils, and person-to-person contact through improper hand hygiene. Cross-contamination, where bacteria from one food item is transferred to another, is also a common transmission route. Additionally, some illnesses can be transmitted through contact with animals or their feces.

E. Food safety regulations and inspections play a critical role in protecting public health by setting standards for food production, processing, and distribution. These regulations are enforced through inspections of food facilities, which help to identify potential sources of contamination and ensure that proper food handling practices are being followed.

EXERCISE 11. WATCH THE VIDEO

https://www.youtube.com/watch?v=horgGwEAm7s

A) Skim the text. Which title fits the best?

1) How to Avoid Cross-Contamination of Foods
2) Understanding Food-Borne Infections and Their Causes
3) The Benefits of Washing Raw Meat Before Cooking It

B) Answer the following questions:

1. What is cross-contamination of food?
2. How can microorganisms or chemical substances be transferred from one food to another?

3. Why is cross-contamination a risk?
4. What can cause foodborne infections?
5. How can cross-contamination be avoided when handling food?
6. What should you do to avoid indirect contaminations?
7. How should you store raw food in the fridge?
8. What should you avoid using when preparing meals?

EXERCISE 12. WATCH THE FOLLOWING VIDEO AND CHOOSE THE BEST TITLE

https://www.youtube.com/watch?v=nGKv7l3saK4

1. The Complex Problem of Food Contamination and its Impact on Health
2. Cross-Contamination and Why it Occurs
3. Food Safety and Global Collaboration

A) Watch again and answer the following questions:

1. What are the three types of contaminants mentioned in the text?
2. What is food supply chain? At which steps in the food supply chain can contamination occur?
3. Give examples of how contamination can happen at the production step.
4. How does food adulteration affect the safety of food?
5. What are some potential sources of contamination at the distribution stage?
6. What are some potential sources of contamination at the preparation stage?
7. Besides contamination, what are other ways that food can be potentially harmful?
8. What are some global initiatives and organizations working on food safety?
9. What is the role of governments in ensuring food safety at a national level?
10. How can industry contribute to ensuring food safety throughout the supply chain?
11. What is HACCP and how does it help control potential food hazards?
12. What are some simple steps that individuals can take to reduce the risk of foodborne disease?

B) Find the following phrases in the text of the video

значимый для здоровья и благополучия; вызывать тяжелые заболевания; свинец, ртуть или мышьяк; недопустимое использование пестицидов; токсический остаток пестицидов в еде; фальсификация продуктов питания; хранить при правильных температурах, приводить к росту болезнетворных микроорганизмов; бессимптомная болезнь; почечная недостаточность, артрит или невынашивание беременности; паралич; неизлечимые неврологические заболевания; химические вещества; краткосрочное и долгосрочное действие; с ослабленным иммунитетом (1 word); применение и контроль соблюдения норм питания.

EXERCISE 13. FILL THE CONVERSATION WITH THE PHRASES GIVEN

calculate the absorbed dose	the shelf life
guidelines and protocols	the level of radioactivity
side effects on human health	damage DNA or alter body cells
kill any harmful bacteria	radioactive content

David: Hi, Sarah. Did you hear about the new food safety regulation that requires treating food with irradiation?

Sarah: Yeah, I read about it. It's supposed to 1) _____ and prolong 2) _____of certain foods.

David: Exactly. And it's a common production technique in food manufacture already. But some people are concerned about potential pollution and 3) _____.

Sarah: Like what? How does irradiation affect our body cells?

David: Some sources suggest it could 4) _____. But there's no evidence yet.

Sarah: Hmm, that's worrying. But if it makes our food safer to eat, maybe it's worth it.

David: Yes, and scientists can control 5) _____in foodstuffs to ensure it's within safe limits for consumption.

Sarah: That's good to know. But how do they detect any presence of radioactivity in the environment or food products?

David: They run laboratory tests and 6) _____, which is a measure of radiation exposure.

Sarah: Right. So the key is to use just enough irradiation to kill microorganisms like E.coli, salmonella, and campylobacter, without harming consumers' health.

David: Exactly. And companies must label their products accurately regarding the 7) _____.

Sarah: Well, as long as they follow these 8) _____, I think it's a reasonable approach to food safety.

David: Agreed. We need to strike a balance between reducing the risk of foodborne illnesses and minimizing any negative impacts from irradiation.

EXERCISE 14. PUT THE WORDS INTO THE CORRECT FORM

Part 1.

1. _____(cross-contaminate) can occur when using the same cutting board for raw meat and vegetables.
2. Food-borne illnesses can result from consuming _____ (contaminate) food.
3. _____(infect) can spread quickly in crowded places.
4. _____(intolerant) to lactose can cause digestive issues.
5. Proper food _____(handle) techniques can prevent the spread of bacteria.
6. The _____(pathogen) bacteria caused the outbreak of the food-borne illnesses.
7. She is _____(allergy) to peanuts and should avoid eating them.
8. Food _____(poison) can be caused by eating contaminated food.
9. _____(gene) testing can determine if you have a predisposition to certain diseases.
10. The _____(detect) of disease-causing organisms at an early stage increases chances of survival.
11. _____(consume) should always read the label before buying a product.
12. The contaminants in the water supply led to the outbreak of the _____(infect) diseases.
13. Long-term _____(expose) to air pollution can cause respiratory problems.
14. Proper _____(store) of perishable foods is important to prevent spoilage.

15. The occurrence of harmful bacteria in food is _____(accept), which is why many companies turn to irradiation as a means of ensuring food safety.
16. Additives such as _____ (emulsify) are commonly used in food____(store) to prevent spoilage and improve shelf life.
17. Environmental factors can also impact food safety, as exposure to certain toxins or chemicals can be___(harm) to human _____ (take).
18. While some argue that irradiation is a harmful practice, the reality is that it can greatly reduce the____(occur) of harmful bacteria in food.
19. It is important to carefully monitor the use of _____ (add) in food production, as some may have negative effects on human intake if consumed in excess.

Part 2.

Campylobacter is considered to be the most common 1)_____ (BACTERIA) cause of human gastroenteritis in the world. Campylobacter 2) _____(INFECT) are generally mild, but can be fatal among very young children, the 3)_____ (OLD), and immunosuppressed individuals. Campylobacter species can be killed by heat and 4)_____(THOROUGH) cooking food. To prevent Campylobacter infections, make sure to follow basic food hygiene practices when 5) _____ (PREPARE) food.

Escherichia coli (E. coli) is a bacteria that is commonly found in the lower intestine, most E.coli strains are 6)____(HARM), but some can cause serious food 7) _____ (POISON) such as Shiga toxin-producing E. coli (STEC).

Most cases of salmonellosis are mild; however, sometimes it can be 8) life-_____ (THREAT). This disease can be severe in the young, the elderly, and patients with 9) _____ (WEAK) immunity. The 10) _____ (SEVERE) of the disease depends on host factors and the serotype of Salmonella. Basic food hygiene practices, such as "cook thoroughly", are recommended as one of the 11)_____ (PREVENT) measures against salmonellosis.

EXERCISE 15. PUT THE WORDS INTO THE CORRECT ORDER TO FORM INFINITIVE PHRASES

1. handling / before / one's / To / wash / food / hands
2. To / thoroughly / cook / kill / meat / to / any / bacteria
3. foods / To / prevent / spoilage / refrigerate / to / perishable

4. from / cross-contamination / foods / by / avoid / keeping / separate / To / raw / meats / other
5. kitchen / regularly / of / to / surfaces / the / To / spread / sanitize / prevent / germs
6. that / any / passed / date / has / its / To / discard / expiration / food
7. avoid / to / eating / prevent / infection / eggs / salmonella / To / or / raw / undercooked

EXERCISE 16. ANSWER THE FOLLOWING QUESTIONS WITH YOUR GROUPMATES. DISCUSS YOUR ANSWERS IN THE GROUP

1. What are the possible transmission routes?
2. What are foodborne infections? What are they?
3. What are the symptoms of foodborne infections?
4. What can help prevent or treat food poisoning?
5. What synthetic chemicals can food contain?

EXERCISE 17. DISCUSS THE FOLLOWING QUESTIONS WITH YOUR GROUPMATES

1. Have you ever had food-borne illnesses? How did you get it? What did you do?
2. Do you practice proper hygiene?
3. Why can people have poor hygiene?
4. Do you buy food with additives?
5. Have you ever stayed at home after food poisoning? Is it contagious?
6. Have you ever heard about the outbreaks of food-borne infections in the area where you live?
7. Do you check expiration date when you buy products?
8. Cleanliness is next to godliness. What is your opinion about it? How does it relate to avoiding cross-contamination in the kitchen?

EXERCISE 18. DIVIDE INTO PAIRS OR SMALL GROUPS. IN GROUPS DISCUSS A SCENARIO: "YOU ARE PREPARING A MEAL FOR A FRIEND WHO HAS A SEVERE PEANUT/EGG ALLERGY. WHAT STEPS WOULD YOU TAKE TO PREVENT CROSS-CONTAMINATION?" AFTER SHORT DISCUSSION COME UP WITH A LIST OF STEPS TO TAKE TO AVOID

CROSS-CONTAMINATION IN THAT SCENARIO AND PRESENT YOUR IDEAS TO THE CLASS

EXERCISE 19. GUESS THE WORD, THE FIRST LETTER IS GIVEN

1. The p_____ chain reaction test is used to detect the presence of key microbial pathogens. 2. Scientists aim to discover and q_____ pathogens using advanced laboratory techniques. 3. C_____ food can cause harm to consumers if it is not properly handled or cooked. 4. Stabilizers and p____ are often added to food products to extend their s___life. 5. Epidemiology plays a crucial role in identifying and controlling outbreaks of bacterial g_____ infections. 6. Good h_____ practices, such as handwashing, can help prevent the spread of germs. 7. Stool samples are often collected from patients to detect f_____ organisms and diagnose infections. 8. The p_____ count method is commonly used to assess the number of bacteria present in a sample. 9. Food poisoning cases and outbreaks are carefully investigated to determine the s_____ of contamination. 10. The s_____ of a disease can vary depending on the strain and individual's immune response. 11. The c____ of the pathogens can be tested by attempting to grow them in the lab. 12. Food manufacturers are required to s_____ samples for regular quality control checks. 13. The a_____ daily intake of certain food additives is determined by regulatory agencies.

SECTION 2: GRAMMAR
Non-finite verb forms, verbals

ING forms

	Active	**Passive**
Indefinite	*treating*	*being treated*
Perfect	*having treated*	*having been treated*

• **Indefinite** (Active and Passive) is used to describe actions happening at the same time as the finite verb.
• **Perfect** (Active and Passive) is used to describe actions that happened before the finite verb.
Treating your patients with respect is essential for any doctor.

Being treated for a serious illness can be a difficult experience.
Having treated her daughter's fever, the mother felt relieved.
Having been treated for cancer, he was finally able to return to a normal life.

INFINITIVE

	Active	**Passive**
Indefinite	(to) treat	(to) be treated
Continuous	(to) be treating	–
Perfect	(to) have treated	(to) have been treated
Perfect Continuous	(to) have been treating	

The **Indefinite** Infinitive expresses an action simultaneous with the action expressed by the finite verb.

The **Continuous** Infinitive also expresses an action simultaneous with the action expressed by the finite verb but it is an action in progress.

The **Perfect** Infinitive denotes an action prior to the action expressed by the finite verb.

The **Perfect Continuous** Infinitive denotes an action which lasted a certain time before the action of the finite verb. It denotes duration.

It's important *to treat* the wound promptly to prevent infection. The doctor's goal is *to treat* the patient with the most effective medication.

The patient needs *to be treated* immediately for this severe condition. This illness can *be treated* with new medication.

He must *be treating* the patients now. The doctor is happy *to be treating* patients in this rural community, where access to healthcare is limited. I'm glad *to have treated* the rash before it got worse.

I was fortunate *to have been treated* for the virus before it spread. The patient was grateful *to have been treated* by such a skilled physician.

The patient was relieved *to have been treating* the disease successfully for the past six months. The research team was excited *to have been treating* cancer patients with this new drug, as it showed promising results in clinical trials.

EXERCISE 1. READ THE FOLLOWING SENTENCES ABOUT NON-FINITE VERB FORMS AND TELL IF THEY ARE TRUE OR FALSE

1. Infinitives without "to" are called zero infinitives.
2. Participles function as adjectives, describing the state or action of a noun. Non-finite verbs do not function as the main verb in a sentence.
3. Infinitives can be used to express a purpose or intent.
4. There are two types of participles: present and past.
5. Non-finite verbs can help vary sentence structure and add depth to writing.
6. There are 2 verbals in English, they are the participle and the gerund.
7. The verbals are used as the predicate of the sentence.
8. The non-finite verb forms have tense and voice distinctions.

EXERCISE 2. PUT THE VERBS IN BRACKETS INTO CORRECT FORM OF THE INFINITIVE OR PARTICIPLE

1. Scientists must (discover) new pathogens that were previously unknown. What a breakthrough!
2. Food manufacturers should (monitor) the ingredients they use to ensure safety of the ready-to-eat foods.
3. This substance seems (cause) harm to human health based on research findings.
4. You must wait for a while! Stool samples might (submit) for analysis to determine the presence of any harmful bacteria. We will call you as soon as we get the results.
5. The pharmaceutical company claims (study) the effectiveness of their new drug for a year and a half.
6. Before distributing the products, quality control checks should (run) to ensure they meet safety standards.

EXERCISE 3. PUT THE VERBS IN BRACKETS INTO CORRECT FORM OF THE INFINITIVE, GERUND OR PARTICIPLE

1. Food can (absorb) chemicals from packaging materials.
2. DNA probes (carry out) in our laboratory are very accurate.
3. All additives such as colours, sweeteners, preservatives, emulsifiers must (regulate) with strict guidelines.
4. They keep (run) quality control checks to avoid contamination in a food production plant.

5. He is happy (get) treatment from bacterial gastrointestinal infection at home.
6. The pathogens (enumerate) by the technician can't cause harm to human health.
7. The new strain of Salmonella appeared (be) life-threatening for the elderly, pregnant women and people with the compromised immunity.
8. Potential harmful additives (analyze) in the article will be thoroughly studied by the food safety technicians.
9. These additives appear (cause) harm to consumers, they must (ban).
10. There are a lot of ways of (prevent) the incidence of infection originating in food source.
11. He insisted on (monitor) all the ingredients.
12. The laboratory technician claims (submit) samples yesterday.
13. Harmful bacteria (grow) in the food can be destroyed by heat and reduced sharply by freezing the foods. 14. He is looking forward to (receive) diagnostic samples.
15. Food safety technicians seem (detect) the presence of the unwanted disease-causing organisms.
16. When doctor looked into the ward, the patient pretended (sleep).
17. There are a lot of safety rules (follow).

EXERCISE 4. COMPLETE THE SENTENCES TO MAKE THEM TRUE FOR YOU

1. I can't help _____
2. I can't stand_____
3. I look forward to_____
4. I am used to ____
5. It is worth_________is worth ____
6. It's no use ____

EXERCISE 5. MAKE YOUR OWN SENTENCES WHICH ARE TRUE ABOUT PEDIATRICIANS/GPS/STUDENTS OF SIBERIAN STATE MEDICAL UNIVERSITY USING THE WORDS AND MODELS GIVEN

1. ____ want ___
2. ____ can't stand ___
3. ____ can't help ___

4. ____ don’t mind ___
5. ____ object ___
6. ____ manage ___
7. ____ would like their patients ___
8. ___ avoid ___
9. ___ keep ___

Pediatricians GPs Students of Siberian State Medical University	are keen are good insist can’t live are interested are used look forward are tired are in the habit are excited are fed up are annoyed	at in to (2) on (2) without with (someone)/about (something) of (2) about with	

LESSON 4. GENETICS

SECTION 1: VOCABULARY

Nouns and noun phrases: gene, genotype, genetic locus (pl. loci), allele, mutant allele, fixed allele, dominant allele, genetic information, carrier, offspring, co-dominance, synthesis of amino-acid, codon, penetrance, genetic variations, deletion, pigment type, self-replication, heredity, sequence, interaction, protein, population, base pairs in a DNA sequence, gene product, set of genes, genetic testing, cell, generation, germ cells, somatic cells, combination (of alleles), diploid organisms, copy, hybrid, autosomal gene, gene variant, base pairs, insertion, embryo, nucleotides, variant, translation, transcription, Single-nucleotide polymorphism (SNP), Short tandem repeats (STR), specific location, polymorphism, mode of inheritance, missense mutation, modifier, synapsis, infertility, hereditary conditions, pedigree analysis, nondisjunction of chromosome, numbers.
Adjective/ participle: genetic, abnormalities, inefficient (transfer), complete (sets), intervening, homozygous, heterozygous, homologous, hereditary, defining (traits), recessive (traits), multiple, recessive, autosomal, transmit, consecutive (nucleotides), compound (heterozygote), defined, specified, fixed, particular, inherited, possessing, incomplete (dominance), dominant, incomplete penetrance, intronic (mutation), lethal (mutation), premature, embryonic, fetal (development), nonviable, X-linked, splice (variant, site), sex-linked, mitochondrial, male, female, conjugated, congenital, associated with.
Verb: to breed, to express (the phenotype), to possess, to fertilize, to be absent, to dilute, to reduce, to produce, to carry, to duplicate, to penetrate, to code, to translate (into protein), to transfer, to insert, to delete, to inherit, to shift (the triplet), to occupy, to test, to pass on (genetic information), to comprise, to occur, to multiply, to survive.

Транскрипция:
Allele UK: /ˈæliːl/, /əˈliːl/; US: /əˈliːl/;
gamete (/ˈgæmiːt/)
Genetics *амер.* |dʒəˈnetɪks| *брит.* |dʒɪˈnetɪks|
Genotype |ˈdʒenətaɪp|
Haploid |ˈhæplɔɪd|
Heredity *амер.* |həˈredətɪ| *брит.* |hɪˈredɪtɪ|

Heterozygous амер. |ˌhetərəˈzɑɪgəs| брит. |ˌhetərəʊˈzaɪfəs|
Segregation амер. |ˌsegrɪˈgeɪʃn| брит. |ˌsegrɪˈgeɪʃ(ə)n|
Meiosis амер. |maɪˈəʊsɪs| брит. |maɪˈəʊsɪs|
Nondisjunction |nɒnˈdʒʌŋkʃən|
Phenotype амер. |ˈfiːnətaɪp| брит. |ˈfiːnə(ʊ)taɪp|
Pollination амер. |ˌpɑːləˈneɪʃən| брит. |ˌpɒlɪˈneɪʃən|
Zygote |ˈzaɪgəʊt| (pl. zygotes)
Deoxyribonucleic acid (/diːˈɒksɪˌraɪboʊnjuːˌkliːɪk, -ˌkleɪ-/
Ribonucleic acid /ˌraɪ.bəʊ.njuː.kliː.ɪk ˈæs.ɪd/

EXERCISE 1. READ THE TEXT "THE HUMAN GENOME PROJECT AND GENOMICS", UNIT 8, P. 65 IN THE BOOK J. CHRIMES "ENGLISH FOR BIOMEDICAL SCIENCE" AND MARK THE SENTENCES AS TRUE OR FALSE

1. The Human Genome Project began in 1990 as a collaboration between the US Energy Department and the National Institute of Health.
2. The Human Genome Project aimed to identify all the genes in human DNA.
3. The scientists involved in the project wanted to determine the two billion base pair sequence that forms human DNA.
4. The objective of the project was to transfer the results to the public sector for use.
5. A genome is the sum of the RNA in an organism.
6. Genes are units of heredity composed of RNA.
7. The detailed knowledge of the human genome has not provided any advances in biotechnology and medicine.
8. Gene tests are used to examine the DNA directly and test for potential genetic disorders in patients.
9. Gene therapy involves replacing a non-functional gene with a normal gene to correct a disease.
10. Pharmacogenomics is the search to understand how an individual's genetic inheritance will affect the body's reaction to drugs.

EXERCISE 2. MATCH THE WORDS AND DEFINITIONS

1. accurate dosage
2. to map the human genome
3. tailor-made
4. scientific community
5. expanded
6. public scrutiny
7. non-functional gene
8. efficacy
9. confidentiality
10. DNA sequences
11. emergence
12. high-profile debates
13. controversial topic
14. future implications
15. medical enhancement
16. screening
17. to emerge
18. forensic identification of individuals
19. defective genes
20. genetic inheritance

a. a group of scientists who work together and share their knowledge and research findings.
b. a gene that does not produce a protein or has lost its function.
c. keeping information private and only sharing it with authorized individuals.
d. customized or specially designed for a specific purpose or individual.
e. close examination and criticism by the general public.
f. the passing down of traits from parents to offspring through genes.
g. to identify and record all of the genes in a person's DNA.
h. the act of coming into existence or becoming known.
i. improving or altering physical or mental abilities through medical interventions.
j. the precise amount of medication needed for treatment.
k. using scientific methods to determine the identity of a person, often used in criminal investigations.
l. to come into existence or become known.
m. increased or enlarged in size, scope, or extent.
n. potential consequences or effects that may occur in the future.
o. the ability to produce desired results or effectiveness.
p. the process of testing for a particular disease or condition.
q. a subject that is highly debated and has strong opposing opinions.
r. the order of nucleotides (A, T, C, G) in a strand of DNA.

s. genes that have mutations or abnormalities which can cause health problems.
t. discussions or arguments that receive a lot of attention and media coverage.

EXERCISE 4. FILL-IN THE GAPS WITH THE VOCABULARY GIVEN

tailor-made, to (2), accurate dosage, DNA sequences, forensic identification of individuals, non-functional genes, map, controversial topic, transfer, genetic inheritance, genetic, inheritance, pharmacogenomics, high-profile debates, gene tests, emerging, behavioural genetics, defective genes (2), genome, medical enhancement, sequence

1. The scientists are working hard _____(1) the human genome.
2. _____(2) is a key factor in determining our genetic makeup.
3. Each individual's genetic _____(3) is unique and can provide valuable information.
4. Researchers plan _____(4) the results of their study to other labs for further analysis.
5. The human _____(5) contains all the genetic information that makes up a person.
6. _____(6) can help identify potential health risks and guide treatment plans.
7. With new technology, _____(7) discoveries in the field of genomics continue to surprise us.
8. Carriers of disease often pass on _____(8) to their offspring.
9. Certain diseases can be caused by having _____(9).
10. Scientists are using advanced techniques to better understand _____(10).
11. _____(11) is a revolutionary way of prescribing tailor-made medications.
12. The study of _____(12) has led to groundbreaking medical advancements.
13. Personalized medicine is now possible with the use of _____(13) testing.
14. _____(14) of medication is crucial when considering someone's genetic makeup.
15. _____(15) relies on analysis of DNA sequences.

16. _____(16) is a growing area of research that looks at the role of genes in behavior.
17. _____(17) may become possible with the knowledge gained from studying the human genome.
18. The human genome project remains a _____(18) among scientists and ethicists.
19. _____(19) have taken place regarding the ethics involved in genetic testing.
20. _____(20) provide important clues in understanding and treating genetic disorders.

EXERCISE 5. DISCUSS THE FOLLOWING QUESTIONS

1. What is the purpose of mapping the human genome?
2. How has the scientific community expanded since the emergence of the human genome project?
3. Can screening for defective genes lead to tailor-made treatments?
4. Why is it important to accurately dosage medications based on genetic inheritance?
5. How does the emergence of non-functional genes affect medical enhancement?
6. What are some potential future implications of the human genome project?
7. In what ways has public scrutiny affected high-profile debates surrounding the human genome project?
8. How do DNA sequences play a role in forensic identification of individuals?
9. Is confidentiality a concern when it comes to sharing genetic information for research purposes?
10. Why is the topic of the human genome project considered controversial?

EXERCISE 6. READ THE TEXT AND ANSWER THE QUESTIONS

Genetics is the study of genes, genetic variation, and heredity in organisms. It is an important branch in biology because heredity is vital to organisms' evolution. Gregor Mendel, a Moravian Augustinian friar working in the 19th century in Brno, was the first to study genetics scientifically. Mendel studied "trait inheritance", patterns in the way traits are

handed down from parents to offspring over time. He observed that organisms (pea plants) inherit traits by way of discrete "units of inheritance". This term, still used today, is a somewhat ambiguous definition of what is referred to as a gene.

Trait inheritance and molecular inheritance mechanisms of genes are still primary principles of genetics in the 21st century, but modern genetics has expanded to study the function and behavior of genes. Gene structure and function, variation, and distribution are studied within the context of the cell, the organism (e.g. dominance), and within the context of a population. Genetics has given rise to a number of subfields, including molecular genetics, epigenetics and population genetics. Organisms studied within the broad field span the domains of life (archaea, bacteria, and eukarya).

Genetic processes work in combination with an organism's environment and experiences to influence development and behavior, often referred to as nature versus nurture. The intracellular or extracellular environment of a living cell or organism may increase or decrease gene transcription. A classic example is two seeds of genetically identical corn, one placed in a temperate climate and one in an arid climate (lacking sufficient waterfall or rain). While the average height of the two corn stalks may be genetically determined to be equal, the one in the arid climate only grows to half the height of the one in the temperate climate due to lack of water and nutrients in its environment.

The cell is the basic structural and functional unit of all forms of life. Every cell consists of cytoplasm enclosed within a membrane, and contains many macromolecules such as proteins, DNA and RNA, as well as many small molecules of nutrients and metabolites. The term comes from the Latin word cellula meaning 'small room'.

Cells can acquire specified function and carry out various tasks within the cell such as replication, DNA repair, protein synthesis, and motility. Cells are capable of specialization and mobility within the cell.

Most plant and animal cells are only visible under a light microscope, with dimensions between 1 and 100 micrometres. Electron microscopy gives a much higher resolution showing greatly detailed cell structure. Organisms can be classified as unicellular (consisting of a single cell such as bacteria) or multicellular (including plants and animals). Most unicellular organisms are classed as microorganisms. The number of cells in plants and animals varies from species to species; it has been estimated

that the human body contains around 37 trillion (3.72×1013) cells. The human brain accounts for around 80 billion of these cells.

The study of cells and how they work has led to many other studies in related areas of biology, including: discovery of DNA, cancer systems biology, aging and developmental biology.

Cell biology is the study of cells, which were discovered by Robert Hooke in 1665, who named them for their resemblance to cells inhabited by Christian monks in a monastery. Cell theory, first developed in 1839 by Matthias Jakob Schleiden and Theodor Schwann, states that all organisms are composed of one or more cells, that cells are the fundamental unit of structure and function in all living organisms, and that all cells come from pre-existing cells. Cells emerged on Earth about 4 billion years ago. [Griffiths et al.]

Questions:

1. What is genetics?
2. What does genetics work with?
3. What is the cell?
4. What are the subfields of genetics?
5. What are the units of inheritance?
6. What are the genetics scientific notions?
7. What is the classification of the organisms?
8. What are the primary principles of modern genetics?

EXERCISE 7. CHOOSE THE CORRECT VARIANT

1. The basic biological function in the organism is called the combination of *cells/alleles.*
2. *Self-replication/ transcription* characterizes the DNA chain.
3. The product of the DNA self-replication results in a *new generation /translation* development.
4. *Recessive/defines* traits occur only in case of homozygous genotype.
5. *Mutations/nucleotides* can lead to cancer.
6. A DNA sequence forming a unit of genomic information is called a *heterozygote/codon*.
7. A *compound heterozygote/an embryo* marks a codon having several recessive traits at a locus.
8. The term "*phenotype/generation*" characterizes morphology of the organism.

9. *Transmission/transcription* of genes to an organism's offspring forms phenotypic traits.
10. *Genotype/nucleotide* along with environmental and evolutionary factors determine the phenotype.
11. A-T, G-C in DNA are known to be *base pairs/compound heterozygotes*.
12. Regular body cells that reorganize and reproduce various tissues in the organism are called *germ /somatic* cells.
13. Some genetics misfunctions appear in the organism at the stage of an *embryo/locus*.
14. The gene mutation is a synonym to the set of *genes/gene* variant.
15. When an egg and a *sperm/somatic cell* unite, the united fertilized cell contains DNA from both parents.
16. A fixed *allele/haploid* is homozygous for any member of the population.
17. *Zygotes/gametes* are diploid reproductive cells.
18. A *male/female* reproductive cell is called the ovum.
19. During *segregation/conjunction* one species transfers it's genetics material to the other.
20. A *missense mutation/gene product* may alter the function of the resulting proteins in DNA.

EXERCISE 8. INSERT THE MISSED WORDS

set of genetic information / hereditary / pollination / generation / RNA
haploid / / loci / gametes / zygote / codons / DNA / fertilization / alleles / meiosis / transmitted / germ cells / genes / genetic information /
SNP / intronic / cell / synapsis / polymorphism / hybrid / somatic cells

1. According to the most widespread errors … is ... from one ... to another directly.
2. ... decomposing effect is one of the most perspective issues in genetics.
3.... are the central object in modern genetics research.
4. A mutation characterized by a new splicing site is called …
5. ….. is the basic unit of an organism.
6. … set of chromosomes causes the abuse of their dominant and recessive traits.
7. ... cells represents a complete set of chromosomes.
8. Variants of a gene in homologous chromosomes are called …

9. …chain is characterized by ribose.
10. The combination of ... in a gene defines the amino-acid sequence of proteins in the polypeptide chain.
11. A diploid cell capable to produce any other is called ... .
12. A genome is described as the complete ...
13. Long molecules of … comprise chromosomes.
14. DNA replication in two cycles of cell division to produce four daughter cells is known as ...
15. Scientists state ... to be haploid cells.
16. Either genetics code or environmental factors may interact to affect the ... modes.
17. .... and .... are the process of reproduction.
18. The genomic map is comprised of several ...
19. A synonym to “hereditary” is ...
20. …. occurs during meiosis.
22. …. defines a germline substitution of a single nucleotide at a specific position in the genome.
23. The variety of cells or nuclei in size is also **...**
24. A … the offspring resulting from combining the qualities of two organisms of different varieties or species.
25. Don’t mix ... and ... . They have different representation.

EXERCISE 9. TRANSLATE THE SENTENCES

1. Интегрирующая роль генетики заключается в том, что она исследует универсальные свойства на всех уровнях организации живого: молекулярном, клеточном, организменном и популяционном и на всех таксономических группах организмов, включая и человека [Асланян].
2. Одно из коренных положений современной генетики состоит в том, что наследственная информация о развитии и свойствах организмов содержится главным образом в молекулярных структурах хромосом, заключённых в ядрах всех клеток организма и передаваемых от родителей потомкам [Беляев].
3. Биохимические процессы, лежащие в основе индивидуального развития организма, осуществляются на базе поступающей из ядра информации в цитоплазматических структурах клетки [Беляев].
4. Некоторые клеточные органеллы, в частности хлоропласты и митохондрии, обладают генетической автономией, т. е. содержат наследственный материал [Беляев].

5. Один из фундаментальных принципов генетики – дискретность наследственных факторов, определяющих развитие признаков и свойств [Беляев].

6. Для удобства анализа явлений наследования признаков Мендель ввёл буквенную символику. Гены доминантных признаков обозначаются заглавными буквами алфавита, рецессивных – строчными [Беляев].

7. Наследственную основу организма, константного в отношении какого-либо доминантного признака, можно обозначить формулой АА, генетическая формула организма с рецессивным признаком – аа [Беляев].

8. Организмы, несущие только гены, обусловливающие развитие доминантного (АА) или рецессивного (аа) признака, называются гомозиготными; организмы, несущие и те, и другие гены (Аа), – гетерозиготными [Беляев].

9. Гены, занимающие одно и то же положение в гомологичных хромосомах и влияющие на развитие одних и тех же признаков, называют аллельными генами [Беляев].

10. Явление расщепления признаков гибридных (гетерозиготных) организмов основано на том, что половые клетки (гаметы) гибридов несут только один из двух полученных ими от родителей аллельных генов. На этом состоит принцип чистоты гамет, отражающий дискретность структуры наследственного материала [Беляев].

11. Чистота гамет объясняется расхождением в мейозе гомологичных хромосом и локализованных в них аллельных генов в дочерние клетки, а числовые соотношения типов в потомстве от скрещивания гетерозиготных особей – равной вероятностью встречи гамет и заключённых в них генов при оплодотворении [Беляев].

12. Если вести анализ только по одному признаку, то обнаруживаются два типа потомков: один – с доминантным, другой – с рецессивным признаком [Беляев].

13. Независимость наследования, т. е. свободное комбинирование, присуща тем признакам, за развитие которых отвечают гены, лежащие в разных (негомологичных) хромосомах. Таким образом, причина независимого наследования – в независимом расхождении негомологичных хромосом в мейозе [Беляев].

14. Последующий детальный анализ закономерностей наследования показал, что совокупность признаков организма (фенотип) далеко не всегда соответствует комплексу его наследственных задатков,

так как даже на одинаковой наследственной основе признаки могут развиваться по-разному под влиянием различных внешних условий [Беляев].

15. Наследственно-обусловленные признаки могут не проявиться в фенотипе либо в силу их рецессивности, либо под влиянием тех или др. факторов внешней среды. Если фенотип особи доступен непосредственному наблюдению, то о её генотипе с наибольшей полнотой можно судить на основе изучения потомков, полученных в определенных скрещиваниях [Беляев].

SECTION 2: GRAMMAR
THE GERUND

The **gerund** is the non-finite verb form which also combines the properties of the verb with those of a noun. Similar to the infinitive, it serves as the verbal name of the process, but it has a stronger substantive quality. As different from the infinitive, and similar to the noun, the gerund can be modified by a noun in the possessive (or common) case or a pronoun (expressing the subject of the verbal process) – The driver's(his) being rude like that was disgusting. I read about the hostages having been released. It can be used with prepositions.

The combinability of the gerund is also dual, sharing some features of the verb (inside the construction) with some of the noun. The verb-type combinability is shown in combination with nouns-objects, modifying adverbs, semi-functional predicator verbs (start doing, can't stand doing). Of the noun-type is combinability with finite notional verbs as the object, subject, as prepositional adjunct (object, attribute, modifier), with nouns as prepositional adjunct.

The functions of gerund in the sentence can be:

Subject – Repeating your accusations doesn't make them more convincing.

Object – He delayed breaking news.

Prepositional object – He didn't object against our coming here.

Predicative – Luck is believing you're lucky.

Attribute – There is a pleasant prospect of listening to her story.

The formal sign of the gerund is homonymous with that of the present participle, it is the suffix – ing added to its categorially (not semantically) leading element.

The gerund distinguishes two grammatical categories: the aspect of retrospective coordination and voice. The paradigm includes four forms:

	simple	**perfect**
active	Taking	Having taken
passive	Being taken	Having been taken

Since the meaning of the infinitive and the gerund is similar, the reason of usage of the infinitive after verbs want, expect, and the like, and the gerund after avoid, delay, deny, and the like, lies in semantic shade of infinitive having the meaning of purpose, which can be proved by transformation – I want to come. – I want it to happen so, in order me to come. – I deny coming. – I deny the fact, the thing of coming. – It is also brightly reflected in the use of gerund/infinitive with stop, remember and try.

The **gerundial construction** is a syntactic pattern. It consists of the gerund with the defining words and the syntactic derivative structures:

– Learning genetics is extremely important.

The syntactic functions of the gerundial construction and the gerund are similar.

EXERCISE 1. TRANSFORM VERBS FROM THE TOPICAL GLOSSARY INTO THE GERUND

breed
express
possess
fertilize
be absent
dilute
reduce
produce
carry
duplicate
penetrate
code
transfer
insert
delete
inherit
shift
occupy
test
pass on (genetic information)
comprise
occur
multiply
survive
translate

EXERCISE 2. MAKE SENTENCES WITH THE GERUND USING THE VERBS FROM THE TOPICAL GLOSSARY

EXERCISE 3. MAKE WORD COMBINATIONS WITH THE WORDS USING THE GERUND

homozygous	incomplete
heterozygous	intronic
homologous	lethal
hereditary	premature
recessive	embryonic
multiple	fetal
recessive	nonviable
autosomal	X-linked
transmit	splice
consecutive	sex-linked
compound	mitochondrial
defined	male
specified	female
fixed	conjugated
particular	congenital
inherited	associated with
possessing	incomplete
dominant	

EXERCISE 4. FIND A GERUNDIAL FORM FOR THE TOPICAL GLOSSARY ADJECTIVES AND PARTICIPLES

EXERCISE 5. MAKE DEFINITIONS TO THE TOPICAL GLOSSARY NOTIONS USING THE GERUND

EXERCISE 6. CONVERT THE BASIC SENTENCES USING THE GERUND

1. They see no connection between hereditary diseases and influenza.
2. What happens if we mix male and female gametes?
3. In the course of the experiment DNA thymine was eliminated.
4. Nano robots are capable to transform the set of genes.
5. Genetic engineering matter concerning changes in transmission of genetic information seems to be fantastic.
6. It’s impossible to dilute diploid organisms.
7. We can’t guarantee vital activity of a damaged cell.
8. Genetic testing is also used to help archeologists.

9. Fever can be transmitted congenitally. Scientists use reverse research methods to define the state of a hybrid.
10. Make an attempt to interfere genetic loci during your experiment.
11. These technologies enable to provide a selective scenario for an embryo development.
12. What base pairs do you know?
13. Meiosis discovery was the first step in genetics development.
14. Make a hypothesis on the intronic mutation.
15. Gene inheritance in mammals occurs in sexual reproduction
16. Would you comment upon the law of independent assortment?
17. Mind the role of guanine in DNA replication.
18. A team of researchers discovered the fossilized bone fragments of the first-known Neanderthal family. DNA analysis of these fragments offered rare insights into Neanderthals' lives – depicting their social structures, migratory patterns, and relationships [2022 in genetics].
19. Genetic mutations help to avoid Covid-18.
20. 33 of the 50 drugs recently approved by the Food and Drug Administration were supported with genomic data – making it clear that genetic insights will play an increasingly important role in development of new therapies for people who need them most [2022 in genetics].
21. Scientists discovered that the plague pandemic in XIV century has affected the genome.
22. We approve the influence of the mother's diet during pregnancy that causes possibility of diabetes in her child.
23. The "Synthetic regulatory reconstitution" is a technology aimed at genes regulation.
24. They did a researched to study many disorders etiology and elaborate therapy methods.
25. FDA approves gene therapy to treat non-invasive cancer.
26. The Alzheimer disease genetic therapy is under clinical testing.
27. Genetic discovery opens new bioengineering opportunities for human and plant health.
28. CRISPR gene editing technology has been used in over 5,000 research studies [Golkar].
29. More than 80 % of rare diseases have a genetic component [Golkar].
30. You know that gene editing technologies hold promise to treat genetic disorders like sickle cell disease and muscular dystrophy.

EXERCISE 7. CONVERT PERSONALLY INVENTED SENTENCES INCLUDING THE GERUND FORM IN A CHAIN LIKE WAY USING THE TOPICAL GLOSSARY

Student A: «This week we study the process of fertilization».
Student B: «This week we study fertilizing the gametes» – «The fixed alleles translation is nonsense»
Student C: «Fixed alleles translating means nonsense» – «Complete your research on the female chromosomes» …

EXERCISE 8. MAKE A TOPICAL MONOLOGUE USING THE GERUND AND GERUNDIAL CONSTRUCTIONS

EXERCISE 9. TASK 1. CONVERT THE SENTENCES SUBSTITUTING THE NOUNS AND THE ACTIVE GERUND FORM BY THE PASSIVE ONE

1. The patient's recovery concerns the congenital diseases treating.
2. DNA protein chain splitting experiment was the subject of discussion at the conference.
3. Scientists claim mitochondrial disruption being the reason of infertility.
4. Professor’s talking about DNA reduplication was the most important lecture of the course.
5. I don’t think explaining the process of fertilization will be a subject of genetic engineering in the future.
6. Would you like to start a research upon melanoma and leukemia.
7. We confirm amino-acids synthesizing being a clue point in DNA formation.
8. How much time gametes combining is normal.
9. Have you ever seen alleles splitting under a microscope?
10. Mutating the set of genes is possible under the natural conditions.
11.What generation in a raw recessive traits remediating is possible?
12. Does preventing missense mutations matter?
13. A germ cell surviving is important for breeding.
14. Reading a scientific paper on genetics is essential for the exam passing.
15. Your PhD thesis will be on adenine recombining.
16. What conclusion will you come after performing an experiment on mutant allele combining?
17. Make a report if their pedigree analysis failing confirms.

18. Can you tell herbals from mammals reproducing?
19. Comment on somatic cells multiplying.
20. A professor asks:
- What do you know about the genetic information transmitting?
21. Pessimists claim scientists interfering mode of inheritance is dangerous.
22. Professional genetic testing helps preventing some diseases conditions.
23. DNA data base applying helps to define criminals.
24. We don't definitely know some vaccines influencing the further generation.
25. Genetics studying is important for the population healthcare supporting.
26. There is no doubt smoking is perilous for fetal developing.
27. Can you explain the process of conjugating and X-linking in genetics?
28. They say genetically modified products consuming leads to fatal mutations.
29. How many scientific papers on phenotype are worth translating?
30. Our colleagues dream of treating hereditary diseases in every hospital.
31. We suggest rare syndromes associated with genetic variations studying at the level of academic education.
32. Denying chromosomes is useless. It's a scientifically approved fact.

Task 2. Continue sentences using other words and notions from the topical glossary with the active and passive gerund forms

EXERCISE 10. CONVERT THE SENTENCES USING THE GERUNDIAL CONSTRUCTION

1. Mutagenesis may occur spontaneously in nature, or as a result of exposure to mutagens [Beale].
2. The mechanism by which mutations occur may be complex, and take longer to unravel [Beale].
3. At least 169 enzymes are either directly employed in DNA repair or influence DNA repair processes [Geisinger et al.].
4. The mechanism by which mutation occurs varies according to the mutagen, or the causative agent, involved [Heidenreich].
5. DNA is not entirely stable in aqueous solution, and depurination of the DNA can occur [Loeb].

6. In order to learn the influence a sequence has on phenotype, or to discover its biological function, researchers can engineer a change or disrupt the DNA [Reski].
7. The mechanism by which the PAH adducts give rise to mutation, however, is still under investigation [Reski].
8. When DNA is damaged, the cell responds in various ways to fix the damage and minimize the effects on the cell [Weinert, Hartwell].
9. The sequence of heterocyclic bases on the interior of the DNA double helix constitutes the genetic code that drives the operation of al living organisms [Gates].
7. The organic chemistry of DNA damage is fundamentally important to diverse fields including medicinal chemistry, toxicology, and biotechnology [Gates].
8. Genomes are dynamic entities that change over time as a result of the cumulative effects of small-scale sequence alterations caused by mutation and larger scale rearrangements arising from recombination . [Brown].
9. Both mutation and recombination can have dramatic effects on the cell in which they occur [Brown].
10. A mutation in a key gene may cause the cell to die if the protein coded by the mutant gene is defective [Brown].
11. With a single-celled organism such as a bacterium or yeast, all genome alterations that are not lethal or reversible are inherited by daughter cells and become permanent features of the lineage that descends from the original cell in which the alteration occurred [Brown].
12. In Drosophila, almost all growth occurs in the larval stage, which is terminated by pupariation, which marks the onset of metamorphosis, the transition to adulthood comparable with mammalian puberty [Texada et al.].
13. After a mutant is found, the gene mutated is identified through standard molecular techniques [Ahringer J.].
14. RNAi can also be carried out on a global scale, where knockdown of (nearly) every gene is tested to induce a phenotype of interest [Ahringer].
15. This section discusses general features to consider this technique [Ahringer].
16. For some genes, shorter times post-injection will give a stronger effect, particularly for genes with a zygotic but not a maternal function [Ahringer].
17. We therefore hope to receive more papers describing model systems that address these important goals and to keep the community abreast of

new developments and resources in established model organism and developing model system databases [Hieter et al.].

EXERCISE 11. TRANSLATE THE SENTENCES USING THE GERUND AND THE GERUNDIAL CONSTRUCTION

1. Фундаментом для развития генной инженерии служат достижения в молекулярной биологии, микробиологии, биохимии и генетике [Шарипова, с. 4].
2. Знание белкового продукта позволяет сделать заключение о функции гена [Шарипова, с .4].
3. На стадии метафазы митоза хромосомы состоят из двух продольных копий [Снигур, с. 12].
4. Существует несколько способов для увеличения эффективности трансформации [Шарипова, с. 8].
5. К увеличению частоты трансформации приводит также обработка клеток полиэтиленгликолем в результате частичного повреждения цитоплазматической мембраны [Шарипова, с. 8].
6. При последующем снижении температуры праймеры присоединяются к их геномным гомологам и могут с помощью ДНК-полимеразы удлиниться, т. е. на ДНК-матрице синтезируется вторая цепь [Гончаренко, с. 34].
7. Один из самых современных и перспективных способов получения рекомбинантных бактерий разработали учёные из лаборатории Микробиологической инженерии университета Китасато в Японии [Никульшина, Панкова, с. 95].
8. Уникальным вариантом вакцин являются трансгенные растения (томаты, табак, бананы, морковь, картофель), в ДНК которых введены гены, чьи белковые продукты вызывают иммунный ответ [Ахова].
9. С помощью этих микропредставителей животного мира целенаправленно конструировали новые типы векторных молекул и реципиентных клеток, прогнозируя свойства рекомбинантных молекул ДНК [Никульшина, Панкова, с. 94].
10. Именно на основании представленных выше параметров мы считаем, что единообразное правовое регулирование всех генетических технологий в целом с использованием рискориентированного подхода и отнесение их к категориям низкой, средней и высокой вероятности наступления рисков не будет отвечать основной цели такого регулирования – эффективному нормированию возникающих в связи

с различными генетическими технологиями общественных отношений [Юдин, с. 6].
11. Отнесение тех или иных медицинских генетических технологий к выделенным исходя из вероятности наступления рисков видам на основании предложенных нами критериев не должно, по нашему мнению, быть исключительным преимуществом законодателя (включая Минздрав России) [Юдин, с. 7].
12. В сфере здравоохранения имеются: МГТ, которые уже длительное время используются в медицинской деятельности и зарекомендовали себя как эффективные [Юдин, с. 7].
13. Большинство плазмид, которые используются в работе с рекомбинантными ДНК, не коньюгативные и не способны самостоятельно переходить в клетки путем коньюгации [Шарипова, с. 9].
14. Первичное клонирование ДНК обычно дает набор клонов, соответствующих полному геному [Шарипова, с. 15].
15. Созданная гибридная клетка обладает возможностями к быстрому размножению (от миеломной клетки) и продуцированию антител к определенному антигену, использованному для иммунизации (от плазмоцита) [Никульшина, Панкова, с. 95].
16. До эпохи генной инженерии одну из важных проблем здоровья человека, связанную с нарушением работы желез внутренней секреции и приводящей к замедлению роста детей вплоть до карликовости, лечили введением препарата гормона роста (соматотропин), который получали из гипофиза умерших людей [Никульшина, Панкова, с. 95].
17. Генная инженерия используется при получении рекомбинантных вакцин, например, против вирусного гепатита В, а также в создании диагностических тест-систем для таких опасных инфекций как ВИЧ-инфекция [Никульшина, Панкова, с. 96].
18. Появилась возможность искусственно создавать гены, кодирующие химерные полипептиды, обладающие свойствами двух или более природных белков [Шарипова, с. 6].
19. Точки начала репликации на молекуле ДНК имеют специфическую последовательность оснований [Снигур, с. 18].
20. Перед началом трансляции синтезированные в результате разнообразных биохимических реакций ил полученные с пищей аминокилоты должны пройти стадию активации и присоединиться к тРНК [Снигур, с. 26].

LESSON 5. DRUG DISCOVERY

SECTION 1: VOCABULARY

Nouns: analysis, aim, objective, improvement, innovation, licence, product, a chemical, a substance, potency, specificity, absorption, duration of action, stability, storage, drug discovery, drug candidate, a drug target, toxicity level, side effects, availability of source, manufacture, technique, enzyme, trials, pharmacokinetics, a placebo, outcomes, an application, pharmacovigilance.
Adjective/ participle: active, risky, stable, tolerant, innovative, toxic, synthetic, marine (product), common, rare, light-sensitive, temperature-sensitive, pharmaceutical, medicinal, well-tolerated, initial, beneficial, adverse (effects), pre-clinical, clinical (trials), suitable, therapeutic.
Adverb: constantly, officially, legally, thoroughly.
Verb: computer-aided design, to attack a target, it takes … to do smth, on average, in vivo testing, in vitro, public health authorities, to give a licence, the food and drug administration, on an industrial scale, to provide with drugs, to meet world health needs.

EXERCISE 1. MATCH THE TERMS WITH THE DEFINITIONS

1. absorption	**a.** to assess or judge the quality, importance, or value of something.
2. to evaluate	**b.** to examine or test for the presence of something.
3. risky	**c.** involving the possibility of harm, danger, or loss.
4. stable	**d.** to separate or set apart from others.
5. to isolate	**e.** the process of taking in or soaking up something.
6. innovative	**f.** the process of making goods by hand or machinery.
7. storage	**g.** the act of making something better or more satisfactory.
8. licence	**h.** the introduction of new ideas, methods, or products.
9. to emerge	**i.** not likely to change or fail; firmly established.
10. potency	**j.** a legal document giving official permission to do something.
11. toxic	**k.** containing poisonous substances that can cause harm or death.
12. to screen	
13. manufacture	
14. innovation	
15. improvement	

l. the action of keeping something in a specified place for future use.
m. introducing new ideas or methods; original and creative.
n. the strength or power of something.
o. to become known or apparent.

EXERCISE 2. COMPLETE THE GAPS WITH THE MISSED INFORMATION

evaluate	medicinal	target	toxicity	outcomes
absorb	discovery	administrate	develop	initial
substance	well-tolerated	constantly	carry	adverse

1. Researchers are planning to _____ out a research on the effectiveness of the new drug.
2. Computer-Aided Design has revolutionized the process of drug _____in recent years.
3. Identifying a drug _____is crucial for developing an effective treatment.
4. The _____level of the experimental drug needs to be carefully monitored during clinical trials.
5. The body needs to _____the medication quickly for it to be effective.
6. Nurses need to _____the medication according to the doctor's instructions.
7. Scientists are working hard to _____new treatments for rare diseases.
8. The _____properties of the herb have been used for centuries in
9. The new drug is _____by most patients in the clinical trial.
10. The _____results of the study show promising potential for future research.
11. Researchers are analyzing a _____found in the plant for its medicinal properties.
12. Scientists are _____researching new ways to improve drug delivery methods.
13. The drug was withdrawn from the market due to its _____effects on patients.

14. The objective of the study is to _____the effectiveness of the treatment.
15. The _____of the clinical trial will determine the future of the drug in the market.

EXERCISE 3. WATCH THE VIDEO AND ANSWER THE QUESTIONS

https://youtu.be/DhxD6sVQEYc?si=oDXI6dH-rMlulbpY

Comprehension questions:
1. What is the first step in the process of developing a new medicine?
2. How many compounds are typically examined before narrowing it down to a single candidate medicine?
3. What is the primary concern during the clinical testing phase with the FDA?
4. What are the main focuses of Phase 1, Phase 2, and Phase 3 clinical trials?
5. How long does the process of a successful clinical trial typically take?
6. What is included in a typical new drug application filed with the FDA?
7. How does the FDA determine which medicines are safe and effective for public use?

Discussion questions:
1. How much do you know about the process of developing and bringing new medicines to market?
2. What are some of the challenges faced by research teams in analyzing diseases and developing new drugs?
3. Do you think the lengthy and expensive process of drug development is justified considering the impact on public health?
4. How important is the role of the FDA in ensuring the safety and efficacy of new medicines before they are approved for public use?
5. Have you ever thought about the individuals behind the development of the medicines you take, and the immense effort they put into making our lives better?

EXERCISE 4. CROSSWORD

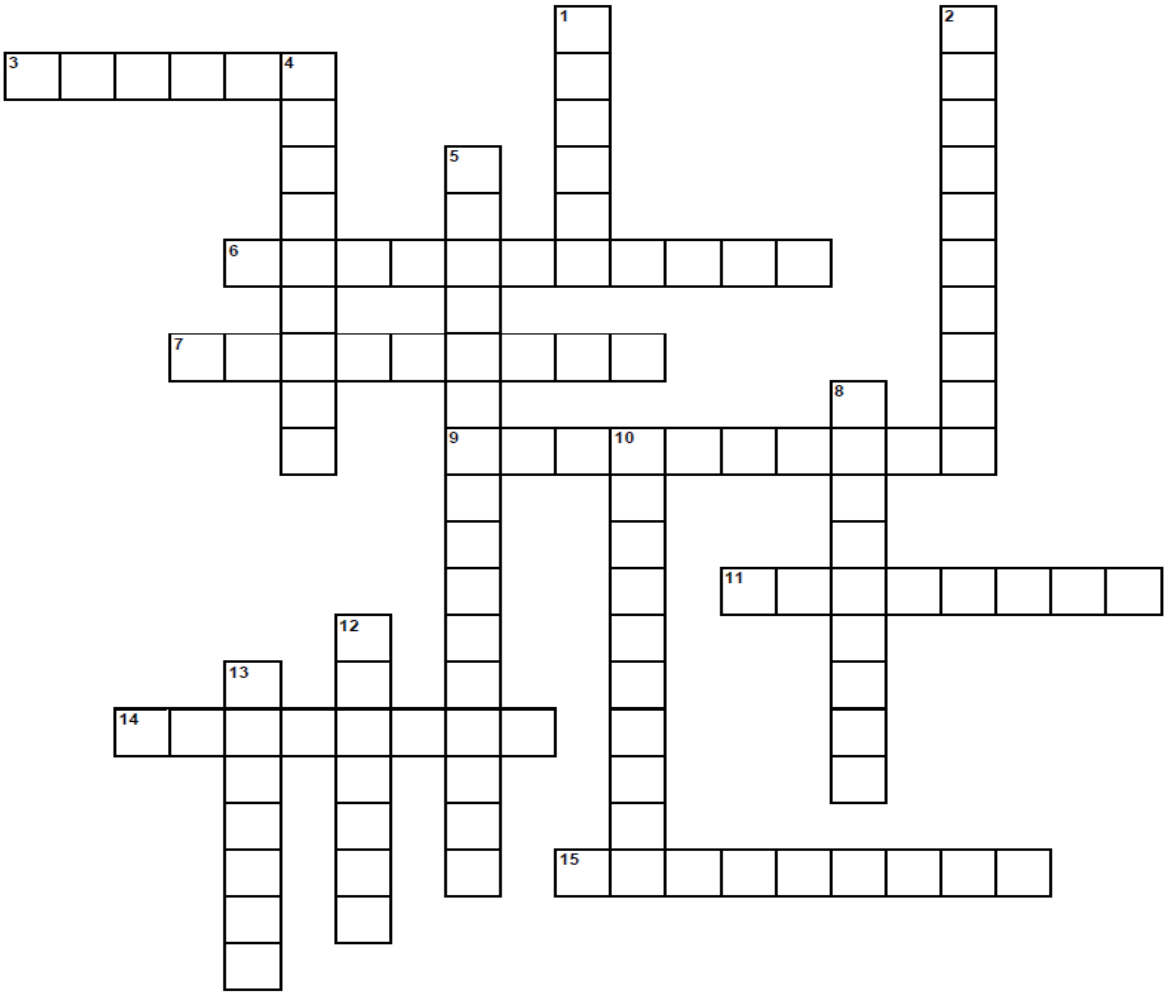


Рисунок 2

Across

[3] experiments or tests conducted to evaluate the effectiveness of something, such as a new drug or treatment.

[6] relating to the treatment or healing of a disease or injury.

[7] to ascertain or establish exactly, typically through investigation or analysis.

[9] continuously or without interruption.

[11] appropriate or fitting for a particular purpose or situation.

Down

[1] a protein that acts as a catalyst to speed up chemical reactions in the body.

[2] formally or officially recognized or authorized.

[4] produced artificially rather than occurring naturally.

[5] the study of how drugs are absorbed, distributed, metabolized, and excreted in the body.

[8] the ability of something to remain unchanged or steady

[14] to confirm or prove the accuracy, truth, or validity of something.

[15] a method or procedure for accomplishing a specific task or skill.

over time.

[10] to examine or inspect closely and critically.

[12] to experience or endure a process, especially a medical procedure or treatment.

[13] a substance with no therapeutic effect given to patients, used as part of a clinical trial to compare the effects of an active treatment.

EXERCISE 5. READ THE TEXT AND COMPLETE THE TASKS

GENERIC DRUGS

A generic drug is a medication created to be the same as an already marketed brand-name drug in dosage form, safety, strength, route of administration, quality, performance characteristics, and intended use. These similarities help to demonstrate bioequivalence, which means that **a generic medicine works in the same way and provides the same clinical benefit as the brand-name medicine.** In other words, you can take a generic medicine as an equal substitute for its brand-name counterpart.

Any generic medicine must perform the same in the body as the brand-name medicine. It must be the same as a brand-name medicine in dosage, form and route of administration, safety, effectiveness, strength, and labeling (with certain limited exceptions). It must also meet the same high standards of quality and manufacturing as the brand-name product, and it must be and quality, taken and used in the same way as well. This standard applies to all generic medicines.

Generic medicines use the same active ingredients as brand-name medicines and work the same way, so they have the same risks and benefits as the brand-name medicines. The FDA Generic Drugs Program conducts a rigorous review to ensure generic medicines meet these standards, in addition to conducting inspections of manufacturing plants and monitoring drug safety after the generic medicine has been approved and brought to market.

A generic drug may have certain minor differences from the brand-name product, such as different inactive ingredients.

It is important to note that there will always be a slight, but not medically significant, level of expected variability. When a medicine, generic or brand-name, is mass produced, very small variations in purity, size, strength, and other parameters are permitted. FDA limits how much variability is acceptable.

For example, a very large research study[1] comparing generics with brand-name medicines, found that there were very small differences (approximately 3.5 %) in absorption into the body between generic and brand-name medicines. Some generics were absorbed slightly more, some slightly less. This amount of difference is expected and clinically acceptable, whether for one batch of brand-name medicine tested against another batch of the same brand, or for a generic tested against a brand-name medicine.

Trademark laws do not allow a generic drug to look exactly like other drugs already on the market. Generic medicines and brand-name medicines share the same active ingredient, but other characteristics, such as colors and flavorings, that do not affect the performance, safety, or effectiveness of the generic medicine, may be different.

Generic drugs tend to cost less than their brand-name counterparts because generic drug applicants do not have to repeat animal and clinical (human) studies that were required of the brand-name medicines to demonstrate safety and effectiveness. The reduction in upfront research costs means that, although generic medicines have the same therapeutic effect as their branded counterparts, they are typically sold at substantial discounts, an estimated 80 to 85 % less, compared with the price of the brand-name medicine. When multiple generic companies are approved to market a single product, more competition exists in the marketplace, which typically results in lower prices for patients.

Mark the Statements True or False:

1. Generic medicines have different active ingredients compared to brand-name medicines.
2. Generic drugs have no differences from the brand-name product.
3. A significant research study comparing generic and brand-name medicines discovered slight variations in absorption rates.
4. Generic drugs cost more than brand-name medicines due to the additional studies required for approval.
5. Generic drugs are not permitted to have the same appearance as existing drugs on the market due to trademark regulations.

6. The color and flavor of generic medicines have a significant impact on their performance and safety.
7. Generic medicines have different active ingredients compared to brand-name medicines.

Answer the Questions:

8. How does a generic drug demonstrate bioequivalence with a brand-name drug?
9. What are the key similarities that a generic medicine must have with its brand-name counterpart?
10. Why is it important for a generic drug to meet the same high standards of quality and manufacturing as the brand-name product?
11. What differences may exist between a generic drug and its brand-name equivalent, according to the text?
12. How does the FDA ensure that generic medicines meet safety and quality standards before and after approval?
13. Why do generic drugs tend to cost less than brand-name medications?
14. How does the presence of multiple generic companies approved to market a single product impact pricing in the marketplace?

EXERCISE 6. TRANSLATE THE FOLLOWING SENTENCES INTO ENGLISH

1. Продолжительность действия этого нового лекарства составляет до 12 часов.
2. Стабильность является решающим фактором при производстве лекарств для обеспечения эффективности.
3. Врач предупредил меня о потенциальных побочных эффектах назначенного лекарства.
4. Доступность исходного материала (source material) имеет важное значение для производства высококачественных лекарств.
5. Перед началом лечения врач должен подтвердить историю болезни пациента.
6. Ученые используют точные инструменты для измерения эффективности экспериментальных лекарств.
7. В среднем требуется 15 лет, чтобы вывести новый препарат с момента открытия на рынок.
8. Тестирование In vivo необходимо для оценки того, как лекарство ведет себя в живых организмах.

9. Исследователи часто проводят исследования in vitro для оценки взаимодействия лекарств на клеточном уровне.
10. Органы общественного здравоохранения играют ключевую роль в регулировании распределения лекарств.
11. Фармацевтическая компания надеется получить лицензию на свой многообещающий новый препарат.
12. Управление по контролю за продуктами и лекарствами внимательно следит за безопасностью и эффективностью лекарств.
13. Процессы производства лекарств оптимизированы для выпуска лекарств в промышленных масштабах.
14. Фармацевтические компании несут ответственность за обеспечение больниц жизненно необходимыми лекарствами.
15. Чтобы удовлетворить потребности мирового здравоохранения, исследователи неустанно работают над разработкой новых методов лечения.

SECTION 2: GRAMMAR

EXERCISE 1. OPEN THE BRACKETS USING GERUND OR INFINITIVE

The drug development process begins with (discover) potential compounds. Scientists spend years (research), hoping (find) a molecule effective against a disease. (Discover) these molecules requires understanding complex biological systems and experimenting with different chemical structures. Once a promising compound is found, the pre-clinical stage starts. This stage involves (test) in laboratories, (focus) on understanding the compound's safety and potential effects. (Conduct) animal testing and developing accurate models helps (predict) how the drug will behave in humans. If the results are positive, the drug enters clinical trials, which are essential for (determine) its safety and efficacy in humans. (Participate) in these trials involves strict regulations and careful monitoring. The trials are divided into phases, with each phase designed (gather) specific information. After successful trials, the final step is licensing. (Apply) for approval from regulatory bodies is necessary before the drug can be marketed. Licensing ensures the drug meets all safety standards, allowing it to be used by the general public.

EXERCISE 2. OPEN THE BRACKETS USING GERUND OR INFINITIVE

(Develop) new drugs involves several crucial steps. (discover) a new drug, scientists start by (identify) a target. This can be a protein or a gene, playing a role in a disease. They then screen thousands of compounds, hoping to find one that interacts with the target. (Find) this ‘hit’ is just the beginning. The next stage, pre-clinical testing, is critical for (ensure) safety. It requires a lot of experimentation and data gathering. Researchers use lab tests and animal studies (evaluate) the drug's safety. (Understand) how the drug works and predicting its effects on humans is essential.

Moving on to clinical trials, the drug must (test) on humans. To begin, small groups are used (assess) safety and dosage. If successful, larger groups help understand efficiency and side effects. (Protect) participants' health is vital, involving constant monitoring and reporting. After clinical trials, the drug undergoes a strict review before licensing. This step is necessary (bring) the drug to market. (Get) approval from health authorities confirms it’s safe and effective. Only then can companies start (marketing) and doctors start (prescribing) the new medication.

EXERCISE 3. OPEN THE BRACKETS USING GERUND OR INFINITIVE

When considering medication options, it is essential (understand) the role of generic drugs. (define) a generic drug, it is necessary to first comprehend that a generic drug is a medication that contains the same active ingredient as a brand-name drug. The primary purpose of generic drugs is (provide) a more affordable alternative to brand-name medications. Patients may (choose) to use generic drugs to save money on their prescriptions.

(Produce) a generic drug, a pharmaceutical company must (demonstrate) that the medication is bioequivalent to the brand-name drug. This process involves (conduct) tests to ensure that the generic drug has the same effectiveness and safety profile as the original medication. Once the generic drug is approved by regulatory authorities, it can (market) and sold to consumers.

Patients should (consult) their healthcare provider before (switch) to a generic drug. It is crucial (discuss) any potential benefits or risks associated with changing medications. Healthcare professionals can (provide)

guidance on whether a generic drug is a suitable option based on the individual's medical history and needs.

In conclusion, understanding generic drugs is essential for (make) informed decisions about medication choices. By learning about the role and benefits of generic drugs, patients can (navigate) the healthcare system more effectively and make choices that align with their needs and preferences.

EXERCISE 4. OPEN THE BRACKETS USING GERUND OR INFINITIVE (DIFFERENT FORMS CAN BE USED)

Understanding Clinical Trials: A Drug Candidate's Journey.

In the bustling laboratory of the university, researchers were noticed to be diligently working on a groundbreaking clinical trial for a promising drug candidate. The team was known (work) tirelessly for months, hoping to discover a new treatment for a rare disease.

The process began with the decision (test) the drug candidate on a group of patients. Before (administer) the drug, the researchers had carefully studied its effects in the lab. They wanted (ensure) that the drug was safe and effective.

As the trial progressed, the researchers found themselves (analyze) a vast amount of data. The drug seemed (show) positive results in some patients. Excitement was in the air as the team continued (monitor) the progress.

Despite the challenges faced, the drug candidate was finally ready (enter) the next phase of testing. The team was ecstatic as they watched the drug (use) in a real-world setting. The results seemed (be) promising, sparking hope for the future.

In conclusion, the journey of a drug candidate through a clinical trial is a complex yet rewarding process. The researchers were dedicated to (find) a solution and contributing to the advancement of medicine. Their hard work will hopefully (lead to) the development of a life-changing treatment.

EXERCISE 5. OPEN THE BRACKETS USING DIFFERENT FORMS OF THE INFINITIVE

1. We are glad (to conduct) this experiment.
2. This generic drug is said (to be) very affordable.
3. They must (forget) about the deadline.

4. Lucy was assumed (to leave) the day before.
5. I'm glad (to work) on this project for the last ten years.
6. He must (to wait) for ages to see the results.
7. The organizers were thought (to prepare) for days.
8. Your report has (to type).
9. This experiment must (to conduct) by Professor Ivanov’s team.
10. The trials are believed (to conduct) for years.
11. They must (to work) on a new project now.
12. This time now, he must (to present) the report on the conference.
13. A new drug was reported (to discover) in the pharm laboratory.
14. The clinical trials are expected (to finish) yesterday itself.
15. He seems (to write) a report for two hours already.

EXERCISE 6. OPEN THE BRACKETS USING DIFFERENT FORMS OF THE GERUND

1. There is no point in (apply) for the grant.
2. I hate (argue) with you.
3. She regretted not (study) harder when she was at school.
4. I hate (lye) to.
5. I don’t like (tell) what and what not to do.
6. She does not appreciate (touch) again and again.
7. He was not upset about (fire) from the job.
8. I am not upset about (lose) the job anymore. (active voice)
9. (Go) through bad experiences makes me who I am today. (active voice)
10. The technician denied (steal) the microscope. (active gerund)
11. I regret (send) to the new office. (passive gerund)
12. He showed no signs of (warn).
13. After (write) in small letters, the notice was not clearly visible.
14. I remember (study) this lesson.
15. She was happy about (send) abroad for studies.

LESSON 6. NEW TECHNOLOGIES

SECTION 1: VOCABULARY

Nouns: advances, breakthrough, case study, catalogue, concern, confidentiality, deskilling, discovery, fabric, funding, hurdles, ignorance, innovation, invention, initiative, issue, nanotechnology, overreliance, pacemaker, provision, sphygonometer, unobtrusiveness.
Verbs: to access, to analyze, to benefit (from), to contribute (to), to dwell (on), to examine, to explore, to investigate, to stifle, to undergo.
Adjectives/adverbs: alarming, artificial, beneficial, challenging, computing, constant, convenient, crucial, curtailed out (of), detrimental, dramatic, enormous, far-reaching, harmful, hazardous, joint, indefensible, ingenious, invaluable, mature, objectionable, persuasive, pioneering, real-time, recent smart, sophisticated, structural, sudden, undoubtedly.
Phrases: arouse debates, be compatible (with), clinical market, it's not all rosy, key-hole surgery, knock-on effect, life expectancy, lose sight of the patient, meet the demands, muscle fatigue, play devil's advocate, recuperative break, speed of delivery, speed of recovery, stem cells, work safe.

EXERCISE 1. FIND THE ODD ONE OUT. EXPLAIN YOUR CHOICE

1 case study/ survey/ produce/ experiment/ fieldwork
2 idea/ conduct/ analyze/ examine/ explore/
3 figures/ data/ results/ inventions/ statistics
4 enormous/ big/ dramatic/ initiative/ far-reaching
5 stifle/ inhibit/ overwhelm/ promote/ choke
6 pioneering/ new/ conventional/ latest/ modern
7 far-reaching/ overreliance/ undergo/ deskilling/ undoubtedly
8 funding/ sponsor/ subsidizing/ investment/ cut back
9 radical/ constant/ dramatic/ sudden/ fast
10 transformation/ change/ consistency/ modification/ revolution
11 accelerometer/ sphygonometer/ keyhole surgery/ pacemaker/ nanotechnology
12 drawbacks/ disadvantage/ downside/ weakness/ advances
13 technological/ biological/ medical/ special/ approval
14 evolution/ transformation/ innovation/ invention/ development
15 ingenious/ endogenous/ smart/ talented/ bright

EXERCISE 2. A) MATCH THE PHRASES

1.	play	a.	surgery	
2.	lose	b.	all rosy	
3.	Arouse	c.	debates	
4.	it’s not	d.	on the downside	
5.	key-hole	e.	devil’s advocate	
6.	life	f.	expectancy	
7.	dwell	g.	change	
8.	stifle	h.	sight of the patient	

B) Match the phrases from part A with their definitions below

1. the length of time that a person is likely to live
2. or laparoscopy is a minimally invasive surgical technique used in the abdominal and pelvic regions
3. to prevent modification or adjustment
4. spark public discussion and controversy
5. to pretend, in an argument or discussion, to be against an idea or plan that a lot of people support, in order to make people discuss and consider it in more detail
6. to be no longer be able to establish contacts with patients (often used figuratively)
7. to keep thinking or talking mainly about negative sides of an issue
8. something is not as good as it appears

EXERCISE 3. A) FILL IN THE GAPS IN THE TABLE WITH THE CORRECT WORD FORMS

NOUN	VERB	ADJECTIVE
1. benefit		
2.		hazardous
3.		persuasive
4.	advance	
5.		detrimental
6. deskilling		
7.		convenient
8.	access	

B) Fill in the gaps with the correct word from the table

1. Clearly, we need to expand_____to medicine by building the capacity of healthcare systems.
2. These are_____chemicals that can cause death if inhaled.
3. Technological change can enhance skills development, but may also have the potential to____ employees in traditional occupations.
4. The_____of a medication regime, i.e. dosing complexity and frequency, is considered of great importance to patient adherence.
5. Professor Higgins has been scrutinizing the issue of benefit and_____in the medical use of radiation.
6. There are many_____effects of modern drugs, such as easing pain, controlling blood sugar, lowering blood pressure, or curing an infection.
7. Being a doctor implies using knowledge of decision-making psychology to_____patients to engage in healthy behaviors.
8. The university prospectus says they will teach courses using recent medical research, helping you to improve your English skills while continuing to_____your medical knowledge.

EXERCISE 4. UNSCRAMBLE LETTER TO FIND WORDS AND PHRASES. GUESS THE LAST PHRASE BY IDENTIFYING LETTERS WITH THE CORRESPONDING NUMBERS

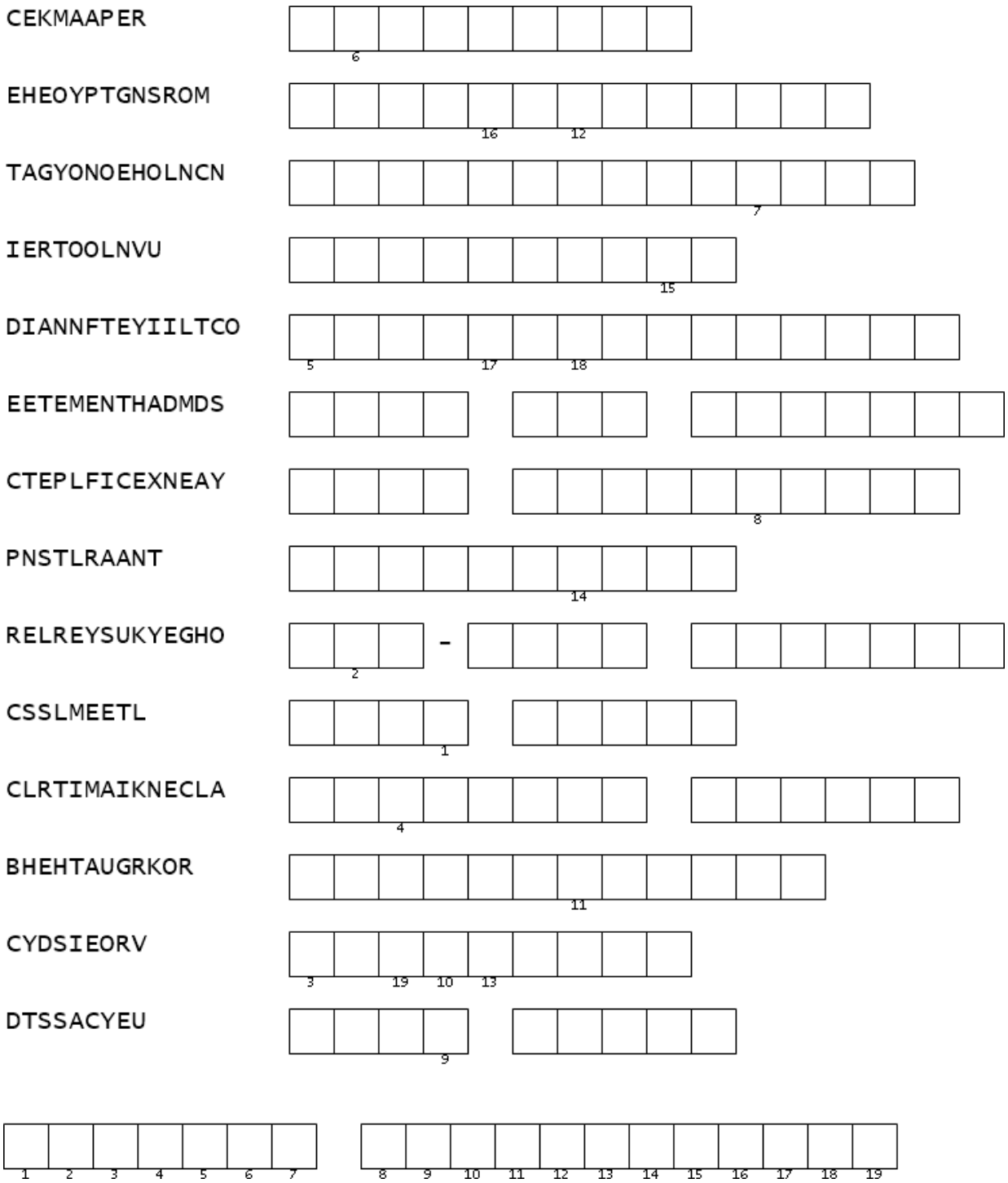


Рисунок 3

EXERCISE 5. DECIDE WHETHER THE POINTS BELOW REFER TO POSITIVE OR NEGATIVE SIDES OF USING MODERN TECHNOLOGIES IN MEDICINE. EXPLAIN YOUR CHOICE

1. knock-on effect
2. stem cell research
3. over-reliance on equipment and electronic devices
4. speed of delivery
5. increased life expectancy
6. medical experiments
7. international joint initiatives in medical sphere
8. the cost of medical care
9. ethical issues
10. impersonal care
11. digitalization of health records
12. cybersecurity in healthcare
13. the ease of clinical workflow
14. using in-home technology
15. speed of recovery

EXERCISE 6. WATCH THE VIDEO 'HOW LIGHT TECHNOLOGY IS CHANGING MEDICINE' AND ANSWER THE QUESTIONS BELOW

1. How does a pulse oximeter measure the oxygen level in our blood-stream?
2. Why does the amount of light that makes it out the other side of the fingerclip depend on the concentration ratio of the two types of hemo-globin?
3. How can a second infrared wavelength LED help eliminate the blood vessel size effect?
4. What is integrated photonics and how is it used in medical sensor tech-nology?
5. How does a ring resonator device enhance chemical fingerprinting?
6. What is the potential application of labs-on-a-chip in detecting illnesses?
7. Why is human saliva considered a valuable sample for analysis in labs-on-a-chip?

8. How do labs-on-a-chip use chemical fingerprinting to identify illnesses?
9. What role does a bank of detectors play in resolving the chemical fingerprint of a saliva sample?
10. How does repurposing light contribute to carrying and extracting information in various fields?

B) Project task 'Medical discoveries that changed the world'.
Choose any discovery or invention you know well. Prepare a brief message about it giving the answers to the questions below.

1. What ?
2. When?
3. Who?
4. Where?
5. Why?

SECTION 2: GRAMMAR
GERUND
The Simple Gerund

The Simple Gerund refers to the present or future.

	Active voice	**Passive voice**
Positive	studying	being studied
Negative	not studying	not being studied

- **Studying cancer** will help to understand better ways to treat it.
- What makes smallpox less dangerous is its **being studied**.
- **Not studying** the needs of modern students led to the decrease of university ratings.
- The main criterion that attracted our attention to the issue was its **not being studied**.

The gerund as the <u>subject</u> of the sentence
- **Smoking** causes lung cancer.
- **Overdoing** sports might be harmful.

The gerund as the <u>complement of the verb 'to be'</u>
- One of his duties **is attending** classes.
- The hardest thing about learning English **is understanding** the gerund.

The gerund <u>after prepositions</u>

The gerund must be used when a verb comes after a preposition. This is also true of certain expressions ending in a preposition, for example the expressions ***be accounted for, prevent from, in spite of, there's no point in,result in***.

- Can you sneeze **without opening** your mouth?
- There's no point **in waiting** for good results.

The gerund <u>after phrasal verbs</u>

Phrasal verbs are composed of **a verb + preposition or adverb**.

- When will you **give up smoking**?
- She always **puts off going** to the dentist.

The gerund <u>after TO</u>

There are some phrasal verbs that include the word "to" as a preposition, for example, ***to look forward to***, ***to take to, to be accustomed to***, ***to get around to***, ***& to be used to, owing to***. It is important to recognize that the word "to" is a preposition in these cases because it must be followed by a gerund. It is not part of the infinitive form of the verb. You can check whether "to" is a preposition or part of the infinitive. If you can put the pronoun "it" after the word "to" and form a meaningful sentence, then the word "to" is a preposition and must be followed by a gerund.

I **look forward to hearing** from you soon. – I **look forward to it**.

When will you **get around to learning** the lecture? – When will you **get around to it**?

The gerund <u>in compound nouns</u>

In compound nouns using the gerund, it is clear that the meaning is that of a noun, not of a continuous verb. For example, with the word "swimming pool" it is a pool for swimming in, it is not a pool that is swimming.

- I am giving Sally a **driving lesson**.
- Our clinic have bought a new **heart starting machine**.

The gerund <u>after some expressions</u>

The gerund is necessary after the expressions *can't help, can't stand, to be worth, & it's no use*.

- She **couldn't help telling** the truth.
- It's **no use trying** to make him study English.

EXERCISE 1. COMPLETE THE SENTENCES USING THE GERUND AS SUBJECT

Example: _____ was extremely difficult. – **Working on that discovery** was extremely difficult.

1. _____ will improve my chances of promotion at work.
2. _____ was one of her greatest satisfactions.
3. The idea of my research is _____ .
4. _____ was very tiring.
5. _____ is intellectually stimulating.
6. _____ takes a lot of time and effort.
7. _____ keeps you up to date with current events.
8. What really made my life complicated was _____ .
9. _____ is hardly worth trying.
10. _____ can be very interesting.
11. _____ made medical service more affordable.
12. _____ has become a real issue in our hospital.
13. The real reason why clinical workflow has been intensified is _____ .
14. _____ increased life expectancy in our country.
15. _____ should be taken seriously.

EXERCISE 2. USE CORRECT PREPOSITIONS IN THE SENTENCES BEFORE GERUNDS IF NECESSARY

1. Some problems were accounted after having changed the experimental conditions.
2. We got many various samples owing drying leaves and herbs.
3. Using large amounts of water resulted germinating.
4. Students were busy planting new trees in the park.
5. They feel like trying to bring their views into agreement.
6. Finding a new approach to the problems is an important step in scientific work.
7. This newly discovered method is worth applying.
8. It is no use maintaining the life in the cells in question.
9. Small blue-green algae prevent mineral salts being washed out by rain.
10. They were used taking part in such experiments.
11. Our hospital only benefit using in-home technology.

12. The government should have contributed more developing professional skills of medical workers.
13. More patients have required insertion of permanent pacemakers.
14. I would give them only forty-five days to report their findings.
15. Health care project funding was curtailed out by the authorities not being competent in this field.

EXERCISE 3. PUT THE WORDS INTO THE CORRECT ORDER

1. temperature lowering increased the the storage phase.
2. this the effect be by can heating substance eliminated.
3. there region some reason is for lack of funding in the this.
4. object radiologists most to these applying terms.
5. opinion she expressing avoided in her public.
6. experiment she is the point of on performing this.
7. director the is of for extending time the project.
8. in we having obtained these remember previous data the survey.
9. her in greatest is working alone the pleasure lab.
10. work he on research coordinating insisted their.
11. be relying one's health on drugs prescription can detrimental to in the long-term only.
12. medical exploring advancements new in technology patient improve outcomes is to crucial.
13. has use of artificial intelligence in healthcare shown great promise in processes streamlining and the errors reducing.
14. progress government and red tape regulations often making stifles technologies the of medical.
15. proper funding support are, many life-changing medical potentially technologies unable reach their full potential without and to.

EXERCISE 4. TRANSLATE THE SENTENCES USING GERUND

1. Виртуальная реальность в медицине – это прорыв в лечении.
2. Европарламент считает необходимым свернуть проект по строительству новых поликлиник.
3. Доктор Роджерс из-за своего невежества несет ответственность за подавление одного из величайших достижений, когда-либо сделанного в медицине.
4. Начало революции медицине многие относят к 1900-м годам.

5. Деквалификация в научной работе способствует большему отчуждению новых технологий среди персонала.
6. Развитие и внедрение современных технологий затронуло многие сферы, начиная от онкологии и хирургии, заканчивая стремительной разработкой вакцин от COVID-19.
7. В основе телемедицины лежит предоставление консультаций, диагностики, профилактики и лечения при помощи компьютерных и телекоммуникационных технологий.
8. Применение роботов в медицинской практике не только эффективно, но и безопасно.
9. Система 5G рассчитана на обеспечение минимальной задержки передачи информации.
10. В настоящее время самыми современными тенденциями в медицине являются такие, как роботизация, машинное обучение и генная инженерия.
11. Сейчас ведется работа по построению способов идентификации врача и пациента, а также надежной защиты персональных данных.
12. Финансирование проектов в современной медицине определяет многое.
13. Повышение квалификации персонала больницы является одним из ключевых вопросов.
14. Применение нанотехнологий очень распространено в различных областях медицины.
15. Проявление симптомов ОРВИ, а также распространение вируса от одного человека к другому напоминает «эффект домино».

The Perfect Gerund

The Perfect Gerund shows that the action of the – ing-form happened before the action of the verb.

	Active voice	**Passive voice**
Positive	having studied	having been studied
Negative	not having studied	not having been studied

- **Having studied** Anatomy before made it possible for him to enter the university.

- Anatomy was not difficult for him because of its **having been studied**.
- He denied **not having studied** Anatomy before.
- **Not having been studied** Anatomy before was obvious.

EXERCISE 5. USE ACTIVE GERUND, PRESENT OR PERFECT

1. I hate your (hang) around here while others are working on the project.
2. I recall his (have) a discussion with me the day when I met him.
3. Dr. Kang doesn't like (spend) time in the lab.
4. Mr. Roser enjoyed (take) care of his students.
5. No one likes (get) up early at weekend.
6. He denied (steal) a brand new device from the university.
7. She regrets (not / complete) the work on time.
8. (not / study) the issue properly did not let us apply for the project.
9. I kept (argue) with my colleagues because their methods are not effective.
10. He says he thinks (be) a scientist is not for him.
11. His (be) smarter than his groupmates was obvious.
12. (Achieve) high score allowed him to apply for the program later.
13. (Be) not compatible with the equipment in the lab, the device was sent back.
14. (Cause) enough harm and stress to the people around, he was expelled from the research institute.
15. (Analyze) things no-one can ever understand is his hobby.

EXERCISE 6. USE PASSIVE GERUND, PRESENT OR PERFECT

1. He is quite annoyed at (order) about like that.
2. Beibei dislikes (regard) as a nobody.
3. The fierce lady dislikes (interrupt) in her conversation.
4. No one enjoyed (disturbed) in the middle of the night.
5. We couldn't help (impress) by their wonderful achievements.
6. He doesn't like (talk) to in that way.
7. He likes joking and (joke at), and he also doesn't mind (make) fun of.
8. She recalls (beat) many times by her stepfather.
9. I don't remember (scold) by my former boss.
10. She'd run the risk of (arrest) if she continued doing something dirty.
11. The new teaching method has the advantage of (try) a few times by experienced teachers.

12. Sandy left the meeting without (notice).
13. All Sandy wanted was her daughter (give) the job.
14. (Train) by the best teachers allowed him to achieve the best results in studying cancer.
15. The main problem of some employees here is (disqualify).

LESSON 7. BIOMEDICINE

SECTION 1: VOCABULARY

Nouns: autoclave, dropper, spectrophotometer, flowchart, contaminants, magnifier, incubator, PCR (Polymerase Chain Reaction) machine, Erlenmeyer flask, Bunsen burner, impurity.
Phrases: hands-on experience, cause and effect, pursuing a career in biomedicine, agar plates, multi-disciplinary approach, blood sample, marketable at the workplace, blood transfusion, tissue samples, laminar air flow cabinet, test tube rack, graduated cylinder, hot air oven, orbital shaker.

EXERCISE. 1. A) FILL IN THE GAPS WITH THE WORDS FROM THE TABLE

hands-on experience	cause and effect	impurities
tissue samples	agar plates	blood sample
multi-disciplinary approach	flowchart	blood transfusion
marketable at the workplace	table	contaminants and
pursuing a career in biomedicine		

1. The biomedical scientist cleaned the lab bench to prepare _____ for culturing bacteria.
2. The nature of the illness was determined by analyzing the _____ under a microscope.
3. _____ in the samples could affect the accuracy of the results, so precautions were taken during the experiment.
4. _____ requires a strong foundation in biology and chemistry.
5. The technician carefully incubated the _____ to allow any potential pathogens to grow.
6. Understanding the _____ relationships in biological systems is crucial for proper diagnosis and treatment.
7. A _____ involving experts from different fields can lead to innovative solutions in biomedicine.
8. The student gained valuable _____ working with biological materials in the lab.

9. Developing skills that are _____ is essential for success in the biomedicine.
10. The researcher created a _____ to visualize the steps involved in analyzing the data.
11. The results were summarized in a ____ for easy reference during presentations.
12. In some cases, ____ might be necessary in order to provide the necessary support for the patient's recovery.

B) Answer the following questions

1. Why have you decided to pursue a career in biomedicine?
2. What skills, knowledge, trains can be marketable at the workplace in your field?
3. Why is multi-disciplinary approach beneficial to biomedical studies?
4. Have you already gained the hands-on experience in your field? When? What courses, training programs did you take?
5. Do you often draw flowcharts, tables and mindmaps? Do you do it on your own or on your teacher assignment?

EXERCISE 2. READ THE TEXTS AND DECIDE WHAT FIELDS OF BIOMEDICINE ARE DESCRIBED, BIOPHYSICS, BIOCHEMISTRY OR MEDICAL CYBERNETICS

1. The word _____ was coined by the German chemist Carl Neuberg in 1930. It is a laboratory-based branch of biology that combines biology and chemistry to understand how biomolecules such as proteins, nucleic acids, lipids, and carbohydrates contribute to the structure, function, and regulation of biological systems.
2. The term _____ was coined by the German scientist Karl Friedrich Wilhelm Ludwig in the mid-19th century. Since then, the field has evolved significantly, integrating concepts from biology, chemistry, and physics to explore complex biological questions using quantitative approaches. It is an interdisciplinary field that applies the principles and methods of physics to understand biological systems. It encompasses a wide range of topics, including the mechanics of biological molecules, the dynamics of cellular processes, and the physical principles underlying biological phenomena.
3. The term _____ was coined by Norbert Wiener, who is often regarded as the father of cybernetics. Wiener introduced this concept in the mid-

20th century, emphasizing the application of cybernetic principles to medical problems, including the regulation of bodily functions and the interactions between patients and healthcare systems. It focuses on the communication and control mechanisms within biological systems, particularly in relation to health and disease management.

What else can you add about biophysics, biochemistry or medical cybernetics? Why have you chosen your department, major? Would you like to change? Why?

EXERCISE 3. BIOCHEMISTRY IS AN EXCITING AND DYNAMIC FIELD WITH ENDLESS POSSIBILITIES FOR RESEARCH AND INNOVATION. THERE ARE KEY BRANCHES OF BIOCHEMISTRY. WHAT BRANCHES ARE YOU MOSTLY INTERESTED IN? IF YOU STUDY BIOPHYSICS OR MEDICAL CYBERNETICS NAME THEIR BRANCHES AND YOUR FOCUS OF INTEREST

1. Structural biochemistry focuses on studying the structure of biological molecules like proteins, nucleic acids, and lipids. It involves techniques such as X-ray crystallography and nuclear magnetic resonance spectroscopy to understand the three-dimensional structures of biomolecules.
2. Enzymology deals with the study of enzymes, which are biological catalysts essential for various biochemical reactions. Students in this field explore enzyme kinetics, mechanisms of action, and enzyme regulation.
3. Metabolic biochemistry involves the study of metabolic pathways that convert nutrients into energy and other essential molecules. This branch examines how the body metabolizes carbohydrates, lipids, and proteins and how disruptions in metabolism can lead to diseases.
4. Molecular biology focuses on the study of the molecular basis of biological processes, including DNA replication, gene expression, and protein synthesis. Students learn about techniques like PCR, DNA sequencing, and gene editing tools like CRISPR-Cas9.
5. Medical biochemistry applies biochemical principles to understand diseases and develop diagnostic and therapeutic strategies. This branch covers topics such as clinical biochemistry, biochemical markers of disease, and personalized medicine.
6. Immunology involves the study of the immune system, including how it recognizes and responds to pathogens and foreign substances. Biochem-

ists in this field explore the biochemistry of immune responses, antibody production, and immune cell signaling.
7. Biotechnology combines principles of biochemistry with engineering to develop solutions in areas like healthcare, agriculture, and environmental sciences. Students learn about genetic engineering, bioprocessing, and production of biofuels and pharmaceuticals.

EXERCISE 4. FILL IN THE GAPS WITH THE WORDS FROM THE TABLE. THEY NAME DIFFERENT EQUIPMENT USED BY BIOCHEMISTS. WATCH VIDEO WITH THE IMAGES HTTPS://WWW.YOUTUBE.COM/WATCH?V=KXTGKLXMCQU

a. magnifier
b. laminar air flow cabinet
c. test tube rack
d. incubator
e. graduated cylinder
f. bunsen burner
g. spectrophotometer
h. autoclave
i. dropper
j. hot air oven
k. orbital shaker
l. erlenmeyer flask
m. PCR (Polymerase Chain Reaction) machine

1. is a laboratory tool consisting of a small tube with a tapered tip, used to dispense precise volumes of liquid, one drop at a time.
2. is a simple optical instrument used to enlarge or magnify the appearance of small objects or details, aiding in visual inspection or analysis.
3. is a common laboratory apparatus used for heating, sterilizing, or performing chemical reactions by adjusting the flow of gas and air to produce a hot flame.
4. is a conical laboratory flask with a narrow neck, typically used for storing, mixing, or heating liquids in chemical experiments.
5. is a holder designed to support and organize multiple test tubes upright, allowing easy storage and access during laboratory procedures.
6. is an instrument used to measure the intensity of light absorbed or transmitted by a substance at various wavelengths, often used in biochemical analysis and research.
7. is a tall, narrow container with volume markings along its side, used to measure and dispense accurate volumes of liquids in laboratory experiment.
8. is a device used to sterilize equipment and

supplies by subjecting them to high pressure and temperature steam.

9. is a controlled environment chamber used to grow and maintain microbiological cultures or cell cultures at a constant temperature and, in some cases, humidity.
10. is a laboratory instrument used to amplify and replicate DNA sequences through the process of PCR, enabling the detection and analysis of specific genetic material.
11. is a type of oven that uses dry heat to sterilize equipment, glassware, and other materials used in laboratories.
12. is a device used to agitate liquid samples in laboratory vessels, such as flasks or test tubes, by shaking them in a circular motion, facilitating mixing and reaction processes.
13. is a specially designed workspace equipped with HEPA filters that provide a sterile environment for handling sensitive materials or conducting experiments requiring contamination-free conditions.

EXERCISE. 5 READ THE TEXT AND PUT THE WORDS INTO CORRECT FORM

Biomedicine, often referred to as Western medicine, is a branch of medical science that applies biological and physiological principles to 1) _____ (clinic) practice. It emphasizes standardized, evidence-based treatments validated through biological research, administered by the trained doctors, nurses, and other licensed 2) ____ (practice).

The scope of biomedicine extends beyond traditional medical practices, encompassing a wide range of 3) _____ (science) and technological approaches. From in vitro 4) _____ (diagnose) to in vitro 5) ____, from the molecular mechanisms of cystic fibrosis to the population dynamics of the HIV virus, biomedicine delves into the intricate workings of the human body at 6)_____ (vary) levels. It seeks to understand molecular 7) ____ (interact), study carcinogenesis, and explore the potential of gene therapy.

Biomedicine is fundamentally rooted in molecular biology, integrating the complexities of the human 8) _____ (gene), transcriptome, proteome, physiome, and metabolome.
Biomedicine is not simply a blend of biology and medicine. It posits that health phenomena must be 9) ____ (understand) in terms of physical and biochemical processes. It prioritizes experimental techniques for acquiring and assessing health-related knowledge for10) ___ (predict), diagnosis, and therapy.

EXERCISE. 6. CHOOSE THREE TERMS, KEY CONCEPTS FROM YOUR PROFESSIONAL FIELD, AND DEFINE THEM SO THAT YOUR CLASSMATES CAN GUESS YOUR TERM. MAKE THE LIST OF ALL THE TERMS. MAKE SENTENCES WITH THEM

EXERCISE 7. WATCH THE VIDEO HTTPS://WWW.YOUTUBE.COM/WATCH?V=RNLRTPCY8NK. LISTEN TO THE BIOMEDICAL ENGINEERS AND TELL WHY THEY CHOSE THEIR FIELD. WHY BIOMEDICAL ENGINEERS ARE DREAMERS? WHAT IS YOUR PROFESSIONAL DREAM?

EXERCISE 8. WATCH THE VIDEO ABOUT BIOMEDICAL SCIENTIST HTTPS://WWW.YOUTUBE.COM/WATCH?V=93K4HJVCOEC

Consult a dictionary to understand the meaning of the following words: hands-on experience, read plates, sensitivities, fecal samples, trial and error, cell count, CSF samples, biopsy, aspirates, gout, placement, be eligible to, get into the swing.

A) Answer the questions

1. What are the three main sections of pathology, as explained by Dan Davidson?
2. How does Dan Davidson's work contribute to the overall healthcare process?
3. What kind of training program did Dan Davidon go through to become a biomedical scientist?
4. Dan Davidson's journey to becoming a biomedical scientist was not a straightforward one. He explored different career paths before finding his passion in microbiology. Reflect on your own experiences with exploring

different interests and how you eventually found your own path. What lessons did you learn along the way?
5. Dan describes the collaborative nature of his work, emphasizing the importance of teamwork and support among colleagues. Reflect on a time when you worked collaboratively with others on a project or task. What were the challenges and rewards of working as part of a team?

B) Read the text and answer the questions below

Dan Davidon, a biomedical scientist specializing in microbiology, works at James Cook University Hospital. Pathology, he explains, encompasses three primary branches: cell pathology, microbiology (or bacteriology), and blood sciences. Microbiology, he emphasizes, is a highly hands-on field, involving the cultivation, analysis, and identification of microorganisms. This work often involves meticulous microscopic examination to determine the specific organisms present in patient samples.
Davidon describes the role of a microbiologist as crucial in a hospital setting. By analyzing samples from patients, they identify the causative agents of infections and determine appropriate treatment options. This information is then relayed to consultants who approve the recommended sensitivities before the results are communicated back to the referring physician. Davidon underscores the critical role of pathology in providing accurate diagnoses and treatment plans, emphasizing that without it, medical professionals would be left to guess at the nature of illnesses and potential therapies.
Davidon's passion for microbiology is evident in his enthusiasm for identifying and understanding the microorganisms he encounters. He actively seeks out scientific literature to deepen his knowledge and stay abreast of the latest developments in the field. The daily work of a microbiologist, he explains, is diverse and dynamic, encompassing a wide range of tasks. These can include analyzing urine samples, performing sensitivity testing, examining blood cultures, and conducting cell counts on various tissue samples. The day-to-day activities are often dictated by the needs of the patients and the demands of the laboratory.
Davidon highlights the collaborative nature of the work, emphasizing the importance of teamwork and mutual support within the laboratory. He describes instances where colleagues assist each other to ensure timely completion of tasks and avoid delays in patient care. The emphasis on patient-centered care is paramount, and the team strives to provide accurate and timely results to facilitate optimal treatment decisions.

Davidon's journey to becoming a biomedical scientist was not a linear one. While science was always a strong interest, he initially pursued a different career path. It wasn't until his late twenties that he discovered the field of pathology and the role of biomedical scientists. This revelation sparked a renewed passion for science, leading him to pursue a degree in biomedical science and subsequently a practitioner training program. This program involved a combination of university coursework and practical placements, providing him with valuable hands-on experience.
Davidon's first day as a biomedical scientist at James Cook Hospital was a whirlwind of new information and experiences. The fast-paced environment and lots of information to absorb were initially overwhelming. However, he quickly adapted to the demands of the role, finding a rhythm and routine that allowed him to thrive. Davidon's journey underscores the importance of pursuing one's passions, even if the path is not always straightforward. His story serves as an inspiration to those seeking fulfilling careers in the sciences, demonstrating that it is never too late to discover and pursue one's true calling.

1. What is the primary role of a biomedical scientist specializing in microbiology, as described by Dan Davidson?
A) To conduct research on new antibiotics and antimicrobial agents.
B) To analyze patient samples and identify microorganisms, aiding in diagnosis and treatment.
C) To develop and implement new diagnostic techniques for infectious diseases.
D) To educate healthcare professionals about the importance of infection control.

2. What aspect of Dan Davidson's work does he find particularly rewarding?
A) The opportunity to work with cutting-edge technology and equipment.
B) The chance to make a direct impact on patient care and outcomes.
C) The ability to work independently and solve complex problems.
D) The flexibility and variety of tasks he encounters on a daily basis.

3. What was Dan Davidson's initial career path before he pursued a career in biomedical science?
A) He worked as a research assistant in a university laboratory.
B) He pursued a career in teaching and education.
C) He worked in industry and later obtained counseling qualifications.

D) He served as a medical assistant in a hospital setting.

4. What specific methods does Dan Davidson use to analyze microorganisms in his work?
A) He primarily relies on advanced genetic sequencing techniques.
B) He uses a combination of microscopy, culturing, and other analytical methods.
C) He focuses on observing patient symptoms and conducting physical examinations.
D) He primarily uses computer simulations and data analysis to identify microorganisms.

5. What does Dan Davidson emphasize as the crucial role of pathology within a hospital?
A) Pathology provides a crucial link between research and clinical practice.
B) Pathology plays a vital role in educating medical professionals about new diseases.
C) Pathology helps to streamline the administrative processes within a hospital.
D) Pathology provides essential diagnostic information, preventing guesswork and trial-and-error methods.

6. What aspect of Dan Davidson's work does he describe as being particularly collaborative?
A) He works closely with other scientists to develop new diagnostic tools.
B) He collaborates with patients to understand their medical history and symptoms.
C) He works closely with colleagues in the lab, relying on teamwork and support.
D) He collaborates with pharmaceutical companies to test new drugs and treatments.

7. What was Dan Davidson's initial reaction to the fast-paced lab environment at James Cook University Hospital?
A) He was immediately comfortable with the routine and felt confident in his abilities.
B) He found the environment overwhelming and challenging at first, but quickly adapted.

C) He was disappointed by the lack of opportunities for independent research.
D) He was frustrated by the lack of collaboration and support from his colleagues.

8. What does Dan Davidson's journey to becoming a biomedical scientist highlight about pursuing a career in science?
A) It is essential to have a clear career path from a young age to succeed in science.
B) It is important to be passionate about science and willing to explore different paths.
C) It is crucial to have a strong academic background and research experience to enter the field.
D) It is necessary to have a natural talent for science to be successful in the field.

LESSON 8. CAREER IN BIOMEDICAL SCIENCE

SECTION 1: VOCABULARY

Nouns: biomedicine, challenge, compatibility, cytogenetics, employee, employer, pathway, position, promotion, prospect, salary, strength, wage, weakness.
Verbs: to apply for, to carry out, to complete, to employ, to hire, to medicate, to preserve, to supervise.
Adjectives/adverbs: available to, biomedical, fast-changing, high-powered, high-profile, permanent, promising, steady.
Phrases: a career takes off, additional skills and abilities, at the forefront of (smth), at the height/peak of your career, attend interview, brilliant career, climb the career ladder, cutting edge, educational background, embark on a career, have a career in, job description, job title, look forward to (smth), forensic science, offer someone a job, personal objectives, private sector, project title, public sector, research and development (R&D), take on work, transfusion science, work closely with, work experiences, work under pressure, wreck/ruin someone's career, yours faithfully, yours sincerely.

EXERCISE 1. A) THE PICTURES BELOW DESCRIBE THE MAIN STEPS OF JOB APPLICATION PROCESS. PUT THEM INTO THE CORRECT ORDER

Рисунок 4

B) MATCH THE SENTENCES TO THE PICTURES

- Wait a few days.
- Make a follow up call to confirm the documents were received.
- Visit the employer to fill out your application form.
- Send your application, cover letter and resume.
- Call the employer.
- Write your resume and cover letter.
- Understand your career ambitions.
- Attend an interview.

EXERCISE 2. A) LOOK THROUGH THE FOLLOWING CV OF A BIOMEDICAL SCIENTIST. FILL IN THE GAPS USING WORDS, NUMBERS AND PHRASES FROM THE BOX

handcrafting / personal objectives / additional skills and abilities / project title / job description / work experiences / job title / educational background / foreign languages knowledge / other educational achievements

Biomedical Scientist Resume

Hannah Michaels
NY, USA
+1495999000
hannah@pharmacist.com

Posted on: 2022-11-23

1_____ :

A recent Master of Science graduate from the United Kingdom, with a passion of procuring knowledge in applied sciences related research. Seeking for a career opportunity in a research institute or laboratory, to maintain and apply my strong problem-solving, research, laboratory, verbal and oral communication skills, healthcare and administrative skills obtained from my past job experiences and education. Aim to contribute positively towards the success of the industry. Keen to join a team of professionals and build a career on a successful platform.

2_____

2004 – 2009 University of Brighton, United Kingdom	Master of Science (Honours) **(Biomedical science-IBMS Accredited, Awarded with Distinction)**
1994 – 2000 Cardiff University, United Kingdom	Bachelor of Science (Honours) **(Biomedical science)**
1990 – 1994 Al Nahda National School (Girls), U.A.E	GCSE AS & A level **(Biology, Chemistry, Physics, Mathematics & Others**)

3. _____

2009-2011

MSc Research Project report completion- Awarded with Distinction:

(Extensive Practical-lab based research: Applied Tissue culture and MTT method)

4._____: Evaluating the cytoprotective potential of Myricetin in an in vitro model of glial oxidative stress

Supervised by: Jimi Adu, BSc, PhD, Senior Lecturer in Neuroendocrinology, School of Pharmacy & Biomolecular Sciences, University of Brighton, United Kingdom

5._____

20014 – Today

Al Borg Laboratories, U.A.E (Licensed by Quest Diagnostics, U.S.A)
6._____: Customer support/Operations Executive and IT Programming Assistant.
Job description:

- Acquainted with the LDM software and types of tests carried out in the local and outsourced laboratories.
- Registered patients for laboratory tests- with and without insurance.
- Attended patient and client queries related to laboratory tests and monitored status of test report generation, whether pending or processing.
- Active engagement with staff of all UAE branches and client offices that used the same software, for IT programming including; locking and unlocking features for employees that had access to the online system, adding/editing new and old laboratory tests/ clients, test comments, enabling abnormal result alerts, managing costs of the laboratory tests into the system, keeping up to date normal and low to high-end references for tests.
- Point of contact for laboratory technicians, managers, pathologists, customer support executives, and clients to oversee operations in the local and outsourced laboratories.

2019-2014
Grand Technology Resources General Trading L.L.C., U.A.E
Job Title: Enrollment Executive
7._____:

- Acquired biometrics (fingerprints and photographs) whilst successfully enrolled applicants for the processing of MRP applications, including birth certificate issuance.
- Regularly monitored the status of MRP applications and reported the line-manager regarding office work
- Point of contact for new clients via telecommunication for the company

Certificates achieved:

- Personal Effectiveness: Problem Solving skills
- Leadership skills: Coaching skills, Team briefings, Assertiveness for leaders, Tackling poor performances
- Effective Communication skills: Listening and Awareness skills, Negotiation skills, Anger Management
- Speaking and Presenting skills: Delivered Poster/PowerPoint/Prezi presentations and gained high marks during my course.

8._____:
Good Analytical skills using MS-Word, MS-Excel, Power Point, Minitab software and Statistical tests**.**

9._____:

- English, Bengali, Urdu, Hindi, & Arabic text writing (have basic knowledge, keen to develop further)

Hobbies:
Amateur photograph, corresponding with friends, **10._____**, sunbathing, gardening etc.

B) USE INFORMATION ON PAGE 17 (ENGLISH FOR BIOMEDICAL SCIENCE. COURSE BOOK) AND WRITE A RESUME ACCORDING TO THE PLAN

1. Your goals and objectives
2. Educational Background
3. Work experience
4. Additional Skills and Abilities
5. Hobbies and interests

EXERCISE 3. HOW TO WRITE AN APPLICATION LETTER

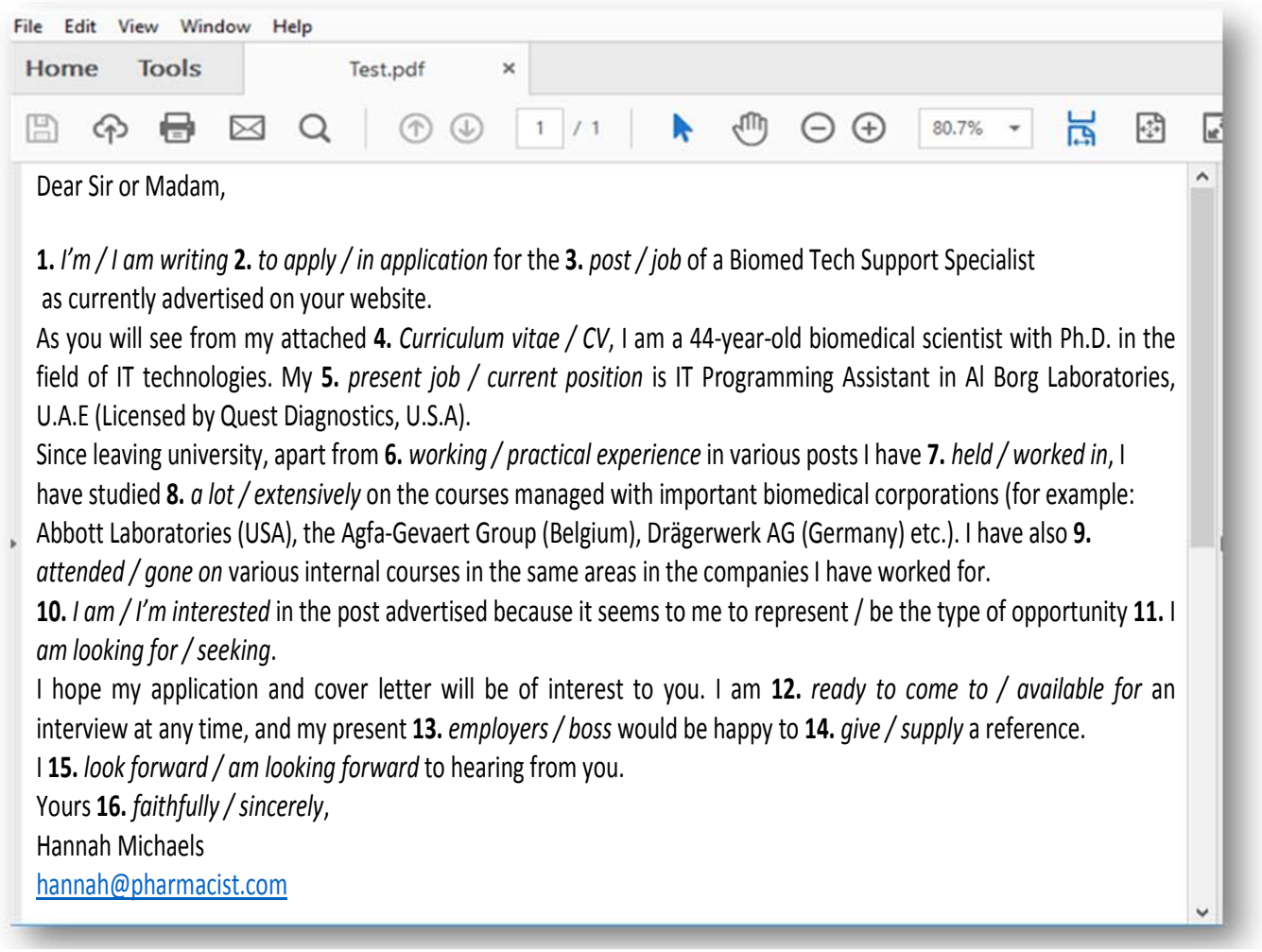
A) Talking point. Discuss these questions.

1. When you apply for a job, is it better to send a letter or an email?
2. How many pages should your application be?
3. What things should you mention in your application?
4. How many pages should your CV have?
5. Should you send a photograph as well?
6. Why do you need to write a cover letter?
7. Should you write an application in a formal or an informal style?

B) CONSIDER THE MAIN DIFFERENCES BETWEEN FORMAL AND INFORMAL STYLE. GIVE YOUR OWN EXAMPLES

Informal	Formal
1. Contractions (*I'm, it's been*)	no contractions (*I am, it has been*)
2. short words (*try*)	long words (*endevour*)
3. more common words (*begin*)	less common words (*commence*)
4. phrasal verbs (*team up*)	no phrasal verbs (*collaborate*)
5. verbs (*I am writing to apply*)	preposition + noun (*I am writing in application*)
6. I'm looking forward	I look forward
7. Abbreviation (*Sept.*)	no abbreviations (*September*)
8. emoticons, exclamation marks	no personal attitude

EXERCISE 4. READ THE APPLICATION LETTER BELOW WRITTEN BY HANNAH MICHAELS. CHOOSE THE CORRECT VARIANT ACCORDING TO THE INFORMATION FROM THE PREVIOUS EXERCISE


File Edit View Window Help

Home Tools Test.pdf

1 / 1 80.7%

Dear Sir or Madam,

1. *I'm / I am writing* **2.** *to apply / in application* for the **3.** *post / job* of a Biomed Tech Support Specialist as currently advertised on your website.

As you will see from my attached **4.** *Curriculum vitae / CV*, I am a 44-year-old biomedical scientist with Ph.D. in the field of IT technologies. My **5.** *present job / current position* is IT Programming Assistant in Al Borg Laboratories, U.A.E (Licensed by Quest Diagnostics, U.S.A).

Since leaving university, apart from **6.** *working / practical experience* in various posts I have **7.** *held / worked in*, I have studied **8.** *a lot / extensively* on the courses managed with important biomedical corporations (for example: Abbott Laboratories (USA), the Agfa-Gevaert Group (Belgium), Drägerwerk AG (Germany) etc.). I have also **9.** *attended / gone on* various internal courses in the same areas in the companies I have worked for.

10. *I am / I'm interested* in the post advertised because it seems to me to represent / be the type of opportunity **11.** I *am looking for / seeking*.

I hope my application and cover letter will be of interest to you. I am **12.** *ready to come to / available for* an interview at any time, and my present **13.** *employers / boss* would be happy to **14.** *give / supply* a reference.

I **15.** *look forward / am looking forward* to hearing from you.

Yours **16.** *faithfully / sincerely*,

Hannah Michaels

hannah@pharmacist.com

Рисунок 5

EXERCISE 5. VIDEO 'MEDICAL SCIENCE--CAREER CHOICE FOR THE 21ST CENTURY'

A) BEFORE WATCHING

Match the phrases and expression from the video with their more formal equivalents

1. I get to pick up my own hours.	**a.** I became involved in this activity.
2. I got/went into it.	**b.** I mostly do my everyday chores.
3. I am trying to figure out.	**c.** I do different things at the same time.
4. I pretty much have a regular stuff.	**d.** I want to finally understand it.

5. I slowly cascade between different points.	**e.** I can make my own schedule and decide when to work.

B) WHILE WATCHING

Watch the video and choose the best summary below. Explain your choice

1. In the video, Chad Glen talks about his research on gap junctions and their connection to diseases like cancer, Parkinson's, and Alzheimer's. He focuses on his childhood fear of cancer and how it motivated him to pursue a career in science. Chad hopes to determine what goes wrong in diseases like epilepsy and find ways to correct them. He highlights the collaborative and supportive environment in his lab and expresses his excitement about the research process. What he like most is the opportunity to be always in contact with his colleagues during his working day.

2. In the video, Chad Glen discusses his work on gap junctions and their role in cell communication. He mentions the association between gap junctions and diseases like cancer, Parkinson's, and Alzheimer's. Chad also talks about the importance of understanding the spatial patterns of intercellular communication in different cell types. He explains the tools and techniques used in his research, such as flow cytometry. His ultimate goal is to contribute to the understanding and potential treatment of diseases related to gap junction dysfunction.

3. In the video, Chad Glen, a scientist at Georgia Tech, discusses his work on gap junctions and their relation to diseases like cancer, Parkinson's, and Alzheimer's. He shares his curiosity-driven journey into science and his goal of understanding how cells communicate in populations. Chad explains the tools and techniques he uses in the lab, such as pipettes and flow cytometry. His dream is to create a model of intercellular communication to better understand and potentially find solutions for diseases like Parkinson's and Alzheimer's.

C) AFTER WATCHING

Watch the video again (if necessary) and decide whether the statements below are TRUE or FALSE.

1. Chad Glen works with gap junctions at Georgia Tech.
2. Chad Glen is originally from Canada.
3. Chad Glen used to practice karate when he was younger.
4. Chad Glen started drinking coffee at the age of 14.

5. Chad Glen's interest in research articles started when he looked up the effects of caffeine.
6. Chad Glen was scared of the boogie man when he was younger.
7. Chad Glen's research focuses on understanding how cells communicate through connexons and gap junctions.
8. Chad Glen hopes his research can help understand diseases like Parkinson's, Alzheimer's, and epilepsy.

EXERCISE 6. COMPLETE THE SENTENCES WITH 'WORK', 'JOB' OR 'CAREER'

1. I took on too much ..... last month and couldn't finish it all.
2. At the peak of her ..... she was managing a research team of 200 people.
3. Daniel Robertson's ..... in biomedicine lasted almost three decades.
4. Julie has a very demanding ....., but she enjoys it, nonetheless.
5. At the moment we are carrying out ..... on the design of the new collaborative project.
6. The scandal ruined his ..... and he never worked in clinics again.
7. I'm going to apply for a ..... in a biomedical laboratory.
8. She had a long and brilliant ..... in surgery.
9. At 20, she got her first steady ..... in a regional hospital.
10. One essential skill for the workplace is being able to ..... under pressure.
11. The decision to embark on a ..... in microbiology led me to my current position as an research analyst.
12. I am currently available to start ..... immediately and would welcome the opportunity to discuss my qualifications further with your company.
13. As a highly motivated individual, I am seeking a fulfilling ..... that challenges me both professionally and personally.

14. Motivated by my strong desire for success, I have always pursued high-powered ..... in various industries, leading to diverse and enriching experiences.
15. It was in 1980 that her ..... really took off when she was offered a part in a TV series.

SECTION 2: GRAMMAR
PARTICIPLES

A participle is a word that is formed from a verb and is used to make compound verb forms. There are three types of participles in English:

- **Present participle**
- **Past participle**
- **Perfect Participles**

	Active	Passive
Present participle	V-ing (studying)	Being V_3 (being studied)
Past participle		V_3
Perfect Participles	having V_3	having been V_3

Present Participle

A present participle is a verb form that ends in '-ing', and it can be combined with the verb **'to be'** to form **continuous tenses**. For example:

- Watch + -ing → watching
- Say + -ing → saying
- Sit + -ing → sitting

Present participles have a similar meaning to active verbs.

- To give the result of an action *The was busy, **examining his patient**.*
- To give the reason for an action ***Knowing she didn't' feel well**, Richard bought her some medicine.*
- To talk about an action that happened at the same time as another action.
  ***Standing in the queue in the drug store**, I realized I had left my prescription.*
- To add information about the subject of the main clause ***Starting in the new year**, the new policy requires total vaccination against flu.*

Present Participle: Passive Voice

The passive voice is formed by using the 'be verb followed by the V_3. Pay attention to the examples:

- **Being asked by the professor**, he did not know what to say.

Past Participle

The past participle is a verb form that usually ends in a '**-d**' or '**-ed**' and can serve different functions. However, some verbs do not form their past participles by adding '-ed' or '-d'. They are called irregular verbs.
Past participles normally have a passive meaning.

- With a similar meaning to an *if* condition ***Used in this way****, participles can make your writing more concise.* (*If you use participles in this way, …)*
- To give the reason for an action ***Worried by the news****, she called the hospital.*
- To add information about the subject of the main clause ***Exhausted after her nightshift****, the nurse was coming back home.*

Perfect participle

Perfect participles show that the action they describe was finished <u>*before*</u> the action in the main clause.

- ***Having got dressed****, the surgeon slowly went downstairs.*
- ***Having finished their training****, they will be fully qualified doctors.*

Perfect participles can be structured to make an active or passive meaning.
Having been made redundant*, she started looking for a new job.*

Participles after conjunctions and prepositions

It is also common for participles, especially with *-ing*, to follow conjunctions and prepositions such as *before, after, instead of, on, since, when, while* and *in spite of.*

- ***Before giving injection****, you should wash your hands.*
- ***On arriving at the laboratory****, he went to get changed.*

EXERCISE 1. A) TRANSLATE INTO ENGLISH AS PRESENT PARTICIPLE ACTIVE. PAY ATTENTION TO THE POSITION OF PARTICIPLES

1) принимая на работу
2) прослушивая сердце и легкие

3) подтверждая доставку документов
4) чувствуя головную боль
5) выполняя работу
6) изучая биомедицину
7) нанимая сотрудников

B) Change the sentences, using present participle active

Example: As **I have** a demanding job I need to complete all tasks on time – **Having** a demanding job, I need to complete all tasks on time.

1. The people who wait for me in the corridor are my patients.
2. As we had an appointment with the doctor for 10 o'clock we hurried to the polyclinic.
3. As I felt rotten I called in our district doctor.
4. Doctor Jenkins who works at this polyclinic is a very experienced doctor.
5. As my son was ill with quinsy he had to gargle his throat 5 or 6 times a day.
6. Registering clerk who is looking for this patient's card is my friend.
7. As the doctor was palpating my abdomen he asked me several questions.
8. As you enter the dean's office give your application to the woman who is sitting at the window.

EXERCISE 2. A) TRANSLATE INTO ENGLISH AS PRESENT PARTICIPLE PASSIVE

1) будучи принятым на работу
2) будучи осмотренным
3) будучи подтвержденной
4) будучи диагностированным
5) будучи выполненной
6) будучи изученной
7) будучи нанятым

B) CHANGE THE SENTENCES USING PRESENT PARTICIPLE PASSIVE

Example: The patient ***who is being examined*** *by the doctor* is my neighbor. – The patient ***being examined*** *by the doctor* is my neighbor.

1. I know the patient who is being examined now.

2. The health certificate which I was receiving yesterday should be handed in to the dean's office.
3. The tests which are being made now will tell us all necessary information about the disease.
4. When Philip was being examined he said that he had felt rotten since morning.
5. When the patient was being directed to the in-patient department he received the direction from the polyclinic.
6. The borders of the heart which the doctor was determining turned out to be dilated.
7. The candidates, who were shortlisted, were expected to come today afternoon.
8. This job, which is high-powered, demands excellent managing skills.

EXERCISE 3. A) TRANSLATE INTO ENGLISH AS PAST PARTICIPLE PASSIVE

1) принятый на работу
2) осмотренный пациент
3) подтвержденная доставка документов
4) диагностированное заболевание
5) выполненная работа
6) изученная дисциплина
7) нанятый сотрудник

B) Change the sentences using Past Participle Passive

Example: The man who was hospitalized today is my father. – The man hospitalized today is my father.

1. The treatment which had been prescribed produced a strong effect on the patient's health.
2. The doctor whom we talked to was an experienced consultant.
3. The findings of the electrocardiogram which we took yesterday showed that his condition became better.
4. The patient who was laid down on a stretcher was in a poor condition.
5. The patient whom the doctor discharged from the hospital was cheerful and alert.
6. The students who were acquainted with the daily regime of the clinic were shown some wards.

7. The exam which I passed was chemistry.
8. The great prospects which we were discussing with our colleagues today will give us many opportunities.

EXERCISE 4. A) TRANSLATE INTO ENGLISH AS PERFECT PARTICIPLE ACTIVE

1) приняв на работу
2) осмотрев пациента
3) подтвердив доставку документов
4) диагностировав заболевание
5) выполнив работу
6) изучив дисциплину
7) наняв сотрудника

B) Change the sentences using the Perfect Participle Passive

1. When she had gargled her throat she felt an instant relief.
2. After he had recovered he attended the first classes in therapy.
3. As the nurse had taken the patient's temperature, she asked him to come in.
4. As the doctor had got all findings he made the initial diagnosis of angina pectoris.
5. When he had taken sleeping-draughts he went to bed.
6. As the nurse had painted the skin with alcohol she gave the patient an injection.
7. After Peter had sent his application, he had to wait for a couple of days.
8. When he had worked for 10 years in forensic medicine, he decided to change his life completely.

EXERCISE 5. MAKE 3 SENTENCES WITH DIFFERENCE TYPES OF PARTICIPLES TO EACH PICTURE

Рисунок 6

EXERCISE 6. PARAPHRASE THE SENTENCES USING PRESENT, PAST OR PERFECT PARTICIPLE. USE ACTIVE OR PASSIVE FORM

1. Many patients who suffer from depression use antidepressants.
2. The child who is crying must be hungry.
3. Doctor Williams, who had been promoted, became the Head of the Department.
4. The doctor who is examining Mary is one of the best doctors in this country.
5. The subject which is being discussed now concerns all of us.
6. The technique which was suggested was unsatisfactory.

7. When my cousin was offered a new job, she had to move to Wisconsin.
8. When the baby saw the doctor, she began to cry.
9. While he was walking down the street, Dr. Samuelson met his ex-colleague.
10. They tried to understand the causes that underlie a given behavior.
11. He rejected a job offer after he was informed he would have a lower salary.
12. The student described the method, which was used by this doctor.
13. The findings of the electrocardiogram which we took yesterday showed that his condition became better.
14. That young biomedical scientist, who works for our company, is going to climb the career ladder quickly enough.
15. As soon as the receptionist left the room, she heard the bell ringing.

LESSON 9. LABORATORY INFORMATION SYSTEMS

SECTION 1: VOCABULARY

Nouns: Laboratory Information System (LIS), Laboratory Information Management System (LIMS), patients samples, data entry, sample tracking charts, data crunching, databases, software, data exchange, information sorting, data retrieval, Data integrity, confidentiality, quality assurance.
Verbs: to manage, to carry out, to run, to contribute, to provide, to access, to eliminate, to perform, to record, to label, to store, to track, to generate, to monitor, to verify, to report, to validate, to streamline.
Adjectives/ participles: hand drawn, time-consuming, sophisticated, real-time, relevant, current, compatible with, accurate, timely, user-friendly, reliable, affordable, accessible, updated, comprehensive.
Adverbs: undoubtedly, arguably, manually.
Phrases: a great deal, to keep pace, to meet the needs of, enter patient information, analyze samples generate reports, store data securely, manage laboratory workflows, interface with other systems, track sample location, maintain quality control, automate processes, integrate with instruments, validate results, audit trails.

EXERCISE 1. MATCH THE TERMS WITH THE DEFINITIONS

1. Laboratory Information System (LIS)	**a.** the act of inputting or adding data into a computer system or database.
2. Computerization	**b.** organized collections of data stored electronically for easy access, retrieval, and management.
3. to store	
4. Sample Tracking	
5. Data Crunching	**c.** keeping sensitive information private and secure to prevent unauthorized access or disclosure.
6. to track	
7. Documentation	
8. to generate	**d.** monitoring and recording the movement and location of samples throughout the testing process.
9. Quality Assurance	
10. data retrieval	
11. Data integrity	**e.** the process of converting manual tasks or processes into automated ones using computers.
12. confidentiality	
13. Data Entry	
14. Databases	**f.** analyzing and processing large amounts

15. Real-time Interface	of data to extract meaningful insights or patterns. **g.** to keep something in a specific place for future use or reference. **h.** a system or feature that allows immediate interaction or communication with data as it is being processed or updated. **i.** ensuring that processes and products meet established standards and requirements to maintain high quality. **j.** the process of accessing and extracting specific information from a database or storage system. **k.** the accuracy, consistency, and reliability of data over its entire lifecycle. **l.** to produce or create something, like reports or analysis, usually through automated means. **m.** to follow the progress or movement of something, such as samples or data. **n.** written records or information that provide details about processes, procedures, or results. **o.** a computer system used in laboratories to manage and store data related to tests and experiments.

EXERCISE 2. COMPLETE THE GAPS WITH THE MISSED INFORMATION

increase	needs	carry
time-consuming	running	hand-drawn
manage	integrate	conducting
sophisticated	accuracy	track
relevant	data	pace

1. The laboratory manager needs to _____ the workflow efficiently to ensure timely results.
2. In order to _____ out the required tests, the laboratory technician followed the standard operating procedures.

3. The system administrator is responsible for _____ the Laboratory Information System smoothly.
4. The new system will automate processes to _____ efficiency in our laboratory.
5. It is essential that our LIS can _____ with instruments to streamline data collection.
6. The scientists prefer to use _____ graphs for better visualization of the data.
7. To ensure _____, we track sample location throughout the testing process.
8. Our laboratory maintains quality control by _____ regular audits and inspections.
9. Developing a new software module can be a _____ process but worth it in the end.
10. The laboratory has invested in _____ equipment to enhance testing capabilities.
11. The real-time monitoring feature allows lab technicians to _____ samples throughout the testing process
12. It is crucial to include all _____ patient information in the Laboratory Information System.
13. The laboratory staff handles a great deal of _____ entry on a daily basis.
14. To keep _____ with the increasing workload, additional staff members were hired.
15. The updated LIS was designed to meet the _____ of both researchers and clinicians.

EXERCISE 3. WATCH THE VIDEO AND ANSWER THE QUESTIONS

https://youtu.be/DhxD6sVQEYc?si=oDXI6dH-rMlulbpY

Comprehension questions:
1. How is digitalization impacting business models and product design?
2. What are the expectations of consumers in the manufacturing industry today?
3. Why do new generation consumers pose a challenge for brands in terms of loyalty?
4. How does social media influence brand image in today's market?

5. Why is quality compromised as companies rush to be first with innovative products?
6. How can Siemens LIMS help manufacturers maintain quality control in their laboratories?
7. What benefits can manufacturers expect from implementing a LIMS solution?

Discussion questions:
1. How has digitalization impacted the way products are designed, produced, and consumed in today's market?
2. What are some of the challenges that the manufacturing industry is facing in the current digital age?
3. How do consumers' changing preferences, such as a focus on health and sustainability, impact the products that companies need to offer?
4. In what ways do new generation consumers differ from previous generations in terms of brand loyalty and promotion?
5. How can implementing a Laboratory Information Management System (LIMS) help manufacturers improve their lab efficiency and quality control processes?

EXERCISE 4. CROSSWORD

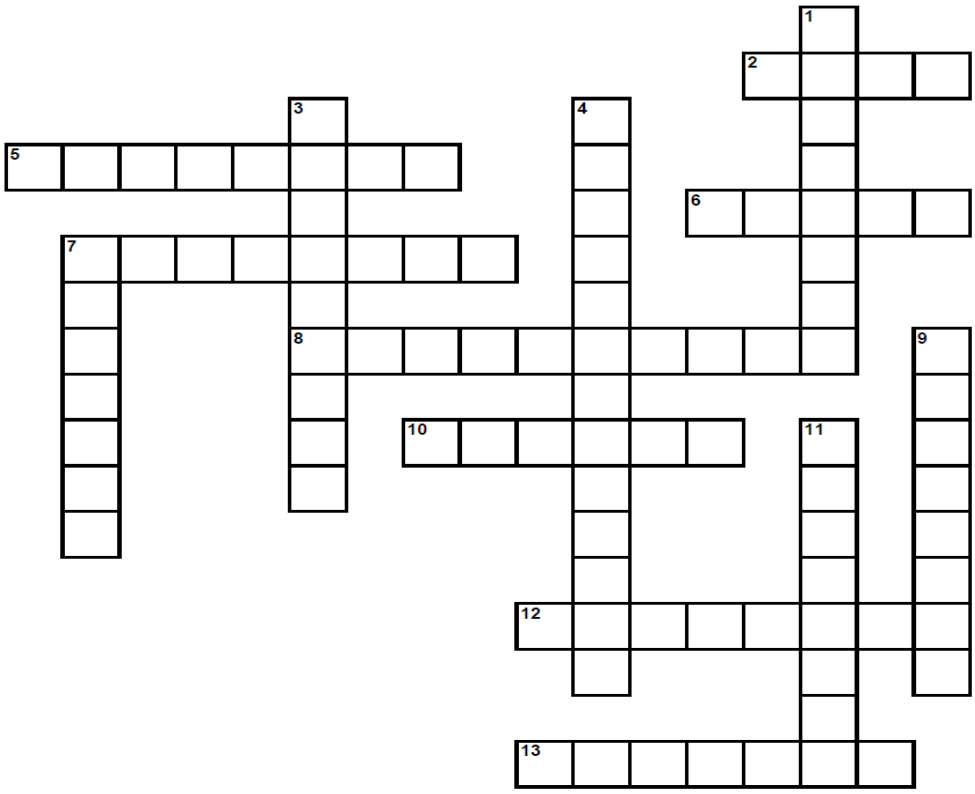


Рисунок 7

Across

[2] Information, often in the form of facts or statistics.

[5] Programs or applications that run on a computer or other electronic devices.

[6] An official inspection or examination of financial accounts or other records.

[7] By hand, without the use of machines or automation.

[8] Easily reached, used, or understood.

[10] To confirm or check the accuracy or truth of something.

[12] Closely connected or appropriate to the matter at hand.

[13] Small amounts or portions of something that are used to represent a larger whole.

Down

[1] To confirm or prove the accuracy or validity of something.

[3] Organized collections of data that are stored electronically.

[4] Complex, advanced, or highly developed.

[7] To observe, keep track of, or check on something over time.

[9] To make a process or task run automatically without the need for constant human intervention.

[11] Dependable, trustworthy, or consistently good in quality.

EXERCISE 5. READ THE TEXT AND COMPLETE THE TASKS

What is a laboratory information system (LIS)?

A laboratory information system (LIS) is computer software that processes, stores and manages data from patient medical processes and tests.

Physicians and lab technicians use laboratory information systems to coordinate inpatient, outpatient and point-of-care medical testing. They can assist during sample creation, testing and reporting. All laboratory tests benefit from using an LIS including hematology, chemistry, immunology and microbiology. Basic laboratory information systems commonly have features that manage patient check in, order entry, specimen processing, result entry and patient demographics. An LIS tracks and stores clinical details about a patient during a lab visit and keeps the information stored in its database for future reference.

The electronic data capture process of an LIS can reduce time spent and reduce errors. They can produce labels for specimens, track the specimen

during transport and testing, associate test results with patient medical records and manage test billing.

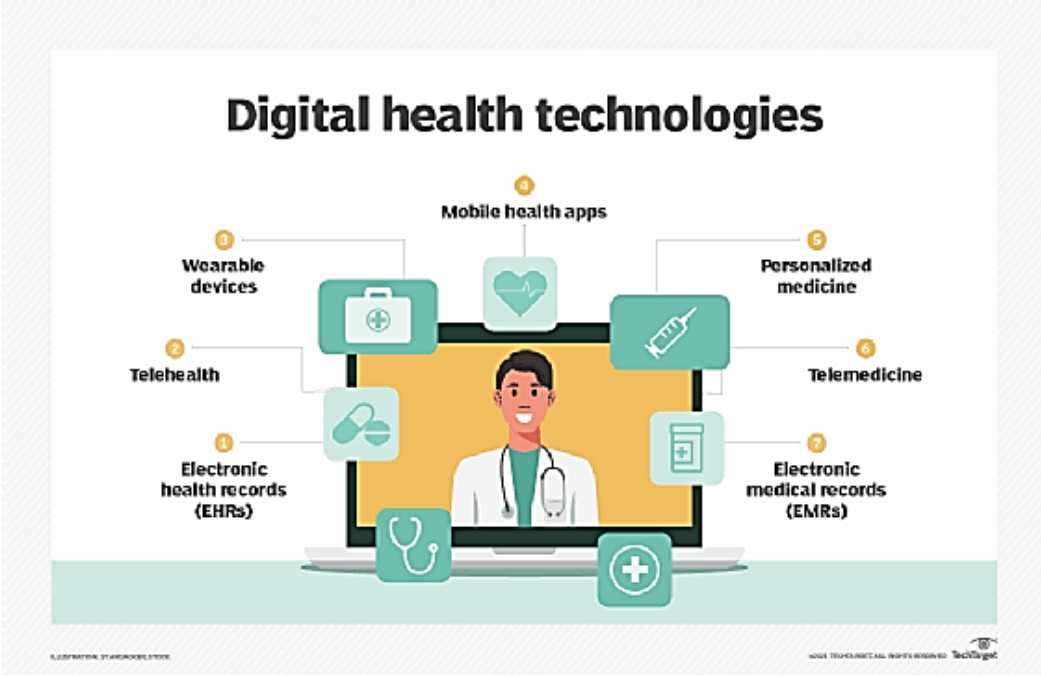


Рисунок 8

Laboratory information systems are digital health technologies used to coordinate patient medical testing.

Maintenance of laboratory information systems took on added importance with the introduction of the meaningful use program. The program is overseen by the Centers for Medicare and Medicaid Services and consists of sets of criteria split into stage 1, stage 2 and stage 3. Participating healthcare providers that successfully prove their electronic health record (EHR) systems or EHR modules -- such as an LIS -- satisfy program criteria are eligible for incentive payments. If an LIS is tested and certified to meet meaningful use criteria or other health IT certification standards, it is defined as an EHR module.

Some meaningful use reporting measures that could involve an LIS include the electronic submission of lab test results to public health agencies and the incorporation of clinical lab test results into a certified EHR system.

Because they handle medical records, a LIS might be subject to additional laws and regulations. For example, in the United States they need to comply with HIPAA laws as laboratory results are considered protected health information (PHI).

What are laboratory information management systems?

A closely related technology to a LIS is a laboratory information management system (LIMS). An LIS is a healthcare system that holds patient clinical data. By comparison, an LIMS can be deployed in healthcare, too, but it is also used in nonmedical laboratory settings. This might include environmental testing laboratories, pharmaceutical laboratories, food safety, and water treatment plants. The functionality of an LIS and LIMS now largely overlap, and many tools are interchangeable for each use.

An LIMS can be used as a web tool or be installed on a personal computer. It stores and manages captured data, as well as produces reports from that data.

Capabilities of an LIMS is as follows:

Sample collection and tracking. An LIMS can capture data during sample collection such as time and notes from the technician. It often produces and scans barcode labels on sample containers.

Test allocation and scheduling. An LIMS assigns samples to testing equipment and technicians. It can account for test duration and equipment capabilities.

Data collection. An LIMS' data collection capabilities include automatic ingesting of data from test equipment and manual data entry.

Test validation. An LIMS' test validation includes test equipment calibration and certification data and flagging of anomalous results that might require retesting.

Data reporting. An LIMS report provides results to other systems or produces reports and charts based on collected data.

Data archiving. An LIMS provides safe storage of data according to data retention policies for data archiving purposes.

Electronic health record data can aid clinical informatics research through streamlined clinical trial recruitment, public health surveillance and health IT analytics.

Mark the Statements True or False:

1. Healthcare professionals utilize laboratory information systems to manage various types of medical testing.
2. An LIS does not store any patient information for future reference.
3. The electronic data capture process of an LIS can eliminate the need for manual data entry.
4. Laboratory information systems are primarily used for administrative tasks in healthcare facilities.

5. The meaningful use program increased the significance of maintaining laboratory information systems.
6. Meaningful use reporting measures require LIS to provide real-time test results to patients.
7. Due to their management of medical records, LIS may be subject to extra legal requirements.
8. An LIS is primarily used for administrative tasks in healthcare facilities.
9. An LIMS is compatible with all operating systems.
10. An LIMS can only be accessed through a mobile application.

Answer the Questions:
1. What is the purpose of a laboratory information system (LIS)?
2. How do physicians and lab technicians use laboratory information systems?
3. What are some features commonly found in basic laboratory information systems?
4. How can an LIS reduce time spent and errors during the electronic data capture process?
5. Why did the maintenance of laboratory information systems become more important with the introduction of the meaningful use program?
6. What are some meaningful use reporting measures that could involve an LIS?
7. How does a laboratory information management system (LIMS) differ from a laboratory information system (LIS)?

EXERCISE 6. TRANSLATE THE FOLLOWING SENTENCES INTO ENGLISH

1. Лаборатория использует программное обеспечение для безопасного хранения данных исследований пациентов.
2. Технические специалисты управляют рабочими процессами лаборатории, обеспечивая точные результаты.
3. Система может взаимодействовать с другими системами для оптимизации процессов.
4. Ученые отслеживают местоположение образцов, чтобы избежать ошибок во время экспериментов.
5. Контроль качества необходим для обеспечения точных результатов в лаборатории.

6. Автоматизация процессов помогает повысить эффективность и точность.
7. Важнейшим аспектом лабораторных информационных систем является способность эффективно управлять лабораторными рабочими процессами.
8. Диаграммы отслеживания образцов помогают контролировать ход экспериментов.
9. Ученые полагаются на базы данных для анализа информации.
10. В лаборатории используется программное обеспечение для оптимизации работы.
11. Обмен данными между системами облегчает взаимодействие медицинских специалистов.
12. Лабораторная технология создана с учетом потребностей медицинских работников.
13. Работники вводят информацию о пациенте в систему в целях тестирования.
14. Ученые анализируют образцы для составления отчетов в медицинских целях.
15. Обеспечение безопасного хранения данных имеет решающее значение в лабораторных условиях.

SECTION 2: GRAMMAR
CONSTRUCTIONS WITH THE PARTICIPLE

Both participle I and participle II can be used singly (She went away crying; The tree was cut down), in a phrase (Do you know the man standing at the entrance? Shaken by the news, she stood motionless), or in a participial construction (/ saw them stealing apples in my garden; She found the lock broken).

The participle can form four participial constructions:
the objective participial construction
the subjective participial construction
the nominative absolute participial construction
the prepositional absolute participial construction.

The Objective Participial Construction

The Objective Participial Construction is a construction in which the participle is in predicate relation to a noun in the common case or a pronoun in the objective case. In the sentence this construction has the function of

a complex object. In Russian it usually corresponds to a subordinate object clause.

• I saw him crossing the street. Я видел, что он переходит улицу.

▪ **The Objective Participial Construction with Participle I** may be found after:		
1) *the verbs denoting sense perception:* **to see to hear to feel** **to watch** наблюдать **to notice** замечать, обращать внимание **to observe** наблюдать, следить **to perceive** воспринимать, ощущать, понимать, осознавать **to overhear** подслушивать **to imagine** воображать, понимать, представлять себе **to smell**	smb doing smth	○ I saw **him playing** tennis. ○ Did you hear **me knocking**? ○ She could feel her **heart beating** wildly. ○ I watched **him drawing** the portrait. Я наблюдал за тем, как он рисовал портрет. ○ It is difficult to imagine **him marrying** anyone. Трудно представить, что он вообще на ком-либо женится. ○ Do you smell **something burning**?
2) to listen to	smb doing smth	○ I listened to **them talking** about the picture.
3) to catch заставать; обнаруживать **to find** находить; заставать **to keep** вынуждать, заставлять (к-л ч-л делать) **to leave** оставлять **to discover** узнавать, обнаруживать, находить	smb doing smth	○ I caught **them taking** my peaches. Я застал их, когда они брали мои персики./Я схватил их, когда они брали мои персики. ○ I found **him crying** bitterly. Я застала его в слезах./Я нашла его горько плачущим./Когда она нашла его, он горько плакал. ○ I'm sorry I've kept **you waiting**. Извините, я заставил вас ждать. ○ I left **him talking** to Jack. Я оставил его разговаривающим с Джеком./ Когда я уходил, он говорил с Джеком. ○ I discovered **them swimming** in our pool. Я обнаружил, что они плавают в нашем пруду.
4) the verbs of causative meaning: **to have** довести до, заставить, добиться **won't have** не допущу, не позволю **can't have** не допущу, не позволю **to get … going** взяться за дело, начать действовать, заставить **to set** довести до, заставить **to start** запускать; пускать в ход; вводить в действие	smb doing smth	○ He had **them speaking** English in 6 months. Он добился того, что они заговорили по-английски за шесть месяцев. (Он сделал так, что они заговорили по-английски за шесть месяцев.) ○ I won't have **you wasting** so much time on trifles. Я не допущу, чтобы ты тратил так много времени на пустяки. ○ I can't have **him making** so much noise when everybody is asleep. Я не допущу, чтобы он так шумел, когда все спят. ○ The new director will soon get **the firm going**. Новый директор скоро заставит фирму заработать. ○ Your words set **me thinking**. Твои слова заставили меня думать.

Рисунок 9

▪ **The Objective Participial Construction with Participle II** may be found after:		
1. *the verbs denoting sense perception:* **to see** **to hear** **to feel** **to watch** **to find** **to leave** **to keep**	smb done smth done	◦ I heard his **name mentioned** several times. Я слышал, как его имя несколько раз упоминали. ◦ I saw **him taken** away by the police. Я видел, что его забрала полиция. ◦ She found **the picture damaged**. ◦ He left the **work unfinished**. Он оставил работу незаконченной.
2. *the verbs of mental activity:* **to think** **to believe** **to consider** **to understand**	smb done smth done	◦ She considered **the problem solved**. Она считала, что проблеме решена. ◦ He thought **her married** long ago. Он думал, что она уже давно замужем.
3. *the verbs denoting wish:* **to want** **to wish** **to desire** **to prefer** **would like**	smb done smth done	◦ I want the **work finished** by Saturday. Я хочу, чтобы работа была закончена к субботе. ◦ I prefer my **house redecorated**. (=I prefer my **house to be redecorated**.) Я предпочитаю, чтобы мой дом был заново отремонтирован. ◦ I'd like my **car serviced**, please. (=I'd like my **car to be serviced**, please.) Я бы хотел, чтобы мою машину отремонтировали.
4. *the verbs of causative meaning:* (causative –каузативный, причинный; выражающий связь причины и следствия) **to have** **to get** **to make** (We use the causative to stress the fact that we are 'causing' someone else to perform a service for us.) **won't have** не допущу, не позволю **can't have** не допущу, не позволю	smb done smth done	◦ I have my **shoes cleaned** every day. ◦ I had my **hair cut** yesterday. Я сделала стрижку вчера. ◦ When did you have your **hair cut**? ◦ We must get out **tickets registered**. Мы должны зарегистрировать наши билеты. ◦ He soon made his **presence felt**. Скоро почувствовалось его присутствие. ◦ I won't have my best **friend laughed at**. Я не допущу, чтобы над моим лучшим другом смеялись.

Рисунок 10

The Subjective Participial Construction

The Subjective Participial Construction is a construction in which the participle is in predicate relation to a noun in the common case or a pronoun in the nominative case.

In the sentence the Subjective Participial Construction has the function of a complex subject (or another point of view: one component of the construction has the function of the subject, the other component is part of a compound verbal predicate.) In Russian it usually corresponds to a complex sentence.

• He was seen crossing the street. Видели, как он переходил улицу.

smb smth	*is* *was* *can be* *will be*	1) *after the verbs of sense perception:* **seen** **heard** **noticed** **watched** **observed**	**doing** smth **done** (Participle I or Participle II)	○ **He** *was seen* **turning** round the corner. Видели, как он повернул за угол. ○ **She** *was heard* **singing**. Было слышно, как она поет. ○ Her **name** *was heard* **mentioned**. Было слышно, как упомянули её имя.
smb smth	*is* *was* *can be* *will be*	2) **found** **left** **kept** **caught** **reported** **shown**	**doing** smth **done** (Participle I or Participle II)	○ **The children** *were found* **sleeping** on the floor. Детей нашли спящими на полу. ○ **I** *was kept* **waiting** two hours. Меня заставили ждать два часа./Меня держали в ожидании два часа. ○ **The dress was found torn**. Платье нашли порванным.
smb smth	*is* *was* *can be* *will be*	3) **considered** **believed** **thought**	**done** (Participle II)	○ **The boat** *was considered* **lost**. Считалось, что лодка потерялась. ○ **She** *is considered* **cured**.

Рисунок 11

The Nominative Absolute Participial Construction is a construction in which the participle is in predicate relation to a noun in the common case or a pronoun in the nominative case; the noun or pronoun is not the subject of the sentence; in the sentence this construction has the function of an adverbial modifier. In Russian it usually corresponds to an adverbial clause. In the Nominative Absolute Participial Construction Participle I (in all its forms) or Participle II is used.

***Function:* Adverbial modifier of:**	
a) time	• **The signal given,** the train started. • **The lamp having been lit**, he opened his book.
b) cause	• **The room being dark**, I could not at first see where the speaker was. • **The key having been lost**, they couldn't enter the cottage.
c) attendant circumstances	• He turned and went, **we following him**. • He sat on the sofa, **his eyes closed, his legs crossed**.
d) condition	• **Circumstances permitting,** we'll start tomorrow. • **Negotiations failing**, we will have to change our proposals. Если переговоры не будут иметь успеха, нам придется изменять наши предложения.

Рисунок 12

The Absolute Participial Construction may be introduced by the preposition 'with' and is then called the Prepositional Absolute Participial Construction. It is not necessarily set off by a comma. This construction is rendered in Russian by a coordinate clause or деепричастный оборот.
Prepositional absolute constructions are less common than non-prepositional ones.

***Function:* Adverbial modifier of:**	
a) attendant circumstances	• Andrew went into the house **with his heart beating fast**. • I can't walk **with my leg broken**.
b) cause	• **With Louise living in Spain,** we don't see her often.

Рисунок 13

EXERCISE 1. POINT OUT THE PARTICIPIAL CONSTRUCTION IN EACH SENTENCE AND DEFINE ITS TYPE

1. The conference having ended, the visitors went home.
2. We heard the door of the lab closing.
3. With the experiments having been carried out, they started new investigations.
4. Do you smell something burning?
5. His name was often heard mentioned.
6. It being an emergency situation, you must think quickly.
7. I heard my name mentioned
8. I can't write with you standing there.
9. I want my article published.
10. I want it done as soon as possible.
11. These very important details were found missing from a later description of the manuscripts.
12. I have never heard them speaking English.
13. They were seen leaving the room.
14. The students were heard discussing a new topic.
15. All the essays having been written and collected, the teacher sent the students home.

EXERCISE 2. CHOOSE PARTICIPLE I OR PARTICIPLE II IN THE OBJECTIVE PARTICIPIAL CONSTRUCTION

1. I don't want to see anyone _____ (to hurt).
2. Edward soon made his views _____ (to know).
3. I have often heard it _____ (to say).
4. I want it _____ quickly (to do).
5. We found the papers _____ . (to steal)
6. I want the answer _____ at once. (to send)
7. I noticed him _____ in the garden. (to work)
8. I have my hair _____ cut once a month.
9. Where did you have your watch _____? (to mend)
10. She found the experiment _____ . (to finish)

11. He saw the laboratory _____. (to clean)
12. Your words set me _____ thinking. (to think)
13. They found the article _____ . (to publish)
14. I watched him _____ the room. (to leave)
15. Did you notice anyone _____ at the gate? (to stand)

EXERCISE 3. RE-WORD THE FOLLOWING SENTENCES INTO SENTENCES WITH THE SUBJECTIVE PARTICIPIAL CONSTRUCTIONS

I could see the visitor walking restlessly backwards and forwards. →► The visitor could be seen walking restlessly backwards and forwards.
We have often heard his name mentioned. →► His name was often heard mentioned.

1. I've often heard the professor mentioning the term LIS during the lecture.
2. We observed them recording the test results manually.
3. They found him monitoring the work of the equipment.
4. I hope she hasn't noticed me leaving the lab so late.
5. They considered the experiment carried out.
6. We noticed the technician checking the work of LISs.
7. The technician watched the tool working slowly during the experiment.
8. They consider her cured.
9. They found the results verified.
10. We have often seen patients samples checked manually.
11. They found the door locked.
12. I could see the visitors entering the conference hall.
13. I saw the technician carefully calibrating the equipment before starting the analysis.
14. We observed the laboratory staff meticulously documenting every step of the procedure.
15. The lab assistant noticed the equipment malfunctioning.

EXERCISE 4. USE THE NOMINATIVE ABSOLUTE PARTICIPIAL CONSTRUCTION FOR THE RUSSIAN CLAUSES

1. (Так как образцы прибыли с опозданием), the lab technicians had to adjust their schedule.
2. (Поскольку оборудование неисправно), the lab results were delayed.

3. (Соблюдая все протоколы безопасности), the technicians handled the samples with care.
4. (Пока ожидаются результаты), the doctor couldn't give the patient a diagnosis.
5. (После внедрения новой лабораторной технологии), the workflow was significantly improved.
6. (В процессе обработки нового образца пациента), the lab team carefully reviewed the accompanying paperwork.
7. (После завершения испытаний), the samples were archived for future reference.
8. (Поскольку анализ занял больше времени), the lab manager had to inform the doctor.
9. (Коллектив лаборатории работал не покладая рук), the backlog of patient samples was finally cleared.
10. (Поскольку оборудование было правильно откалибровано), the results were highly accurate.
11. (Обучение сотрудников лаборатории завершено), they were prepared to handle any situation.
12. (Благодаря тому, что образцы были правильно маркированы), the risk of errors was greatly minimized.
13. (Благодаря внедрению новых правил техники безопасности), the lab environment was safer for everyone.
14. (Пока директор лаборатории просматривал отчеты), the team discussed the latest findings.
15. (Поскольку бюджетные ограничения были проблемой), the lab staff had to prioritize their tasks.

EXERCISE 5. USE THE PREPOSITIONAL ABSOLUTE PARTICIPIAL CONSTRUCTION FOR THE RUSSIAN CLAUSES

1. После завершения обработки данных, the lab technicians could analyze the results and generate reports.
2. После завершения анализа данных, the lab team presented their findings to the researchers.
3. Точно записывав данные, the lab ensured the reliability of its findings.
4. Благодаря обновлению программного обеспечения для анализа данных, the lab gained access to new features and capabilities.
5. Поскольку образцы пациентов были правильно подготовлены, the lab could conduct accurate testing.

6. Благодаря тому, что данные организованы и доступны для поиска, the lab team could quickly retrieve information when needed.
7. Благодаря постоянному контролю системы ввода данных, the lab ensured the integrity and security of its data.
8. Благодаря удобному интерфейсу LIMS, laboratory staff could easily navigate and use the system.
9. Благодаря LIMS, отслеживающей образцы от их поступления до отчетности, accurate and comprehensive sample management was ensured.
10. Поскольку LIS постоянно развивается и адаптируется к новым технологиям, the laboratory remained at the forefront of innovation.
11. Благодаря расширению возможностей с помощью LIS, Laboratory staff felt more confident and efficient in their work.
12. Благодаря тому, что LIS сократил количество ошибок, laboratory operations became more cost-effective.
13. Благодаря тому, что LIS формирует подробные отчеты, lab managers gained valuable insights into laboratory performance.
14. Благодаря преобразованию лабораторной деятельности с помощью LIS, the lab became a model of efficiency and innovation.
15. Благодаря автоматизации ввода данных LIMS, lab technicians could focus on more complex tasks.

EXERCISE 6. TRANSLATE THE SENTENCES INTO ENGLISH USING OBJECTIVE PARTICIPIAL CONSTRUCTION, SUBJECTIVE PARTICIPIAL CONSTRUCTION, NOMINATIVE ABSOLUTE PARTICIPIAL CONSTRUCTION, PREPOSITIONAL ABSOLUTE PARTICIPIAL CONSTRUCTION

1. Лаборант наблюдал, как тщательно готовятся к анализу пробы. (Objective).
2. Все образцы были правильно промаркированы, и лаборанты уверенно приступили к вводу данных. (Nominative Absolute).
3. После завершения процесса ввода данных команда лаборатории перешла к анализу результатов. (Prepositional Absolute).
4. Лаборант наблюдал за тем, как машина анализирует образцы, следя за тем, чтобы процесс проходил гладко. (Objective).
5. Образцы поступали партиями, и команда лаборатории работала эффективно, чтобы обработать их все. (Nominative Absolute).

6. После завершения анализа данных директор лаборатории представил результаты исследовательской группе. (Prepositional Absolute).
7. Оборудование регулярно калибруется, поэтому лаборанты могут быть уверены в точности анализов. (Nominative Absolute).
8. Поскольку аналитические возможности лаборатории постоянно расширяются, команда может проводить более сложные исследования. (Prepositional Absolute).
9. Лаборатория оборудована по последнему слову техники, что позволяет команде проводить широкий спектр тестов с высокой точностью. (Nominative Absolute).
10. Было замечено, что новое программное обеспечение повысило эффективность работы лаборатории. (Subjective).
11. Было замечено, что результаты пациента просмотрены врачом. (Subjective).
12. Было слышно, как команда лаборатории празднует успешное завершение сложного анализа. (Subjective).
13. Было замечено, что в лаборатории тестируется новый метод идентификации биомаркеров (Subjective).
14. Было замечено, что лабораторные процедуры стандартизированы для контроля качества. (Subjective).
15. Сообщается, что результаты нового исследования будут представлены на научной конференции. (Subjective).

СПИСОК ЛИТЕРАТУРЫ / REFERENCES

1. McCarter, S. Oxford English for Careers: Medicine 2: teacher's resource book / S. McCarter. – Oxford: Oxford University Press, 2017. – 103 p.
2. McCarter, S. Oxford English for Careers: Medicine 2: student’s book / S. McCarter. – Oxford: Oxford University Press, 2017. – 144 p.
3. Career Paths: Medical: student's book: 3 books / Virginia Evans, Jenny Dooley, Trang M. Tran. – 7th impression. – Newbury: Express Publishing, 2018. – 117 p.

Учебное издание

Авторы:
Анастасия Анатольевна Абрамова
Марина Владимировна Власова
Наталья Александровна Дмитриенко
Анна Андреевна Меньшикова
Наталия Геннадьевна Новикова
Ольга Васильевна Петухова

АНГЛИЙСКИЙ ЯЗЫК ДЛЯ СТУДЕНТОВ МЕДИЦИНСКИХ СПЕЦИАЛЬНОСТЕЙ

ЧАСТЬ II

учебное пособие

Технический редактор И.Г. Забоенкова
Обложка И.Г. Забоенкова

Издательство СибГМУ
634050, г. Томск, пр. Ленина, 107
тел. +7 (3822) 901–101, доб. 1760
E-mail: izdatelstvo@ssmu.ru

Подписано в печать 12.11.2024
Формат 60x84 1/16. Бумага офсетная.
Печать цифровая. Гарнитура «Times». Печ. л. 8,3. Авт. л. 5,4
Тираж 100 экз. Заказ № 29

Отпечатано в Издательстве СибГМУ
634050, Томск, ул. Московский тракт, 2
E-mail: lab.poligrafii@ssmu.ru