КАЗАНСКИЙ ФЕДЕРАЛЬНЫЙ УНИВЕРСИТЕТ
ИНСТИТУТ МЕЖДУНАРОДНЫХ ОТНОШЕНИЙ
ВЫСШАЯ ШКОЛА ИНОСТРАННЫХ ЯЗЫКОВ И ПЕРЕВОДА

И.С. Налимова, М.В. Асмоловская, К.А. Сахибуллина

Professional English for Medical Students

КАЗАНЬ
2022

УДК 811.111 (075.8)
ББК 81.2Англ-923

Печатается по рекомендации учебно-методической комиссии
Института международных отношений
(протокол № 8 от 27 апреля 2022 года)

Рецензенты:
кандидат филологических наук, доцент КФУ, **Воронина Е.Б.**
кандидат педагогических наук, доцент, Казанский Инновационный Университет им. В. Г. Тимирясова, **Дульмухаметова Г.Ф.**

Professional English for Medical Students: учеб. пособие / И.С. Налимова, М.В. Асмоловская, К.А. Сахибуллина. – Казань: КФУ, 2022. – 188 с.

Учебное пособие предназначено для студентов медицинских специальностей и включает в себя аутентичные тексты по актуальным проблемам медицины, практические задания, направленные на создание необходимого лексического запаса, развитие навыков чтения специальной литературы, перевода специальных текстов, устной и письменной речи.

УДК 811.111 (075.8)
ББК 81.2Англ-923

Предисловие.

Настоящее пособие предназначено для студентов первого и второго курсов медицинских специальностей «Лечебное дело», «Стоматология», «Медицинская биохимия», «Фармация», с уровнем Intermediate/Upper-Intermediate и содержит аутентичные материалы и задания по английскому языку для специальных целей (ESP). Пособие составлено в соответствии с требованиями программы по английскому языку и может быть рекомендовано к использованию как для аудиторной, так и самостоятельной работы.

Цель учебного пособия – отработка навыка реферирования аутентичных статей медицинской направленности.

Пособие состоит из трех разделов. Первый раздел посвящен темам, изучаемым на 1 курсе – анатомия и физиология человека, фармация, виды лекарственных средств. Второй раздел охватывает темы, изучаемые на 2 курсе – патологии, болезни человека, в том числе стоматологические. Третий раздел содержит тексты для дополнительного чтения, предназначенные для самостоятельной работы студентов. Также в пособии представлен план реферирования статей на английском языке.

Каждый раздел включает в себя ряд уроков, которые содержат статьи для изучающего чтения, упражнения на отработку и закрепление новой лексики, словообразование, умение оперировать терминами, отработку коммуникативных навыков, а также устного и письменного перевода. Ряд упражнений предполагает творческое участие студентов в форме презентаций, докладов.

В учебном пособии использованы оригинальные тексты из аутентичных источников, учебников по специальности и электронных ресурсов.

Материалы пособия прошли апробацию в студенческих группах.

CONTENT

Part 1. Курс 1……. 6

Unit 1. Skeletal system…… 6

Unit 2. Respiratory system…….. 13

Unit 3. Digestive system……. 21

Unit 4. Blood. Circulation…… 29

Unit 5. Endocrine system…….. 38

Unit 6. Pharmacy……. 46

Unit 7. Types of medication. Drugs administration……. 55

Part 2. Курс 2…… 68

Unit 8. Skeletal disorders……. 68

Unit 9. Digestive disorders……... 76

Unit 10. Nervous system disorders……. 83

Unit 11. Cancer…… 91

Unit 12. Inherited diseases…… 99

Unit 13. Dentistry. Earliest Dental Fillings…….. 108

Unit 14. Dentistry. Evolutionary history of teeth…… 118

Unit 15. Dentistry. Problems with our teeth……. 129

Part 3. Supplementary reading…… 140

Text 1. Why This Man's Blood Helped Save Millions of Babies…… 140

Text 2. Giant Heart……... 142

Text 3. No, 'Negative-Calorie' Foods Aren't a Real Thing…….. 144

Text 4. People take iodine pills after Chernobyl exploded…….. 147

Text 5. Why Breathing Deeply Helps You Calm Down……. 149

Text 6. Difference Between Bacterial And Viral Infections…… 151

Text 7. Even mild COVID-19 can shrink the brain…….. 157

Text 8. Allergies…… 161

Text 9. Smoking and disease…… 163

Text 10. Haemoglobin…….. 166
Text 11. Lipids……. 168
Text 12. Surprising health benefits of donating blood……. 171
Text 13. Too Much Tech Tied to Carpal Tunnel Syndrome……. 173
Text 14. Respiratory infections……. 176
Text 15. Ten wacky brain facts about learning……. 178
Plan for rendering and discussion……... 181
References…… 185

Part I. Курс 1.

UNIT 1. Skeletal system.

PRE-READING

Exercise 1. Study the vocabulary before reading the text.

Professional terms

- cartilage/ˈkɑːtɪlɪdʒ/ – хрящ
- an extra digit /ˈdɪdʒɪt/– аллельное число
- fabella – сесамовидная кость латеральной головки икроножной мышцы)
- tissue/ˈtɪʃuː/ – ткань
- hyoidbone/’haɪɔɪd/– подъязычная кость
- bonemarrow/ˈmærəʊ/ – костный мозг
- hammer/ˈhæmə(r)/ – молоточек
- anvil/ˈænvɪl/– наковальня
- stirrup/ˈstɪrəp/ – стремечко
- fight or flight response – механизм «бей или беги»

Verbs

- to transmit /trænzˈmɪt/– передавать

Adjectives

- prevalent/ˈprevələnt/ – преобладающий

Exercise 2. Before reading the text, answer the following questions and discuss them with your partner.

1. What unusual facts about bones do you know?
2. Do all the people have the same number of bones?
3. What are the functions of bone marrow?
3. How do you think your bones can be connected with stress?

TEXT

Exercise 3. Read, translate the article and be ready to do the exercises.

Six fun facts about the human skeleton

Bones are amazing. People are often surprised to learn that bone is a living tissue. It is widely understood that our bones have the ability to repair themselves after breaks and fractures. But they are also constantly removing and rebuilding themselves in response to everyday activity, in a cellular process that we call remodeling.

Here are some other facts about the skeleton.

1. Not everyone has 206 bones

Textbooks teach that there are 206 bones in the human skeleton as the anatomical norm. But babies are born with over 300 bones, originally made of cartilage, which are mineralised during the first few years of life, and some bones fuse together.

Some people are born with extra bones, such as a 13th pair of ribs or an extra digit. Some people even develop extra bones during their lives. A recent study showed that the fabella, a little bean-shaped bone found at the back of the knee, is becoming more prevalent in the human body because of improved nutrition and people getting heavier.

2. The human skeleton is constantly changing in height

The change in height of a child in their first year is the most rapid and we have reached our adult height by our mid- to late teens. But even once our bones stop growing, our height can still change.

At joints, there is a layer of cartilage covering the bones. Cartilage is a rubbery layer of tissue made up collagen and water. Over the course of a day, the cartilage, particularly in your spine, is compressed by gravity. This means that you are shorter by the time you go to bed. Thankfully, after a period of lying horizontally, the

cartilage is able to return to its original size. The lack of gravity in space has the opposite effect on astronauts who are up to 3% taller after a stint in space.

3. Only one bone is not connected to another bone

The hip bone's connected to the thigh bone … but not all bones in the human skeleton are connected to each other. The one exception is the hyoid bone.

The U-shaped hyoid bone sits at the base of the tongue and is held in place by muscles from the base of the skull and jaw bones above. This bone enables humans to talk, breathe and swallow.

4. Bone marrow isn't just space filler

Long bones, such as the thighbone, are filled with bone marrow made of fat cells, blood cells and immune cells. In children, the bone marrow is red reflecting its role in making blood cells. In adults, the bone marrow is yellow and contains 10% of all the fat in the adult body. It was long thought that bone marrow fat cells were nothing more than a space filler, but scientists are increasingly learning how the fat inside bones has important metabolic and endocrine functions, affecting the whole human body.

5. The smallest bones are in the ear

The smallest bones in the human body are the malleus (hammer), incus (anvil) and the stapes (stirrup). Collectively, these bones are known as the ossicles (Latin for "tiny bones") and their role is to transmit sound vibrations from the air to the fluid in the inner ear. Not only are these the smallest bones in the body, but they are also the only bones that do not remodel after the age of one. This is important, as a change in shape could affect hearing.

6. Bones cause you stress

Within the human body, our sympathetic nervous system is the mechanism by which our body readies itself for intense activity. This is often called the fight-or-flight response and is associated with the release of the hormone adrenaline in response to a stressful situation. But recently, researchers published a paper

identifying osteocalcin, a hormone released by bone-forming cells, as a key player in the stress response.

Mice specifically bred without the ability to produce osteocalcin did not have a fight-or-flight response in stressful situations compared with regular mice. The scientists also examined the osteocalcin levels in humans, where they found raised levels in blood and urine after the human subjects were exposed to stress. Ultimately, it was shown that osteocalcin switches off the parasympathetic rest-and-digest mechanism, which allows the activation of the fight-or-flight response.

(Retrieved from: https://theconversation.com/six-fun-facts-about-the-human-skeleton-123711)

VOCABULARY EXERCISES

Exercise 4. Give Russian equivalents.

Живая ткань, под влиянием, анатомическая норма**,** объединиться, бобовидная кость, в течение дня, расположен в основании языка**,** все больше и больше узнают, влиять на слух, главный элемент.

Exercise 5. Match the words 1-8 with the definitions A-F.

1. bone marrow	A) a collection of cells that form the different parts of humans, animals and plants
2. hammer	B) to send an electronic signal, radio or television broadcast, etc.
3. tissue	C) an additional finger
4. prevalent	D) the first of three small bones in the middle ear that carry sound to the inner ear
5.cartilage	E) a U-shaped bone or complex

	of bones that is situated between the base of the tongue and the larynx
6. to transmit	F) he strong white tissue that is important in supporting and connecting parts of the body, and especially in joints to prevent the bones rubbing against each other
7. hyoid bone	G) a soft substance that fills the hollow parts of bones
8. an extra digit	H) that exists or is very common at a particular time or in a particular place

Exercise 5. Find as many synonyms as you can for the following words. Use a dictionary.

constantly -

prevalent -

nutrition -

spine -

scientists -

affect -

intense -

examine –

Exercise 6. Fill in the gaps in the sentences using the words given below. Use the words in the appropriate form.

nutrition, tissue, bone marrow, fight or flight response, affect, transmit, cartilage, examine, hyoid bone, intense

1. But once we realize something, our mind begins to … our future.

2. Good … plays an important role in maintaining the health of people living with HIV.

3. And the x-rays showed that the … was broken.

4. The … starts in the hypothalamus, which activates the adrenal gland in two different ways.

5. Patient has unexplained, … abdominal pains.

6. The method makes it possible to receive, store and …voice messages according to an individual list.

7. Excessive vitamin A causes … around bones to tear and bleed.

8. More recently gene therapy has been attempted as an alternative to the … transplant.

9. I'll look for environmental markers when I … the bone.

10. You're the first orthopedic surgeon to grow … out of nothing.

Exercise7. Arrange the words so as to make sentences.

1. The /bones / incus / smallest / in / malleus / human / body / are / stapes/ and the / the / the / the.

2. People /lives / during / even / some / extra / their / develop / bones.

3. Tissue / is / a /made / rubbery / water / layer / of / up / collagen / cartilage / and.

4. This /talk / breathe / bone / humans / to /, and / swallow / enables.

5. A / bone-forming / released / osteocalcin / is/ cells / hormone / by.

6. Yellow / the / bone /10% / in / adults, /marrow/ is /adult / and / of / all / the / fat / in / the / contains / body.

7. Babies / 300 / but / over / originally / of / are / born / cartilage / with / bones, / made.

8. Bone/ the /hyoid / one / is / the /exception.

COMPREHENSION AND DISCUSSION EXERCISES

Exercise 8. Answer the questions.

1) What kind of process is called the remodeling of bones?

2) How many bones does an average adult have?

3) How many bones does a newborn baby have?

4) What kind of extra bones may people have?

5) Can your height change when your bones stop growing?

6) What is cartilage?

7) Name the bone which is not connected to other bones?

8) What does the marrow consist of?

9) Why is the marrow in children red? And why is the marrow yellow in adults?

10) What are the smallest bones of the human body? Where are they located?

11) What kind of hormone is released by bone-forming cells?

Exercise 9. Say whether the statements are true or false. Give reasons.

1) Our bones can repair themselves after breaks and fractures.

2) Babies are born with 300 bones and when they grow up they throw out a part of them.

3) When you lie on bed you are getting higher.

4) Astronauts are higher in space that on land.

5) U-shaped hyoid bone is located in your ear.

6) A bone marrow in adults contains 90% of all the fat.

7) Ossicles transmit sound vibrations from the air to the fluid in the inner ear.

8) Fight-or-flight response is associated with the release of the hormone adrenaline.

Exercise 10. Translate the following sentences from Russian into English.

1. Ничего не осталось, только кожа и хрящи.
2. Воспаление тканей характерно для вдыхания какого-либо наркотика.
3. Еще одной распространенной темой является борьба с нищетой.
4. Вообще-то с костным мозгом всё немного сложнее.
5. Первая пуля прошла через жилет Арнольда, и застряла в его лопатке.
6. Большинство мышц находятся в туловище, что очень хорошо.

Exercise 11. Render the article. Follow the plan. See page 181.

UNIT 2. Respiratory system.

PRE-READING

Exercise 1. Study the vocabulary before you read the text.

Professional terms

- amount /əˈmaʊnt/ – количество
- build up /ˈbɪldʌp/– накопление
- myoglobin /maiəu'gləubin/– миоглобин
- autopsy /ˈɔːtɒpsi/ – вскрытие
- medical examiners /ɪgˈzæmɪnə(r)/ – судмедэксперт
- rupture /ˈrʌptʃə(r)/ – разрыв
- scholar /ˈskɒlə(r)/ – ученый;

Verbs

- to expel /ɪkˈspel/ – выводить, выталкивать, изгонять
- to allow/əˈlaʊ/ – позволять

- to replace /rɪˈpleɪs/ – заменить
- tofloat /fləʊt/ – плыть, парить
- to depict /dɪˈpɪkt/ – изображать
- to snorkel /ˈsnɔːkl/ – нырять с трубкой
- to withstand /wɪðˈstænd/ – противостоять, выстоять

Adjectives

- blood-acidifying /əˈsɪdɪfaɪ/ – окисляющий кровь
- syncytial – синцитиальный

Exercise 2. Before reading the text, answer the following questions and discuss them with your partner.

1. What are the main organs included in respiration process?
2. How many inspirations are made by an adult in a minute?
3. Does respiration vary in different mammals?

TEXT

Exercise 3. Read, translate the article and be ready to do the exercises.

Gasp! 11 surprising facts about the respiratory system

The respiratory system is made up of several organs and structures, including the lungs, windpipe, diaphragm and alveoli. It is responsible for taking in oxygen and expelling carbon-dioxide waste.

Here are 11 surprising facts about the respiratory system.

You lose a lot of water just by breathing.

Breathing allows you to take in the oxygen your cells need and expel carbon-dioxide waste. But when you exhale, you also breathe out a lot of water. How much water do you lose from breathing?

When at rest, humans exhale up to 17.5 milliliters of water per hour, according to a 2012 article in the journal Polish Pneumonology and Allergology. But you lose about four times that amount when you exercise, the study said.

Some people can hold their breath for more than 20 minutes.

The average time an adult can hold his or her breath is between 30 and 60 seconds. This limitation has more to do with the buildup of blood-acidifying carbon dioxide than the lack of oxygen, which your body stores in muscle proteins called myoglobin.

But free divers – people who practice the sport of diving underwater without using equipment like scuba gear – have different techniques, such as hyperventilation, to decrease the concentration of carbon dioxide in the blood, allowing them to hold their breath for remarkably long times. Denmark's Stig Severinsen currently holds the Guinness World Record for the longest free dive – in 2010, he held his breath underwater for 22 minutes.

The lungs are the only organs that can float on water.

Each of your lungs contains about 300 million balloon-like structures called alveoli, which replace the carbon-dioxide waste in your blood with oxygen. When these structures are filled with air, the lungs become the only organs in the human body that can float on water.

In fact, medical examiners use the so-called "lung float test" during autopsies to determine if a baby was stillborn (died in the womb). If the lungs float, the baby was born alive; if the lungs don't float, the baby was stillborn.

The common cold can be caused by hundreds of different viruses.

The common cold is by far the most prevalent respiratory-system illness, and may be the most common illness known today. It is the leading cause of doctor visits, as well as missed days from work and school, according to the Centers for Disease Control and Prevention. In the United States alone, there are more than 1 billion cases of the common cold each year.

A cold is often thought to be synonymous with "rhinovirus," the virus that most frequently causes this type of illness. But there are actually more than 200 viruses that can cause a cold, including the human coronavirus and the respiratory syncytial virus.

The lungs and windpipe were important symbols in ancient Egypt.

In humans and other animals, the lungs and windpipe must work together to provide the tissues and cells of the body with oxygen. The ancient Egyptians understood the importance of this cohesion for survival, and created a hieroglyph that depicts the lungs attached to the windpipe, to symbolize the unity between upper and lower Egypt that was necessary for the country to be strong and healthy.

Because pharaohs were responsible for ruling over the two lands, the lungs-windpipe hieroglyph is often found on artifacts belonging to pharaohs, including clothing, furniture and jewelry.

Elephants have a unique respiratory structure.

In the respiratory system of mammals, a thin sheet of tissue called the pleura wraps around the lungs and lines the chest cavity. The area between the layers of pleura is known as the pleural space, or pleural cavity, and it contains pleural fluid, which provides lubrication as the lungs expand and contract.

Unlike all other mammals, the pleural cavity of elephants is filled with tough connective tissue. This unusual structure allows elephants to snorkel and withstand the differences in pressure above and below water, without rupturing the blood vessels in the lining of their lungs, according to a 2001 article in journal Respiration Physiology.

Pulmonary circulation was first described in the 13th century.

Pulmonary circulation is the process by which blood travels from the heart to the lungs and then back to the heart. This flow keeps the heart supplied with oxygen, which the blood picks up from the lungs.

In 1243, the Arab physician Ibn al-Nafis became the first person to describe this complicated process, when he detailed it in his work, "Commentary on Anatomy in Avicenna's Canon." It wasn't until 300 years later that European scholar came to the same conclusion, according to a 2008 article in the Journal of Applied Physiology.

(Retrieved from: https://www.livescience.com/44105-respiratory-system-surprising-facts.html)

VOCABULARY EXERCISES

Exercise 4. Give Russian equivalents.

Carbon-dioxide waste, at rest**,** according to**,** lack of oxygen**,** remarkably**,** the most prevalent**,** furniture and jewelry.

Exercise 5. Give English equivalents.

Превышать объем в четыре раза, ограничение, без использования оборудования, являться обладателем мирового рекорда Гиннеса, заболевание дыхательной системы, респираторный сентенциальный вирус, символизировать единство, окружать легкие, выстилать легкие, сложный процесс.

Exercise 6. Match the words 1-10 with the definitions A-J.

1) autopsy	A) to be strong enough not to be hurt or damaged by extreme conditions, the use of force, etc.
2) buildup	B) the process of acid production in blood
3) to allow	C) an increase in the amount of something over a period of time
4) to withstand	D)a person who knows a lot

	about a particular subject because they have studied it in detail
5) rupture	E) to force air or water out of a part of the body or from a container
6) scholar	F) to dive or swim under water using a special tube
7) blood-acidifying	G) to be used instead of somebody/something else; to do something instead of somebody/something else
8) to replace	H) an official examination of a dead body by a specially trained doctor in order to discover the cause of death
9) to expel	I) an injury in which something inside the body breaks apart or bursts
10) to snorkel	J) to let somebody/something do something; to let something happen or be done

Exercise 7. Complete the table with the appropriate word forms.

Verb	**Noun**	**Adjective**
circulate	circulation	circulatory
inhale		
	exhalation	
snorkel		
		united
determine		
	concentration	

		breathless
limit		

Exercise 8. Fill in the gaps in the sentences using the words given below. Use the words in the appropriate form.

Withstand, expel, lack of oxygen, prevalent, scholar, float, replace, buildup

1. Well, … can cause the brain to hallucinate.
2. She was also a visiting … at the Texas A&M University from 1968 to 1969.
3. We wanted to create a seed that could genetically … whatever nature threw at it.
4. He doesn't ride machines, but instead uses his wings to … above the ground.
5. It seems also to be the most … drug among the general population.
6. Elyan will have to be unconscious when you … the spirit.
7. The … of fluid in my spine is a degenerative condition.
8. But you know you cannot … your brother.

COMPREHENSION AND DISCUSSIONEXERCISES

Exercise 9. Answer the questions.

1. How much water does an average adult exhale in an hour?
2. How much is exhaled when a person does physical exercises?
3. Why can’t people hold their breath for more than 60 seconds?
4. What helps free divers to hold their breath for a long time?
5. Approximately how many alveoli are there in your lungs?
6. What is the “lung float test” used for?

7. What is another term used for a cold?

8. What did windpipe and lungs symbolize in ancient Egypt?

9. What is pleura and what is its function?

10. What is unusual about the elephant's pleural cavity?

11. What is pulmonary circulation?

12. Who was the first person to describe pulmonary circulation?

Exercise 10. Say whether the statements are true or false. Give reasons.

1. An average person exhales about 17 liters of water per hour.

2. Usually a person can hold his/her breath for about 30-60 seconds.

3. Myoglobin is a protein which carries iron to the tissues.

4. A lung-float test is used to determine the cause of an adult person.

5. There are more than 200 viruses that can cause a cold.

6. In ancient Egypt the lungs and windpipe symbolized the health of the pharaoh.

7. The pleural cavity of elephants is filled with tough connective tissue.

8. The scientist who described pulmonary circulation was a Greek scholar.

Exercise 11. Translate the following sentences from Russian into English.

1. Дыхание позволяет получать необходимый клеткам кислород и удалять отходы углекислого газа.

2. Это ограничение в большей степени связано с накоплением подкисляющего углекислого газа в крови, чем с нехваткой кислорода.

3. Когда эти пузырьки заполнены воздухом, легкие становятся единственными органами в человеческом теле, которые не тонут в воде.

4. Простуда часто считается синонимом "риновируса", вируса, который чаще всего вызывает этот тип болезни.

5. Пространство между слоями плевры известна как плевральное пространство, или плевральная полость.

Exercise 12. Choose the fact which you found the most interesting for you. Discuss it with your partner.

Exercise 13. Render the article. Follow the plan. See page 181.

UNIT 3. Digestive system.

PRE-READING

Exercise 1. Study the vocabulary before you read the text.

Professional terms

- saliva/səˈlaɪvə/– слюна
- bolus/ˈbəʊləs/– пищевой комок
- windpipe/ˈwɪndpaɪp/– трахея
- breakdown – расщепление, разрушение
- entericnervoussystem – энтеральная нервная система
- survival /səˈvaɪvl/–выживание

Verbs

- toidentify/aɪˈdentɪfaɪ/– определять, идентифицировать
- tochew/tʃuː/ – жевать
- toswallow/ˈswɒləʊ/– глотать
- tobreakdown – разрушать, расщеплять
- torelease/rɪˈliːs/– выделять
- tooccur/əˈkɜː(r)/– возникать, происходить

Adjectives

- entire /ɪnˈtaɪə(r)/ – целый, весь
- tremendous/trəˈmendəs/ – огромный, невероятный

Exercise 2. Before reading the text, answer the following questions and discuss them with your partner.

1. How long is the digestive system?
2. How does the brain control digestion?
3. What is the role of the liver and the pancreas in digestion?

TEXT

Exercise 3. Read, translate the article and be ready to do the exercises.

Interesting facts about your digestive system

Like most things related to our bodies, we only pay attention to our digestive system when it's giving us a problem. Otherwise, we tend to overlook it and put all sorts of things into it without a second thought. Although we learn about the process of digestion in high school, most of us had other things on our minds back then. But knowing how your digestive system is supposed to work can help in terms of overall digestive health—knowledge which can help you take better care of your digestive system, more quickly identify any possible digestive problems, and help you to communicate more effectively with your doctor.

Your Digestive System Is Surprisingly Long

The length of your entire digestive system from the mouth to anus is approximately 30 feet long.

Your digestive system is responsible for breaking down the foods you eat so that you can absorb vital nutrients. Food is broken down mechanically—through chewing, for example, and through the use of enzymes—into the form of molecules that can be absorbed by and moved through your blood.

You Produce a Lot of Saliva

Our mouths secrete approximately one liter of saliva a day.

Saliva production through our salivary glands is the first step in digestion. Saliva is mostly made up of water, but does contain other substances, and can be stimulated by just thinking about or smelling food.

Swallowing Is a Pretty Complex Operation

It takes anywhere from two to five seconds for food to make its way down your esophagus into your stomach.

After we've chewed our food, it's formed into something called a bolus. Swallowing is a complex procedure in which the bolus is moved into the pharynx as the larynx (the organ connected to our windpipe) is covered and the esophagus opening is widened to accept the bolus. The bolus is then moved down through the esophagus through coordinated muscle movements known as peristalsis.

Your Pancreas and Liver Are Not so Mysterious

The primary role of both your pancreas and liver is to produce substances that break down the foods you eat.

As the chyme makes its way into your small intestine, it's met with juices produced by the liver and the pancreas. The liver produces bile, which is stored in the gallbladder and then released into the small intestine to break down fats, while the pancreas secretes enzymes into the small intestine that break down protein, carbohydrates, and fats. The pancreas also releases a substance called bicarbonate that neutralizes any acid that's made its way out of the stomach.

So Much Happens in Your Small Intestine

The small intestine is where the most important work of digestion takes place, that of further breaking down the food we eat into molecular components that can be absorbed into the bloodstream. You may remember from high school biology that the small intestine has three parts: the duodenum, the jejunum and the ileum. Bile from the gallbladder and digestive enzymes from the pancreas are mixed into the chyme in

the duodenum. The final breakdown and absorption of nutrients occur in the second two parts.

Your Body Actually Has Two Brains

Your digestive system has its own little mini-brain.

The functioning of the digestive system is regulated by the enteric nervous system (ENS), which is made up of a tremendous amount of nerve cells and is regulated by the same neurotransmitters, most notably serotonin, found in the brain. This similarity has earned the ENS the title of the "Second Brain."

Your brain and digestive system work in close partnership, a phenomenon that you have first-hand knowledge of any time your stomach flips when you think of something anxiety-provoking—or more dramatically if you experience diarrhea when you are stressed. This collaboration is thought to be essential to our survival as a species; although digestion is essential for life, dealing with threats is just as necessary.

(Retrieved from: https://www.verywellhealth.com/digestive-system-facts-1944708)

VOCABULARY EXERCISES

Exercise 4. Find English equivalents of the following word combinations in the text.

Быть склонным упускать из виду, много других мыслей в голове, жизненно важные питательные вещества, слюнные железы, расширяться, который накапливается в желчном пузыре, нейтрализует любую кислоту, молекулярные компоненты, нейромедиаторы, вызывающий тревогу, необходимый для жизни.

Exercise 5. Read the definition and guess the word.

1. _____ – very great, huge;

2. _____ – to expel or secrete some substance;

3. _____ – an adjective used when you are emphasizing that the whole of something is involved;

4. _____ – the state of continuing to live or exist, often despite difficulty or danger;

5. _____ – a small round mass of a substance, especially food that has been chewed to make it soft before it is swallowed;

6. _____ – one of the main divisions of the autonomic nervous system (ANS) governs the function of the gastrointestinal tract.

7. _____ – the liquid that is produced in your mouth that helps you to swallow food;

8. _____ – the process of a substance breaking into the parts of which it is made.

Exercise 6. Complete the table, make nouns from the given verbs and translate them into Russian.

VERB	NOUN	TRANSLATION
to identify		
to swallow		
to break down		
torelease		
tooccur		
to survive		
to absorb		
to widen		
to experience		

Exercise 7. Fill in the gaps in the sentences using the words given below. Use the words in the appropriate form.

Without a second thought, identify first-hand knowledge, swallow, experience, windpipe, break down, chew, complex procedure, breakdown.

1. Every user who calls must … their license number.
2. Let's … carefully because I'm missing an earring.
3. My wife hands me pills, I … them.
4. If he had a bagel stuck in his …, I would have seen it on the echo.
5. Micro-organisms … the waste into healthy organic peat.
6. Doctors thought it would cause anything from a nervous … to blindness.
7. They also gained …of selected projects and had the opportunity to network with their peers.
8. Polluting the world … while it goes down the toilet.
9. The doctor said that it's a difficult and ….
10. You'll … increasingly severe visual hallucinations, paranoia, delusions.

Exercise 8. Make up verb phrases. Write down your own sentences using the phrases.

1) without	a) of water
2) take	b) provoking
3) made up	c) knowledge
4) take	d) a second thought
5) first-hand	e) place
6) anxiety	f) care of

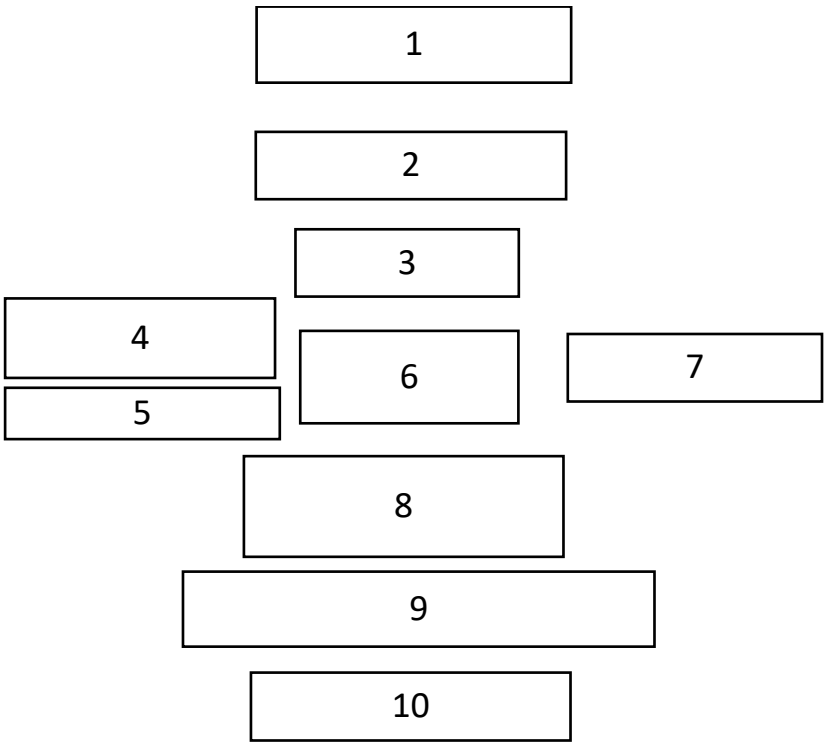
COMPREHENSION AND DISCUSSIONEXERCISES

Exercise 9. Answer the questions.

1. Why is it important to know about your digestive health?
2. How long is the digestive tract?
3. How much saliva is produced during a day?
4. What is saliva made of?
5. How much time does it take food to pass through the esophagus?
6. What is the most important function of the liver and pancreas in digestion?
7. What are the parts of the small intestine?
8. What is the main function of the small intestine?
9. Which part of the nervous system regulates the digestion?
10. Why is it important for the brain and intestine to work together?

Exercise 10. Complete the diagram.

Pathway of food through the digestive system



Write down your answers below:

1) _____;

2) _____;

3) _____;

4) _____;

5) _____;

6) _____;

7) _____;

8) _____;

9) _____;

10) _____;

Exercise 11. Translate the following sentences from Russian into English.

1. Мы, как правило, упускаем это из виду и кладем в него всякие вещи без лишних раздумий.

2. Слюна в наших слюнных железах – первый шаг в пищеварении.

3. Печень вырабатывает желчь, которая хранится в желчном пузыре.

4. Тонкая кишка состоит из трех частей: двенадцатиперстной, тощей и подвздошной кишки.

5. Ваш мозг и пищеварительная система работают в тесном сотрудничестве.

Exercise 12. Choose one of the facts from the article to make a report and present it in front of the class.

1. The functions of the digestive glands.

2. Intestine as a second brain.

3. The functions of the small intestine.

Exercise 13. Render the article. Follow the plan. See page 181.

UNIT 4. Blood. Circulation.

PRE-READING

Exercise 1. Study the vocabulary before you read the text.

Professional terms

- hematologist /ˌhiːməˈtɒlədʒɪst/–гематолог
- blood clot /ˈblʌdklɒt/–тромб, сгусток крови
- range /reɪndʒ/–предел, объем
- complication /ˌkɒmplɪˈkeɪʃn/–осложнение
- platelets /ˈpleɪtlət/ –тромбоциты
- vitalrole/ˈvaɪtl/ – жизненно важная роль
- defense /dɪˈfens/–защита
- life cycle /ˈsaɪkl/–жизненный цикл
- primary care physician – лечащий врач-терапевт

Verbs

- to take into account – учитывать
- topropel/prəˈpel/– продвигаться, проходить
- toalert/əˈlɜːt/– предупреждать, сообщать
- to refer /rɪˈfɜː(r)/–направлять

Adjectives

- essential /ɪˈsenʃl/–необходимый
- cellular /ˈseljələ(r)/ –клеточный
- incompatible /ˌɪnkəmˈpætəbl/ –несовместимый
- concave /kɒnˈkeɪv/–вогнутый

- pale /peɪl/–бледный

Exercise 2. Before reading the text, answer the following questions and discuss them with your partner.

1) What are the main contents of blood?

2) How many liters of blood are there in the human body?

TEXT

Exercise 3. Read, translate the article and be ready to do the exercises.

How does blood work, and what problems occur?

Blood is a combination of plasma and cells that circulate through the entire body. It is a specialized bodily fluid that supplies essential substances around the body, such as sugars, oxygen, and hormones. It also removes waste from the cells in the body.

Hematologists work to identify and prevent blood and bone marrow diseases, as well as studying and treating the immune system, blood clotting, and the veins and arteries.

Fast factsonblood

- Blood transports oxygen and nutrients around the body and removes cellular waste, among a range of other vital functions.
- Plasma makes up 55 percent of blood content. The other 45 percent consists mainly of red blood cells and platelets.
- Blood groups are categorized based on the antibodies and antigens in the cell. Receiving an incompatible blood donation can lead to fatal complications.
- Anemia, blood cancer, and clots are all potential disorders of the blood.

Structure

Blood consists of plasma, red and white blood cells, and platelets.

Plasma: This constitutes approximately 55 percent of blood fluid in humans.

Plasma is 92 percent water, and the contents of the remaining 8 percent include:

- carbondioxide
- glucose
- hormones
- proteins
- mineralsalts
- fats
- vitamins

The remaining 45 percent of the blood mainly consists of red and white blood cells and platelets. Each of these has a vital role to play in keeping the blood functioning effectively.

Red blood cells (RBCs), or erythrocytes: They are shaped like slightly concave, flattened disks and transport oxygen to and from the lungs. Hemoglobin is a protein that contains iron and retains the oxygen until its destination. The life span of an RBC is 4 months, and the body replaces them regularly. Amazingly, our body produces around 2 million blood cells every second.

White blood cells, or leukocytes: White blood cells make up less than 1 percent of blood content, and they form vital defenses against disease and infection. The normal range of the number of white blood cells in a microliter of blood is between 3,700 and 10,500. Higher and lower levels of white blood cells can indicate disease.

Platelets, or thrombocytes: These interact with clotting proteins to prevent or stop bleeding. There should be between 150,000 and 400,000 platelets per microliter of blood.

RBCs, white blood cells, and platelets are produced in the bone marrow before entering the bloodstream. Plasma is mostly water that is absorbed from ingested food

and drink by the intestines. Combined, these are propelled around the entire body by the heart and carried by the blood vessels.

Functions

Blood has a number of functions that are central to survival, including:

- supplying oxygen to cells and tissues
- providing essential nutrients to cells, such as amino acids, fatty acids, and glucose
- removing waste materials, such as carbon dioxide, urea, and lactic acid
- protecting the body from infection and foreign bodies through the white blood cells
- transporting hormones from one part of the body to another, transmitting messages, and completing important processes
- regulating acidity (pH) levels and body temperature

Another important function of the blood is its protective action against disease. White blood cells defend the body against infections, foreign materials, and abnormal cells.

Groups

Blood groups are defined by the antibodies and antigens in red blood cells.

Blood groups categorize blood based on the presence and absence of certain antibodies. The groupings also take into account antigens on the surface of the blood cells.

Antibodies are proteins in plasma that alert the immune system to the presence of potentially harmful foreign substances. The immune system will attack the threat of disease or infection. Antigens are protein molecules on the surface of red blood cells.

RBCs sometimes contain another antigen called RhD. This is also noted as part of the blood group. A positive blood group means that RhD is present.

Humans can have one of four main blood groups. Each of these groups can be Rhd positive or negative, forming eight main categories.

- Group A positive or A negative: A antigens are found on the surfaces of blood cells. Anti-B antibodies are found in the plasma.
- Group B positive or B negative: B antigens are found on the surfaces of blood cells. Anti-A antibodies are found in the plasma.
- Group AB positive or AB negative: A and B antigens are found on the surfaces of blood cells. There are no antibodies foundin the plasma.
- Group O positive and O negative: There are no antigens are found on the surfaces of blood cells. Both anti-B and anti-A antibodies are found in the plasma.

Disorders

The most common blood disorders are:

- *Anemia*: This is a shortage of RBC or hemoglibin in the blood. As a result, the cells do not transport oxygen effectively, and symptoms can include fatigue and pale skin.
- *Blood clots*: These can be vital for the healing process of wounds and injuries. However, some clots coagulate inside a blood vessel and create a blockage. Clots can be fatal.
- *Blood cancers*: Leukemia, myeloma, and lymphoma are types of blood cancer. Mutated blood cells divide uncontrollably without dying at the normal point in the life cycle of a cell.

If symptoms of a blood disorder are suspected, the patient should visit a primary care physician. It is likely that they will be referred to a specialist in blood disorders, known as a hematologist.

(Retrieved from: https://www.medicalnewstoday.com/articles/196001)

VOCABULARY EXERCISES

Exercise 4. Give as many synonyms as you can for the following words. Use a dictionary.

entire –

identify –

incompatible –

transports –

retains –

indicate –

essential –

disorder –

Exercise 5. Complete the table. Guess the word or give the definition were necessary.

1)	a very small part of a cell in the blood, like a disc in shape. It helps to clot the blood from a cut or wound.
2) life cycle	
3)	a thick, almost solid mass that is formed when blood dries or becomes thicker
4) complication	
5)	curvingin
6) pale	
7)	connected with or consisting of the cells of plants or animals
8) defense	

9)	to warn somebody about a dangerous situation or one that requires immediate action
10) primary care physician	

Exercise 6. Give English equivalents.

Заболевания костного мозга, клеточные отходы, переливание, несовместимая кровь, образовывать жизненную защиту, составлять примерно 55%, инородные материалы, дефицит эритроцитов, процесс заживления ран, заболевания крови.

Exercise 7. Fill in the gaps in the sentences using the words given below. Use the words in the appropriate form.

Blood clot, cellular, platelets, incompatible, vital role, survival, take into account, life cycle, primary care physician.

1. …and GPs are trained at State education centers.
2. Her …structure's unlike anything I've ever seen.
3. The scientific and technological communities play a … in diagnosing problems and developing response options.
4. Training programs should … … … their age-related needs and constraints.
5. While I was repairing the abdominal wall, a … formed in the left ventricle.
6. Transfusing his … will keep him healthy while we wait.
7. According to this, bugs have a very short ….
8. This legend is … with the historical facts.
9. These genes regulate cell growth and … .

Exercise 8. Complete the table with the appropriate word forms.

Noun	Verb	Adjective	Adverb
defense			
	refer		
		alert	
combination			
	constitute		
			approximately
effect			
		protective	

COMPREHENSION AND DISCUSSIONEXERCISES

Exercise 9. Answer the questions.

1) What does blood consist of?

2) What are the contents of blood plasma?

3) What is the main function of hemoglobin?

4) What is the average life span of the RBC?

5) Where are all blood cells produced?

6) Name 5 main things your blood does for your body.

7) What are the blood groups categorized by?

8) What are the main blood groups? How do they differ?

9) What are the most common blood disorders?

10) How is the specialist working with blood disorders called?

Exercise 10. Say whether the statements are true or false. Give reasons.

1. 55% of blood is plasma and the other 45% consists of red blood cells and platelets.

2. If a patient receives incompatible blood in transfusion in can cause allergy.

3. Plasma contains 8% water.

4. Hemoglobin is a protein that contains carbon dioxide and oxidizes blood.

5. The main function of leucocytes is to protect the body from infections.

6. Blood transports hormones throughout the body.

7. The shortage of red blood cells or hemoglobin leads to blood clots.

8. Antibodies are proteins in plasma and antigens are proteins on the surface of the RBC.

Exercise 11. Translate the sentences into English.

1. Гематологи занимаются выявлением и профилактикой заболеваний крови и костного мозга.

2. Анемия, рак крови и тромбы–все это потенциальные заболевания крови.

3. Удивительно, но наше тело производит около 2 миллионов клеток крови в секунду.

4. Плазма –это в основном вода, поступившая с пищей и питьём через кишечник.

5. Иммунная система атакует инфекции и другие угрозы здоровью.

Exercise 12. Match the blood type with the description

Blood type	***Antigens and Antibodies***
A	**B antigens** on the surfaces of blood cells. **Anti-A antibodies** in the plasma.
B	**No antigens.** **Anti-B and anti-A antibodies** in the plasma.

AB	**A antigens** on the surfaces of blood cells. **Anti-B antibodies** in the plasma.
O	**A and B antigens** on the surfaces of blood cells. **No antibodies.**

Exercise 13. Render the article. Follow the plan. See page 181.

UNIT 5. Endocrine system.

PRE-READING

Exercise 1. Study the vocabulary before you read the text.

Professional terms

- satiety /səˈtaɪəti/ – сытость, насыщение
- genetic predispositions /ˌpriːdɪspəˈzɪʃn/ – генетическая предрасположенность
- mental sharpness /ˈʃɑːpnəs/ – острота ума
- adipose tissue /ˈædɪpəʊz/ /ˈtɪʃuː/ – жировая ткань
- lean proteins – постные белки
- fuel /ˈfjuːəl/ – топливо

Verbs

- to throw smth out of whack – вывести из строя, перевернуть с ног на голову
- to compromise/ˈkɒmprəmaɪz/ – негативно сказаться на
- to starve /stɑːv/ –голодать
- to suspect /səˈspekt/ – подозревать

Adjectives

- long-term /ˌlɒŋ ˈtɜːm/ – долгосрочный

Exercise 2. Before reading the article, answer the following questions and discuss them with your partner.

1) How do hormones affect your body?

2) What kind of hormones control your metabolism?

3) What kind of hormones control your appetite?

TEXT

Exercise 3. Read, translate the article and be ready to do the exercises.

How Your Hunger Hormones Control Weight Loss

And what you can do right now to get them back under control

Leptin and ghrelin sound like they could be names from *Lord of the Rings*. But they are actually hormones that regulate your feelings of hunger and satiety.

Ghrelin is released by your stomach when it is empty, signalling your brain that it is time to eat. Ghrelin is fast-acting and should decrease dramatically when you are full. It is at its highest right before you eat, and its lowest about an hour after a meal.

Leptin, on the other hand, means "thin" in Greek, and lets you know when it is time to stop eating. It is a hormone released by your fat cells that tells your brain when your body has had enough fuel and can start burning fat to create energy. It is a longer-term energy balancing hormone and is thought to be the more significant hormone out of the two in terms of appetite, energy production, weight gain and weight loss.

"In a perfectly working body, ghrelin tells us to eat so we don't die of starvation, and leptin tells us when to stop," says Dr. Michelle Sands, hormone, metabolism and epigenetics expert. Unfortunately, hormones aren't always in such perfect balance. Obesity, genetic predispositions or health conditions, diet, sleep and lifestyle can throw our hunger and satiety out of whack, as well as compromise how efficiently our hunger hormones function. The good news is, there are many

modifications you can make to get your leptin and ghrelin levels back to where you'd like them to be.

What Is Leptin?

Leptin is a hormone that lets you know when you've had enough food. It decreases your appetite, and signals your body that it is OK to start burning fat for energy. It is released by fat cells into your blood stream to let the hypothalamus, a part of your brain, know your body has enough energy stores in the form of body fat, and that you don't need to eat anymore and can start making energy out of stored food.

"Leptin is a bigger player than ghrelin when it comes to weight gain and energy balance," Dr. Sands says. "It's closely tied to your thyroid and brain. When leptin is working well, we have a better metabolic rate, mood regulation, memory, brain function, mental sharpness. When it's no, it can play a role in obesity, mood swings, and brain fog. A lot of symptoms we attribute to low thyroid can also be leptin resistance."

What Is Leptin Resistance?

Because leptin is created your fat cells, people who have more adipose tissue tend to have higher leptin levels circulating in their bodies. As result of this constant high exposure to leptin, they can build up a resistance to it as well as its appetite-suppressing effects. This can cause the brain to think that you still need more food, or are starving, and keep sending you messages to eat after it should stop.

How Can I Treat Leptin Resistance?

Leptin resistance can also be caused by consistently high insulin levels or an inflamed hypothalamus.

"But there's a lot you can do to reduce leptin resistance," Dr. Sands says. Some dietary and lifestyle remedies for leptin resistance include:

- Consuming healthy fats such as olive oil, avocado, coconut, fish and grass-fed, pasture-raised animals.

- Eliminating added sugar from your diet.
- Getting at least eight hours of sleep. Studies show that getting 8 to 10 hours of quality sleep a night, as opposed to seven or fewer, results in better leptin sensitivity, reduced cravings and a better balance of hunger and energy balancing hormones.
- Getting adequate exercise. The National Institute of Health (NIH) reports that moderate aerobic exercise can improve leptin resistance in people with diabetes and obesity.

What Is Ghrelin?

Ghrelin is a hormone that increases appetite. It is released by your stomach, and travels through your blood to signal to your hypothalamus that your body is in need of fuel, as well as to conserve energy and find food.

How Can I Optimize My Ghrelin Functioning?

Studies say that in people with obesity, ghrelin decreases only slightly after eating, which can lead the brain to think more food is needed and lead to overeating. Strategies to help improve ghrelin functioning include:

- Avoiding sugar and high-fructose corn syrup, which can fail ghrelin's decline after eating.
- Eating plenty of healthy carbs such as whole grains, as well as lean proteins like chicken, fish, and tofu. These foods can decrease ghrelin levels and keep you feeling fuller longer.
- Once again, getting enough sleep!
- Staying well-hydrated.

If you suspect your hunger hormones aren't working optimally, it's also a good idea to make an appointment with an endocrinologist to discuss your health, diet, lifestyle, genetic factors and determine the right treatments to get you back to feeling your best.

(Retrieved from: https://www.endocrineweb.com/news/63844-how-hunger-hormones-control-weight-loss)

VOCABULARY EXERCISES

Exercise 4. Give Russian equivalents.

Fast-acting, energy balancing, weight gain, weight loss, epigenetics, decreases your appetite, closely tied, exposure, consistently high insulin levels, cravings, genetic factors.

Exercise 5. Give English equivalents.

Голод и насыщение, вырабатываться желудком, долгосрочный гормон, балансирующий энергию, могут вывести баланс голода и насыщения из строя, запасы энергии, высокий уровень инсулина, качественный сон, полезные углеводы, цельные зерна, записаться на прием.

Exercise 5. Read the definition and guess the word.

1. _____ –used for storing fat;
2. _____ – lasting or having an effect over a long period of time;
3. _____ – a condition that makes somebody/something likely to behave in a particular way or to suffer from a particular disease especially genetic;
4. _____ – the state or feeling of being completely full of food, or of having had enough of something;
5. _____ – a small organ at the front of the neck that produces hormones that control the way in which the body grows and functions;
6. _____ – to have an idea that something is probably true or likely to happen, especially something bad;
7. _____ – lack of success in doing or achieving something;

8. _____ –a kind of proteins including such products as tofu, fish, turkey etc.

Exercise 6. Complete the table with the appropriate word forms.

VERB	NOUN	TRANSLATION
to starve		
to resist		
to inflame		
to consume		
to increase		
to conserve		
to treat		

Exercise 7. Fill in the gaps in the sentences using the words given below. Use the words in the appropriate form.

Healthy carbs, satiety, quality sleep, long-term, adipose tissue, genetic predisposition, starving, make an appointment.

1. Sounds like we better find this Dr. Chandler and ….
2. Farming yields … and root vegetables, while the forest can provide protein, green leaves, vitamins and minerals.
3. Massage acts on … indirectly via general effect on metabolism.
4. Dominique is …, and she doesn't eat carbs or dairy.
5. To succeed, any … strategy must place people at the centre.
6. What about a … to an autoimmune disease?
7. Adding dietary fiber to foods and beverages increases … and reduces energy intake at the next meal.

8. If you have … , it increases your concentration, attention, decision-making, creativity, social skills, health.

Exercise 8. Arrange the words so as to make sentences.

1) longer-term / balancing / a / leptin / is / hormone / energy.

2) it / appetite / decreases, / and / fat / signals / burn / your / body / your / that / it / energy / is / time / to / for.

3) leptin /inflamed / resistance / also / be / hypothalamus / caused / can / by / an.

4) Doctors / obesity / say/ moderate / resistance / exercise / can / leptin / in / that / people /aerobic / with / diabetes / and / improve.

5) is / a / appetite / hormone / that /ghrelin / increases.

6) foods / can / ghrelin / these / levels / decrease /feeling / longer / and / keep / you / fuller.

7) to / help / include / improve / functioning / strategies / ghrelin

8) cause / this / can / the / think / brain / to / that / more / you / still / food / need

COMPREHENSION AND DISCUSSIONEXERCISES

Exercise 9. Answer the questions.

1. What are the main hunger hormones?
2. What is the main function of ghrelin?
3. What is the main function of leptin?
4. Which of these two hormones is more important in hunger management?
5. What is leptin resistance?
6. What are some methods of the leptin resistance treatment?
7. What can you do to optimize ghrelin production in your body?
8. What should you do if you suspect hunger hormones imbalance?

Exercise 10. Match the hormones with their characteristics and functions. Sometimes both options are possible.

Leptin	1) It controls the feeling of satiety
	2) It controls the feeling of hunger
	3) It is released highly before you eat
	4) It sends signals to the brain when it's time to make create energy from food
	5) It tells our brain when to stop eating
Ghrelin	6) It increases appetite
	7) It is released by the stomach
	8) It is released by fat cells
	9) It is closely connected with the thyroid gland
	10) It travels through the blood to hypothalamus

Exercise 11. Translate the following sentences into English.

1. Потребление полезных жиров, таких как оливковое масло, авокадо, кокос, рыба способствуют снижению лептинорезистентности.

2. Это гормон, который вырабатывается жировыми клетками.

3. Если это генетическая предрасположенность, у Анжелики развился определенный ген?

4. Чувство насыщения зависит от объема пищи, а не от ее типа.

5. Ожирение, генетическая предрасположенность или состояние здоровья, питание, сон и образ жизни могут нарушить баланс голода и насыщения.

Exercise 12. Choose one of the topics to make a report and present it in front of the class.

1.Leptin resistance. Reasons and treatment.

2. Leptin and ghrelin balance.

3. What is ghrelin and how to keep it functioning properly.

Exercise 13. Render the article. Follow the plan. See page 181.

UNIT 6. Pharmacy.

PRE-READING

Exercise 1. Study the vocabulary before reading the text.

Professional terms

- pharmacy /ˈfɑːməsi/ – фармация
- pharmacist /ˈfɑːməsɪst/ – фармацевт
- primary health professional – специалист первичного медицинского звена
- medication /ˌmedɪˈkeɪʃn/ – лекарство
- drugtherapy /drʌg ˈθerəpi/ – медикаментозное лечение
- pharmaceutics /ˌfɑːməˈsjuːtɪks/ – фармацевтика
- medicinal chemistry /məˈdɪsɪnlˈkemɪstri/ – химия лекарств
- pharmacognosy /ˌfɑːməˈkɒgnəsi/ – фармакогнозия

- dosage form /ˈdəʊsɪdʒ/ – форма дозировки, лекарственная форма
- property /ˈprɒpəti/ – свойство; имущество, собственность
- prescription (fordrugs) /prɪˈskrɪpʃn/ – рецепт, предписание

on prescription (BrE) – по рецепту

by prescription (AmE) – по рецепту

Verbs

- compound /ˈkɒmpaʊnd/ – смешивать, составлять соединение
- dispense /dɪˈspens/ – отпускать препараты по рецепту

Adjectives

- medicinal /məˈdɪsɪnl/ – лекарственный; целебный
- therapeutic /ˌθerəˈpjuːtɪk/ – лечебный; терапевтический

Exercise 2. Before reading the text, answer the following questions and discuss them with your partner.

1. What is pharmacy?
2. What does pharmacy include?
3. Is pharmacy the same as pharmacology?

TEXT

Exercise 3. Read, translate the text and be ready to do the exercises.

What is pharmacy

Pharmacy is the study of preparing and dispensing drugs. Also pharmacy is the location for preparing and dispensing drugs.

Pharmacy (from the Greek φάρμακον = drug) is the health profession that links the health sciences with the chemical sciences. The scope of pharmacy practice includes more traditional roles such as compounding and dispensing medications, and it also includes more modern services related to patient care, including clinical services, reviewing medications for safety and efficacy, and providing drug

information. Pharmacists, therefore, are experts on drug therapy and are the primary health professionals who optimize medication use to provide patients with positive health outcomes.

The field of Pharmacy can generally be divided into three primary disciplines: (1) Pharmaceutics, (2) Medicinal chemistry and Pharmacognosy, (3) Pharmacy practice.

Pharmaceutics is the discipline of pharmacy that deals with dosage form design. Pharmaceutics deals with the formulation of a pure drug substance into a dosage form.

Medicinal or pharmaceutical chemistry is a scientific discipline at the intersection of chemistry and pharmacology involved with designing, synthesizing and developing pharmaceutical drugs. Medicinal chemistry involves the identification, synthesis and development of new chemical entities suitable for therapeutic use. It also includes the study of existing drugs, their biological properties, and their quantitative structure-activity relationships (QSAR). Pharmaceutical chemistry is focused on quality aspects of medicines and aims to assure fitness for the purpose of medicinal products. Medicinal chemistry is a highly interdisciplinary science combining organic chemistry with biochemistry, computational chemistry, pharmacology, pharmacognosy, molecular biology, statistics, and physical chemistry.

Pharmacognosy is the study of medicines from natural sources. It is the study of the physical, chemical, biochemical and biological properties of drugs, drug substances or potential drugs or drug substances of natural origin as well as the search for new drugs from natural sources.

Pharmacy practice is the discipline of pharmacy which involves developing the professional roles of pharmacists.

The boundaries between these disciplines and with other sciences, such as biochemistry, are not always clear-cut; and often, collaborative teams from various disciplines research together.

Pharmacy is the science and art concerned with the preparation and standardization of drugs. Its scope includes the cultivation of plants that are used as drugs, the synthesis of chemical compounds of medicinal value, and the analysis of medicinal agents. Pharmacists are responsible for the preparation of the dosage forms of drugs, such as tablets, capsules, and sterile solutions for injection. They compound physicians', dentists', and veterinarians' prescriptions for drugs. The science that embraces knowledge of drugs with special reference to the mechanism of their action in the treatment of disease is pharmacology.

Pharmacology is sometimes considered a fourth discipline of pharmacy. Pharmacology is the study of how drugs interact with living organisms to produce a change in function. Pharmacology is not synonymous with pharmacy, though in common usage the two are at times confused. Pharmacology deals with how drugs interact within biological systems to affect function, while pharmacy is a medical science concerned with the safe and effective use of medicines.

(Retrieved from https://www.britannica.com/science/pharmacyand https://www.chemeurope.com/en/encyclopedia/Pharmacy.html#Pharmacists)

VOCABULARY EXERCISES

Exercise 4. Give Russian equivalents.

The scope of pharmacy, compounding and dispensing medications, patient care, providing drug information, chemical entity, medicines from natural sources, the synthesis of chemical compounds, drugs interact within biological systems.

Exercise 5. Give English equivalents.

Безопасность и эффективность, медикаментозное лечение (лекарственная терапия), на стыке химии и фармакологии, междисциплинарная наука, свойства лекарств, стерильный раствор.

Exercise 6. Match the words with their definitions.

dispense	prescription
interact	property
medicinal	therapeutic
pharmacist	solution

1. helping to treat an illness
2. helpful in the process of curing illness or infection
3. a quality or characteristic of something
4. an official piece of paper on which a doctor writes the details of the medicine or drugs that someone needs
5. 1) a liquid in which other substances have been mixed and dissolved; 2) the answer to a problem
6. to prepare medicine and give it to people, as a job
7. to communicate with or react to each other
8. a person whose job is to prepare medicines and sell or give them to the public in a shop or in a hospital

Exercise 7. Make up phrases.

Verb	Noun
1. link	a) medications
2. compound/ dispense	b) drug information
3. synthesize/ develop	c) for safety and efficacy
4. review	d) dosage form

5. provide	e) the health sciences with the chemical sciences
6. deal with	f) pharmaceutical drugs
Adjective	**Noun**
7. primary	g) use
8. medicinal	h) entity/ compound
9. drug	i) disciplines/ health professionals
10.therapeutic/ medication	j) chemistry/ properties/ products
11. chemical	k) sources
12. natural	l) therapy

Exercise 8. Study the derivatives of words and translate them.

pharmacy – pharmaceutical – pharmaceuticals – pharmaceutics – pharmacology – pharmacognosy – pharmacist

therapy – therapeutic – therapist

medicine – medical – medicinal

to synthesize – synthesized – synthesizing – synthesis

to develop – developed – developing – development

to compound – compounded – compound (adj) – compound (noun)

to save – saved – saving – safe – safety

to effect – effective – efficacy

to solve – dissolve – solved – solving – solvent – solution

to use – used – unused (drugs) – using – useful – use – usage

to dose – dosed – dosing – dose – dosage

to prescribe – prescribed – prescribing – prescription

Exercise 9. Complete the sentences with the appropriate form of the words from exercise 8.

1. Water is a universal … .
2. These drugs can sometimes … miraculous cures.
3. I always take my daily … of vitamin C.
4. Common salt is a … of sodium and chlorine.
5. There are recommendations about … in elderly patients.
6. The researchers … the chemical compound in England in 1874.
7. Antibiotics are only available on (by) … .
8. For your …, before taking medications, we recommend you to consult your doctor first.
9. Hydrochloric acid is a … of hydrogen and chlorine.
10. It is important to evaluate the … and safety of the treatment.
11. The British … company AstraZeneca employs about 5,000 people in the town.
12. A … will never dispense a prescription unless they know it is genuine.

COMPREHENSION AND DISCUSSION EXERCISES

Exercise 10. Say whether the statements are true or false. Give reasons.

1. The word pharmacy is of Greek origin.
2. Pharmacy is the theoretical science.
3. Pharmacy unites medical sciences with chemistry.
4. Dispensing medications involves preparation of drugs.
5. Pharmacognosy deals with dosage forms.
6. A dosage form is a pure drug substance.
7. Pharmacy is the health science that studies the use of drugs in biological systems.
8. The field of Pharmacy is divided into five primary disciplines.
9. Pharmacists are the experts in drug therapy.

10. The boundaries between pharmacy disciplines are clear-cut.

Exercise 11. Match the branches of pharmacy with their scope of action.

Pharmaceutics	studies/ deals with	how drugs interact with biochemicals, and how drugs are discovered and created
Medicinal chemistry		dispensing medication correctly, deals with patients to optimize drug therapy
Pharmacognosy		how drugs dosage forms are made
Pharmacy practice		how drugs interact with biological systems. This field encompasses pharmacokinetics and pharmacodynamics. It is highly interdisciplinary.
Pharmacology		drugs derived from natural sources

Exercise 12. Study the idioms and sayings in English. Translate them or try to find a similar idiom in Russian. Make up situations to illustrate them.

1. A dose of your own medicine – the same bad treatment that you have given to others.
2. In small doses – for short periods of time.
3. Like a dose of salts – very fast and easily.
4. All the problems have solutions at the back of the book.
5. Safety first – safety is the most important thing.

Exercise 13. Fill in the gaps with the words.

chemist's	drugs
compounded	medication
dispensed	pharmacists
dispensing	physicians

therapy safety

1. Pharmacy is the science about … and medicine.
2. … are people who prepare the medicines under the recipe of the doctor and sell to sick people.
3. Traditionally, pharmacists … and … medications on the orders of … .
4. More recently, pharmacy has come to include other services related to patient care including clinical practice, … review, and drug information.
5. Pharmacists are experts in drug … .
6. An establishment in which pharmacy (in the first sense) is practiced is called a pharmacy (this term is more common in the United States) or a … (which is more common in Great Britain, though pharmacy is also used).
7. The role of pharmacy is changing, with a particular focus on the shift from … and supply towards services that help people to get the most from their medicines and stay well.
8. There is a stronger focus on assuring and improving the quality of care – all health care providers must get better at finding out what patients want and need, and delivering this with … , consistency and compassion.

Exercise 14. Give information on the given issues using the following words and word combination.

1. Pharmacy as a science:

links the health sciences with the chemical sciences; compounding and dispensing medications; medications for safety and efficacy; optimize medication use; preparation and standardization of drugs.

2. Pharmacy and its components:

dosage form; designing, synthesizing and developing pharmaceutical drugs; properties; medicines from natural sources; interact.

Exercise 15. Choose one of the topics to make a report and present it in front of the class.

1. Pharmacy as an interaction of health science and chemical sciences.
2. Pharmaceutics.
3. Pharmacognosy.
4. Pharmacology.
5. The work of a pharmacist.

Exercise 16. Render the article. Follow the plan. See page 181.

UNIT 7. Types of medication. Drug administration.

PRE-READING

Exercise 1. Study the vocabulary before reading the text.

Professional terms

- Food and Drug Administration (FDA) – Служба государственного надзора за качеством продуктов питания и лекарственных средств
- expiration date /ˌekspəˈreɪʃndeɪt/ – дата истечения срока годности
- manufacture date /ˌmænjəˈfæktʃərdeɪt/ – дата изготовления
- shelflife /ˈʃelflaɪf/ – срок годности
- full potency – активность лекарственного средства
- stash (ofdrugs) /stæʃ/ – тайный запас
- EpiPen /ˈepipen/ – автоинъектор эпинефрина
- drug'sefficacy /ˈefɪkəsi/ – эффективность действующего вещества
- financial incentive /faɪˈnænʃəl ɪnˈsentɪv/ – денежное поощрение, финансовый стимул
- insurer /ɪnˈʃʊərə(r)/ – страховая компания

- stockpile (of medications) /ˈstɒkpaɪl/ – запас, резерв
- disease outbreak /ˈaʊtbreɪk/ – вспышка эпидемии
- ibuprofen /ˌaɪbjuːˈprəʊfen/– ибупрофен
- insulin /ˈɪnsjəlɪn/-BrE /ˈɪnsəlɪn/-AmE – инсулин
- nitroglycerin /ˌnaɪtrəʊˈglɪsərɪn/ – нитроглицерин
- antibiotic /ˌæntibaɪˈɒtɪk/ – антибиотик
- antibiotic resistance /rɪˈzɪstəns/ – устойчивость к антибиотику
- antihistamines /ˌæntiˈhɪstəmiːn/ – антигистаминовые (антигистаминные) препараты
- painreliever /ˈpeɪnrɪˌliːvər/– болеутоляющее средство
- dietpills /ˈdaɪət ˌpɪl/ / – таблетки для похудения

Verbs

- expire /ɪkˈspaɪə(r)/ – истекать, заканчиваться
- require /rɪˈkwaɪə(r)/ – /rɪˈkwaɪə(r)/
- guarantee /ˌgærənˈtiː/ – гарантировать
- retain /rɪˈteɪn/ – сохранять, удерживать
- remain + adj /rɪˈmeɪn/ – оставаться
- degrade /dɪˈgreɪd/ – ухудшаться, разлагаться
- prevent abuse /prɪˈvent əˈbjuːs/ – предотвратить злоупотребление

Adjectives

- expired medication – просроченное лекарство
- over-the-counter medicine /ˌəʊvə ðə ˈkaʊntə(r)/ (abbr. OTC)– безрецептурное лекарственное средство
- prescription medicine – рецептурное лекарственное средство
- active ingredients – действующее вещество

• peer-reviewed /ˌpɪərrɪˈvjuːd/ – рецензируемый, направляемый на экспертную оценку

Exercise 2. Before reading the text, answer the following questions and discuss them with your partner.

1. Do all medications have expiration dates?
2. Do medications remain effective after the expiration date?
3. Can we use expired medications?
4. What is the shelf life of a medication?

TEXT

Exercise 3. Read, translate the text and be ready to do the exercises.

Does Medicine Really Expire?

Ever since 1979, the U.S. Food and Drug Administration (FDA) has required that pharmaceutical companies put expiration dates on prescription and over-the-counter medicines.

That doesn't mean your bottle of ibuprofen will go bad in the same way as, say, an expired carton of milk. The date that you see printed on a pill bottle is the date until which the medicine's manufacturer will guarantee the drug's safety and full potency. How long a drug actually remains safe and effective, however, is often a matter of debate.

Besides some medicines like insulin, nitroglycerin and liquid antibiotics, whose active ingredients are known to be less stable over time, many drugs might have a much longer shelf life than their packaging suggests.

But not everyone knows that, so poison control centers occasionally get calls from people who are concerned because they accidentally took expired medication, said Lee Cantrell, director of the San Diego Division of the California Poison Control System.

“The last time I checked, I haven’t seen any peer-reviewed documentation of expired medicine causing any problems in people,” Cantrell told Live Science. The effectiveness of medicines, however, may degrade over time, but there are few studies on the issue, he said.

That said, several years ago, Cantrell had a rare opportunity to examine an old stash of drugs — including antihistamines, pain relievers and diet pills — found in the back of a pharmacy.

“We found that those medications, some of them at least 40 years past their manufacture date, still retained full potency,” Cantrell said. That study was published in the journal JAMA Internal Medicine in 2012. Cantrell published another study in 2017 showing that EpiPens — the expensive auto-injectors used to treat life-threatening allergic reactions — retained 84 percent of their potency more than four years past their expiration dates, suggesting that in an emergency, an expired EpiPen would be better than nothing.

In Cantrell’s view, pharmaceutical companies are the only ones that have the money to do long-term studies on drug’s efficacy, “but there’s absolutely no financial incentive for them to do it.” (When the medicine you need expires, you, or your insurer, pay for more.)

The federal government, however, has a financial incentive to study the shelf life of drugs. The U.S. maintains a stockpile of medicines that could be needed in the case of an emergency like a terrorist attack or a disease outbreak. In 1986, the FDA and the U.S. Department of Defense started the Shelf-Life Extension Program (SLEP) to save on the costs of replacing expired drugs in this stockpile.

A SLEP study in 2006 tested 122 different drugs stored under ideal conditions, and as a result, extended the expiration date of a majority of the drugs in the stockpile by an average of about 4 years. In 2016, SLEP helped save $2.1 billion that would have been spent replacing expired drugs in the stockpile, the Department of Defense

reported, according to a ProPublica investigation. Even so, the FDA still strongly warns consumers against taking expired medicine.

“Certain expired medications are at risk of bacterial growth and sub-potent antibiotics can fail to treat infections, leading to more serious illnesses and antibiotic resistance,” the agency says on its website. Questions about specific expired medications are best directed toward your pharmacist or doctor.

The FDA also encourages people to bring their unused and expired meds to the National Prescription Drug Take-Back days, hosted by the U.S. Drug Enforcement Administration (DEA), in part to prevent abuse. The White House claims that in 2018 these events “shattered records” with nearly 3.7 million pounds of unused and expired prescription drugs recovered. But while the Trump administration might see a victory in that high number, others will surely see a massive amount of pharmaceutical waste.

(Retrieved from https://www.livescience.com/65052-why-do-medicines-have-expiration-dates.html)

_____

- Shelf-Life Extension Program – программа продления срока годности
- poison control center – токсикологический центр
- National Prescription Drug Take-Back – возврат национальных рецептурных лекарств
- U.S. Department of Defense – министерство обороны США
- U.S. Drug Enforcement Administration – агентство по борьбе с наркотиками. Администрация по контролю за соблюдением законов о лекарственных средствах

VOCABULARY EXERCISES

Exercise 4. Study the meaning of the words in the dictionary. Are they synonyms?

medicine

medication

drug

remedy

Exercise 5. Match the English and Russian equivalents.

1. pharmaceutical companies	a) упаковка
2. prescription medicines	b) фармацевтические отходы
3. over-the-counter medicines	c) подвергаемый риску
4. active ingredients	d) в экстренном случае
5. packaging	e) лекарства, хранимые в идеальных условиях
6. expired medicine	f) потребители
7. degrade over time	g) фармацевтические компании
8. life-threatening allergic reactions	h) действующее вещество
9. in an emergency	i) безрецептурные лекарственные средства
10. drugs stored under ideal conditions	j) просроченное лекарство, с истекшим сроком годности
11. consumers	k) рецептурные лекарственные средства
12. at risk	l) опасные для жизни аллергические реакции
13. fail to treat infections	m) устойчивость к антибиотику
14. pharmaceutical waste	n) не способны лечить инфекции
15. antibiotic resistance	o) ухудшаться со временем

Exercise 6. Find pairs of synonyms.

of verbs:

1.	to expire	a) to keep, to preserve, to store
2.	to require	b) to avoid, to stop
3.	to guarantee	c) to produce
4.	to retain	d) to end
5.	to prevent	e) to order; to need
6.	to manufacture	f) to promise, to make sure

of nouns:

7.	medication	g) reason, motivation
8.	efficacy	h) medicine, drug, remedy
9.	incentive	i) painkiller
10.	pain reliever	j) effectiveness

Exercise 7. Find pairs of antonyms.

1.	prescription drugs	a) not overdue
2.	expired	b) to change
3.	to degrade	c) over-the-counter medications
4.	to remain	d) to lose
5.	to retain	e) to become better, to improve

Exercise 8. Make up verb phrases.

1.	put/ extend	a) safe and effective
2.	guarantee	b) the shelf life of drugs
3.	remain	c) long-term studies on drug’s efficacy
4.	take	d) the drug’s safety and full potency
5.	retain	e) expiration dates
6.	do	f) full potency

7.	study	g) consumers
8.	warn	i) expired medication

Exercise 9. Match the words with their definitions.

EpiPen	outbreak
expiration date	antibiotic resistance
shelf life	insurer
over-the-counter medicines	drug's efficacy
stash (of drugs)	financial incentive
stockpile	

1. an amount of something that is kept secretly
2. a person or company that provides people with insurance
3. a small device used to give an injection of epinephrine in order to treat a severe allergic reaction
4. the ability of a medicine to produce the intended result
5. a sudden start of something, especially of a disease or something else dangerous or unpleasant
6. the last day on which a product or service can be used
7. something (money) that stimulates a person to do something
8. drugs that can be obtained without a prescription
9. a large supply of something that is kept to be used in the future if necessary
10. the length of time that food, etc. can be kept before it is too old to be sold; the length of time that something remains useful
11. the power not to be affected by antibiotics or something

Exercise 10. Complete the sentences choosing the appropriate variant.

1. Severe allergy sufferers are advised to carry an … at all times. (EpiPen / shelf life)

2. Discard foods after their … . (outbreak / expiration date)

3. The product has a guaranteed … of 60 days. (shelf life / stockpile)

4. You can buy most cold … remedies. (over the counter / resistance)

5. In the Middle Ages the … of cholera took millions of lives. (insurer / outbreak)

6. Many viruses develop … to drugs. (stash / resistance)

7. They have a … of weapons and ammunition that will last several months. (stockpile / expiration date)

8. They recently ran a series of tests to measure the … of the drug. (stash / efficacy)

9. The police discovered a large … of drugs. (stash / over the counter)

10. Please contact your … if you have any questions. (insurer / shelf life)

Exercise 11. Study the derivatives of words and translate them.

to expire – expired (medication) – expiring – expiration date

to manufacture – manufactured – manufacturing – manufacturer

to insure – insurance (e.g. life/health/medical/car/travel insurance) – insurer

to relieve (the pain) – relieved – relieving – relief – reliever

to require – required – requiring – requirement

to guarantee – guaranteed – guarantee

to stash – stash

to retain – retained – retaining – retention – retentive

to prevent – prevented – preventing – preventive – prevention

allergy – allergic (reaction)

Exercise 12. Complete the sentences with the appropriate form of the words from exercise 11.

1. Millions of Americans lack adequate health … .
2. I can … that you will enjoy the film.
3. This substance can … its properties after boiling and freezing.
4. The work of a surgeon will … total concentration.
5. In this hospital there are patients with special dietary … .
6. The … … on this yogurt was November 20.
7. My passport will … next month.
8. This company … the equipment used to make contact lenses.
9. The police were able to take … action and avoid a possible crime.
10. Vaccination will … the spread of the disease.
11. I like cats but unfortunately, I'm … to them.
12. He needed a place to … some cash.
13. Take pain … like aspirin and get lots of rest.

Exercise 13. Translate the sentences from Russian into English.

1. Доктор порекомендовал ему оставаться в постели в течение нескольких дней.

2. Это заболевание требует срочного лечения.

3. Бактерии вырабатывают устойчивость к антибиотикам.

4. Вакцинация предотвратит распространение болезни.

5. Свежие фрукты имеют очень короткий срок годности.

6. Со временем действующие вещества лекарств становятся менее стабильны.

7. Дата изготовления и дата истечения срока годности лекарств указаны на упаковке.

8. Большие дозы обезболивающих могут быть опасны для жизни.

9. Вы можете купить безрецептурные лекарства в аптеке.

10. Не принимайте просроченные лекарства.

COMPREHENSION AND DISCUSSION EXERCISES

Exercise 14. Say whether the statements are true or false. Give reasons.

1. Some drugs might have a much longer shelf life than their packaging suggests.
2. Expired medications don’t cause any problems in people.
3. The effectiveness of medicines doesn’t change over time.
4. An old stash of drugs showed that some medications can retain full potency even 40 years after their manufacture date.
5. Pharmaceutical companies do long-term studies on drug’s efficacy.
6. The Shelf-Life Extension Program extended the expiration date of a majority of the drugs in the stockpile by an average of about 10 years.

Exercise 15. Answer the questions.

1. Which US government department is responsible for making sure that food and drugs are safe to be sold?
2. Do prescription medications or over-the-counter medicines contain information about expiration dates on their packaging?
3. What is the expiration date?
4. What is the manufacture date?
5. What does the manufacturer guarantee by the expiration date?
6. Is it risky to take expired medications? Are consumers at risk?
7. Are expired EpiPens recommended in an emergency?
8. What is antibiotic resistance? What problems does it cause?

9. What is the purpose of the National Prescription Drug Take-Back days, hosted by the U.S. Drug Enforcement Administration?

Exercise 16. Look through the text and find out what these abbreviations stand for.

FDA

SLEP

OTC

DEA

Exercise 17. Match the type of medication with its effect.

antibiotic

anticoagulant

antidepressant

antihistamine

anti-inflammatory

antipyretic

antiviral

EpiPen

insulin

nitroglycerin

pain reliever (painkiller)

1. a drug used to treat diabetes mellitus
2. a drug that prevents blood clotting
3. a drug used to dilate coronary blood vessels
4. a drug that reduces pain
5. a drug used to treat allergies, especially hay fever
6. a small device used to give an injection of epinephrine in order to treat a severe allergic reaction
7. a drug used to reduce inflammation
8. a drug that relieves symptoms of depression
9. a drug that can destroy harmful bacteria in the body or limit their growth

10. a drug used to treat diseases caused by a virus

11. a drug used to reduce or prevent a high temperature

Exercise 18. Study the idioms and sayings in English. Translate them or try to find a similar idiom in Russian. Make up situations to illustrate them.

1. (choose, follow, take, etc.) the line/path of least resistance – (to choose, etc.) the easiest way of doing something.

2. remain aloof (stand/ keep aloof) – not to become involved in something; to show no interest in people. Stand aside.

   e.g. Angela remained aloof from her colleagues.

3. the fact remains – it is still true.

   e.g. I know you're sorry now, but the fact remains that you hit your sister.

Exercise 19. Choose one of the topics to make a report and present it in front of the class.

1. Utilization of unused and expired medications
2. Side effects of medications
3. Types of drugs
4. Administration of medications

Exercise 20. Render the article. Follow the plan. See page 181.

Part 2. Курс 2.

UNIT 8. Skeletal disorders.

PRE-READING

Exercise 1. Study the vocabulary before reading the text.

Professional terms

- adolescent /ˌædəˈlesnt/ – подросток, юноша
- cartilage /ˈkɑːtɪlɪdʒ/ – хрящ, хрящевина
- crippling /ˈkrɪplɪŋ/ – деформация *adj* калечащий
- collagen /ˈkɒlədʒən/ – коллаген
- deposition /ˌdepəˈzɪʃn/ – отложение
- oestrogen /ˈiːstrədʒən/ – эстроген
- osteoporosis /ˌɒːstiəʊpəˈrəʊsɪs/ – остеопороз
- osteoarthritis /ˌɒstiəʊɑːˈθraɪtɪs/ – остеоартрит
- stiffness /ˈstɪfnəs/ – жесткость, прочность
- swelling /ˈswelɪŋ/ – отек, отечность
- resorption /rɪˈzɔːpʃ(ə)n/ – резорбция, рассасывание
- tiredness /ˈtaɪədnəs/– усталость, утомляемость, вялость

Adjectives

- brittle /ˈbrɪtl/ – хрупкий, ломкий, непрочный
- irreversible /ˌɪrɪˈvɜːsəbl/ – необратимый, непоправимый
- liable /ˈlaɪəbl / – подверженный, склонный
- porous /ˈpɔːrəs/ – пористый, проницаемый, рыхлый

Exercise 2. Before reading the text, answer the following questions and discuss them with your partner.

1. What is brittle bone disease? Who gets it?
2. Is the development of osteoarthrosis related to diet?

3. What exercises are used to prevent osteoporosis?
4. What are signs of osteoarthritis?
5. What medications are used to treat rheumatoid arthritis?

TEXT

Exercise 3. Read, translate the text and be ready to do the exercises.

Osteoporosis (brittle bone disease) is characterised by a reduction in bone mass: more bone is broken down in the body (bone resorption) than is laid down (bone deposition). The disease is usually associated with loss of weight. Other symptoms include tiredness, pains, and acute back pain. However, the most harmful effect of the disease is that the bone becomes porous, brittle, and liable to fracture.

Osteoporosis is an age-related disease, primarily affecting post-menopausal women. However, it can occur much earlier in life and can affect men whose bone densities are particularly low. Bone is living tissue consisting of a calcified matrix and fibres of collagen. As a bone grows, it responds to the mechanical stresses that is subjected to. A femur of an active person who performs regular load-bearing exercises, for example, is generally thicker and denser than the femur of an inactive person. Bone elongation stops at maturity, but bones continue to change in density and strength throughout adulthood. There is generally some degree of bone weakening with age, but insufficient exercise or a low calcium diet (especially in early life when bones are elongating) may accelerate the onset of osteoporosis. Excessive exercising and weight-loss dieting are also linked with development of the disease. Some people may be genetically predisposed to osteoporosis. A gene affecting vitamin D metabolism has been found in Australians which may largely account for the genetic variation in their bone density (vitamin D enhances calcium and phosphorus absorption from the gut and, with parathyroid hormone, lays down these minerals in bones). If this gene occurs in a wider

population, it may not be long before genetic screening can be used to identify those at risk of osteoporosis so that preventative measures can be taken.

Preventing osteoporosis

Moderate weight-bearing exercises (such as cycling, dancing, and walking stimulate calcium deposition, strengthen bones, and reduce the risk of osteoporosis. Young people benefit most from exercise because strong and healthy bones are more easily established in adolescents and young adults.

Slightly overweight post-menopausal women are generally less likely under suffer from osteoporosis than slim women. The extra fat may act as a protective cushion for bones, and the bones of plump women may be heavier and stronger. However, the most likely reason for the lower incidence of osteoporosis in plump women is that the extra fat enables them to produce more oestrogen. This hormone is involved in calcium metabolism in both males and females. Its presence reduces the demineralisation of bones. Some doctors believe that the best way to prevent osteoporosis in post-menopausal women is by hormone replacement therapy (HRT) which gives low doses of oestrogen. Unfortunately, this treatment is not suitable for all women.

A diet that includes a good intake of calcium-rich foods (such as dairy products) may help prevent osteoporosis. It is especially important for pre-menopausal women to have adequate calcium intake so that they can build up high peak bone densities in early adult life. By a careful mixture of exercise and a calcium-rich diet, most people should be able to prevent the development of osteoporosis. The prevention of another age-related bone disease, osteoarthritis, is much more problematic.

Osteoarthritis

Osteoarthritis (osteoarthrosis) is a degenerative disease of the cartilage that covers bones in joints. It is characterised by stiffness in heavily used joints such as in the knees, hips, and fingers. Osteoarthritis may progress

into the bone itself, causing pain and stiffness. X-rays of people with osteoarthritis reveal that the joint space (the space between the bones) narrows because of loss of cartilage, and bony deposits and other irregularities develop at the edges of the bones.

Although osteoarthritis affects some children, it is more common in those past middle life. It results in more than 50 000 hip and knee replacements each year in the UK. Its development is linked with obesity, low bone density, congenital abnormalities in the structure of joints, and repeated mechanical stress. However, a comparison of the incidence of osteoarthritis in pairs of identical and non-identical twins indicates that the disease is partly genetically determined.

The development of osteoarthritis is usually slow and irreversible, but it is rarely crippling. In most cases, the symptoms can be kept under control for many years by proper treatment, which usually includes reduction of pressure across the joint (for example, by losing weight and using a walking stick), the use of analgesics (painkillers) and anti-inflammatories such as acetylsalicylic acid (aspirin), and corrective surgery.

Osteoarthritis is sometimes confused with another type of joint disease called rheumatoid arthritis (RA). However, RA is a chronic inflammatory disorder rather than degeneration of the cartilage. It starts gradually and may occur at any age, but usually occurs between the ages of 30 and 40 years. Typically, many joints are affected at the same time (especially the fingers, wrists, and ankles). RA is an autoimmune disease in which the immune system attempts to destroy its own tissue. Treatment includes anti-inflammatories (such as aspirin) and other drugs, gentle exercise to maintain joint mobility, and ice treatment to relieve swelling. In very severe cases, joints may be replaced.

(Retrieved from Kent M. Advanced biology. – Oxford University Press, 2004, pp. 346-347.)

VOCABULARY EXERCISES

Exercise 4. Give Russian equivalents.

Brittle bone disease, bone mass, bone resorption, bone deposition, age-related bone disease, post-menopausal women, calcified matrix, back and bone pain.

Exercise 5. Give English equivalents.

По мере роста кости, возрастное заболевание, метаболизм витамина Д, сокращает риск развития остеопороза, чрезмерная физическая нагрузка.

Exercise 6. Use a monolingual English dictionary and give the definitions of the following words.

Adolescent, deposition, overweight, hormone replacement therapy (HRT), demineralization, walking stick.

Exercise 7. Fill in the gaps with derivatives of words and translate them.

Term (verb)	Noun
reduce	
associate	
elongate	
accelerate	
prevent	
stimulate	
mineralize	
cripple	
affect	
swell	

Exercise 8. Make up phrases and write down sentences with them.

1. load-bearing	a) diet
2. bone	b) exercise
3. calcium	c) women
4. weight	d) mobility
5. protective	e) pain
6. congenital	f) exercise
7. autoimmune	g) cushion
8. joint	h) surgery
9. causing	i) disease
10. corrective	j) abnormalities
11. plump	k) loss
12. weight-bearing	l) elongation

COMPREHENSION AND DISCUSSION EXERCISES

Exercise 9. Translate the following sentences from Russian into English.

1. Витамин D улучшает всасывание кальция, фосфора и ускоряет заживление переломов.
2. Заболевания, ограничивающие двигательную активность, могут способствовать развитию остеопороза.
3. Однако наиболее пагубное воздействие болезни заключается в том, что кость становится пористой и хрупкой.
4. Кости полных женщин могут быть тяжелее и крепче чем у худых.
5. Эстроген участвует в метаболизме кальция как у мужчин, так и у женщин.

6. Остеоартроз – это хроническое дегенеративное заболевание, вызывающее повреждение хряща.

7. В большинстве случаев симптомы остеопороза можно держать под контролем в течение многих лет с помощью правильного лечения.

8. Как правило, развитие заболевания происходит медленно и необратимо.

9. Остеоартрит иногда путают с другим заболеванием суставов, называемым ревматоидным артритом.

10. Лечение включает противовоспалительные средства (например, аспирин) и другие лекарства.

Exercise 10. Translate the following text from English into Russian.

Strategies for the prevention of knee osteoarthritis

Primary and secondary prevention strategies are necessary to prevent increased rates of OA resulting from an ageing population and increasing rates of obesity and physical inactivity. Strategies that are developed for knee OA might not be transferable to other joints, because of anatomical and other differences.

Primary prevention strategies are intended to prevent the onset of specific diseases via risk reduction, by altering behaviours or exposures that can lead to disease, or by enhancing resistance to the effects of exposure to a disease agent. Preventing knee injury and obesity during adolescence are examples of strategies that are relevant to knee OA. Secondary prevention includes the detection and treatment of risk factors for progression in individuals who are already at risk. Examples relevant to knee OA include the detection and monitoring of weight gain and impairments in proprioceptive acuity, dynamic joint stability and muscle function, and subsequent intervention with weight management and targeted exercise therapy in those who already have sustained a knee injury. OA is a heterogeneous disease with several different phenotypes and a large number of risk factors, which often

interact with each other. Three important risk factors, which show promise for both primary and secondary intervention, are obesity, trauma and impaired muscle function.

(Retrieved from Roos E. M., Arden N. K. Strategies for the prevention of knee osteoarthritis // Nature Reviews Rheumatology. – 2016. – Vol. 12. – №. 2. – pp. 92-101. https://doi.org/10.1038/nrrheum.2015.135)

Exercise 11. Say whether the statements are true or false. Give reasons.

1. A lot of people may be genetically predisposed to osteoporosis.
2. Brittle bone disease is characterized by bone resorption and bone deposition.
3. Osteoporosis can occur much earlier in life.
4. Osteoarthritis is an age-related disease, affecting post-menopausal women.
5. Osteoporosis and osteoarthritis are usually associated with loss of weight.
6. A hip of an active person is generally thicker and denser than the femur.
7. Bones of people continue to change throughout lifetime.
8. There is some degree of bone weakening with age.
9. A diet includes a good intake of calcium-rich food (such as dairy products).
10. The best preventative measure against rheumatoid arthritis is hormone replacement therapy.

Exercise 12. Choose one of the topics to make a report and present it in front of the class.

1. The development of osteoporosis.
2. National Osteoporosis society.

3. Preventing rheumatoid arthritis (RA).
4. The link between weight-bearing exercises and osteoarthritis.
5. The typical features of bone weakening.

Exercise 13. Render the article. Follow the plan. See page 181.

UNIT 9. Digestive disorders.

PRE-READING

Exercise 1. Study the vocabulary before reading the text.

Professional terms

- anorexia nervosa /ˌænəˌreksiə nɜːˈvəʊsə/ – анорексия, нервная анорексия
- bingeing /bɪndʒɪŋ / – обжорство, переедание
- bulimia nervosa /buˌlɪmiə nɜːˈvəʊsə / – булимия, нервная булимия
- diuretic / daɪjʊˈretɪk / – мочегонное средство, диуретик
- disturbance / dɪsˈtɜːbəns / – нарушение, расстройство
- eating disorder / ˈiːtɪŋ dɪsˈɔːdə / – расстройство приема пищи
- infertility /ɪnfɜːˈtɪlɪtɪ / – бесплодие
- obesity / əʊˈbiːsɪtɪ / – ожирение
- psychotherapy / saɪkəʊˈθerəpɪ/ – психотерапия
- restoration / restəˈreɪʃn/ – восстановление
- slimness /ˈslɪmnəs / – стройность
- starvation / stɑːˈveɪʃn/ – голодание, голод
- sexuality/ˌsekʃuˈæləti/ – чувственность, сексуальность, различие полов

Verbs

- cease/ si:s/– переставать, прекращать

Adjectives

- fatal / feɪtl / – смертельный, летальный
- severe /sɪˈvɪə / – тяжелый, серьезный

Exercise 2. Before reading the text, answer the following questions and discuss them with your partner.

1. What is an eating disorder?
2. What are two main groups of eating disorders?
3. What are common symptoms of anorexia?
4. What are common symptoms of bulimia?
5. What are consequences of unhealthy lifestyle?

TEXT

Exercise 3. Read, translate the text and be ready to do the exercises.

Eating disorders

The preoccupation of Western culture with slimness and the negative stereotyping of plump people have contributed to an upsurge in eating disorders, especially among young women. Women are continually bombarded with images from media reinforcing the notion that they have to be slim to be beautiful, successful, healthy, and happy.

An eating disorder is a potentially dangerous disturbance in the pattern of eating. The term usually refers to two main groups of disorder: anorexia nervosa and bulimia nervosa (often abbreviated to anorexia and bulimia respectively). In reality, there is a whole range of eating disorders and it is not always easy to put a particular disorder neatly into either of the two main groups. Patients with such a disorder are said to have an eating disorder not otherwise specified.

Anorexia

Anorexia, sometimes referred to as self-starvation syndrome, is a potentially fatal eating disorder in which a loss of appetite of desire for food leads to severe loss of body mass. Anorexics are ten times more likely to be female than male. The condition is recognized as a serious psychological disturbance. It has been linked to dietary problems in early life, parental obsession with food, problems within the family, and rejection of adult sexuality. It is also seen as a constant attempt to please others.

Whatever the cause, the effects of anorexia are dramatic and potentially very dangerous. Symptoms include:

- loss of body mass to less than 85 per cent of ideal body mass
- muscle wasting (including heart muscle)
- intense fear of becoming obese, even when underweight
- disturbance of body image (that is, feeling fat even very thin)

In women, the normal menstrual cycle ceases, resulting in infertility.

Anorexia is much more than dieting gone wrong. It requires medical treatment and may respond to psychotherapy. The more long-standing the condition, the more difficult is to treat. If treated early, most of the physical symptoms of anorexia can corrected through nutrition and the gradual restoration of normal body mass. In severe, well-developed cases, the heart may become so weakened by loss of cardiac muscle that the chances of recovery are small. One 1996 study reported a mortality rate 6.6 per cent during a ten-year period following diagnosis.

Bulimia

Bulimia (binge-purge syndrome) is characterized by sequence of excessive eating followed by purging (efforts to remove the food from the body). Self-induced vomiting is the most common method of purging, but fasting, excessive exercise, and taking laxatives (drugs that stimulate bowel emptying or diuretics (drugs that stimulate the kidney to eliminate large volumes of urine) are all used to counteract the effects of binge.

Like anorexia, chronic bulimia usually has underlying psychological causes. Binge eating may help to release pent-up emotions and enable the bulimic to be distracted from problems. However, a typical bulimic then has to purge to remove feelings of guilt associated with bingeing. Short episodes of bulimia are quite common, but bulimic behavior may become chronic if a person develops a psychological need to binge. Repeated purging can cause an imbalance of mineral salts which can lead to cardiovascular problems.

Bulimia may occur as a phase of anorexia. Both disorders must be regarded as serious and medical advice must be sought. However, it is not easy to identify bulimics. They may not show symptoms until late in the course of the illness and unlike anorexics they may have a normal body mass. Both bulimics and anorexics are often secretive about their eating behavior and usually deny that they have a problem.

Obesity

In addition to eating disorders, most cases of obesity also reflect a disturbed pattern of eating. Most obesity results from eating too much and not exercising enough.

Although obesity is an excess of body fat, it is commonly defined in terms of body mass index. However, obesity is not necessarily the same as being overweight. A very muscular person may be heavy but still have less than 10 % body fat. It is generally agreed that body fat should not exceed 20-25% of total body mass in men and 28-30% in women.

Obesity is a major health hazard. Obese people are predisposed to a number of diseases including diabetes mellitus, certain cancers, cardiovascular disease and hypertension. It also increases the risk of developing a hernia, gallstones and varicose veins.

(Retrieved from Kent M. Advanced biology. – Oxford University Press, 2004, pp. 356-357.)

VOCABULARY EXERCISES

Exercise 4. Give Russian equivalents.

Loss of body mass, muscle wasting, disturbance of body image, dieting gone wrong, psychological disturbance, the preoccupation of Western culture with slimness.

Exercise 5. Give English equivalents.

Потеря аппетита и желания пищи, проблемы питания в раннем детстве, приступы булимии довольно распространены, психологическая потребность в переедании, дисбаланс минеральных солей.

Exercise 6. Use a monolingual English dictionary and give the definitions of the following words.

Counseling, illness, body shape**,** starvation, feeling, obese, fat.

Exercise 7. Make up phrases and write down sentences with them.

1. ideal body	a) muscle
2. the normal	b) obsession
3. the gradual restoration of normal	c) rate
4. rejection of	d) emotions
5. a ten year	e) behaviour
6. eating	f) menstrual cycle
7. medical	g) pattern
8. bulimic	h) advice

9. pent-up	i) period
10. mortality	j) adult sexuality
11. parental	k) body mass
12. cardiac	l) mass

COMPREHENSION AND DISCUSSION EXERCISES

Exercise 8. Translate the following sentences from Russian into English.

1. Однако, нелегко распознать булимию.

2. У женщин нормальный менструальный цикл пропадает, что приводит к бесплодию.

3. При лечении на ранних стадиях, большинство физических симптомов анорексии могут быть исправлены посредством питания и постепенным восстановлением нормальной массы тела.

4. Исследование 1996 года установило частоту смертности равную 6,6% за время десятилетнего периода наблюдения за диагнозом.

5. Самостоятельный вызов рвотного рефлекса – наиболее распространённый метод очистки.

6. Анорексия в 10 раз чаще встречается у женщин, чем у мужчин.

7. Оба расстройства должны рассматриваться как серьёзные.

8. Люди с ожирением предрасположены к большому количеству заболеваний, включая диабет, определенные виды рака, сердечно-сосудистые заболевания и гипертонию.

9. В добавление к пищевым расстройствам, большинство случаев ожирения также отражают нарушенную систему питания.

10. Пищевое расстройство – это потенциально опасное нарушение в системе питания.

Exercise 9. Translate the following text from English into Russian.

Avoidant restrictive food intake disorder

Avoidant restrictive food intake disorder (ARFID), previously known as selective eating disorder, is a condition where people limit the amount or type of food eaten. Unlike anorexia nervosa, people with ARFID do not have a distorted body image or extreme fear of gaining weight. ARFID is most common in middle childhood and usually has an earlier onset than other eating disorders. Many children go through phases of picky eating, but a child with ARFID does not eat enough calories to grow and develop properly, and an adult with ARFID does not eat enough calories to maintain basic body function.

Symptoms include:

Dramatic restriction of types or amount of food eaten;

Lack of appetite or interest in food;

Dramatic weight loss;

Upset stomach, abdominal pain, or other gastrointestinal issues with no other known cause;

Limited range of preferred foods that becomes even more limited.

(Retrieved from https://www.nimh.nih.gov/health/topics/eating-disorders)

Exercise 10. Say whether the statements are true or false. Give reasons.

1. Obesity is the same as being overweight.
2. Obesity increases the risk of developing a hernia, gallstones, and varicose veins.
3. Most cases of anorexia also reflect a disturbed pattern of eating.
4. Most cases of bulimia results from eating too much and not exercising enough.
5. The effects of anorexia are dramatic and potentially very dangerous.
6. Obesity is much more than ‘dieting gone wrong’.

7. Bulimia is characterized by sequences of excessive eating.

8. Like anorexia, chronic bulimia usually has underlying psychological cause.

9. One 1996 study reported a birth rate of 6.6 per cent during a ten-year period followed diagnosis.

10. Patients with such a disorder are said to have an eating disorder not otherwise specified.

Exercise 11. Choose one of the topics to make a report and present it in front of the class.

1. Obesity is a major health hazard.
2. Self-starvation syndrome.
3. Bulimia nervosa.
4. Anorexia nervosa.
5. The link between obesity and disease.

Exercise 12. Render the article. Follow the plan. See page 181.

UNIT 10. Nervous system disorders.

PRE-READING

Exercise 1. Study the vocabulary before reading the text.

Professional terms

- ageing /ˈeɪdʒɪŋ / – старение
- Alzheimer's disease /ˈæltshaɪməz dɪziːz/ – болезнь Альцгеймера
- amino acid / əˌmiːnəʊ ˈæsɪd / – аминокислота
- deterioration / dɪˌtɪərɪəˈreɪʃn / – ухудшение, деградация
- hemisphere / ˈhemɪsfɪə / – полушарие

- hippocampus /ˌhɪpəˈkæmpəs/– гиппокамп
- senescence /sɪˈnesns / – физиологическое старение
- memory loss /ˈmeməri lɒs / – потеря памяти
- senile dementia / ˌsiːnaɪl dɪˈmenʃə / – старческое слабоумие
- stroke /strəʊk / – инсульт
- hormone replacement therapy /ˌhɔːməʊn rɪˈpleɪsmənt θerəpi / – заместительная гормональная терапия

Verb

- shrink / ʃrɪŋk / – сокращаться, уменьшаться

Adjectives

- sensitive/ˈsensətɪv/–чувствительный
- urgent / ˈɜːdʒənt / – неотложный, экстренный
- inactive /ɪnˈæktɪv/ – пассивный, инертный

Exercise 2. Before reading the text, answer the following questions and discuss them with your partner.

1. What is ageing?
2. What are effects of ageing?
3. What are common symptoms of Alzheimer's disease?
4. Could senescence be the cause of Alzheimer's disease?
5. What are the major changes that take place in our brain with age?

TEXT

Exercise 3. Read, translate the text and be ready to do the exercises.

Ageing and Alzheimer's disease

You may be delighted to know that the chance of reaching a ripe old age is higher now than it has ever been. As our understanding of ageing increases, we will

be able to extend our lives even further. Ageing and longevity (length of life) appear to have a strong genetic component:

- Children of long-lived parents tend to have long lives.
- The normal ageing process can be speeded up by gene defects such as Werner's syndrome.
- Different animals have different life expectancies.

Because of this genetic involvement in ageing, we might soon be able to manipulate our genes to improve our life expectancy. Although an understanding of the genetic basis of longevity may give us the secret of eternal youth, the goal of most gerontologists (biologists who study ageing) is to improve the quality of later life, not to extend it indefinitely.

The effects of ageing: senescence

As we grow older we tend to become physically weaker: muscle mass decreases, and bones become more brittle and break more easily. The physiological processes that maintain our organs and systems become less sensitive, less accurate, and slower: reactions times become slower, maximum heart rate is lowered by about one beat for each year a person ages, and the resting heart rate and basal metabolic rate (BMR) decline (after the age of 60, BMR slows down at a rate of up to 3 per cent each year). The likelihood of suffering disability and disease increases (at the immune system becomes less efficient) and, eventually we are confronted with a situation to which we can no longer respond effectively and we die. The complex of ageing processes that eventually lead to death is called senescence. Senescence affects every part of our body, including the brain.

Nerve cells in the brain either cannot regenerate at all or do so only slowly. Dead and damaged cells are therefore not replaced as quickly as they are lost. The number of nerve cells are therefore declines with age and the brain becomes smaller. It is estimated that the brain of a 90-year-old has about 10 per cent fewer nerve cells than that of a 30-years old. You might think, therefore, that the brain function would

inevitably decline with age also. However, this is not necessarily so. In the absence of senile dementia, although some memory loss commonly occurs, certain types of intellectual skill can actually increase with age. Most biologists believe that a decrease in brain function is not an inevitable consequence of ageing. It is now thought that memory loss, personality changes, and other malfunctions could be due to a disease process which might be treated or even prevented.

Senile dementia and Alzheimer's disease

Senile dementia is a loss of intellectual faculties which begins after the age of about 65 years. It is characterised by memory loss, a gradual decline in reasoning, a tendency to be confused easily, and personality changes. It is not itself a disease, but rather the symptom of a variety of diseases of which Alzheimer's disease is the most common. In this disease there is a gradual build-up of protein which forms deposits called plaques outside cells, and tangles within the nerve cells. The plaques consist of an abnormal protein called beta-amyloid which has between 39 and 42 amino acids; it tends to fold into insoluble structures. The tangles result mainly from the protein tau. Tau is associated with microtubules, which help nerves to carry out their functions. Unfortunately, in Alzheimer's patients, tau becomes overloaded with phosphate groups which disrupt its function. The areas of the brain most affected are the cortex of the cerebral hemispheres and the hippocampus; both are involved in memory, and the hippocampus is the seat of personality. The brain of an Alzheimer's patient also shrinks significantly.

Causes of Alzheimer's disease

Alzheimer's disease is now believed to be caused by a variety of factors, some genetic and others environmental. Although mainly a disease of old age, it can also strike younger people. The fact that there is often a family history of the disease indicates a strong component. A very small number of patients with early-onset Alzheimer's disease (no more than 20 worldwide) have gene mutations in chromosome 21 (the chromosome involved in Down's syndrome). This mutation

affects the production of beta-amyloid proteins. Other genetic abnormalities have been found in both young and Alzheimer's patients.

It has been suggested that Alzheimer's disease is related to exposure to aluminium (for example, by using aluminium cooking utensils). This suggestion was based on two main observations. First, high levels of aluminium in the blood cause confusion. Secondly, aluminium was discovered in the plaques present in brains of people who had suffered Alzheimer's. However, the confusion associated with high blood aluminium is quite different from that associated with Alzheimer's; and the aluminium discovered in plaques is now thought to have come from water used in the preparation of the tissue for microscopical examination. Therefore, the connection between aluminium and Alzheimer's has been generally discounted.

Alzheimer's disease is the fourth biggest killer in economically developed countries after heart disease, cancer, and stroke. The search for a cure is urgent, not just because it can kill, but because in strips a person of the will to live and spreads misery among loved ones. A resent theory suggests that some forms of Alzheimer's disease are inflammatory responses which can be slowed or even stopped by aspirin-like drugs.

Delaying the inevitable

You cannot halt ageing. It starts at conception and ends in death. However, research indicates that you can increase your change of living a long and healthy life by taking regular exercise and eating sensibly. Although everyone suffers a steady deterioration in fitness with each decade, the deterioration in active people is much less than in those who are inactive. Eating food such as fruits and vegetables that are rich in antioxidants (for example, vitamin A, C, and E) may also slow down the ageing process by mopping up free radicals. Many scientists believe that these are one of the main environmental causes of ageing. Women approaching menopause may also be able to delay some of the adverse effects of ageing by taking hormone replacement therapy.

(Retrieved from Kent M. Advanced biology. – Oxford University Press, 2004, pp. 344-345)

VOCABULARY EXERCISES

Exercise 4. Give Russian equivalents.

Personality changes, immune system, respond effectively, lead to death, affects every part of the organism, damaged cells, complex ageing process, long-lived parent, brain function.

Exercise 5. Give English equivalents.

Старение влияет на наш организм, полушария головного мозга, целый ряд факторов, семейный анамнез заболевания, воспалительный процесс.

Exercise 6. Match the words with their definitions.

1. dementia	a) the process of becoming old and showing the effects of being old
2. senescence	b) a serious disease, especially affecting older people, that prevents the brain from functioning normally and causes loss of memory, loss of ability to speak clearly, etc.
3. ageing	c) to fail to work correctly
4. Alzheimer's disease	d) a rare, autosomal recessive disorder which is characterized by the appearance of premature aging
5. malfunction	e) the length of time that something is likely to live, continue or function

6. Werner's syndrome	f) the process of growing old
7. lifespan	g) a serious mental disorder caused by brain disease or injury, that affects the ability to think, remember and behave normally

Exercise 7. Make up phrases and write down sentences with them.

1. genetic	a) mass
2. life	b) process
3. later	c) disability
4. muscle	d) loss
5. reaction	e) consequence of ageing
6. heart	f) life
7. person	g) expectancy
8. memory	h) old age
9. inevitable	i) time
10. suffering	j) age
11. physiological	k) basis
12. a ripe	l) rate

COMPREHENSION AND DISCUSSION EXERCISES

Exercise 8. Translate the following sentences from Russian into English.

1. Заместительная гормональная терапия (ЗГТ) у женщин, приближающихся к менопаузе, может замедлить некоторые из неблагоприятных последствий старения.

2. Понимание генетической основы долголетия может раскрыть нам тайну вечной молодости.

3. Когда мы становимся старше, мы слабеем физически: мышечная масса уменьшается, а кости становятся более хрупкими и легче ломаются.

4. Старение поражает каждую часть нашего тела, включая мозг.

5. Физиологические процессы, которые поддерживают наши органы и системы, становятся менее чувствительными и медленными: скорость реакции замедляется, максимальная частота сердечных сокращений снижается примерно на один удар за каждый год возраста человека.

6. Употребление фруктов и овощей, богатых антиоксидантами, может замедлить процесс старения.

7. В настоящее время считается, что потеря памяти, изменения личности и другие нарушения могут быть вызваны болезненным процессом, который можно было вылечить или даже предотвратить.

8. Старческое слабоумие – это потеря интеллектуальных способностей, которая начинается после 65 лет.

9. Болезнь Альцгеймера вызвана различными факторами.

10. Другие генетические аномалии были обнаружены как у молодых и здоровых людей, так и у пациентов с болезнью Альцгеймера.

Exercise 9. Translate the following text from English into Russian.

Accelerated ageing

About one in 10 million people will get old before their time because of a rare genetic disorder called Werner's syndrome. The first signs are failure to go through the usual adolescent growth spurt. Soon after this, hair goes prematurely grey cataracts develop in the eyes, the skin becomes less flexible, and diabetes mellitus, osteoporosis, thickening of the arteries, and tumours develop. These degenerations normally occur much later in life. The life expectancy of someone with Werner's syndrome is only about 45 years, even with considerable medical assistance.

(Retrieved from Kent M. Advanced biology. – Oxford University Press, 2004, p. 345.)

Exercise 10. Say whether the statements are true or false. Give reasons.

1. Alzheimer's disease is the first biggest killer in economically developed countries.
2. Ageing and longevity (length of life) appear to have strong genetic components.
3. Eating fast food may also slow down the ageing process.
4. The deterioration in active people is much less than in those who are inactive.
5. It has been suggested that Alzheimer's disease is related to exposure to potassium.
6. A very small number of patients with early-onset Alzheimer's disease have gene mutations.
7. High levels of aluminum in the blood cause confusion.
8. Senile dementia is a loss of intellectual faculties.
9. Nerve cells in the brain can regenerate.
10. Senescence affects every part of our body.

Exercise 11. Make the plan of the text.

Exercise 12. Render the article. Follow the plan. See page 181.

UNIT 11. Cancer.

PRE-READING

Exercise 1. Study the vocabulary before reading the text.

Professional terms

- cancer /ˈkænsə/ – рак
- body tissue / ˈbɒdi ˈtɪʃuː / – ткань организма
- proto-oncogene / ˈprəʊtə ˈɒŋkəʊʤiːn / – протоонкоген
- oncogene / ˈɒŋkəʊʤiːn / – онкоген
- tumour / ˈtjuːmə / – опухоль, новообразование
- metastasis / məˈtæstəsɪs / – метастаз, метастазирование, метастатическое поражение
- commonwart / ˈkɒm.ən wɔːt / – обыкновенная бородавка

Verbs

- breakdown / breɪkdaʊn / – ломать, разрушать, распадаться
- compress / kəmˈpres / – сжимать, сдавливать
- divide / dɪˈvaɪd / – делить, подразделять
- suppress / səˈpres / – подавлять, сдерживать
- inhibit / ɪnˈhɪbɪt / – подавлять, препятствовать

Exercise 2. Before reading the text, answer the following questions and discuss them with your partner.

1. What is cancer?
2. What are types of cancer?
3. What are common triggers of cancer?
4. Could aluminum be the cause of cancer?
5. Explain why the risk of developing stomach cancer can be reduced by chemotherapy?

TEXT

Exercise 3. Read, translate the text and be ready to do the exercises.

Cancer

Cancers are among the most feared diseases. More than 200 types of cancers are known. They have many causes and treatments but all cancers are a result of uncontrolled cell division.

Cells dividing out of control

In healthy, normal body tissue, cells divide by mitosis. The process is carefully controlled by specific genes and other mechanisms. For example, proto-oncogenes are thought to stimulate cell division, whereas tumour suppressor genes inhibit cell division. In a healthy cell, the activities of these two types of gene are in balance. Problems arise when the genes mutate or other control mechanisms break down so that cells can divide uncontrollably. Most cancers are probably caused not by a single factor but by a combination of genetic and environmental factors operating over several years.

Cancer-causing agents in the environment are called carcinogens. They probably trigger cancers by causing the proto-oncogenes that stimulate cell division to mutate into oncogenes (onkos means tumour). Most mutated cells are either destroyed by the body's immune system or die, causing no harm to the body. However, a single mutated cell may divide to form a clone of identical cells. Eventually a mass of abnormal cells called a tumour is formed.

Most tumours, such as common warts, are benign. Benign tumours do not spread from their point of origin. However, some benign tumours (such as ovarian cysts) can compress surrounding tissues and displace them. Tumours which can spread through the body are called malignant tumours. Malignant tumour cells can be carried by the bloodstream or lymphatic system to invade other tissues, causing secondary cancers. This process is called metastasis. It is the most dangerous characteristic of cancer, as it can be very difficult to find secondary cancers and remove them.

Causes of cancer

The causes of cancer are far from fully understood, but several specific triggers have been identified. At least 15 per cent of all cancers worldwide are a consequence of chronic infectious disease, the most important being hepatitis B and C viruses, causing liver cancer; HIV, the human immunodeficiency virus, causing cervical cancer; and the Helicobacter pylori bacterium, causing stomach cancer.

About 5 per cent of human cancers tend to run in families, indicating that there is a strong genetic predisposition towards these cancers. It is thought that these predispositions are due to the inheritance of particular oncogenes, or of proto-oncogenes which are readily transformed into oncogenes if exposed to particular carcinogens.

Carcinogens include radiation, ultraviolet light from the Sun, and X-rays, which can all damage DNA and cause mutations which may lead to cancers. Ultraviolet light from the Sun is the most common form of carcinogenic radiation. Exposure to certain wavelengths of ultraviolet light is linked to the development of skin cancers, including a highly malignant form called a melanoma. Chemical carcinogens include inorganic arsenic compounds that cause skin cancers, tars in tobacco smoke, and asbestos products which cause lung cancers, along with some dietary substances. Many common foods are believed to contain carcinogens, but the levels are usually too low to be harmful.

In 1993 the European Prospective Investigation of Cancer was set up to examine the links between diet and cancer. Detailed diet diaries and health records of 250 000 people across Europe are being studied over a ten-year period. The results will allow researchers to examine the diets of apparently healthy patients who later develop cancer. It will also allow us to identify diets which reduce the risk of certain cancers. It is already thought that the incidence of cancer of the colon, for example, can be reduced by eating a high-fibre diet with plenty of fruit and vegetables.

Treating cancer

Although there is no single cure for all cancers, many can be prevented or treated successfully. Prevention includes avoiding or at least minimising exposure to known carcinogens. Obvious examples are to avoid inhaling asbestos dust or tobacco smoke, and either to avoid going out in strong sunlight or to use an appropriate sunscreen product which offers protection against damaging ultraviolet light.

Effective treatment often depends on early diagnosis of a cancer. For example, most skin cancers are treatable if caught early, and over 80 percent of cancers of the colon, breast, and cervix can be cured if diagnosed early. Diagnosis of cervical cancer and breast cancer involve screening programmes, in which members of a population who show no symptoms are tested to find early signs of the disease. The screening test for cervical cancer is called the cervical smear test. Cells are gently scraped from the cervix and examined microscopically for abnormalities. In the early stages, cervical cancer is simple to treat and the progress of the disease can be halted. Screening for breast cancer, which affects about one woman in twelve at some stage in their lives, involves self-examination for any unusual lumps; mammography, in which the breasts are X-rayed; and biopsy, in which sample cells are examined for any malignancy.

Treatments for cancer include:

1. surgical removal of the tumour
2. radiotherapy, destruction of cancerous cells by means of X-rays or radiation from radioactive substances
3. chemotherapy of the wholebody using chemicals which kill dividing cells (both normal cells and tumour cells)
4. chemotherapy which targets cancer cells (for example, using monoclonal antibodies).

There have been great advances in our understanding of cancer in recent years. Cancer research is very active and new knowledge is gained every day, enabling doctors to establish the causes of the diseases and to design new treatments.

However, much remains unknown. Finding cures for cancers will continue to be one of our greatest challenges in the twenty-first century.

(Retrieved from Kent M. Advanced biology. – Oxford University Press, 2004, pp. 348-349.)

VOCABULARY EXERCISES

Exercise 4. Give Russian equivalents.

Diagnosis of cervical cancer, the causes of the diseases, destruction of cancerous cells by means of X-rays, screening for breast cancer, inhaling asbestos dust or tobacco smoke, the European Prospective Investigation of Cancer.

Exercise 5. Give English equivalents.

Хирургическое удаление опухоли, химиотерапия злокачественных новообразований, исследование раковых заболеваний, поиск лекарственных средств от рака, самодиагностика, моноклональные антитела.

Exercise 6. Use a monolingual English dictionary and give the definitions of the following words.

Mammography, radiotherapy, patient, endoscopy, ultrasonography, biopsy, malignancy.

Exercise 7. Make up phrases and write down sentences with them.

1. cause	a) tissue
2. tumour	b) to the body
3. the most	c) immunodeficiency virus
4. operating	d) chronic

5. the body's	e) cell
6. cause	f) of cancer
7. infectious disease	g) tumour
8. a single mutated	h) immune system
9. human	i) mutation
10. causing no harm	j) over several years
11. normal body	k) dangerous characteristic
12. benign	l) suppressor genes

Exercise 8. Study the derivatives of words and translate them.

to inhibit – inhibiting – inhibitory – inhibition – inhibitor

to mutate – mutation – mutable – mutating

to compress – compressor – compressibility – compression – compressible – compressed – compressing

to invade – invader – invasion – invading

treatment – treatable – treating – treated

exposure – exposing – exposed – exposition

to identify – identifier – identification – identifiable – identifying – identified

COMPREHENSION AND DISCUSSION EXERCISES

Exercise 9. Translate the following text from English into Russian.

In addition to radiography and smear test, cancer screening techniques include ultrasonography and endoscopy. In ultrasonography a controlled beam of ultrasound above 30000 HZ is directed into the body. A light at the end of the tube and an optical system or miniature video camera transmits an image to the examiner's eye. Both techniques can be used to detect unusual growths so that a biopsy can be

performed. In a biopsy, a small piece of the unusual tissue is removed for microscopic examination.

(Retrieved from Kent M. Advanced biology. – Oxford University Press, 2004, p. 349.)

Exercise 10. Say whether the statements are true or false. Give reasons.

1. Cancers are among the least feared diseases.
2. Diagnosis of cervical cancer and breast cancer involve screening programmes.
3. Cancer can be treated successfully.
4. About 15 per cent of human cancers tend to run in families.
5. In a healthy cell, the activities of these two types of gene are in balance.
6. Chemical carcinogens include inorganic arsenic compounds.
7. Ultraviolet light from the Sun is the most common form of chemical radiation.
8. At least 15 per cent of all cancers worldwide are a consequence of non-infectious disease.
9. Screening for breast cancer involves self-examination for any unusual lumps.
10. Most tumours are malignant.

Exercise 11. Choose one of the topics to make a report and present it in front of the class.

1. Causes of cancer.
2. Treating cancer.
3. Liver cancer.
4. Melanoma.
5. Cancer screening techniques.

Exercise 12. Render the article. Follow the plan. See page 181.

UNIT 11. Inherited diseases.

PRE-READING

Exercise 1. Study the vocabulary before reading the text.

Professional terms

- atherosclerosis /ˌæθərəʊsklɪəˈrəʊsɪs / – атеросклероз
- cystic fibrosis /ˌsɪstɪk faɪˈbrəʊsɪs/ – муковисцидоз, кистозный фиброз
- congenital malformation/kənˈʤenɪtl mælfɔːˈmeɪʃn / – врождённый порок развития, врожденная аномалия
- fate /feɪt / – участь, судьба
- fetus /ˈfiːtəs / – зародыш, плод
- German measles/ˌʤɜːmən ˈmiːzəlz / – краснуха, немецкая корь
- heamophilia /ˌhiːməˈfɪliə / – участь, судьба
- Huntington’sdisease/hʌntɪŋtənzdɪˌziːz/ – болезнь Хантингтона (Гентингтона), хорея Хантингтона
- phenylketonuria /fɛnʌɪlkiːtəˈnjʊərɪə / – фенилкетонурия
- placenta / pləˈsentə / – плацента, детское место
- sickle-cellanaemia /ˌsɪklseləˈniːmiə / – серповидно-клеточная анемия
- thalidomide /θəˈlɪdəmaɪd / – талидомид (седативное лекарство)
- vigorously /ˈvɪgərəslɪ / – активно, энергично

Verb

- succumb /səˈkʌm / – погибать, умирать, не устоять

Exercise 2. Before reading the text, answer the following questions and discuss them with your partner.

1. What is cystic fibrosis?
2. What diseases are present from birth and even earlier?
3. What is thalidomide most commonly used for?
4. What is the preventative measure of common disease?
5. What causes sickle-cell anaemia?

TEXT

Exercise 3. Read, translate the text and be ready to do the exercises.

Inherited diseases

The best way to ensure a long life free of any major disease is to choose the right parents. If your parents live to a ripe old age, then you are more likely to. If your parents die young of, for example, a heart attack, then you have a higher risk of suffering the same fate.

The interaction between genes and the environment

The chance of a person succumbing to disease depends on an interplay between genes (the carriers of inherited information) and environment (the conditions under which the person lives, including such factors as diet and exercise). Which component, genes or environment, has the greater effect will depend on the particular disease and other circumstances.

Diseases determined almost entirely by genetic factors which can be passed from parent to offspring are called inherited diseases. For example, cystic fibrosis (CF) is a common genetic disorder that occurs worldwide. Many inherited diseases, such as CF, sickle-cell anaemia, phenylketonuria, and heamophilia, are present from birth (and even before). Others, such as Huntington's disease, do not appear until later in life, possibly after a person has had children.

All defects that are present at birth are called congenital malformations (CMs). Although some are inherited, and others are caused by environmental factors, the precise cause of many CMs is uncertain. Environmental factors which might disrupt fetal development include drugs. Thalidomide, for example, taken by pregnant women for morning sickness was found to cause fetal abnormalities such as deformed limbs (thalidomide is no longer used as an anti-morning sickness drug). Other substances that can cross the placenta and cause fetal malformations include alcohol and also viruses such as the rubella virus which causes German measles.

Many non-communicable diseases develop well after birth, and have many causes (are multifactorial). Epidemiological research has shown that they tend to occur more frequently among members of the same family, suggesting that some individuals have a genetic make-up which makes them more likely to suffer a particular disease (they are genetically predisposed to the disease), Common diseases with a genetic predisposition include atherosclerosis (narrowing of the arteries), coronary heart disease, hypertension (high blood pressure), diabetes mellitus, some cancers, rheumatic illnesses, and some mental illnesses. Genetic predisposition is regarded as the single most important risk factor for coronary heart disease, According to the World Health Organisation: it is highly probable that genetic approaches to the prevention of common diseases will emerge as one of the dominant strategies for the improvement of health.

Huntington's disease: a ticking time-bomb

Huntington's disease is a serious inherited disease which usually shows itself between the ages of 35 and 45. It is caused by a single mutation which causes nerves to degenerate. Brain cells die, causing behavioural changes, loss of mental powers, and uncontrollable movements. It is a dominantly inherited disease; consequently, children of a parent with Huntington's disease have a 50 per cent chance of inheriting it. About 100 000 people worldwide have Huntington's disease; 3000 of them live in the United Kingdom.

For infectious diseases, the environment (especially exposure to the pathogen) is often of prime importance in determining whether someone will suffer the disease. However, inherited characteristics can also affect the person's ability to resist and tolerate an infectious disease. The interaction between genetic and environmental factors is shown dramatically in the relationship between sickle-cell anaemia and malaria.

Sickle-cell anaemia

Sickle-cell anaemia is an inherited disease caused by a single gene mutation. Two genes are responsible for determining the type of haemoglobin we have: one for the pair of alpha chains and the other for the pair of beta chains. Research shows that sickle-cell anaemia results from a mutation in just one nucleotide base, causing a difference in one amino acid between the abnormal beta chain and the normal beta chain.

The gene responsible for sickle-cell anaemia has two possible forms or alleles. The sickle-cell allele is given the symbol Hb^S; the normal allele is Hb^A. As each person usually has two alleles for a particular gene, three combinations are possible: Hb^AHb^A; Hb^AHb^S; and Hb^SHb^S.

Only Hb^SHb^S individuals have the full-blown version of sickle-cell anaemia. At low oxygen partial pressures (for example, in active muscles), a large percentage of the red blood cells of people with sickle-cell anaemia become sickle shaped and unable to carry oxygen efficiently. The distorted cells tend to form clots and block blood vessels. If the sickle-shaped cells reach the spleen, they are usually removed from circulation, causing anaemia and jaundice. There is no satisfactory treatment for the disease, which can kill, particularly during childhood, though some patients can live to 60-70 years.

Hb^AHb^S individuals have a much lower tendency to form sickle-shaped red blood cells. These individuals are said to have sickle-cell trait. The trait sometimes causes mild anaemia, particularly when oxygen partial pressures are low (for

example, at high altitude or when exercising very vigorously in hot environments), but it usually causes no adverse symptoms. People with sickle-cell trait can lead normal and active lives.

Sickle-cell anaemia is endemic in parts of Africa, the Middle East, and India, where malaria is prevalent. In these areas, the Hb^S allele is far more common than in other areas because it gives some resistance against malaria. In people with sickle-cell anaemia or sickle-cell trait, red blood cells have a low binding capacity for oxygen. Because the malarial parasite has an active aerobic metabolism, requiring a plentiful supply of oxygen, it can not grow and reproduce within these red blood cells.

The relationship between sickle-cell anaemia and malaria shows how the development of disease is affected by a complex interaction between inherited and environmental factors.

(Retrieved from Kent M. Advanced biology. – Oxford University Press, 2004, pp. 340-341.)

VOCABULARY EXERCISES

Exercise 4. Give Russian equivalents.

Suffering the same fate, the World Health Organisation, a common genetic disorder, anti-morning sickness drug, deformed limbs, runs in the family.

Exercise 5. Give English equivalents.

Развитие плода, утреннее недомогание, предрасположенность к наследственным заболеваниям, врожденные пороки развития плода, одна из ключевых стратегий по улучшению состояния здоровья.

Exercise 6. Use a monolingual English dictionary and give the definitions of the following words and word combinations.

Placenta, malformation, common disease, trait, resistance, inherited information.

Exercise 7. Match the words and phrases with their definitions.

1. inherited disease	a) an inherited disorder that increases the levels of phenylalanine
2. sickle cell disease	b) s a form of short-limbed dwarfism
3. Huntington's disease	c) disease determined almost entirely by genetic factors
4. phenylketonuria	d) a condition that stops parts of the brain working properly over time
5. congenital malformation	e) a serious form of anaemia that is found mostly in people of African family origins, and which is passed down from parents to children
6. achondroplasia	f) a medical condition that causes severe loss of blood from even a slight injury because the blood fails to clot normally
7. heamophilia	g) a physical defect present in a baby at birth

Exercise 8. Make up phrases and write down sentences with them.

1. adverse	a) trait
2. mild	b) clot

3. sickle-cell	c) factor
4. satisfactory	d) research
5. form	e) make-up
6. severe	f) anaemia
7. genetic	g) characteristic
8. non-communicable	h) cell
9. distorted	i) ability
10. person’s	j) disease
11. epidemiological	k) treatment
12. inherited	l) symptom

COMPREHENSION AND DISCUSSION EXERCISES

Exercise 9. Translate the following text from Russian into English.

1. Болезнь Хантингтона – это серьезное наследственное заболевание, которое обычно проявляется в среднем возрасте.

2. Люди с наследственными заболеваниями могут вести активный образ жизни.

3. На развитие заболевания влияет сложное взаимодействие между наследственными факторами и факторами окружающей среды.

4. Этот признак иногда вызывает легкую форму анемии.

5. Большой процент эритроцитов у людей с серповидно-клеточной анемией приобретает серповидную форму и не может эффективно переносить кислород.

6. Около 100 000 человек во всем мире страдают болезнью Хантингтона.

7. Два гена отвечают за определение типа гемоглобина.

8. Исследование показало, что серповидноклеточная анемия возникает в результате мутации всего в одном нуклеотидном основании, вызывающей разницу в одной аминокислоте.

9. Однако унаследованные характеристики могут повлиять на способность человека сопротивляться инфекционному заболеванию и переносить его.

10. Клетки мозга отмирают, вызывая изменения в поведении, потерю умственных способностей и неконтролируемые движения.

Exercise 10. Skim the article and comment on it supplying your answer with examples.

Klinefelter syndrome (sometimes called Klinefelter's, KS or XXY) is where boys and men are born with an extra X chromosome. Chromosomes are packages of genes found in every cell in the body. There are 2 types of chromosomes, called the sex chromosomes, that determine the genetic sex of a baby. These are named either X or Y.

Usually, a female baby has 2 X chromosomes (XX) and a male has 1 X and 1 Y (XY). But in Klinefelter syndrome, a boy is born with an extra copy of the X chromosome (XXY). The X chromosome is not a "female" chromosome and is present in everyone. The presence of a Y chromosome denotes male sex. Boys and men with Klinefelter syndrome are still genetically male, and often will not realise they have this extra chromosome, but occasionally it can cause problems that may require treatment. Klinefelter syndrome affects around 1 in every 660 males.

Klinefelter syndrome does not usually cause any obvious symptoms early in childhood, and even the later symptoms may be difficult to spot.

Many boys and men do not realize they have it.

Possible features, which are not always present, may include:

- in babies and toddlers – learning to sit up, crawl, walk and talk later than usual, being quieter and more passive than usual
- in childhood – shyness and low self-confidence, problems with reading, writing, spelling and paying attention, mild dyslexia or dyspraxia, low energy levels, and difficulty socialising or expressing feelings
- in teenagers – growing taller than expected for the family (with long arms and legs), broad hips, poor muscle tone and slower than usual muscle growth, reduced facial and body hair that starts growing later than usual, a small penis and testicles, and enlarged breasts (gynaecomastia)
- in adulthood – inability to have children naturally (infertility) and a low sex drive, in addition to the physical characteristics mentioned above.

Most boys and men with Klinefelter syndrome will not be significantly affected and can live normal, healthy lives. Infertility tends to be the main problem, although there are treatments that can help.

(Retrieved from https://www.nhs.uk/conditions/klinefelters-syndrome/)

Exercise 11. Say whether the statements are true or false. Give reasons.

1. Sickle-cell anaemia is widespread in Africa and India.
2. Inherited diseases tend to run in families.
3. Huntington's disease appears since birth.
4. The chance of a person succumbing to disease depends on interplay between genes and environment.
5. Cystic fibrosis can be passed from parents to children.
6. Heamophilia is caused by environmental factors.
7. The precise cause of CF is uncertain.
8. Common diseases with a genetic predisposition include atherosclerosis, coronary heart disease, hypertension, diabetes mellitus etc.
9. Most of inherited diseases are present from birth.

10. The best way to ensure a long life free of any major disease is to choose the right parents.

Exercise 12. Choose one of the topics to make a report and present it in front of the class.

1. The development of Phenylketonuria.
2. An outstanding person who suffers inherited disease.
3. Non-communicable diseases.
4. Genetic predispositions to the development of Kearns-Sayre syndrome (KSS).
5. The typical features of heamophilia.

Exercise 13. Retell the article. Follow the plan. See page 181.

UNIT 13. Dentistry. Earliest Dental Fillings

PRE-READING

Exercise 1. Study the vocabulary before reading the text.

Professional terms

- dentistry /ˈdentɪstri/ – стоматология
- dental filling /ˈdentl ˈfɪlɪŋ/ – зубная пломба
- dental caries /ˈkeəriːz/ BrE; /ˈkeriːz/ AmE – кариес зубов
- tooth cavity /tuːθ ˈkævəti/– зубная полость
- pulp cavity /ˈpʌlp ˈkævəti/ ALSO tooth's pulp chamber – полость пульпы зуба
- gum /gʌm/ – десна
- toothpick /ˈtuːθpɪk/ – зубочистка
- incisor /ɪnˈsaɪzə(r)/ – резцовый зуб; резец

- bitumen /ˈbɪtʃʊmən/ BrE; /bɪˈtuːmən/ AmE – битум
- Paleolithic /ˌpæliəˈlɪθɪk/, /ˌpeɪliəˈlɪθɪk/ – эпоха палеолита

Verbs

- come up with – предложить/ придумать идею, решение, план
- drill (out) /drɪl/ – сверлить
- fill /fɪl/ / seal /siːl/ a tooth – пломбировать зуб
- extract a tooth /ɪkˈstrækt/ – удалить зуб
- scoop out /skuːp/ – выскабливать
- attest /əˈtest/ – свидетельствовать; доказывать; демонстрировать
- wince at something /wɪns/ – вздрагивать, морщиться (от испуга, боли, отвращения)

Adjectives

- dental /ˈdentl/ – стоматологический
- inflamed /ɪnˈfleɪmd/ – воспаленный
- rotten teeth /ˈrɒtn/ – гнилые зубы
- decayed /dɪˈkeɪd/ – испортившийся; прогнивший, разлагающийся
- convincing /kənˈvɪnsɪŋ/ – убедительный
- resourceful /rɪˈsɔːsfl/, /rɪˈzɔːsfl/ – находчивый; изобретательный, смышлёный

Exercise 2. Before reading the text, answer the following questions and discuss them with your partner.

1. When did dentistry appear and develop?
2. Are teeth as hard as bones?
3. What information can scientists and doctors get by examining teeth?

4. How are teeth connected with other organs?

TEXT

Exercise 3. Read, translate the text and be ready to do the exercises.

Earliest Dental Fillings

Discovered in 13,000-Year-Old Skeleton

You might wince at the sight of your dentist holding an electric drill over your mouth. But you can be thankful she's not using a stone tool instead.

That is what the most advanced dental care looked like thousands of years ago. By studying teeth at archaeological sites, scientists think that prehistoric humans came up with a variety of resourceful solutions to dental problems: people drilled out cavities, sealed crown fractures with beeswax, used toothpicks to relieve inflamed gums and extracted rotten teeth.

Now, researchers report that they've discovered what is perhaps the oldest known example of tooth-filling at an ice age site in Italy.

Archaeologists unearthed the skeletal remains of a person who lived about 13,000 years ago at Riparo Fredian, near Lucca in northern Italy. The person's two front teeth (or upper central incisors) both had big holes in the surface that reach down to the tooth's pulp chamber.

Researchers recently analyzed horizontal striations inside the tooth holes, and concluded that these scratch marks were most likely produced by the scraping and twisting of a hand-held tool. This ice age person was probably in pain from necrotic or infected tooth pulp inside the teeth; seeking relief, they might have intentionally scooped out the decayed tissue, enlarging their cavities in the process, *according to* the study published online March 27 in the American Journal of Physical Anthropology.

But the dental work didn't end there. Inside the tooth cavities, there were traces of bitumen, a tar-like substance that might have been used as an antiseptic or a filling to protect the tooth from getting infected, the researchers said.

Alejandra Ortiz, a postdoctoral researcher at Arizona State University's Institute of Human Origins who wasn't involved in the study, said she finds the authors' argument for dentistry highly convincing.

"Until now, the earliest evidence of dental filling came from a 6,500-year-old human tooth from Slovenia," Ortiz told. "This new finding adds another piece of information for a possible emergence of oral health practices before modern carbohydrate-rich diets led to an enormous increase in dental caries," also known as cavities.

Study co-author Stefano Benazzi, an archaeologist at the University of Bologna, said that the only earlier example of such paleo-dentistry comes from a nearby site. A few years ago, Benazzi and his colleagues also studied this specimen, a 14,000-year-old tooth from Villabruna in northern Italy with a scraped-out, but not filled, cavity.

Benazzi told that these examples from Villabruna and RiparoFredian attest that something was changing during this time. Scientists have increasing evidence suggesting that during the late upper Paleolithic, some dental diseases, like cavities, were on the rise in some populations, which could be related to changes in diet, food processing or culture, Benazzi said.

"Actually, we do not know, but maybe the increase of dental problems drove some populations to develop dental treatments," Benazzi added.

(Retrieved from https://www.livescience.com/58722-earliest-dental-fillings-ice-age-skeleton.html)

VOCABULARY EXERCISES

Exercise 4. Match the English and Russian equivalents.

1.	a stone tool	a) гигиена полости рта
2.	prehistoric humans	b) передние зубы
3.	resourceful solutions	c) инфицированный; заражённый
4.	skeletal remains of a person	d) обработка пищевых продуктов
5.	front teeth	e) быть связанным с
6.	tooth hole	f) каменный инструмент
7.	the decayed tissue	g) находчивые решения
8.	a tar-like substance	i) доказательство; свидетельство
9.	infected	j) скелетные останки человека
10.	oral health	k) полость в зубе
11.	evidence	l) вещество, похожее на смолу
12.	be related to	m) первобытные люди
13.	food processing	n) разложившаяся ткань

Exercise 5. Find pairs of synonyms.

1.	fill a tooth	a) believable
2.	tooth caries	b) decompose
3.	come up with	c) pull out/ remove/ take out a tooth
4.	inflamed	d) tooth hole
5.	rotten	e) seal a tooth
6.	to decay	f) be connected with
7.	convincing	g) tooth decay
8.	extract a tooth	h) suggest, find
9.	tooth cavity	i) decayed
10.	be related to	j) painful

Exercise 6. Make up verb phrases. There may be several variants.

1.	fill	a) rotten teeth
2.	drill out	a) the decayed tissue
3.	seal	b) a tooth
4.	extract	c) an idea/ plan/ solution
5.	scoop out	d) crown fractures
6.	come up with	e) cavities

Exercise 7. Find in the text all the phrases with the word *dental*. Make up sentences with them.

dental care / filling / caries / treatment / problems

Exercise 8. Match the words with their definitions.

attest

convincing

dental caries/ tooth decay

dental filling

dentistry

resourceful

1. the artificial substance put into holes in teeth to repair them
2. good at finding ways of doing things and solving problems
3. the medical study of the teeth and mouth
4. to show or prove that something is true
5. damage from natural causes or lack of care in teeth or bones; decay
6. what makes somebody believe that something is true

Exercise 9. Arrange the words so as to make sentences.

1. resourceful / She's / manager / a / very.
2. decay / your / Sugar / makes / teeth.

3. doctor / him / convince / to see / I / tried to / a.
4. rotten / The gas / has / eggs /a / like / smell.
5. The / was / tooth /extracted.
6. She / fillings / already / five / has.
7. in / and / Smoking / arteries / heart / accelerates / the / the decay.
8. new / She / a / came up with / idea.
9. argument / I / his / convincing / found/ very.
10. The / inflamed / wound / had become.

Exercise 10. Study the derivatives of words and translate them.

dentistry – dental – dentist

to fill – filling

to extract – extracted – extracting – extraction – extract

to inflame – inflamed – inflammatory – anti-inflammatory – inflammation

to decay – decayed – decaying – decay

to convince – convinced – convincing – convincingly – conviction

to resource – resourced – resourcing – resourceful – resourcefully – resourcefulness

to infect – infected – infecting – infectious – infection

Exercise 11. Complete the sentences with the appropriate form of the words from exercise 10.

1. I hope this will … you to change your mind.
2. The bacteria live on food particles and produce acid that … the enamel on your teeth.
3. Steroids often help reduce the … and itching in the skin.
4. The dentist may decide that the wisdom teeth need to be … .
5. Have you made an appointment for your … ?

6. One … farmer opened up his field as a car park and charged people £10 to park there.

7. Flu is highly … .

8. The dentist said she would do the … immediately.

Exercise 12. Translate the sentences from Russian into English.

1. Она придумала убедительное объяснение.

2. Это выглядело бы как белая пломба во рту, полном гнилых зубов.

3. Есть ли убедительные доказательства того, что лечение работает?

4. Ей всего восемь лет, а у нее уже пять пломб.

5. Они очень изобретательные и целеустремлённые.

6. Мой стоматолог не смог обнаружить никаких признаков кариеса и полостей в зубах.

7. Ее суставы сильно воспалены.

8. Стоматологу пришлось удалить ему зуб.

9. Врач выписал мне противовоспалительное лекарство.

10. Разрушение зубной эмали предполагает недостаток стоматологического ухода в детстве.

COMPREHENSION AND DISCUSSION EXERCISES

Exercise 13. Say whether the statements are true or false. Give reasons.

1. Today dentists use an electric drill rather than stone tools.

2. Prehistoric people didn’t have dental problems and dental care.

3. When the archeologists discovered the skeletal remains of a prehistoric person, he didn’t have teeth.

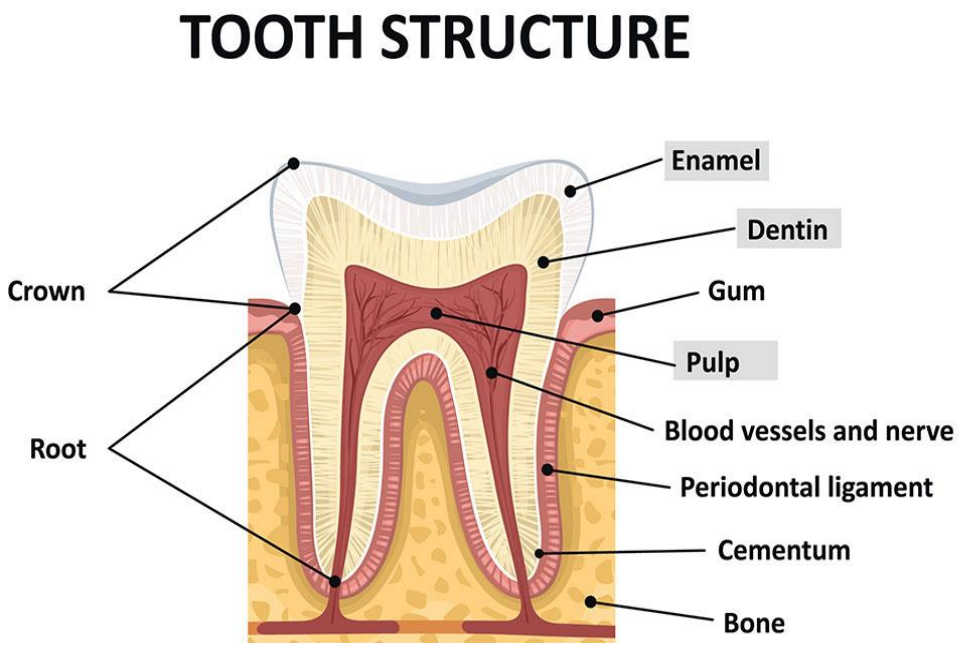
4. Ice age people didn’t have decayed teeth, teeth holes, teeth cavities.

5. Ice age people scooped the decayed tissue and filled the tooth.

Exercise 14. Answer the questions.

1. What dental problems did prehistoric people treat?
2. Where did archaeologists discover the oldest known example of tooth-filling?
3. How old are skeletal remains of a person with the oldest tooth-filling?
4. What dental problems did the ice age person have?
5. What dental treatment did ice age people provide?
6. What material did ice age people use to fill teeth?
7. How are dental practices related to changes in people's diets and food processing?

Exercise 15. Study the tooth anatomy and complete the passage with appropriate parts of a tooth.



An outer coating of a tooth is made from … (1), which is the hardest substance in the human body. This durable material is capable of serving us our entire lives if

properly taken care of, supported by the softer and more sensitive **…** (2) that can be found beneath it.

… (3) is a porous material that has microscopic openings that lead directly to the **…** (4) and provide sensation throughout the teeth. This is the material that causes sensitivity and pain when decay reveals it and is much more susceptible to damage than the surface layer of enamel. Finally, at the center of the tooth can be found the fleshy **…** (5), where all sensation, feeling, and life-support for our teeth come from.

There is one more substance that, while not technically part of the tooth, serves an important role. That would be the **…** (6), a resilient substance that serves to connect the tooth into its socket in the jaw.

Taking proper care of your gums and jaw is also essential to oral health. The **…** (7) help to protect the base of your teeth from damage, while the jaw supports and holds them in place during use. The gums are also the source of the life-sustaining blood flow for your teeth. Additionally, there is the **…** **…** (8), a structure responsible for providing cushioning against the abuses your teeth take during use and helping to secure them into the jawline.

Exercise 16. Study the idioms and sayings in English. Translate them or try to find a similar idiom in Russian. Make up situations to illustrate them.

1. **seal** somebody's fate – decide someone's destiny.

e.g., I was waiting for the answer which was to seal my fate.

2. **fill** your boots – to take as much as you want of something; help yourself.

3. **fill** someone's shoes – to do someone's job or accept someone's responsibilities.

4. a **rotten** apple (a bad apple) – one bad person who has a bad effect on others in a group.

5. beat somebody to a **pulp** – to hit someone repeatedly until they are badly injured.

6. the jewel in the **crown** – the most attractive or valuable part of something.

Exercise 17. Choose one of the topics to make a report and present it in front of the class.

1. Ancient dentistry
2. Early dentists / first dentists
3. Tools which early dentists use and modern dental instruments
4. Information which teeth can give
5. Dental treatment

Exercise 18. Render the article. Follow the plan. See page 181.

UNIT 14. Dentistry. Evolutionary history of teeth

PRE-READING

Exercise 1. Study the vocabulary before reading the text.

Professional terms

- vertebrate creatures /ˈvɜːtɪbrət ˈkriːtʃə(r)/ – позвоночные живые существа
- gum disease /gʌm/ – пародонтит
- dental practitioner /ˈdentəlpræk¸tɪʃənər/ – практикующийстоматолог; дантист; стоматолог
- enamel /ɪˈnæml/ – эмаль
- enamel prism /ˈprɪzəm/ – эмалевая призма зуба
- dentin /ˈdentiːn/ – дентин
- ancestor /ˈænsestə(r)/ – предок
- tetrapods /ˈtetrəpɔd/– четвероногие
- endothermy /¸endəʊˈθɜːmɪ/ – эндотермия, теплокровие

- paleontologist/ˌpæliɒnˈtɒlədʒɪst/, /ˌpeɪliɒnˈtɒlədʒɪst/ – палеонтолог

Verbs

- take out a tooth – удалить зуб
- nip /nɪp/ – кусать, щипать
- scrape /skreɪp/ – царапать, скрести
- grasp /grɑːsp/-BrE, /græsp/-AmE– ухватить
- chew /tʃuː/ – жевать
- align /əˈlaɪn/ – выровнять
- wear out – изнашивать
- sustain /səˈsteɪn/ = maintain /meɪnˈteɪn/ – поддерживать; удержать

Adjectives

- crooked teeth /ˈkrʊkɪd/ – кривыезубы
- impactedwisdomtooth /ɪmˈpæktɪd/ – ретенированный зуб мудрости, с затруднённым прорезыванием
- pointed teeth /ˈpɔɪntɪd/ – заостренные зубы

Exercise 2. Before reading the text, answer the following questions and discuss them with your partner.

1. When did first teeth appear?
2. How did teeth develop and change in various vertebrate creatures?
3. What ate the main parts in the structure of teeth?
4. Are teeth the hardest part of our body?

TEXT

Exercise 3. Read, translate the text and be ready to do the exercises.

Evolutionary history of teeth

I sat at an oral surgeon's office waiting for my daughter. Patients went in, one after another, resigned to having their third molars, commonly known as wisdom teeth, taken out. They left with bandages and ice packs, wrapped around their heads. Each carried preprinted home care instructions, and prescriptions for antibiotics and pain meds.

Removal of the wisdom teeth is almost a rite of passage for young adults in America today. Our dental issues are not normal. Most other vertebrate creatures do not have the same dental problems that we do. They rarely have crooked teeth or cavities. Our fossil forebears did not have impacted wisdom teeth, and few appear to have had gum disease.

Indeed, the teeth of modern-day humans are a profound contradiction. They are the hardest parts of our body yet are incredibly fragile. Although teeth endure for millions of years in the fossil record, ours cannot seem to last a lifetime in our mouths. Teeth gave our ancestors dominance over the organic world, yet today ours require special daily care to be maintained. Paleontologists have long understood that our teeth are deeply rooted in evolutionary history. Now clinical researchers and dental practitioners are also starting to take notice.

Our teeth break foods without themselves being broken – up to millions of times over the course of a lifetime. Their remarkable strength results from the combination of two components: a hard external cap of enamel made almost entirely of calcium phosphate and an internal layer of dentin, which also has organic fibers that make the tissue flexible.

This design did not emerge overnight. Recent insights from paleontology, genetics and developmental biology have allowed researchers to reconstruct the evolution of their structure.

The first vertebrates were jawless fishes that appeared more than half a billion years ago, during the Cambrian period. These earliest fishes did not have teeth, but many of their descendants had a scaly tail and head armor made from toothlike plates

of calcium phosphate. Each plate had an outer surface of dentin, sometimes covered by a harder, more mineralized cap, and an interior pulp chamber that housed blood vessels and nerves.

The earliest teeth came later, with the jawed fishes. These were mostly simple pointed structures that could be used to capture and immobilize prey and to scrape, pry, grasp and nip all manner of living things.

Once teeth were in place, many innovations followed, including changes in their shapes, numbers and distributions, in how they were replaced and in how they attached to the jaw. Enamel first appeared by around 415 million years ago in tetrapods (amphibians, reptiles and mammals) and the lobe-finned fishes. Enamel was initially limited to the scales, which suggests that like teeth, enamel originated in skin structures and then made the leap to the mouth.

Teeth figured heavily in the origin and early evolution of mammals because of their role in supporting warm-bloodedness (endothermy). Generating one's own body heat has a lot of advantages, such as enabling one to live in cooler climates and places with more variable temperatures; allowing one to sustain higher travel speeds, to maintain larger territories. But endothermy comes with a cost: mammals burn 10 times as much energy at rest as reptiles of similar size do. Mammalian teeth must wring more calories out of every bite. To do that, they must chew.

Mammalian teeth guide chewing movements; direct and dissipate chewing forces; and position, hold, fracture and fragment food items. For teeth to function properly during chewing, their opposing surfaces must align to a fraction of a millimeter. The need for such precision explains why, unlike fishes and reptiles, most mammals do not just grow new teeth repeatedly throughout life when old ones wear out or break. Ancestral mammals lost that ability to facilitate chewing. Enamel prisms are part of the same adaptive package. Most researchers believe they evolved to increase tooth strength to the level needed for chewing.

(Adapted from https://www.scientificamerican.com/article/why-we-have-so-many-problems-with-our-teeth/)

VOCABULARY EXERCISES

Exercise 4. Match the English and Russian equivalents.

1. bandages and icepacks	a) кривые зубы
2. prescription for antibiotics	b) фосфаткальция
3. crooked teeth	c) история эволюции
4. impacted wisdom tooth	d) захватить и обездвижить добычу
5. a profound contradiction	e) бинты и пакеты со льдом
6. require special daily care	f) вырабатывать тепло тела
7. evolutionary history	g) амфибии, рептилии и млекопитающие
8. calcium phosphate	h) требуют особого ежедневного ухода
9. capture and immobilize prey	i) выровнять с точностью до доли миллиметра
10. changes in shape, number and distribution	j) ретинированный зуб мудрости
11. generate body heat	k) глубокое противоречие
12. align to a fraction of a millimeter	l) изменения в форме, количестве и распределении
13. a scaly tail and head armor	m) рецепт на антибиотики
14. amphibians, reptiles and mammals	n) чешуйчатый хвост и головная броня

Exercise 5. Find pairs of synonyms.

1.	to maintain	a) with a sharp end
2.	warm-bloodedness	b) to extract/ pull out a tooth
3.	ancestors	c) to sustain
4.	pointed	d) to bite
5.	to wear out	e) endothermy
6.	to take out a tooth	f) forebears
7.	to nip	g) to damage, to spoil

Exercise 6. Find pairs of antonyms.

1.	hard	a) jawed fishes
2.	external cap of enamel	b) fragile
3.	jawless fishes	c) internal layer of dentin
4.	balance	d) disappear
5.	appear	e) ancestors, forebears
6.	modern-day humans	f) imbalance

Exercise 7. Complete the table with the appropriate word forms.

Noun	Adjective
mammal	…
…	scaly
evolution	…
…	ancestral
dentistry	…
…	precise

Verb	Noun
prescribe	…

…	chewing
align	…
…	contradiction
create	…

Exercise 8. Match the words with their definitions.

align	impacted tooth
ancestor	paleontologist
chew	scale
crooked	sustain
grasp	wear out

1. not in a straight line; bent or twisted
2. thin plate of hard material that cover the skin of many fish and reptiles
3. a person who studies fossils
4. a person in your family who lived a long time ago
5. put two or more things into a straight line
6. use something so much that it is damaged and cannot be used any more
7. bite food into small pieces in your mouth with your teeth to make it easier to swallow
8. make something continue for some time without becoming less
9. a tooth that cannot grow correctly because it is growing against another tooth below the gum
10. quickly take something in your hand(s) and hold it firmly

Exercise 9. Substitute the underlined words with their synonyms and word combinations from the text.

1. Respiration is important for <u>sustaining</u> of life.

2. His forebears had come to America from Ireland.

3. He took hold of my hand and shook it warmly.

4. His front teeth are not straight.

5. He used to much and damaged two pairs of shoes last year.

6. The dog bit me when we were playing.

7. Before you swallow the food, crush it into smaller pieces with your teeth properly.

8. Life is full of disagreements.

9. Be careful with that vase – it's very delicate and easily broken.

10. The dentist may decide that the wisdom teeth need to be extracted.

Exercise 10. Translate the sentences into English, paying attention to the underlined words.

1. Это мясо трудно жевать.

2. У этих двух особей есть общий предок.

3. Ей удалось поддержать всеобщий интерес до конца своей речи.

4. Животные используют зубы, чтобы захватить и обездвижить добычу.

5. Пакеты со льдом накладываются на часть тела человека, чтобы охладить и уменьшить отек.

6. Зубы требуют особого ежедневного ухода.

7. Стоматолог посоветовал мне удалить ретинированный зуб мудрости.

8. После удаления зуба стоматолог дал мне рецепт на антибиотики и обезболивающее.

9. Зубы – это самые твердые части нашего тела, но в то же время невероятно хрупкие.

10. Эмаль почти полностью состоит из фосфата кальция.

COMPREHENSION AND DISCUSSION EXERCISES

Exercise 11. Say whether the statements are true or false. Give reasons.

1. Most vertebrate creatures have crooked teeth, cavities, impacted wisdom teeth and gum disease.
2. Teeth gave our ancestors dominance over the organic world.
3. These earliest jawless fishes didn't have teeth.
4. The jawed fishes also didn't have teeth.
5. In the course of time teeth changed their shapes, numbers, positions in the mouth, ways of replacement and attachment to the jaw.
6. Reptiles and fishes can grow new teeth repeatedly throughout life.

Exercise 12. Answer the questions.

1. Why are the teeth of modern-day humans a profound contradiction?
2. What components make our teeth remarkably strong?
3. What resemblance of teeth did jawless fishes have?
4. When did enamel appear?
5. What profound changes in teeth did the evolution of endothermic mammals bring about?
6. Do teeth need a precise position during chewing?

Exercise 13. Study the stages of the evolutionary history and match the changes which occurred during those periods.

jawless fishes

↓

jawed fishes

↓

tetrapods

(amphibians, reptiles and mammals) and lobe-finned fishes

↓

mammals

1. developed first enamel, which was initially limited to the scales.
2. developed the need to chew food. Their teeth guided chewing movements; direct and dissipate chewing forces; and position, hold, fracture and fragment food items.
3. did not have teeth, but had a scaly tail and head armor made from toothlike plates of calcium phosphate.
4. had simple pointed teeth to capture and immobilize prey.

Exercise 14. Give information on the given issues using the following words and word combination.

1. Teeth of modern-day humans are a profound contradiction:

hard; fragile; require special daily care.

2. Dental issues are a rite of passage for young adults:

removal of the wisdom teeth; crooked teeth; cavities; impacted wisdom teeth; gum disease; bandages and ice packs; prescriptions for antibiotics and pain meds.

3. Jawless fishes:

during the Cambrian period; scaly tail and head armor; toothlike plates of calcium phosphate; an outer surface of dentin; an interior pulp chamber.

4. Jawed fishes:

simple pointed teeth; capture and immobilize prey; scrape, grasp and nip living things.

5. Tetrapods:

enamel; scales.

6. Mammals

warm-bloodedness (endothermy); generate body heat; advantages; come with a cost; chew; chewing movements; align; precision; live in cooler climates; sustain higher travel speeds; maintain larger territories; enamel prisms.

Exercise 15. Study the idioms and sayings in English. Translate them or try to find a similar idiom in Russian. Make up situations to illustrate them.

1. tip the **scales** (tip the balance) – to affect the result of something in one way rather than another.

e.g. In an interview, smart presentation can tip the scales in your favour.

2. the stars **align** – used to say that a situation is very good or lucky, or becomes completely right in order for something to happen.

e.g. The stars aligned when they met and fell in love.

3. **chew** the fat (informal) – to talk with someone in an informal and friendly way.

e.g. We sat in a bar most of the evening just chewing the fat.

4. **nip** something in the bud – to stop something when it has just begun because you can see that problems will come from it.

e.g. Many serious illnesses can be nipped in the bud if they are detected early enough.

5. **grasp** at straws – to try all possible means to find a solution or some hope in a difficult or unpleasant situation, even though this seems very unlikely.

e.g. I know I'm just grasping at straws here, but is it possible that the doctors are wrong?

6. have a sweet **tooth** (informal) – to like food that contains a lot of sugar.

7. armed to the **teeth** – having many weapons.

e.g. The gunman was reported as being armed to the teeth

Exercise 16. Render the article. Follow the plan. See page 181.

UNIT 15. Dentistry. Problems with our teeth

PRE-READING

Exercise 1. Study the vocabulary before reading the text.

Professional terms

- strain – 1) штамм; 2) искажение, деформация
- abrasion – стирание зубов, изнашивание зуба
- streptococci /ˌstreptəˈkɒkaɪ/ – стрептококки
- lactobacillus /ˌlæktəʊbəˈsɪləs/ – молочно-кислая бактерия
- microbiome /ˌmaɪkrəʊˈbaɪəʊm/– микробиом
- dysbiosis /ˌdɪsbaɪˈəʊsɪs/– дисбиоз
- probiotic /ˌprəʊbaɪˈɒtɪk/– пробиотик
- sucrose /ˈsuːkrəʊz/, /ˈsuːkrəʊs/ – сахароза
- plaque /plæk/, /plɑːk/ – (зубной) налет
- processedfoods /ˈprəʊsest/ – пищевой продукт, подвергшийся технологической обработке; полуфабрикаты
- occlusion /əˈkluːʒn/ – зубной прикус
- orthodontist /ˌɔːθəˈdɒntɪst/ – ортодонт; стоматолог-ортопед

Verbs

- fallshort – не достигать цели; не дотянуть
- catch off guard – захватить врасплох
- afflict /əˈflɪkt/ – беспокоить, поражать (о болезни)
- buffer /ˈbʌfə(r)/ – создавать защитную зону
- swamp /swɒmp/ – наводнять; поглощать
- thrive /θraɪv/ – процветать, разрастаться
- consume /kənˈsjuːm/ – потреблять
- tackle /ˈtækl/ – решить (проблему)

Adjectives

- orthodontic /ˌɔːθəˈdɒntɪk/ – ортодонтический
- pronetodecay /prəʊn/ – предрасположенный к, склонный к
- fermentable /fəˈmentəbl / – способный к брожению
- misalignedtooth /ˌmɪsəˈlaɪnd/ – смещённый, неровный зуб
- maloccludedtooth /ˌmæləˈkluːdɪd/ – зуб, нарушающий прикус
- crowded teeth /ˈkraʊdɪd/ – скученные зубы; смещение зубов из-за недостатка места на альвеолярной дуге
- targeted antimicrobials – антисептические жидкости для полоскания рта

Exercise 2. Before creading the text, answer the following questions and discuss them with your partner.

1. What dental problems are most common today?
2. What is dental caries caused by?
3. Are orthodontic issues a big problem today?
4. Does chewing affect the formation of the jaw?

TEXT

Exercise 3. Read, translate the text and be ready to do the exercises.

Why we have so many problems with our teeth

MICROBIAL IMBALANCE

The evolutionary history of our teeth explains not only why they are so strong but also why they fall short today. The basic idea is that structures evolve to operate within a specific range of environmental conditions, which in the case of our teeth include the chemicals and bacteria in the mouth, as well as strain and abrasion. Changes to the oral environment can catch our teeth off guard. Such is the case with our modern diets, which are unlike any in the history of life on our planet. The resulting mismatch between our biology and our behavior explains the dental caries (cavities), impacted wisdom teeth and other orthodontic problems that afflict us.

Dental caries is the most common chronic disease in the world. It afflicts more than nine in 10 Americans and billions of people across the globe. To understand why the teeth of modern-day humans are so prone to decay, we need to consider the natural oral environment. The healthy mouth is populated by billions of microbes representing up to 700 different species of bacteria alone. Most are beneficial. They fight disease, help with digestion and regulate various bodily functions. Other bacteria are harmful to teeth, such as streptococci and Lactobacillus. They attack enamel with lactic acid produced during their metabolism. Saliva buffers the teeth against acid attack and bathes them in calcium and phosphate to remineralize their surface. The balance between demineralization and remineralization has held for hundreds of millions of years, and both beneficial and harmful bacteria are found in oral microbiomes. Caries results when the leash breaks. Diets rich in carbohydrates feed acid-producing bacteria, lowering oral pH. Streptococci and other harmful species thrive in the acidic environment they produce, and they begin to swamp beneficial bacteria, further reducing pH. This chain of events leads to what clinical researchers call dysbiosis. Saliva cannot remineralize enamel fast enough to keep up, and the equilibrium between loss and repair is shot. Sucrose – common sugar – is especially problematic. Harmful bacteria use it to form a thick, sticky plaque that binds them to teeth and to store energy that feeds them between meals, meaning the teeth suffer longer exposure to acid attack.

Bioarchaeologists have long suggested a link between caries and the transition from foraging to farming within the past 10,000 years or so during the Neolithic period because acid-producing bacteria consume fermentable carbohydrates, which abound in wheat, rice and corn.

The biggest jump in the caries rate came with the Industrial Revolution, which led to the widespread availability of sucrose and highly processed foods. Processed foods are also softer and cleaner, setting up a perfect storm for caries: less chewing to cut the organic film and fewer dietary abrasives to wear away the nooks and crannies in teeth where plaque bacteria take refuge.

MISSING STRESS

Orthodontic disorders are also at epidemic levels today. Nine in 10 people have teeth that are at least slightly misaligned, or maloccluded, and three quarters of us have wisdom teeth that do not have enough room to emerge properly. Simply put, our teeth do not fit in our jaws. According to an anthropologist Rob Corruccini of Southern Illinois University, the mismatch between teeth and jaws was due to the stress environment, meaning the mechanical stresses jaws we experience during eating. And the case is that not teeth are too big – but the jaw is too small.

Corruccini reasoned that tooth size is preprogrammed to fit a jaw subjected during growth to levels of mechanical stress in line with a natural childhood diet. Subsequently, when the jaw does not get the needed stimulation during development, the teeth become crowded at the front end and impacted in the rear. He confirmed this hypothesis with experimental work on monkeys evincing that those fed softer diets had smaller jaws and impacted teeth.

CONCLUSION

An evolutionary perspective reveals our dental disorders as a consequence of an ecological shift. This new vantage point is starting to help researchers and clinicians tackle the root causes of dental disease. Sealants shield our crowns, and fluoride strengthens and remineralizes enamel; however, these measures do nothing to change the conditions in the mouth that bring about decay. Antiseptic mouthwashes kill the bacteria that cause cavities, but they also kill beneficial strains that have evolved to keep harmful bacteria in check. Inspired by recent innovations in microbiome therapies, researchers are beginning to focus on remodeling the dental plaque community. Oral probiotics, targeted antimicrobials and microbiota transplants are on the horizon.

We can also keep the natural oral environment in mind when we think about treating orthodontic disorders. Dentists and orthodontists are realizing that highly processed, softened foods can change the mechanical strains on the face and jaws. Chewing stresses stimulate normal growth of the jaw and the middle of the face in

children. Wisdom teeth cannot emerge properly when the jaw is too short, as occurs when children are raised on foods that are easier to chew than the ones we evolved to eat.

Over the past few years a whole new industry has developed that focuses on growing the jaws to open the airway and fit the teeth as nature originally intended. Effective treatments range from removable palatal expanders and other growth-guidance appliances to surgery. But perhaps if we fed our children foods requiring vigorous chewing from an earlier age, like our ancient ancestors did, we could spare many of them the need for such interventions.

(Adapted from https://www.scientificamerican.com/article/why-we-have-so-many-problems-with-our-teeth/)

VOCABULARY EXERCISES

Exercise 4. Match the English and Russian equivalents.

1. strain and abrasion	a) различные виды бактерий
2. prone to decay	b) потреблять ферментируемые углеводы
3. natural oral environment	c) деформация и истирание
4. different species of bacteria	d) зубной налет
5. acid-producing bacteria	e) антисептические жидкости для полоскания рта
6. oralpH	f) зуб, нарушающий прикус
7. exposure to acid attack	g) кислотообразующие бактерии
8. consume fermentable carbohydrates	h) подверженный к кариесу
9. widespread availability of sucrose	i) устранять первопричины стоматологических заболеваний
10. bring about decay	j) pH полости рта
11. antiseptic mouthwashes	k) естественная среда полости рта

12. maloccludedtooth	l) широкая доступность сахарозы
13. tackle the root causes of dental disease	m) вызывать кариес, приводить к кариесу
14. dental plaque	n) воздействие кислотной атаки

Exercise 5. Find pairs of synonyms.

1. lower pH	a) balance
2. sucrose	b) protect
3. equilibrium	c) be successful
4. afflict	d) cut, scratch
5. swamp	e) engulf
6. thrive	f) reduce pH
7. buffer	g) deal with smth
8. tackle smth	h) affect
9. abrasion	i) common sugar

Exercise 6. Make up antonyms using the negative prefixes un-, im, mis-, de-, mal-.

aligned	match
balance	like
occluded	mineralization

Exercise 7. Complete the table with the appropriate word forms

Verb	Noun	Adjective
evolve	…	…
…	exposure	…
…	…	processed
consume	…	…

…	mineral	…
…	…	fermentable
occlude	…	…
-	orthodontist	…
…	…	acidic
abrade	…	…
-	environment	…
…	…	targeted

Exercise 8. Match the words with their definitions.

abrasion	occlusion
afflict	orthodontic
antiseptic mouthwash	plaque
buffer	prone to
consume	species
lactobacillus	

1. provide protection against harm
2. a set of animals or plants in which the members have similar characteristics to each other
3. a substance containing bacteria that forms on the surface of teeth
4. a type of bacteria that produces lactic acid
5. damage to a surface caused by rubbing something very hard against it
6. the way in which your upper and lower teeth meet
7. use (energy, fuel); eat or drink something
8. to affect somebody/something in an unpleasant or harmful way
9. likely to suffer from something or to do something bad
10. a disinfectant liquid used to make the mouth fresh and healthy

11. connected with the treatment of problems relating to the position of the teeth and jaws

Exercise 9. Complete the sentences with the words from the text.

1. There are many … of dogs.
2. Remove … by brushing your teeth regularly.
3. She had a small … on her knee.
4. He was … to depression even as a teenager.
5. He … huge amounts of bread with every meal.
6. Does she need … treatment to have her teeth straightened?
7. Gum disease happens when … builds up.
8. After the dental examination the orthodontist diagnose mal… .
9. It is an illness that … women more than men.
10. We should try to … the effects of stress on health.

Exercise 10. Translate the sentences into English.

1. Многие виды растений и животных встречаются только в тропических лесах.
2. Она склонна преувеличивать.
3. Алмазы обладают исключительной стойкостью к истиранию (царапинам).
4. Сегодня одними из самых распространенных стоматологических проблем являются зубной кариес, ретинированный зуб мудрости, пародонтит, неправильный зубной прикус, скученные зубы и другие ортодонтические проблемы.
5. Антисептические жидкости для полоскания рта убивают бактерии, вызывающие кариес.

6. Бактерии прикрепляются к поверхности зубов и образуют зубной налет.

7. Слюна защищает зубы от кислотного воздействия и насыщает их кальцием и фосфатом.

8. Полуфабрикаты легче жевать.

9. Кислотообразующие бактерии снижают pH полости рта.

10. В микробиоме полости рта присутствуют как полезные, так и вредные бактерии.

COMPREHENSION AND DISCUSSION EXERCISES

Exercise 11. Say whether the statements are true or false. Give reasons.

1. Beneficial bacteria in our mouth fight disease, help with digestion and regulate various bodily functions.

2. Modern diets don’t affect oral environment.

3. The biggest jump in the caries rate came with the transition from foraging to farming.

4. Sucrose and carbohydrates are the most harmful substances for oral environment.

5. Antiseptic mouthwashes are not useful.

6. Chewing stresses stimulate normal growth of the jaw and the middle of the face in children.

7. Our jaws do not fit in our teeth.

Exercise 12. Answer the questions.

1. What do environmental conditions of our teeth include?

2. What is the most chronic disease in the world?

3. Do we have beneficial or harmful bacteria in our mouth?

4. What are the examples of harmful bacteria in the mouth?

5. What causes dysbiosis in the oral cavity?

6. What is the main orthodontic disorder today?

7. What innovations in dental treatment are on the horizon?

8. Why aren't processed foods and softened foods recommended by the author of the article?

9. What are the most common dental disorders today?

Exercise 13. Put the dental disorders under the right heading.

crowded teeth

dental caries (tooth decay)

dental cavities

impacted wisdom tooth

gum disease (periodontal disease)

malocclusion

Oral environment disorders	Orthodontic disorder
… … …	… … …

Exercise 14. Give information on the given issues using the following words and word combination.

1. Natural oral environment:

billions of microbes; different species of bacteria; beneficial and harmful bacteria; attack enamel with lactic acid; saliva buffers and bathes the teeth; balance between demineralization and remineralization.

2. Dysbiosis:

thrive in the acidic environment; reduce/ lower pH; sucrose; plaque; exposure to acid attack.

3. The biggest jump in the caries rate:

transition from foraging to farming; consume fermentable carbohydrates; availability of sucrose; processed foods; less chewing; fewer dietary abrasives; plaque bacteria.

4. Orthodontic disorders are also at epidemic levels today:

Misaligned and maloccluded teeth; not enough room for wisdom teeth; our teeth do not fit in our jaws; the mechanical stress during chewing; crowded teeth; impacted teeth.

5. How to tackle the root causes of dental disease:

conditions that bring about decay; antiseptic mouthwashes; microbiome therapies; oral probiotics; targeted antimicrobials; microbiota transplants; dental plaque; stimulate normal growth of the jaw; removable palatal expanders.

Exercise 15. Render the article. Follow the plan. See page 181.

Part 3. Supplementary reading

Text 1. Why This Man's Blood Helped Save Millions of Babies

A man in Australia helped save the lives of more than 2 million babies by donating his "special" blood, which was used to make a medication that can prevent life-threatening problems in newborns. But why exactly is this man's blood special, and how does the medication work to save babies?

The 81-year-old man, James Harrison, donated blood for 60 years and made his final donation on Friday, May 11, according to the Australian Red Cross Blood Service. Sometimes called "the man with the golden arm," Harrison donated blood more than 1,100 times, and it's estimated that his donations helped save the lives of 2.4 million babies in total, the Australian Red Cross said.

Harrison's blood contains a rare antibody that's used to make a medication called anti-D immunoglobulin, also known as Rh immunoglobulin. This medication is given to mothers who are at risk for something called "Rh incompatibility" with their fetus, which means the mothers' immune system may attack and destroy the fetus's red blood cells.

When this happens, "you end up with a situation where a lot of these babies would have a significant amount of their red cells broken down while they were in the womb," said Dr. Saima Aftab, medical director of the Fetal Care Center at Nicklaus Children's Hospital in Miami. This can lead to serious complications for the newborn, including brain damage, jaundice or even stillbirth, Aftab said.

However, treatment with Rh immunoglobulin, which is made from the blood plasma of "special" blood donors like Harrison, can prevent these complications.

"The discovery of this antibody is one of the biggest life-saving discoveries of the last century," Aftab told Live Science.

How it works

You've probably heard that your blood type is "positive" or "negative." This refers to a protein called the "Rh factor" on the surface of red blood cells. When

people have this protein, they are said to be "Rh positive," whereas if they lack the protein, they are "Rh negative."

For most people, whether they are Rh positive or Rh negative won't make a huge difference in their lives, Aftab said. But for pregnant women, there can be problems when the mother is Rh negative but the fetus is Rh positive.

That's because if the baby's Rh-positive blood cells leak into the mother's bloodstream, the mother's immune system sees the Rh-positive blood cells as "foreign" and makes antibodies against them, Aftab said. These antibodies can then cross the placenta and break down the fetus's red blood cells. In the developing world, such Rh incompatibility is one of the leading causes of illness and mortality in newborns, Aftab said.

To prevent problems from Rh incompatibility, doctors first test a woman's blood early in pregnancy or before pregnancy. If she is Rh negative, she'll likely be given Rh immunoglobulin. In the United States, about 15 percent of the population is Rh negative, according to Medscape.

The American College of Obstetricians and Gynecologists (ACOG)recommends that Rh-negative women receive this medication when they are 28 weeks pregnant and also within 72 hours after giving birth to an Rh-positive baby. A dose of Rh immunoglobulin may also be needed after invasive procedures, such as amniocentesis, or after a first-trimester miscarriage or abortion, ACOG says. In Australia, about 17 percent of pregnant women receive the treatment, including Harrison's own daughter, the Sydney Morning Herald reported.

Exactly how Rh immunoglobulin works to prevent complications from Rh incompatibility is not clear. But researchers think that the antibody covers the surface of the fetus's Rh-positive blood cells in the mother's bloodstream and prevents the mother's immune system from seeing them, Aftab said.

It's not common for people to have the type of antibody in their blood that's used to make Rh immunoglobulin. Indeed, in Australia, the country's Rh

immunoglobulin is made from a pool of only about 200 blood donors, according to the Australian Red Cross.

Harrison likely developed the antibody when he was given a large blood transfusion at age 14. Following that transfusion, "his immune system revved up a high concentration of antibodies" against Rh-positive blood cells, said Aftab, who has not treated Harrison. This would mean that Harrison himself is Rh negative.

Harrison needed to stop donating blood because he is past the age limit for blood donors in Australia, and the Australian Red Cross said he should stop donating to protect his health, according to the Sydney Morning Herald.

(Retrieved from https://www.livescience.com/62565-blood-donations-saved-babies-james-harrison.html)

Text 2. Giant Heart: Unusual Condition Means Heart is 80% of Man's Chest

A 57-year-old man who went to the emergency room for swelling of his extremities learned that his symptoms had an unusual cause: a massively enlarged chamber of his heart, according to a brief report his case.

Imaging tests revealed that the man had what his doctors described as a "giant right atrium," according to the report, published Aug. 10 in the New England Journal of Medicine. The right atrium is one of the four chambers of the heart.

Because of the enlarged chamber, the man had a "cardiothoracic ratio" of 0.82, according to the report.

The cardiothoracic ratio is a ration of the width of the heart is compared to the width of the chest, said Dr. David Majdalany, a cardiologist and director of the adult congenital heart disease center at the Cleveland Clinic in Ohio, who was not involved with the man's case. In other words, this man's heart was occupying 82 percent of the

width in his chest cavity. A normal cardiothoracic ratio is less than 0.5, meaning that the heart takes less than 50 percent of the width in the chest, Majdalany added.

Indeed, an isolated enlarged right atrium is a very rare condition, Majdalany said.

The right atrium of the heart is responsible for receiving the blood that has returned from its trip around the body. From the right atrium, the blood is pumped down, into the lower chamber of the heart called the right ventricle, and it is then pumped out of the heart and sent to the lungs to receive oxygen, Majdalany said.

In the man's case, the doctors suspected that he was born with the condition. However, certain heart problems can also lead to an enlarged right atrium, Majdalany told Live Science. For example, conditions that cause too much blood to flow into the right atrium may lead to enlargement, he said. This is because the chamber needs to make more space to accommodate that extra volume of blood, he said. High pressure in the right chambers of the heart can also lead to right atrial enlargement, he said.

Problems with the valves in the heart (such as a leaky or narrow tricuspid or pulmonary valve), a hole between chambers of the heart, or abnormal vessels draining into the right atrium can cause too much blood to flow into the right atrium and increase the pressure within it, or the chamber size, Majdalany said.

But when the right atrium is enlarged with high pressure, blood doesn't return efficiently to the heart, which can cause pooling and swelling in the lower extremities, as the man in the case experienced. This slowdown in blood flow is what can cause swelling in other parts of the body, as the man in the case experienced. Because the right atrium receives the blood from the rest of the body, a problem with it can decrease blood flow in the vessels that lead to the atrium, including the veins in a person's legs, Majdalany said. Poor blood flow in the legs can result in swelling, he said.

Another problem that arises from slowed blood flow is the risk of clots, Majdalany said. When blood is not moving along, it's more likely to clot, he said.

These clots can form in the legs or the right atrium and travel to the lungs, or if there is a hole between the two atria, to the brain and cause a stroke, he added.

There are different approaches to treating a person with an enlarged right atrium, Majdalany said. The treatment depends in part on whether the patient has symptoms, and in part on what caused the condition in the first place. For example, if the condition is caused by a problem with a valve or excess blood flow into the right atrium, surgeons may repair the valve or re-route the blood flow, Majdalany said. If the condition is caused by a problem with the heart's rhythm, a procedure called "ablation" may be used to correct the rhythm, he said. And in some cases, surgeons can operate to reduce the size of the atrium, he said.

In the man's case, the doctors who treated him did not perform any surgeries, they wrote in their report. The man was given anticoagulants to prevent blood clots and his condition has not gotten any worse in the past year, according to the report.

(Retrieved from https://www.livescience.com/55742-giant-right-atrium-heart.html)

Text 3. No, 'Negative-Calorie' Foods Aren't a Real Thing, Study Says

It sounds like a dieter's dream: Foods that require more calories to digest than they actually contain. But, alas, so-called "negative-calorie" foods are likely a fantasy — according to a new study done in lizards, they don't seem to exist.

The study is one of the first to scientifically test the idea of negative-calorie foods — a popular notion among dieters that's been promoted in forums, blogs and books alike. Some of the most cited examples of purportedly negative-calorie foods include celery, lettuce, grapefruit, cucumber and broccoli. The thinking goes that these low-calorie, high-fiber foods take more energy to digest and process than they themselves contain.

In the new study — published March 24 on bioRxiv, a preprint website for biological studies that have not yet been published in a peer-reviewed journal — the researchers found that even celery provided the lizards with more energy than it took to digest and process the food. On average, the lizards retained about a quarter of the calories in their all-celery meals, while the rest were either used in digestion or excreted.

"Regardless of the [calories] in the food, you're always going to be able to get something out of it," said study senior author Stephen Secor, a professor of biological sciences at the University of Alabama. In the case of foods like celery, "it's not going to be a lot; but the food itself always is going to provide a profit," calorie-wise.

Although the study was conducted in lizards, Secor told Live Science that if studies were done in people, "you probably would come out with something very similar" to the study's results. "It doesn't make sense you would run into a negative," regarding calories, he added.

But even if these foods aren't technically "negative-calorie," eating them could still help you lose weight. That's because, being low in calories, they don't put much of a dent in your daily calorie needs. You'd have to eat an awful lot of celery — nearly 30 lbs. (12.6 kg), according to the researchers' estimates — to offset the number of calories you burn in a day overall.

What's more, a meal of celery is "not going to sustain you for very long," Secor said. Instead, the researchers suggest referring to these foods as "negative budget" foods, since consuming them "will favor a daily negative [calorie] budget, and hence weight loss," they wrote in their paper.

The study has been submitted to the Journal of Experimental Biology and is under review, Secor said.

Negative calories?

Many nutritionists and doctors have been skeptical of the idea of negative calories. For example, the Academy of Nutrition and Dietetics says that foods such as

celery, lettuce and cucumbers still count toward your day's calories, despite containing very few calories. But few studies have put the idea to the test.

In the new study, the researchers used the "bearded dragon" lizard (Pogona vitticeps) for their animal model. Although bearded dragons and people aren't exactly close on the evolutionary tree, they have some things in common: They are omnivores, and have a gastrointestinal tract and digestive process that's similar to that of mammals, including humans, the researchers said. Plus, they don't mind eating a lot of celery.

The study, led by then-undergraduate student Katherine Buddemeyer, used special machines to determine the animals' metabolic rate, as well as how much energy they used to digest and absorb meals of raw, diced celery. They also accounted for how much energy was lost in the animals' urine and feces.

The animals used about 33% of the calories in the meal for digestion, and about 43% were excreted. That meant that the animals retained about 24% of the meal's energy.

Although the study looked at only one food in one type of animal, the researchers then made a few assumptions in order to estimate the net energy gain (or loss) that might occur in people if they consumed 10 foods that are often cited as negative calorie. In addition to celery, these foods included broccoli, apples, carrots, grapefruit, tomato, cucumber, watermelon, green leaf lettuce and blueberries.

The researchers assumed that people use about 25% of their meal energy for digestion and absorption of food, (a percentage that's two to three times higher than what has been calculated in most human studies and also likely accounts for the calories burned from chewing.)

Even with very conservative estimates, the researchers calculated that people would retain about 19 to 50% of the calories from these foods.

Still, a meal of 3 kg (6.6 lbs.) of celery would provide only enough fuel to sustain a 60-kg (132 lbs.) woman for less than 6 hours of inactivity, the study said.

This means these foods would likely help with weight loss, as long as a person is substituting them for higher calorie foods in their typical diet. But "adding a handful of celery while eating a Big Mac really isn't going to help," Secor said.

(Retrieved from https://www.livescience.com/65233-negative-calorie-foods.html)

Text 4. Why Did People Take Iodine Pills After Chernobyl Exploded?

In the HBO miniseries "Chernobyl," the Soviet nuclear physicist UlanaKhomyuk (a composite character played by Emily Watson) realizes that there's been a massive release of radioactive material somewhere nearby and immediately pops an iodine pill. She then encourages others she encounters to do the same. So, why that pill? How does a simple element like iodine protect against radiation?

The short answer is that it doesn't have any direct anti-radiation effects, but might offer some indirect protection. Iodine doesn't ward off free-flying neutrons or remove radioactive dust from drinking water. It does however change how your body behaves, in ways that can reduce the risk radioactive materials pose. Here's how:

Under normal circumstances, your body is fairly iodine-greedy. Your thyroid needs the chemical, and without iodine, the thyroid can't produce the hormones it usually does. People with severe iodine deficiencies develop enlarged thyroid glands, or goiters. Very young children with iodine deficiencies can even develop intellectual disabilities, according to the American Thyroid Association. In the U.S. and other parts of the world, iodine gets added to table salt to prevent these issues.

But iodine, like all basic elements, comes in different "isotopes," or versions of the element. Every isotope of iodine has the same number of protons (53), but the number of neutrons varies. In its natural state, Earth has only one isotope of iodine: iodine-127, which has 53 protons, 74 neutrons and negligible radioactivity. But as

uranium atoms shatter in the core of a nuclear reactor, they split into smaller atoms, most notably iodine-131.

The difference between iodine-127 and iodine-131 is small, just four neutrons. But iodine-131 is radioactive, firing off neutrons and rapidly decaying, with a half-life of just eight days, meaning half of it will remain after that time. Your body can't tell the difference between these two isotopes, though, and your thyroid gland will hungrily absorb as much iodine-131 as it does iodine-127. And once absorbed, that iodine will sit in your body, spewing radiation into the surrounding tissue and damaging DNA. Taking a large dose of iodine, in theory, will sate your body's hunger for the substance and prevent you from absorbing the iodine-131 once it arrives.

It's best to act quickly though. Iodine-131 is "highly mobile" in its environment, Kathryn Huff, a nuclear reactor engineer and University of Illinois at Urbana-Champaign professor, told Live Science for a previous article. The substance enters the water, where plants pick it up and pass it on to animals. Once the radioactive iodine has been released, it's very difficult to get rid of until it decays away.

Nuclear accidents are still (fortunately) rare enough that there haven't been very conclusive studies on the results of radioactive iodine exposures. But after Chernobyl, the most significant release of radioactive iodine ever, there was a spike in thyroid cancer in children in the affected area.

According to a paper published in April 2000 in the journal Reviews in Endocrine and Metabolic Disorders, thyroid cancer rates across Ukraine in children under age 15 spiked from less than 1 in 1 million to 3 per 1 million. In Belarus, they spiked to 30 per 1 million. And in Gomel Oblast in Belarus, one of the worst-hit regions, thyroid cancer rates in children spiked to 100 per 1 million. (Chernobyl was just 12 miles from the Belarus border.) Elevated cancer rates appeared just four years

after the accident, and children born after the explosion developed thyroid cancer at normal rates.

It's unclear, the authors wrote, to what degree iodine pills saved lives. Potassium iodide was distributed after the accident, the authors noted, but that effort "was not begun until several days after the accident, and its use was very erratic."

People living in the area may have also been unusually susceptible to poisoning via radioactive iodine, the researchers wrote.

"The mild iodine deficiency in the region surrounding Chernobyl could ... have affected the radiation dose," they wrote, "by increasing the amount of iodine accumulated and increasing the size of the gland in which it was deposited, and it might also alter the radiation effect itself."

While it may remain unclear just how many lives iodine pills can save after a nuclear disaster, it's still standard practice in the U.S. to distribute the pills to people living near a nuclear plant. In the event of an emergency, according to handbooks distributed by the U.S. Nuclear Regulatory Commission, safety officials will instruct people in the affected area to take the pills.

(Retrieved from https://www.livescience.com/65634-chernobyl-explosion-nuclear-disaster-iodine.html)

Text 5. Why Breathing Deeply Helps You Calm Down

Deep breaths can settle your nerves, and now scientists have discovered the neural pathway in the brain that controls this process.

In an experiment on mice, scientists identified a circuit of neurons — a tiny cluster of a mere 350 nerve cells, among millions in the mouse brain — that regulate the connection between breathing and the higher-order brain activity that affects how calmly or worked up the mice behaved.

When the scientists removed these cells, they found that the mice still breathed normally, but they were uncharacteristically calm. This discovery, the researchers said, may someday lead to therapies to help people who have anxiety, stress and panic attacks.

Breathing is largely an unconscious, involuntary action that's among the most basic rhythms of life. It is the process in which most animals inhale oxygen to create energy at a cellular level and then exhale carbon dioxide, the byproduct of this cellular respiration.

Yet humans have known for millennia that taking long, slow, deep breaths can have a calming effect and reduce stress. Conversely, panic attacks can cause a person to take short, fast breaths, further exacerbating the sense of unease.

Researchers have known that neural circuits throughout the brain regulate breathing, but until now, they had not pinpointed the neural pathway that connects breathing to the emotional states of anxiety and calmness.

In the new work, a team led by Dr. Mark Krasnow, a biochemistry professor at Stanford University School of Medicine in Stanford, California, searched the main region of the brain that controls breathing rhythms — called the pre-Bötzinger complex — which is nestled in a rudimentary section of the brain stem called the pons. In an experiment that was the culmination of years of work involving techniques such as neural mapping and genetically engineered mice, Krasnow's team zeroed in on the responsible circuitry.

The team found a subset of neurons in the pre-Bötzinger complex that transmits signals to a region in the pons that moderates feelings of alertness, attention and stress.

They also found that these neurons express two proteins, cadherin-9 (CDH9) and developing brain homeobox protein 1 (DBX1), which are controlled by the Cdh9 and Dbx1 genes, respectively.

The researchers then turned to genetically engineered mice, in which they could mute the Cdh9 and Dbx1 genes. This enabled the researchers to select and kill the approximately 350 neurons that are thought to connect breathing to arousal, yet leave all the other neurons untouched, according to the study's lead author, Dr. Kevin Yackle, an assistant researcher at the UCSF School of Medicine. Afterward, the researchers found that the mice spent more time in a calm state.

Although deep breathing is an easy and safe way to control anxiety and stress, Yackle sees potential for developing medicines that target these genes.

"In panic disorders, it may be nearly impossible for one to control breathing," Yackle told Live Science. "Therefore, a pharmacological approach may be critical for preventing these panic attacks triggered by hyperventilation."

Yackle also said that sudden infant death syndrome (SIDS) may result when the brain doesn't sense a lack of oxygen while the infant is sleeping, and thus doesn't arouse the body. Some babies may be at higher risk for SIDS for reasons of genetics or because they were born prematurely. In these cases, babies at the highest risk for SIDS might benefit from a therapy that improves the neural signaling between oxygen intake and arousal, Yackle said.

(Retrieved from https://www.livescience.com/58480-why-breathing-deeply-helps-you-calm-down.html)

Text 6. Difference Between Bacterial And Viral Infections

Diseases attributed to infections have plagued majority of the human population at some point of their life. While some of them might have been bacterial, the causative factor behind the others is virus. Common people fail to make out the differences between the infections caused by bacteria and virus, thus confusing one with the other. However, it is very important to make a clear-cut distinction between bacterial and viral infection for their proper treatment.

Difference Between Bacterial and Viral Infections In Terms Of Definition

Though there are a lot of similarities between bacterial and viral infections, the causative factor behind both being microbes – bacteria and viruses, there are certain differences between the two infections that one needs to be aware of.

Bacterial Infections: As is evident by the very term, bacterial infections are caused by bacteria. Bacteria may be defined as a single-celled microorganism that has the capability of thriving under a varied range of environmental conditions. Though a majority of the bacteria residing in our system are beneficial, there are bacteria that can cause a number of diseases. These are termed as pathogenic bacteria. It is this pathogenic bacterium that causes bacterial infections. They gain access to the body under favorable conditions and begin multiplying and crushing the immune system of the body, upon which the person succumbs to bacterial infections.

Viral Infections: Viral infections, on the other hand are caused by viruses, which may be defined as microorganisms that replicate inside the living cells of the body, termed as host cells. Viruses gain access to the living cells, thereafter, taking control of the cell mechanism, directing it to produce viruses.

Differential Symptoms: Difference Between Bacterial and Viral Infections Based on Symptoms

Before describing the difference in the symptoms between bacterial and viral infections, let’s take a look at some similar symptoms between both the bacterial and viral infections which include: fever, coughing, sneezing, inflammation, fever, vomiting, diarrhea, cramping and fatigue.

Certain diseases, such as pneumonia, diarrhea etc., can be attributed to both bacteria and viruses. However, there are certain distinctions in terms of symptoms between the two- while the symptoms of viral infections are widespread; those of bacterial infection are more localized in nature. While viral infections are generally operational in the respiratory tract of the body, bacterial infections can affect the skin,

genitals and the intestines. However, a correct assessment may be made only after conducting certain pathological tests.

Spreading/Contamination Difference: Difference in the Spreading of Bacterial and Viral Infections

Both bacterial and viral infections can only affect the body, when they have successfully gained access to the biological system and have taken control of the mechanism causing considerable harm to the body.

Bacterial Infections: There are a number of ways in which pathogenic bacteria can enter the body, some of which are:

- Consumption of contaminated water and food can cause bacterial infection.
- Bacterial infection can spread via coming in contact with the feces of the infected person.
- Inhaling the contaminated droplets of the infected person after he/she sneezes or coughs can spread and cause bacterial infection.
- Bacterial infection can spread via open cuts or wounds.
- Bacteria can also enter the body indirectly when the person comes in contact with contaminated surfaces, such as taps, nappies, toys and the like.
- Upon entering the body, the pathogenic bacteria begin to replicate and multiply as soon as it finds favorable conditions, thereby causing bacterial infections.

Viral Infections: Disease causing viruses, on the other hand gain access to the body and spread by means of:

- Coughs, sneezes and vomit spread viral infections.
- Bites of contaminated insects and animals spread viral infections.
- Contact or exposure to contaminated fluids of the body, such as those during sexual intercourse and the like also can spread viral infections.

- Once inside the host cell, the virus takes control of the cell mechanism and directs it in the production of viruses, thereby, causing viral infection and diseases.

Difference In Body Response: Difference Between Bacterial And Viral Infections In Terms Of Reaction Of The Body

Bacterial Infections: The biological system is fashioned in a way that reacts differently to the attack of bacteria and viruses. In case of contamination by bacteria, the body increases the flow of blood to the infected area of the body thus, leading to inflammation as a way of reaction to the bacteria. The immune system produces antibodies, which then, latches to the pathogen, thereby, catalyzing its destruction. These antibodies also contribute significantly towards the destruction of certain pathogens, such as Diphtheria and Tetanus.

Viral Infections: Since viruses take refuge inside host cells, it becomes difficult for antibodies to destroy them. However, our body produces certain distinctive immune cells, called T-lymphocytes which are capable of recognizing and killing virus-containing cells. After their release from infected cells, these viruses are effectively destroyed by the antibodies produced as a result of immunization or as a reaction to the infection.

Differential Treatment: Difference Between the Treatment of Bacterial and Viral Infections

Bacterial Infection: Medical science has come a long way in terms of treatment of bacterial and viral infections. The manner of treatment of diseases caused by these microbes varies to a considerable extent. Bacterial infection can be easily treated with the help of antibiotics, which destroy the metabolic system of the bacteria. However, bacteria can easily adapt to changing environmental conditions. Hence, the overuse of antibiotics makes them resistant to the same. Under unfavorable conditions, some of the bacteria develop a hard external cover and morph into an inactive state. These are called spores and are harder to kill than the living counterparts.

Viral Infection: Viruses are, however, more difficult to kill as they reside inside the living cell and antibiotics are ineffective when it comes to treatment of viral infections. Since, they reside in the host cells the antibodies produced by the body's immune system find it difficult to destroy it. Patients suffering from viral infections are prescribed anti-viral drugs, which inhibit the working of the viral enzymes. However, these drugs are effective only on certain diseases, such as influenza, herpes, hepatitis A, B etc. Interferon, a naturally developing protein, which can now be produced artificially, is given to patients suffering from Hepatitis C and other such viral infections.

Prevention from Bacterial and Viral Infections

Observing certain daily- life cautions can also reduce the possibilities of being affected by these microbes to a great extent. These include:

- Observing rules of hygiene- washing hands after coming in contact with infected person or contaminated surfaces helps in preventing bacterial and viral infections.
- Abstaining from smoking, as it weakens the immune system, thereby, making it easier for the microbes to infest the system.
- Ensuring hygienic toilet facilities before and after defecating to prevent bacterial and viral infections.

What are some Common Bacterial Infections?

A majority of the bacteria have been found to be beneficial with only a small percentage being pathogenic in nature. These disease-causing bacteria enter the system and outnumber the healthy bacteria present in the body. Some of the common diseases caused by bacteria are-

- Urinary Tract Infections– caused by Escherichia Coli (E. coli /ˌiː ˈkəʊ.laɪ/ US /ˌiː ˈkoʊ.laɪ/ - abbreviation for Escherichia coli: a bacterium (= small organism) that can exist in food that has not been cooked enough and can cause serious illness or death

- Whooping Cough– caused by Bordetella Pertussis
- Tuberculosis /tjuːˌbɜːkjuˈləʊsɪs/ - caused by Mycobacterium Tuberculosis
- Diphtheria /dɪfˈθɪəriə/, /dɪpˈθɪəriə/ - caused by Corynebacterium Diphtheriae
- Tetanus /ˈtetnəs/ - caused by Clostridium Tetani

What are some Common Viral Infections?

Common viral infections, on the other hand, include:

- Common Cold - a common illness that affects the nose and/or throat, making you cough, sneeze, etc.
- Shingles /ˈʃɪŋglz/ - a disease that affects the nerves and produces a band of painful spots on the skin
- Influenza /ˌɪnfluˈenzə/ - flu
- Herpes /ˈhɜːpiːz/ - one of a group of diseases, caused by a virus, that cause painful spots on the skin, especially on the face and sexual organs
- HIV /ˌeɪtʃaɪ ˈviː/ - the virus that can cause AIDS (the abbreviation for ‘human immunodeficiency virus’)
- Measles /ˈmiːzlz/ - a disease, especially of children, that causes a high temperature and small red spots that cover the whole body
- Rubella /ruːˈbelə/ - or German measles - a mild disease that causes a sore throat (= a painful throat because of an infection) and red spots all over the body. It can seriously affect babies born to women who catch it soon after they become pregnant.
- Mumps /mʌmps/ - a disease, especially of children, that causes painful swellings at the sides of the face and under the ears

Conclusion

Bacterial and viral infections are very common. A large majority of the population have succumbed to them at some point in their lives. Since the many of

the symptoms of bacterial and viral diseases are almost the same, common people are often unable to make a distinction between the two. As a result it often comes in the way of proper treatment of the diseases. Therefore, it is quite imperative that one is well aware of the differences between these two kinds of infections. Noticing the symptoms, causes and location of the affected area can tell which kind of infection it is to some extent. It is important to consult your physician ASAP if your illness is not subsiding. You doctor is the best person to differentiate between bacterial and viral infections and treat you accordingly.

(Retrieved from https://www.epainassist.com/differences-and-comparisons/difference-between-bacterial-and-viral-infections)

Text 7. Even mild COVID-19 can shrink the brain, preliminary research finds

It resembles brain changes seen in older adults.

With more than 18 months of the pandemic in the rearview mirror, researchers have been steadily gathering new and important insights into the effects of COVID-19 on the body and brain. These findings are raising concerns about the long-term impacts that the coronavirus might have on biological processes such as aging.

As a cognitive neuroscientist, my past research has focused on understanding how normal brain changes related to aging affect people's ability to think and move — particularly in middle age and beyond. But as more evidence came in showing that COVID-19 could affect the body and brain for months or longer following infection, my research team became interested in exploring how it might also impact the natural process of aging.

Peering in at the brain's response to COVID-19

In August 2021, a preliminary but large-scale study investigating brain changes in people who had experienced COVID-19 drew a great deal of attention within the neuroscience community.

In that study, researchers relied on an existing database called the UK Biobank, which contains brain imaging data from over 45,000 people in the U.K. going back to 2014. This means — crucially — that there was baseline data and brain imaging of all of those people from before the pandemic.

The research team analyzed the brain imaging data and then brought back those who had been diagnosed with COVID-19 for additional brain scans. They compared people who had experienced COVID-19 to participants who had not, carefully matching the groups based on age, sex, baseline test date and study location, as well as common risk factors for disease, such as health variables and socioeconomic status.

The team found marked differences in gray matter — which is made up of the cell bodies of neurons that process information in the brain — between those who had been infected with COVID-19 and those who had not. Specifically, the thickness of the gray matter tissue in brain regions known as the frontal and temporal lobes was reduced in the COVID-19 group, differing from the typical patterns seen in the group that hadn't experienced COVID-19.

In the general population, it is normal to see some change in gray matter volume or thickness over time as people age, but the changes were larger than normal in those who had been infected with COVID-19.

Interestingly, when the researchers separated the individuals who had severe enough illness to require hospitalization, the results were the same as for those who had experienced milder COVID-19. That is, people who had been infected with COVID-19 showed a loss of brain volume even when the disease was not severe enough to require hospitalization.

Finally, researchers also investigated changes in performance on cognitive tasks and found that those who had contracted COVID-19 were slower in processing information, relative to those who had not.

While we have to be careful interpreting these findings as they await formal peer review, the large sample, pre- and post-illness data in the same people and careful matching with people who had not had COVID-19 have made this preliminary work particularly valuable.

What do these changes in brain volume mean?

Early on in the pandemic, one of the most common reports from those infected with COVID-19 was the loss of sense of taste and smell.

Strikingly, the brain regions that the U.K. researchers found to be impacted by COVID-19 are all linked to the olfactory bulb, a structure near the front of the brain that passes signals about smells from the nose to other brain regions. The olfactory bulb has connections to regions of the temporal lobe. We often talk about the temporal lobe in the context of aging and Alzheimer's disease because it is where the hippocampus is located. The hippocampus is likely to play a key role in aging, given its involvement in memory and cognitive processes.

The sense of smell is also important to Alzheimer's research, as some data has suggested that those at risk for the disease have a reduced sense of smell. While it is far too early to draw any conclusions about the long-term impacts of these COVID-related changes, investigating possible connections between COVID-19-related brain changes and memory is of great interest — particularly given the regions implicated and their importance in memory and Alzheimer's disease.

Looking ahead

These new findings bring about important yet unanswered questions: What do these brain changes following COVID-19 mean for the process and pace of aging? And, over time does the brain recover to some extent from viral infection?

These are active and open areas of research, some of which we are beginning to do in my own laboratory in conjunction with our ongoing work investigating brain aging.

Our lab's work demonstrates that as people age, the brain thinks and processes information differently. In addition, we've observed changes over time in how peoples' bodies move and how people learn new motor skills. Several decades of work have demonstrated that older adults have a harder time processing and manipulating information — such as updating a mental grocery list — but they typically maintain their knowledge of facts and vocabulary. With respect to motor skills, we know that older adults still learn, but they do so more slowly then young adults.

When it comes to brain structure, we typically see a decrease in the size of the brain in adults over age 65. This decrease is not just localized to one area. Differences can be seen across many regions of the brain. There is also typically an increase in cerebrospinal fluid that fills space due to the loss of brain tissue. In addition, white matter, the insulation on axons — long cables that carry electrical impulses between nerve cells — is also less intact in older adults.

As life expectancy has increased in the past decades, more individuals are reaching older age. While the goal is for all to live long and healthy lives, even in the best-case scenario where one ages without disease or disability, older adulthood brings on changes in how we think and move.

Learning how all of these puzzle pieces fit together will help us unravel the mysteries of aging so that we can help improve quality of life and function for aging individuals. And now, in the context of COVID-19, it will help us understand the degree to which the brain may recover after illness as well.

(Retrieved from https://www.livescience.com/covid-19-shrinks-brain)

Text 8. Allergies

On 19 January 1998, the London newspaper The Times reported that a four-year-old boy may have to live the rest of his life on a diet of cauliflower, chips, bread, and bananas because he is allergic to 95 per cent of foods. Eating chocolates, sweets, peanuts, and milk products causes his mouth and throat to swell and his airways to be so constricted that he would die of asphyxiation (lack of oxygen) if he were not treated within minutes. The boy also suffers from eczema and asthma, two common diseases caused by allergies.

What is an allergy?

An allergy is a response to an antigen that, in most people, has no effect.

The response damages tissues in the body. Allergies happen in people who are hypersensitive to the antigen, they develop the allergic response the second or subsequent times they come into contact with the antigen. An antigen that causes an allergic response is called an allergen. The role of mast cells In the 1960s, scientists discovered that an allergic reaction is an exaggerated immune response. On the first exposure to an allergen, B cells differentiate into plasma cells that (with the help of T cells) produce a specific type of immunoglobulin (antibody) called IgE. Individuals with allergies have a genetic predisposition to produce IgE. Once produced, IgE binds to mast cells. These cells are derived from the same cells that form blood cells. They have a large nucleus and they are often amoeboid (they look and move like the unicellular organism Amoeba).

On a second exposure to the allergen, the allergen attaches to the IgE the sensitised mast cells. This causes the lysis (breakdown) of mast cells which release chemicals such as histamine, serotonin, and heparin. These chemicals cause the symptoms of the allergic reaction. Generalised responses An allergy may be generalised or localised. A generalised allergic reaction is potentially fatal. In hypersensitive individuals, the allergen triggers the immediate release of large amounts of chemicals from mast cells. The chemicals act on smooth muscle cells,

typically causing the bronchioles to constrict, restricting the passage of air in and out of the lungs. The chemicals also cause dilation of arterioles (the small vessels leading from arteries into capillaries), greatly reducing arterial blood pressure. Within a few minutes following contact with the allergen the combined effect of these reactions can kill an individual from asphyxiation and circulatory shock. Treatment is by immediate injection of adrenaline. Allergens that can trigger such a generalised allergic response include nuts, drugs (for example, penicillin), and insect venom from the stings of bees, hornets, and wasps. Localised responses: hay fever and asthma.

Examples of localised allergic reactions include hay fever and bronchial asthma. Hay fever (allergic rhinitis) involves the upper airway. The first exposure to the allergen (commonly pollen or the faeces of house dust mites) sensitises mast cells in the mucous membranes of the upper airway, especially the nasal cavity. Subsequent exposure to the allergen typically causes itchy and watery eyes, congested nasal passages, coughing and sneezing. Hay fever can often be relieved with antihistamine drugs.

Asthma (from a Greek word meaning panting') may be brought on by exercise or lung infections, but the most common form results from an allergic reaction in which mast cells in the lower part of the airway release their chemicals. These chemicals cause the bronchioles to constrict and the alveoli to become full of fluid and mucus. This leads to coughing, wheezing, and difficulty in breathing. Common allergens include pollen, fur, feathers, and house dust. In the UK, the number of asthmatics has risen dramatically in recent years so that asthma is now one of the most common childhood ailments. Treatment for asthma includes gentle reassurance to reduce anxiety (asthmatic attacks are made worse by anxiety); bronchodilators (drugs related to adrenaline which dilate the bronchioles, figure 3); and steroids which reduce the inflammatory response. It is vital that asthmatics who use bronchodilators keep them handy for quick use.

In the UK, about 1500 people die of asthma attacks each year. Many of these deaths could probably have been avoided if bronchodilators had been readily available.

(Retrieved from Kent M. Advanced biology. – Oxford University Press, 2004, pp.342-343)

Text 9. Smoking and disease

Many smokers claim that their habit helps them to relax, but health statistics show that this relaxation comes at a high price. In the USA a some other economically developed countries, almost 20 per cent of deaths have been attributed to diseases associated with inhaling the products of combustion from the tobacco plant Nicotiana tobacum. These products include nicotine, carbon monoxide, and tars.

Nicotine

Cigarette smoking (or the passive inhalation of someone else's cigarette smoke) is the most common method of inhaling tobacco smoke, along with cigar and pipe smoking. The nicotine in the smoke gives cigarettes their psychological and addictive effects. It also contributes to some of harmful effects of smoking on the cardiovascular system and the lungs. Studies carried out in the 1980s revealed that nicotine mimics the actions of some neurotransmitters, especially dopamine in the brain and acetylcholine in the parasympathetic nervous system. The dopamine receptors which are stimulated by nicotine are known to be involved in addictions to other substances such as amphetamines and cocaine. The stimulatory action of nicotine on the parasympathetic nervous system has number of effects: it constricts the finer bronchioles in the lungs, reducing air flow in and out of the lungs; it paralyses cilia which remove dirt and bacteria from the trachea; and it raises the blood pressure and heart rate increasing the risk to smokers of cardiovascular disease.

Nicotine also affects hormone production. For example, cigarette smoking lowers blood oestrogen levels and therefore reduces bone mineralisation, increasing the risk of osteoporosis.

Every time a smoker inhales tobacco smoke he or she is poisoning some red blood cells, Like car exhaust fumes, tobacco smoke contains carbon monoxide, which passes into the bloodstream where it can combine irreversibly with haemoglobin to form carboxyhaemoglobin. As haemoglobin has a much higher affinity for carbon monoxide than it does for oxygen, the formation of carboxyhaemoglobin reduces the oxygen-carrying capacity of the blood. Among heavy smokers, this reduction may be as much as 10 per cent, reducing their ability to take strenuous exercise, and accounting for some the breathlessness experienced by smokers.

Cigarette smoke contains tars. These are organic substances which can stick on to cells in the lungs. The most important of these substances are polycyclic hydrocarbons, which can release carcinogenic free radicals into cells, increasing the risk of cancer, especially of the lungs. Lung cancers are slow to develop and by the time they are diagnosed metastasis has usually happened. Free radicals are unstable, chemically incomplete substances that 'steal' electrons from other molecules. They are highly reactive chemicals. It appears that antioxidants in our diet (especially vitamins AC, and E) mop up free radicals, enabling us to cope with small amounts of them, but large amounts of free radicals can damage chemicals such as enzymes, reducing their effectiveness. Free radicals can also damage DNA, disrupting the delicate store of information; this may lead to the development of cancers. Medical scientists believe that free radicals contribute to at least 50 other major diseases including atherosclerosis, heart disease, rheumatoid arthritis, and lung disease. They may even accelerate the ageing process. In addition to smoking, our exposure to free radicals can be increased by pollution, certain food additives, and ultraviolet light. The high content of free radicals in tar may explain why smokers break down vitamin C much faster than non-smokers. In the UK, it is estimated that the vitamin C

requirements of smokers may be twice as much as for non-smokers and make conditions such as pneumoconiosis (see right) much worse. The tars in cigarette smoke can also indicate and damage lung tissue both mechanically and chemically. This can lead to emphysema or bronchitis. Emphysema is characterised by chronic breathlessness, caused by a gradual breakdown of the thin walls of the alveoli, decreasing the total surface area for gaseous exchange. Bronchitis is an inflammation of the lining of the air passages, which may be acute or chronic. Acute bronchitis usually lasts a few days and is commonly associated with colds. Chronic bronchitis is much more serious and is often due to tars in cigarette smoke irritating the bronchiole walls and triggering an inflammation response. Chronic bronchitis is responsible for about 30 000 deaths each year in Britain; the death rate is about six times higher among smokers. The coughing associated with bronchitis usually contributes to the development of emphysema.

The problems of addiction

In the UK, each packet of cigarettes comes with a government health warning and everyone is aware of the health hazards. Some ignore them, but others take heed and try to stop smoking, However, the nicotine in cigarettes makes smoking highly addictive and it is difficult to 'kick the habit'. Smokers who try to give up commonly suffer withdrawal symptoms including a persistent craving for tobacco, irritability, poor concentration, and weight gain. The symptoms can be relieved by using nicotine patches or chewing gum containing nicotine. These devices often help smokers to reduce the number of cigarettes they smoke or to stop smoking, so removing their exposure to carcinogenic tarry substances (nicotine is not thought to be carcinogenic), but they do not remove the harmful effects of nicotine on the cardiovascular system. Tobacco smoking is a major preventable factor leading to disease and death. There are other less lethal ways of relaxing than by the consumption of a cocktail of carcinogens. The easiest way to avoid the health risks associated with smoking is

never to start smoking in the first place, and to avoid areas where heavy smoking occurs.

(Retrieved from Kent M. Advanced biology. – Oxford University Press, 2004, pp.350-351)

Text 10. Haemoglobin

Blood is the main transport medium for respiratory gases. Most of the carbon dioxide excreted by cells is transported in solution as hydrogen carbonate ions. Oxygen does not dissolve well in water and only a very small amount is carried in solution. Most of the oxygen supplying mammalian cells is carried around the body by haemoglobin. The total haemoglobin content of blood is about 750 g, which is normally confined within red blood cells.

The structure of haemoglobin

Haemoglobin is a conjugated protein. The protein part consists of four polypeptide chains. These chains are of two types called alpha and beta. They are about the same length but have slightly different compositions. Each chain is combined with a non-protein prosthetic group called haem. Haem consists of an atom of iron enclosed in ring structure. Each haem group can combine with one molecule of oxygen. This process is called oxygenation. Each molecule of haemoglobin can therefore combine with a maximum of four molecules of oxygen.

Oxygen dissociation curves

The degree of oxygenation of haemoglobin is determined by the partial pressure of oxygen p(o2) in the immediate surroundings. If p(o2) is low, haemoglobin carries a relatively small amount of oxygen; if p(o2) is high, haemoglobin becomes almost saturated with oxygen. An oxygen dissociation curve shows the degree of haemoglobin saturation with oxygen plotted against different values of p (O2). The curve is an S- or sigmoid shape. At p(O2) close to zero there is

no oxygen bound to the haemoglobin. At low p(O2), the polypeptide chains are tightly bound together, making it difficult for an oxygen molecule to gain access to the iron atoms, and the curve rises only gently. As one molecule of oxygen becomes bound to one haem group, the polypeptide chains open up, exposing the other three haem groups to oxygen. This makes it much easier for them to become oxygenated, and the curve rises steeply. At very high p(O2), the haemoglobin becomes saturated and the curve levels off. The oxygen dissociation curve is steep within the narrow range of p(o2)s in the body. The percentage saturation of haemoglobin in this range varies greatly small changes in p(O2). This means that oxygen readily combines with haemoglobin in the lungs, where p(o2) is higher and is readily released from haemoglobin in the tissues, where p(O2) is lower.

Carbon dioxide and the Bohr shift

Unloading of oxygen in the capillaries of tissues is helped relatively high concentrations of carbon dioxide produced by cellular respiration. Carbon dioxide reduces the affinity of haemoglobin for oxygen at p(O2)s in the body. This therefore shifts the oxygen dissociation curve to the right. This effect is known as the Bohr shift or Bohr effect. The Bohr shift results from the way in which carbon dioxide is transported in the blood. About 5 per cent of carbon dioxide is carried in solution as molecular carbon dioxide, and a small percentage combines with amino groups in haemoglobin to form carbaminohaemoglobin. However, carbon dioxide is carried mainly in solution a hydrogen carbonate ions. Most hydrogencarbonate ions are formed by a series of reactions in red blood cells. First carbon dioxide (CO2) diffuses into red blood cells where it is converted into carbonic acid. This reaction is catalysed by the enzyme carbonic anhydrase. Carbonic acid dissociates, forming protons (H+) and hydrogen carbonate ions (HCO3-). The hydrogencarbonate ions diffuse out of the cell. They are transported in solution in the plasma. Chloride ions (Cl-) diffuse inwards from the plasma to maintain electrical neutrality. This process is called the chloride shift. The protons left inside the cell are mopped up by haemoglobin to form

haemoglobinic acid. This forces the haemoglobin to release its oxygen load, hence the Bohr shift.

By taking up excess protonshaemoglobin is acting as a buffer. This is important in preventing the blood from becoming too acidic.

(Retrieved from Kent M. Advanced biology. – Oxford University Press, 2004, pp.128-129)

Text 11. Lipids

Lipids are a diverse group of compounds which are insoluble in water but dissolve readily in other lipids and in organic solvents such as ethanol, chloromethane, and diethyl ether. Lipids, all contain carbon, hydrogen, and oxygen, though the proportion of oxygen is lower than in carbohydrates.

Fats and oils

Triglycerides (called triacylglycerols by chemists) are lipids made from glycerol and fatty acids. Triglycerides are also called true fats or neutral fats. Glycerol is an alcohol that contains three carbon atoms each linked to a hydroxyl group. A fatty acid has a long chain of hydrogen and carbon atoms (a hydrocarbon chain) ending in an acidic carboxyl (-COOH) group. The carboxyl group ionizes in water to release a hydrogen ion (proton), which gives fatty acids their acidic properties: -COOH = -COO+H.

A triglyceride is formed when each hydroxyl on the glycerol molecule combines with a carboxyl group on a fatty acid molecule, in a reaction called a condensation. Water is removed and an ester bond is formed. Triglycerides are sometimes referred to under the umbrella term “fats”. Sometimes they are according to their physical state: those that are liquid at room temperature (20 C) are called oils; those that are solid are called fats. Each molecule of a fat or oil is made up of glycerol combined with three acids which may all be the same, or may be different.

Fatty acids may be saturated or unsaturated. In a saturated fatty acid, each carbon atom in the hydrocarbon chain is linked to a carbon atom on either side and also to two hydrogen atoms. The carbon atoms are bonded to the maximum number of other atoms. Saturated fatty acids have only single bonds in the hydrocarbon chain. This makes the chain relatively straight so that triglycerides that contain only saturated fatty acids are to pack closely together. Thus, triglycerides of saturated fatty acids tend to be solid ("fats") at room temperature.

In an unsaturated fatty acid, such as oleic acid (a major constituent of olive oil) the carbon atoms in the hydrocarbon chain are not bonded to the maximum number of other atoms. Two or more carbon atoms have double bonds between them. Fatty acids with one double bond are called monounsaturated fatty acids: those with two or more double bonds are called polyunsaturated fatty acids.

The atoms around a double bond may be arranged in either the cis-form or the trans-form. Triglycerides with a high proportion of unsaturated cis-fatty acids tend to be oils because the cis-double bonds kink the hydrocarbon chain, which prevents the molecules from packing closely together. This means the attractions between the molecules are very weak, so the substance is a liquid rather than a solid. Triglycerides with more unsaturated trans-fatty acids tend to be solids because the hydrocarbon chains are straighter, leading to properties similar to saturated fatty acids.

Functions of fats and oils in living organisms

Triglycerides have a higher proportion of hydrogen than either carbohydrates or protein, making them a more concentrated source of energy: each gram of fat or oil yields about 38 kJ, more than twice the energy yield of a gram of carbohydrate. In mammals, excess fat is laid down for storage in special connective tissue (called adipose tissue) under the skin. As well as being an energy store, fats and oils have other functions, including:

- heat insulation – fat is a bad conductor of heat; mammals tend to increase their adipose tissue in winter to reduce heat loss;

- shock absorption –delicate mammalian organs such as the kidneys which are vulnerable to knocks and bumps have relatively thick layers of fat around them;
- buoyancy – many single-celled aquatic organisms produce an oil droplet to aid buoyancy.

Dietary fat in also a source of fatty acids and of phospholipids, which have a number of essential functions.

Phospholipids form a major part of cell membranes including the myelin sheath nerve fibres that allows the rapid conduction of nerve impulses. Phospholipids consist of glycerol attached to two (not three) fatty acid chains. The third hydroxyl group of glycerol combines with phosphoric acid to form a polar group.

Schematic diagrams such show a phospholipid as a tadpole-like structure with the phosphate forming the head and the fatty acid chains a double tail. The polar head is strongly attracted to water: it is hydrophilic ("water-loving"). The non-polar tail, being made up of hydrocarbon chains, is oily and therefore repelled by water: it is hydrophobic ("water-hating"). The phospholipid molecule is said to be amphipathic: that is, one end is hydrophilic and the end is hydrophobic.

In water, phospholipid molecule collect together in a single (monomolecular) layer with the hydrophilic heads poking into the water. In cells, both the intracellular environment and immediate external environment are watery. This causes phospholipids to form a double layer, with the hydrophobic tails pointing inwards, away from the watery environment. The phospholipid bilayer gives cell membranes their fluid properties and allows lipid-soluble substances to pass easily through them.

Waxes, cholesterol, and steroids.

Apart from triglycerides and phospholipids, other lipids include waxes, cholesterol, and steroids. Waxes are similar to triglycerides, but contain fatty acids bonded to long-chain alcohols rather than to glycerol. Waxes are usually relatively hard solids at 20 C, providing protection and waterproofing on the surfaces of insects and leaves.

Steroids contain four rings of carbon and hydrogen atoms with various side chains. Many animal hormones are steroids, including oestrogen and testosterone, which are made from cholesterol, a lipid which shares the same four-ring structure.

Cholesterol is also a raw material for the manufacture of vitamin D. It is a vital component of mammalian cell membranes, strengthening the membranes at high body temperatures.

(Retrieved from Kent M. Advanced biology. – Oxford University Press, 2004, pp. 29-31)

Text 12. Surprising health benefits of donating blood

Every two seconds someone in the U.S. needs blood. Every day, roughly 36,000 units of red blood cells are needed in the U.S., the Red Cross reports. Simply put, that's a lot of blood.

The benefits of giving blood

1. Giving blood can reveal potential health problems

While it isn't the same thing as a trip to the doctor, donating blood can be another way to keep an eye on your cardiovascular health. You'll receive a mini-physical prior to the blood draw, in which someone will check your pulse, blood pressure, body temperature, hemoglobin and more. This can sometimes shed light on issues you didn't even know about.

2. Giving blood can reduce harmful iron stores

One in every two hundred people in the U.S. is affected by a condition called hemochromatosis and most don't even know it, according to Patenaude. Hemochromatosis is a disease that causes an iron overload and is labeled as the most common genetic disease among Caucasians by the Mayo Clinic.

3. Giving blood may lower your risk of suffering a heart attack

Donating blood at least once a year could reduce your risk of a heart attack by 88 percent, according to a study conducted by the American Journal of Epidemiology.* This relates to the iron issue again, says Dr. David Dragoo, healthcare expert at Money Crashers.

Dr. Dragoo explains that high levels of iron in the blood constrict your blood vessels and create more risk of a heart attack. Depleting those extra iron deposits by donating blood gives your vessels more room to operate.

4. Giving blood may reduce your risk of developing cancer

In an average, completely healthy person, the link between giving blood and decreased cancer risk is slim. But research does support a reduced risk of cancer for blood donors with different maladies, one of which is hemochromatosis.

Phlebotomy (the process of drawing blood) was found to be an iron-reduction method that is associated with lower cancer risk and mortality, according to a study published by the Journal of the National Cancer Institute. The study focused on patients affected by peripheral arterial disease (PAD), which the Mayo Clinic describes as a common circulatory problem. PAD patients who regularly donated blood had a lower risk of developing cancer than those who did not.

5. Giving blood can help your liver stay healthy

Another danger of iron overload is the health of your liver. “In recent years, nonalcoholic fatty liver disease (NAFLD), the hepatic expression of metabolic syndrome, has reached epidemic proportions,” reports the National Center for Biotechnology Information.

Research has linked too much iron with NAFLD, Hepatitis C and other liver diseases and infections. Though there are many other factors involved in these problems, donating blood can help relieve some of those iron stores and avoid extra issues in your liver.

6. Giving blood can help your mental state

While there are several physical benefits to donating blood, the most powerful health benefit is arguably in the psychological realm. Donating blood means that someone (or multiple people) somewhere will be getting the help they desperately need.

Donating blood, especially on a regular basis, can be similar to volunteer work. You give of your time (and your literal blood) to help strangers in need. If you go to specific blood donation location each time, you'll get to know some of the staff who are also dedicating themselves to the cause of saving lives.

(Retrieved from https://www.rasmussen.edu/degrees/health-sciences/blog/surprising-health-benefits-of-donating-blood/)

Text 13. Too Much Tech Tied to Carpal Tunnel Syndrome

College students who are glued to their devices may show early signs of developing the painful condition carpal tunnel syndrome, a new study suggests.

Researchers found that young adults who spent an average of 9 hours a day using mobile phones, tablets, gaming consoles and computers reported more pain in their wrists and hands than their peers who spent less time each day using electronic devices. The findings were published online Wednesday (June 21) in the journal Muscle & Nerve.

Carpal tunnel syndrome is a nerve-related condition that causes numbness, tingling and pain in the palm of the hand and wrist. It occurs when there is swelling in a narrow passageway in the wrist known as the carpal tunnel, which puts pressure on the median nerve, a major nerve in the hand.

Students in the study who used their devices intensively had changes in both the size and shape of the median nerve, and changes in a ligament called the transverse carpal ligament, the study found. These changes closely mirror the symptoms of people with carpal tunnel syndrome, said study author Peter White, an

assistant professor of health technology and informatics at the Hong Kong Polytechnic University.

This means that intensive users may be at greater risk of developing carpal tunnel syndrome, White told Live Science.

In the new study, the researchers analyzed data collected from 48 college students, ages 18 to 25. Besides completing a questionnaire describing how much time they spent using electronic devices in the past year, participants also reported whether they had any pain or discomfort from using these devices.

The researchers defined "intensive" users as those who said they used their electronic devices for at least 5 hours a day. Half of the participants fell into this group. When the researchers calculated how much time these students actually spent using their devices, they found the average was about 9 hours a day. Those who were not intensive users spent about 3 hours a day, on average, using their devices.

About 92 percent of intensive users complained of pain or discomfort in their hands or wrists, but only 25 percent of less frequent users experienced pain, according to the findings.

Experts have been concerned that young people's use of devices could bring on carpal tunnel syndrome, but so far, most studies that have looked at this have focused on smartphone use, the researchers wrote in their study. In the new study, the researchers looked at young adult's use of a slew of devices, and used ultrasounds to spot any problems within the hands at an early stage to get a better idea of the problem.

The researchers noted that their study was relatively small and included a relatively homogeneous group of participants; all were college students in Hong Kong. Further studies are needed to confirm the results, the researchers said.

Prevention tips

Physical exams and ultrasound imaging of the hands and wrists showed that men and women who logged excessive hours on their electronic devices had median nerves that were swollen and flattened. This can lead to uncomfortable symptoms.

In addition, frequent users had transverse carpal ligaments that were thicker and showed signs of bowing. This may indicate an increase in pressure inside the carpal tunnel and subsequent compression, or squeezing, of the median nerve, White said.

All that swiping, tapping, clicking, scrolling and pressing of game buttons led to pain not only in the hands and wrists of device enthusiasts, but also in other places on their bodies, including the shoulders, necks, upper and lower backs, and elbows, the study found.

Texting, playing games, typing and browsing the internet all involve repetitive movements, and when these movements are done for long periods of time, they can cause injuries, White said.

Young people are avid users of electronic devices. In fact, in one of his previous studies, White said that out of 500 college students surveyed, only 10 percent reported they used these handheld devices for less than 5 hours a day.

Given the increasing and extended use of electronic devices among many age groups, White offered the following tips to help prevent carpal tunnel syndrome.

- Keep wrists flat. Maintaining the wrist in a straight position can reduce stress on the median nerve, White said.
- Pay attention to form and posture. Loosen up tight grips on gaming devices and avoid applying too much force when typing. Avoid keeping the thumb and fingers in a flexed position for long periods of time. This advice is especially important when using only a single hand on a device, White said.
- Take frequent breaks. Build in regular rest periods to gently stretch out your hands (and the rest of your body) and give them a break from constant activity,

White said. He recommended taking a 5-minute break for every 30 minutes of device use.

(Retrieved from https://www.livescience.com/59637-tech-use-tied-to-carpal-tunnel-syndrome.html)

Text 14. Respiratory infections

1. Common cold

What is it? Inflammation of the mucous membranes that line the nose.

Symptoms. The medical term, viral rhinitis, may not be so familiar, but the symptoms are a runny nose and sneezing. About half the time a cold causes a sore or scratchy throat, and that's often the first symptom, although by the second or third day, the nasal problems predominate.

Causes. Over 200 different types of viruses have been linked to colds, but they all produce similar symptoms. That's partly because symptoms come from a general immune response to an infection of the respiratory tract, not direct damage that might be the signature of certain viruses. Between 30% and 50% of colds are caused by rhinoviruses.

Treatment. The cure for the common cold remains simple, so for now, treatment is about easing symptoms. The cough suppressants in many over-the-counter cold medicines haven't proved to be any more effective than placebos in clinical trials.

2. Sinusitis

What is it? Inflammation of the membranes lining the sinuses.

Symptoms. Uncomfortable pressure in the face that feels painful is the main symptom. The location varies with the sinuses involved; for example, pain in the forehead is an indication that the frontal sinuses are affected, and if it's in the upper jaw and teeth, the maxillary sinuses in the cheeks. Like a cold, sinusitis causes nasal

congestion because of excess mucus production and swollen nasal membranes. Indeed, sinusitis often feels like a cold that just won't go away.

Causes. Your sinuses are like little caves in the bones around your eyes and nose. They're lined with membranes that produce thin, watery mucus that drains through tiny openings called ostia. If those ostia get blocked, fluid and mucus build up, creating a nice, cozy place for bacteria, which are naturally present, to multiply. The body responds to the increased numbers with inflammation and swelling that produces the painful pressure and other symptoms. But only a small fraction of colds — about one in 100 — lead to sinusitis.

3. Pharyngitis

What is it? Inflammation of the structures of the pharynx, or back of the throat, which include the back of the tongue and the tonsils. Strep throat is the form of pharyngitis caused by streptococcus bacteria.

Symptoms. In plain English, pharyngitis is a sore throat. If it's caused by a viral infection, the symptoms are pain with swallowing, a runny nose, hoarseness, and — in children — diarrhea. If it's a bacterial infection, the symptoms are a fever and swollen lymph nodes in the neck, usually without a runny nose or cough.

Treatment. If it's viral pharyngitis, the treatment is what doctors call "nonspecific": rest, pain relievers, salt-water gargles, throat lozenges, and chicken soup, if you like. If it's strep throat, antibiotics are effective.

4. Bronchitis

What is it? Inflammation of the bronchial tubes that connect the windpipe (trachea) to the lungs. When people talk about having a chest cold, they're often talking about bronchitis.

Symptoms. A bad cough is the main symptom. It may last for weeks or much longer if the lining of the bronchi remain irritated even after the initial infection was eliminated.

Treatment. Getting warm, moist air into the bronchi by taking hot showers or using a humidifier can ease the symptoms of acute bronchitis.

5. Pneumonia

What is it? An infection and resulting inflammation deep in the lungs, affecting the small air sacs (alveoli) and nearby tissue. "Walking pneumonia" is the term sometimes used for a mild case that doesn't require hospitalization.

Symptoms. The list of symptoms is long and includes fever, chills, cough, and a feeling that you've been drained of all energy. If the pleura (the membrane that surrounds the lungs) is affected, then chest pain that worsens when you take a deep breath or cough can be a problem

Causes. Most pneumonia is caused by bacteria and Streptococcus pneumoniae bacteria are the most common culprits. Treatment. A chest x-ray is often necessary to make a definitive diagnosis. Pneumonia is presumed to be caused by a bacterial infection, so most cases are treated with oral antibiotics right off the bat.

(Retrieved from https://www.nhs.uk/conditions/respiratory-tract-infection/)

Text 15. Ten wacky brain facts about learning

The human brain is a big, complicated organ. Responsible for making sure that pretty much everything in the body works properly, the brain has more computing power than any piece of technology in the world today.

In fact, the brain is so complicated that scientists aren’t even sure how most of it works. We don’t know how memories form, what memories look like, or even how exactly the brain stores them.

With all of that said, there are a few things we know. One of those things is that the brain goes through some interesting changes every time you learn something new. Such as:

1. YOUR BRAIN MOVES

That’s right, your brain is always changing. From about six weeks in the embryo until you die, your brain constantly changes connections and grows new cells.

2. YOUR BRAIN GETS BORED.

Once you’re familiar with a particular subject, your brain actually reduces blood flow to those areas. That leads to daydreaming, attention loss, and general apathy. So that’s why I didn’t do well in Honors American History. I already knew it all!

3. YOUR CELLS CHANGE WHEN YOU LEARN STUFF.

Learning new things actually helps your brain cells do things more efficiently by reinforcing the myelin sheath. Some scientists think this is what causes muscle memory.

4. SLEEPS HELPS YOU REMEMBER THINGS.

Losing sleep can actually lead to worse memory recall. That’s because your brain stores new info while you’re catching ZZZs.

5. YOUR BRAIN ALSO HAS CELLS CALLED GLIA.

Glia, Greek for glue, keep your nerve cells together. They also make your neuron cells more efficient. For a while scientists thought they didn’t really do anything, but it turns out that they help reinforce axons. Shows what they know!

6. IT’S ALWAYS IN FLUX.

Neuroplasticity is the fancy science word for how your brain changes. It doesn’t mean that your noggin is made out of plastic, but it does mean that your cells and their connections are always in flux.

7. YOUR BRAIN ADAPTS TO DAMAGE.

According to Sharpbrains, when you damage portions of your brain, it can re-learn the same tasks in different parts of the brain. It proves that you can teach old dogs new tricks.

8. THE THINGS YOU LEARN MAKE YOUR BRAIN GROW DIFFERENTLY.

Scientists figured out that taxi drivers have a bigger hippocampus than bus drivers. That's because taxi drivers go a different route every day than bus drivers, so they need better spacial awareness.

9. THE BRAIN IS CONNECTED IN INTERESTING WAYS.

Losing a certain sense can change your behavior in crazy and unpredictable ways. Scientists found that people who suffer from vision loss end up losing weight. Why? Because they couldn't see the food as well!

10. USE IT OR LOSE IT.

Your brain never stops growing and changing. That means that your lifestyle can help make sure you preserve your mental acuity. Doing small things like brain games, taking up a new hobby, or learning an instrument are all ways to keep your noggin sharp.

The brain is an amazing piece of biology. Scientists are constantly learning new things about how it works, and that's because the brain never stops working, and it never stops changing. From the nerves to the hippocampus, interesting things are happening all of the time, and it's up to every person to make sure to keep his or brain as healthy and active as possible.

(Retrieved from https://legacybox.com/blogs/analog/10-wacky-brain-facts-about-learning)

Plan to render an article.

Useful word combinations for rendering and discussion

1. The headline of the article. The author. The publication data. – Название статьи. Автор. Источник публикации.

The article I'm going to give a review of is taken from… (the website/ scientific journal) — Статья, которую я сейчас хочу проанализировать из…

The headline of the article is — Заголовок статьи…

The author of the article is… — Автор статьи…

It is written <u>by</u> — Она написана …(автором)

Unfortunately, the author of the article is not mentioned. – Автор статьи не упомянут.

The article is written <u>on</u> the 16th of November – Статья написана … (дата)

The article under discussion is … — Статья, которую мне сейчас хочется обсудить…

2. The topic of the article and logical parts.

The topic of the article is… — Тема статьи

The key issue of the article is… — Ключевым вопросом в статье является

The article under discussion is devoted to the problem… - Статья, которую мы обсуждаем, посвящена проблеме…

The article is about… - Статья о …

The article deals (***is concerned***) with… - В статье рассматривается

The article touches upon the issue of… - В статье затрагивается вопрос о

The purpose of the article is to give the reader some information on… - Цель статьи – дать читателю некоторую информацию о

The aim of the article is to provide the reader with some material on…- Цель статьи – предоставить читателю некоторый материал по

The article under discussion may be divided into several logically connected parts which are…**the introduction, the main part and the conclusion** — Статьяможетбытьразделенананесколькологическивзаимосвязанныхчастей, таких как…(вступление, основная часть, заключение).

3. The content of the article. Summary. – Краткое содержание.

The author starts by telling the reader that — Автор начинает, рассказывая читателю, что

The author (of the article) writes (**reports, states, stresses, thinks, notes, considers, believes, analyses, points out, says, describes, asserts, mentions, explains, outlines, generalizes, reveals, gives a summary, dwells on, exposes**) that…

The author draws reader's attention to… - Автор обращает внимание читателя на

Much attention is given to… - Большое внимание уделяется…

According to … the scientists/ doctor Smith/ the rule/ the results … - Согласно ученым/ доктору Смиту/ правилу/ результатам (когда ссылаемся на кого-то, чьи-то слова или мнения)

The article goes on to say that… - Далее в статье говорится, что

It is reported (shown, stressed) that … - Сообщается (показано, подчеркнуто), что

It is spoken in detail about… - Подробно говорится о…

From what the author says it becomes clear that… - Из того, что говорит автор, становится ясно, что

The fact that … is stressed. - Тот факт, что... подчеркивается, акцентируется.

The article gives a detailed analysis of… - В статье дается подробный анализ

The author gives full coverage to… — Автор полностью охватывает…

The article contains the following facts…./ describes in details… — Статья содержит следующие факты …. / подробно описывает

Further the author reports (**reports, states, stresses, thinks, notes, considers, believes, analyses, points out, says, describes, asserts, mentions, explains, outlines, generalizes, reveals, gives a summary, dwells on, exposes**) that… / draws reader's attention to...

In conclusion the author writes (**reports, states, stresses, thinks, notes, considers, believes, analyses, points out, says, describes, asserts, mentions, explains, outlines, generalizes, reveals, gives a summary, dwells on, exposes**) that… / draws reader's attention to...

In conclusion the author says / makes it clear that…/ gives a warning that… — В заключение автор говорит / проясняет, что … / дает предупреждение, что …

The author comes to the conclusion that…- Автор приходит к выводу, что

4. Your opinion (conclusion) – Ваш вывод, мнение, отношение к вопросам, поднимаемой в статье.

Taking into consideration the fact that — Принимая во внимание тот факт, что

The main idea of the article is — Основная идея статьи (послание автора)

In addition… / Furthermore… — Кроме того

On the one hand…, but on the other hand… — С одной стороны …, но с другой стороны …

Back to our main topic… - Вернемся к нашей основной теме

To come back to what I was saying… - Чтобы вернуться к тому, что я говорил

In conclusion I'd like to… — В заключение я хотел бы …

From my point of view…/ In my opinion/ To my mind… — С моей точки зрения …

As far as I can judge/ see/ know/ understand… — Насколько я могу судить/ /

I fully agree with / I don't agree with -Я полностью согласен с/ Я не согласен с

It is hard to predict the future, but- Трудно предсказать будущее, но...

I have found the article informative/ entertaining/ dull / important / interesting /of great value <u>because</u> … - Я нахожу статью информативной/ развлекательной/ скучной / важной/ интересной/ имеющую большое значение (ценность), потому что …

References

1. Марковина И.Ю. Английский язык : учебник / Марковина И.Ю., Максимова З.К., Вайнштейн М.В.; Под общей ред. И.Ю. Марковиной. - 4-е изд., испр. и перераб. - М. : ГЭОТАР-Медиа, 2013. - 368 с.
2. Налимова И.С. English for Students of Medicine. Part I: учебное пособие по английскому языку для студентов медицинских специальностей высших учебных заведений / И.С. Налимова. - Казань: КФУ, 2016. - 152 с.
3. Bacterial and viral infections [Электронный ресурс] // Режим доступа:https://www.epainassist.com/differences-and-comparisons/difference-between-bacterial-and-viral-infections
4. Benefits of blood donation [Электронный ресурс] // Режим доступа: https://www.rasmussen.edu/degrees/health-sciences/blog/surprising-health-benefits-of-donating-blood/
5. Blood donation. Rh factor [Электронный ресурс] // Режим доступа: https://www.livescience.com/62565-blood-donations-saved-babies-james-harrison.html
6. Brain facts about learning [Электронный ресурс] // Режим доступа: https://legacybox.com/blogs/analog/10-wacky-brain-facts-about-learning
7. Cambridge dictionary [Электронный ресурс] // Режим доступа: https://dictionary.cambridge.org/ru/ (дата обращения 01.02.2022).
8. Carpal tunnel syndrome [Электронный ресурс] // Режим доступа: https://www.livescience.com/59637-tech-use-tied-to-carpal-tunnel-syndrome.html
9. Covid-19 effect on the brain [Электронный ресурс] // Режим доступа:https://www.livescience.com/covid-19-shrinks-brain
10. Deep breathing [Электронный ресурс] // Режим доступа: https://www.livescience.com/58480-why-breathing-deeply-helps-you-calm-down.html

11. Digestive system facts [Электронный ресурс] // Режим доступа: https://www.verywellhealth.com/digestive-system-facts-1944708
12. Earliest dental fillings [Электронный ресурс] // Режим доступа: https://www.livescience.com/58722-earliest-dental-fillings-ice-age-skeleton.html
13. Eating disorders [Электронный ресурс] // Режим доступа: https://www.nimh.nih.gov/health/topics/eating-disorders
14. Expiration dates of medicines [Электронный ресурс] // Режим доступа: https://www.livescience.com/65052-why-do-medicines-have-expiration-dates.html
15. Giant heart atrium [Электронный ресурс] // Режим доступа: https://www.livescience.com/55742-giant-right-atrium-heart.html
16. How hunger hormones control weight loss [Электронный ресурс] // Режим доступа: https://www.endocrineweb.com/news/63844-how-hunger-hormones-control-weight-loss
17. Iodine deficiency after nuclear disaster [Электронный ресурс] // Режим доступа: https://www.livescience.com/65634-chernobyl-explosion-nuclear-disaster-iodine.html
18. Kent M. Advanced biology. – Oxford University Press, 2004. – p. 624
19. Klinefelter syndrome [Электронный ресурс] // Режим доступа: https://www.nhs.uk/conditions/klinefelters-syndrome/
20. Negative calorie foods [Электронный ресурс] // Режим доступа: https://www.livescience.com/65233-negative-calorie-foods.html
21. Oxford Learner’s Dictionaries [Электронный ресурс] // Режим доступа: https://www.oxfordlearnersdictionaries.com/, (дата обращения 26.01.2022).
22. Pharmacy [Электронный ресурс] // Режим доступа: https://www.britannica.com/science/pharmacy

23. Pharmacy. Pharmacist [Электронный ресурс] // Режим доступа: https://www.chemeurope.com/en/encyclopedia/Pharmacy.html#Pharmacists
24. Problems with our teeth [Электронный ресурс] // Режим доступа:https://www.scientificamerican.com/article/why-we-have-so-many-problems-with-our-teeth
25. Respiratory system surprising facts [Электронный ресурс] // Режим доступа: https://www.livescience.com/44105-respiratory-system-surprising-facts.html
26. Respiratory tract infections [Электронный ресурс] // Режим доступа: https://www.nhs.uk/conditions/respiratory-tract-infection/
27. Roos E. M., Arden N. K. Strategies for the prevention of knee osteoarthritis // Nature Reviews Rheumatology. – 2016. – Vol. 12. – №. 2. – pp. 92-101.
28. Six fun facts about the human skeleton [Электронный ресурс] // Режим доступа: https://theconversation.com/six-fun-facts-about-the-human-skeleton-123711
29. Strategies for the prevention of knee osteoarthritis [Электронный ресурс] // Режим доступа: https://www.nature.com/articles/nrrheum.2015.135

Учебное издание

Налимова Ирина Сергеевна

Асмоловская Мария Владимировна

Сахибуллина Кадрия Азатовна

Professional English for Medical Students

Учебное пособие