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ENGLISH FOR BIOTECHNOLOGISTS AND BIOLOGISTS

МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РФ
ФГБОУ ВПО «УДМУРТСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ»
ФАКУЛЬТЕТ ПРОФЕССИОНАЛЬНОГО ИНОСТРАННОГО ЯЗЫКА

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English for biotechnologists and biologists: Английский язык для биотехнологов и биологов

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Пособие нацелено на подготовку студентов к работе со специальной литературой, обучение устным формам общения по научной тематике на материале предложенных текстов, системное развитие коммуникативных способностей студентов, расширение их активного и пассивного лексического и грамматического запаса.

Пособие предназначено для студентов, обучающихся по направлениям, связанным с биологией, биотехнологией, химией, медициной. Учебное пособие предназначено для студентов очной формы обучения, которые продолжают изучение английского языка на основе знаний, приобретенных в средней школе. Также пособие рекомендуется студентам языковых факультетов для переводов текстов естественно - научной направленности.

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Предисловие

Учебное пособие составлено на основе примерной программы Министерства высшего и среднего специального образования РФ по английскому языку для студентов высших учебных заведений неязыковых специальностей, с учетом требований федеральных государственных стандартов (ФГОС). Пособие предназначено студентам (бакалаврам и магистрам), обучающимся по естественно научным направлениям подготовки: биология, химия, биотехнология, а также студентам-медикам.

Пособие является результатом интеграции специалистов языковой подготовки и специалистов в области биологии и биотехнологии. Следовательно, оно позволяет осуществлять целенаправленную языковую подготовку в вышеуказанных областях, с учетом их профессиональной специфики и применение полученных знаний и умений в дальнейшей деятельности.

Учебное пособие предназначено для студентов очной формы обучения, которые продолжают изучение английского языка на основе компетенций, приобретенных в средней школе, и может быть условно разделено на 2 части.

Первая часть – вводная, она включает в себя тексты общего и ознакомительного характера, не имеющие сложных грамматических конструкций и специальных терминов. Целью является повторить, активировать и систематизировать уже имеющиеся знания учащихся.

Соответственно, вторая часть имеет более сложные грамматические конструкции и специализированный словарный запас - термины, необходимые выпускникам данных направлений. Эта часть профессионально ориентирована и включает в себя темы, непосредственно изучаемые студентами биотехнологами и биологами и на родном языке.

Основной целью обучения студентов является достижение ими практического владения английским языком, т.е. компетентное использование языка выпускниками ВУЗа в их практической деятельности. В соответствии с требования ФГОС это включает наличие следующих умений (компетенций):

- владение одним из иностранных языков на уровне не ниже разговорного (лексический минимум в объеме 4000 учебных лексических единиц общего и терминологического характера);

- демонстрация способности к коммуникации и навыкам делового общения на иностранном языке (использование знания иностранного языка в профессиональной деятельности, в профессиональной коммуникации и межличностном общении);

Данное пособие содержит лексико-грамматический материал для профессионального и бытового общения и чтения научной литературы, способствует формированию у будущих специалистов умение работать самостоятельно (реферирование и аннотирование) с научно-популярными и научными текстами по данной тематике; формирует навыки научно-технического перевода и умение

общаться на английском языке.

В каждой главе предлагается новая лексика и термины, упражнения по использованию профессионального лексикона, вопросы на понимание текста и на расширение кругозора учащихся, различные виды чтения (просмотровое, ознакомительное, информативное, аналитическое), упражнения на перевод, творческие задания и задания на написание письменных высказываний.

Главы состоят из разминки в виде общих вопросов, основного текста на определенную тематику, ряда упражнений, способствующих расширению и закреплению активного словарного запаса, навыку говорения, развитию монологической и диалогической речи. Конечный этап работы с текстом - это, как правило, устное изложение на заданную тему с использованием нового лексического материала.

Далее предложен ряд упражнений на повторение грамматики. Грамматические упражнения намеренно используют более простой и иногда отвлеченный словарный запас, чтобы учащиеся могли полностью сконцентрироваться только на грамматических конструкциях. В сочетании со словарным запасом они применяются в конце главы в творческих или письменных заданиях.

Каждая глава также содержит дополнительный текст, соответствующий заявленной теме, и ряд упражнений к нему.

Для полного освоения и корректного употребления лексики студентам предлагается перевести текст с русского на английский язык.

Написание эссе, письма, сочинения, доклада присутствуют в каждой теме, так как умение их составлять и корректно оформлять видится для будущих специалистов необходимым.

В конце каждой главы учащимся предложены творческие задания. Это может быть презентация, дискуссия, разработка проекта или ролевая игра, где студенты вырабатывают коммуникационный навык. Стоит отметить, что такие задания особенно нравятся студентам, так как они имитируют жизненные ситуации и закрепляют словарный запас в игровой форме.

В конце пособия приведены дополнительные тексты на соответствующие разделам тематики, которые, при желании, можно использовать для продолжения уроков или самостоятельной работы учащихся. Предполагается, что они могут быть использованы в качестве дополнительного материала, расширяющего грамматический и лексический запас и кругозор учащихся.

Оригинальность пособия заключается в том, что оно построено по принципу усложнения не только языкового материала, но и материалов, касающихся соответствующей тематики.

В процессе достижения цели обучения, кроме практических задач решаются воспитательные и общеобразовательные задачи, способствующие повышению общего и культурного уровня студентов, расширению их кругозора, всестороннему развитию личности.

Наряду с аудиторными занятиями предполага-

ется обязательная самостоятельная внеаудиторная работа студентов, включающая выполнение домашнего задания, чтение дополнительной литературы, создание презентаций, исследовательскую работу, написание академического эссе и других письменных высказываний с элементами рассуждения.

В пособии использованы тексты и статьи из различных источников, в том числе отечественных и зарубежных учебников и энциклопедий. Список использованной литературы прилагается в конце данного пособия.

Благодарности.

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Авторы признательны всем студентам, которые, не жалея своего времени, бескорыстно помогали нам, и общение с которыми помогло нам наполнить эту книгу практическим содержанием.

Unit 1

Likes and dislikes

1. Speak on the things you like and dislike in general.

2. Categorize your likes and dislikes according to this table and examples given below:

Category	Likes	Dislikes
Music Animals Clothes Books Food	*Rock…*	*Pop…*

3. You start to study biotechnology. Read and translate the text about tastes of one of your colleagues.

Biotechnologist's favorite things

Studying of biotechnology is a very high priority with me, especially as I dreamt to study biology and chemistry in complex from my childhood. So there're times when I break my agenda, go absolutely crazy and escape to my laboratory and work for the whole day without food and sleep. I really enjoy researching of undiscovered things.

I've got a superb laboratory – over 200 various chemical devices as well as chemicals itself – so you can guess that I just adore making experiments. I really like the entire content of my laboratory – all these tubes, shakers, washers, automatic dispensers and photocolorimeters. Ever since I was young I've loved looking at chemical reactions.

I'm very fond of rats and mice – I've got two white mice at home, Arethna and Flossie. I like outstanding scientists and I read their works on brilliant biotechnology. I watch scientific programs on the television, as well. Some of them are wonderful. Also on my list of likes must be Jamaica. I love going on holiday and I go back there as often as I can. I can find many new interesting species of flora and fauna there.

I tend to wear white overall – maybe because I couldn't afford it when I was a school pupil. I like wearing gloves and a mask, but I can't stand gloves when they are torn! One of my pet hates* is when chemist's shops don't have gloves in my size. I think that's really awful.

There're lots of other things I don't like. I detest violence, and the idea of nuclear war is very frightening indeed. I don't mind being interviewed, but I get annoyed when I get too much attention to my personality. I absolutely hate when people say that biotechnology is a boring thing – such people promote ignorance. I'm also not too keen on rude people and Australian soap operas – they are dreadful.

Notes

*pet hates *BrE* /pet peeve *AmE* – something that you strongly dislike because it always annoys you.

Vocabulary

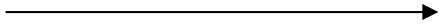
agenda
adore (v)
attractive
awful
baggy suit
be fond of
be keen on
break the rules
brilliant
can't stand
detest (v)
mind (v)
dispenser
dreadful
enjoy (v)
entire content
fantastic
great
hate (v)
high priority
make experiments
outstanding
overall
promote ignorance
scientist
scientific
species
superb
tear (tore, torn) (v)
tube
violence

4. Read the first 3 paragraphs of the text and write down things that a biotechnologist likes. Then read the final two paragraphs and find things that he dislikes.

5. Which of biotechnologist's likes and dislikes do you share with him? List five things that you really like and five that you dislike.

6. Find in the text eight verbs refer to ***likes*** *and* ***dislikes****. Draw a line and write most positive above one end of the line and most negative above the other end. Position the verbs along the line according to how positive or how negative they are.*

Adore



Most positive **Most negative**

7. What famous person would you like to interview? Give reasons for your choice.

Make your own interview with the famous person you like.

8. Give all possible variants & translate them into Russian.

Great (elephant, aim, singer, lection, at painting, grandfather).

9. Paraphrase the following using ***the possessive keys.***

Example: The son of our manager — our manager's son.

1) the clinic of Mr. Smith; 2) a doll of the girls; 3) the works of Rembrandt; 4) a toy of the baby; 5) a meeting of the employees; 6) the bags of those women; 7) the orders of our boss; 8) the books of the

children; 9) the cottage of my parents; 10) a garage of her cousin. 11) the mother of Kate and Mary; 12) the children of my aunt Ann; 13) the paintings by Picasso and Dali; 14) the times of Ivan the Terrible; 15) oil wells of Saudi Arabia.

10. Replace the nouns in the possessive case by the prepositional groups where possible.

Example: He always takes his brothers' bocks. — He always takes books of his brothers.

1) The only thing she wanted was to see her parents' house again. 2) No one could explain the young girl's behavior at yesterday's supper. 3) Last Sunday's rugby match was disappointing. Our team lost. 4) The boy was looking through a children's magazine. 5) After an hour's break we resumed our work. 6) At that time he lived in a little flat for economy's sake. 7) It was four and a half hours' ride. 8) I don't like cow's milk. 9) He was puzzled by Ann and Peter's visit. 10) When Friday came, he was at his wit's ends. 11) She dropped in at the chemist's to buy some aspirin.

11. Remember verb tenses: ***Present Simple*** *and* ***Present Progressive****.*

*Не забывайте, что следующие глаголы не могут использоваться во всех длительных временах:

- глаголы, характеризующие умственную деятельность: know, realize, suppose, understand, believe, remember, forget, think, assume, consider, expect, agree, mean, doubt и др.;
- глаголы эмоций: like, dislike, love, hate, envy, prefer,

wish, want, care идр.;

- глаголы обладания: have, own, belong, contain и др.;
- глаголы чувств: see, hear, smell, taste и др.

12. Find a mistake:

1) Don't speak. The student is working. The student is working for three hours every day.

2) Right now I'm in laboratory. I sit at my workplace. I usually sit at this place.

3) Ali is speaking Arabic. Arabic is his native language, but right now he is speaking English about biopolymers.

13. Open the brackets and put the verb into the ***Present Simple*** *or* ***the Present Progressive****.*

1) Be quiet, please. We (work) with electrophoresis's camera and you (make) a lot of noise. 2) He always (go) for a walk in the evening. 3) Where is Jack? — He (do) chromatography in the laboratory. 4) She (cry). Is something wrong? 5) In the morning I (have) little time, so I (plan) my experiment in the evening. 6) A decade (describe) a period of ten years. 7) Her brother-biochemists (work) in Canada at present. 8) She always (dream) but (do) nothing to realize her dreams. 9) He (be) so suspicious to me at the moment. I wonder why. 10) Hurry up, Jane! We all (wait) for you in laboratory. 11) Turn off the gas. Don't you see water in the tube (boil)? 12) The rats are still ill after experiment but they (get) better gradually. 13) Don't bother her. She (take) her Immunology lesson: she always (take) it in the morning. 14) The living

standards (change). So, every month equipment (get) more expensive. 15) Tom and Mary (leave) for the Netherlands tomorrow. 16) I have just started Biochemistry courses. I (study) modification of proteins. 17) Mercury (boil) at 357.23 degrees Centigrade.

14. Define if the verb tenses in these sentences are correct.

1) I get up at seven in the morning.
2) I'm liking biochemistry.
3) He's knowing interesting thing about biotechnology.
4) I think Mexico's a beautiful country.
5) Universities are staying open late in USA.
6) He's having a flat near the centre.
7) What are you thinking of Watson?
8) Peter's in the laboratory. He makes experiment.
9) What are you thinking about?

15. Translate the following sentences into English:

1) Дважды в неделю он ходит в лабораторию. 2) Студент проводит эксперимент. 3) Вся группа сидит за столом и обсуждает полученные результаты. 4) Мы держим опасные вещества в вытяжном шкафу. 5) Иногда электрофорез идёт весь день. 6) Они редко ошибаются в расчётах. 7) Студент едет в университет. 8) Они ходят в библиотеку каждый день. 9) Мальчик учится. 10)Все любят смотреть на фракталы.

16. Remind ***question formation****. Form the general questions.*

Example: My brother likes skating. — Does my brother like skating?

1) He translates a lot of letters into English. 2) I'm speaking on the phone. 3) Little children like to ask many questions. 4) Now we are carrying out the experiment. 5) She spends a lot of time on her English.

Form the alternative questions.

Example: My brother likes skating (3). —Does your brother like skating or skiing? Does your or his brother like skating? Does your brother or Pete like skating?

1) The film is exciting (2). 2) Thousands of people visits this international exhibition (2). 3) He watches TV every day (3). 4) They are going to the country on Friday (3). 5) She is painting the walls (3).

Form the question tags.

Example: She comes home at 3 pm. — She comes home at 3 pm, doesn't she?

1) They are returning home next month. 2) We are buying a loaf of bread. 3) She opens the window every morning. 4) There is a theatre in the centre of the city. 5) I am right.

S*pecial questions and questions to the subject. Correct the mistakes if any.*

1) How often you have your English classes? 2) What you do at English lessons? 3) What you prepare for your lesson? 4) Who are absent from the previous lesson? 5) How many points you have for your exam? 6) Who you going home with? 7) Who knows this district well?

17. Read the text.

The secret of genius

She looks like any other girl in her first year at school: a smart uniform, a happy smile and a bag of books. But Dineshi, a five-year-old from west London is so clever that she seems almost unreal. With an IQ* of 160, Dineshi knew the alphabet, the days of week and the months of the year when she was one and a half. She started reading just before her second birthday and writing just after it. 'When she was a baby, I realized she was exceptionally bright,' says Dineshi's mother, 'so I tried to provide an environment to help her develop intellectually. I started giving her lessons and she enjoyed them.'

By comparison with the others, such children seem to be incredible intelligent. But according to Professor Michael Howe, a psychologist at Exeter University, they do not have an inborn superhuman talent. Their

remarkable achievements are the result of practice, persistence, and an encouraging environment. The case of Wolfgang Amadeus Mozart seems to support Professor Howe's theory. Mozart was composing music by the age of 5, and at 6 or 7 he was giving professional concerts around Europe. Most people believe that that this was the result of inborn genius. But Professor Howe claims that Mozart's childhood compositions are largely arrangements of other composers' work. Most importantly, his father was an extremely ambitious music teacher who made his son practice more than three hours a day. By the time he was 6, he had probably spent 3,500 hours studying music.

Are geniuses happy? As a child in the early 1900s, Billy Sidis was described as 'the most remarkable boy in the United States'. Brilliant at languages, he taught himself Latin at four and could read and speak 8 languages when he was six. At seven, he gave lecture to the University of Harvard Mathematical Club. He was genius until everything began to go wrong. His parents had to push him to develop his exceptional intelligence, but had totally neglected other important skills. For example, Sidis did not know how to dress himself properly even by the time he was adolescent. Finally, he suffered a breakdown.

There are plenty of people who have high IQs but never achieve anything great. They are bright, but they lack the drive to get on: motivation. Thomas Edison, the inventor of electric light, said genius was 99% perspiration, 1% inspiration. Thus, in conclusion it might be said, we should all be able to excel if we try hard

enough.

*IQ – Intelligence Quotient: a measure if intelligence.

18. Answer the following questions:

1) When did Daneshi start to write?

2) Why can Dineshi be called genius?

3) Who is Professor Howe?

4) How does the case of Mozart support Howe's ideas?

5) What does the example of Billy Sidis show about genius?

6) What skills did Billy Sidis lack?

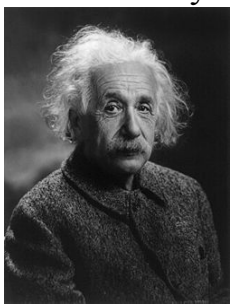
19. Make your own question of different types.

20. Translate the text in your words close to the original.

Ученые нашли возможные причины гениальности Эйнштейна

Изучение фотографий мозга Альберта Эйнштейна выявило необычные анатомические характеристики, которые, возможно, объясняют выдающиеся способности физика.

Самой необычной характеристикой мозга великого физика считалась его масса - 1230 граммов. Это значение близко к нижней границе нормы. Автор исследования Дин Фальк (DeanFalk) заключила, что теменные доли мозга Эйнштейна значительно превосходят по размеру среднестатистические (avarage). Кроме того она установила, что у физика были переразвиты определенные структуры моторной коры, контролирующие движения левой руки. Эти образования обычно связывают с музыкальной одаренностью - они даже получили название музыкальных шишек (сам Эйнштейн с



детства играл на скрипке). Третьей особенностью, выявленной Фальк, стал необычный рисунок бороздок в затылочной области обоих полушарий.

Автор исследования подчеркивает, что утверждение о связи между необычными структурными особенностями мозга Эйнштейна и его гениальными способностями является всего лишь гипотезой.

21. Here is the first chapter of ***one scientist's diary.*** *Here in after you will read it and discover things about this scientist's life. Translate it into English using the words you have learned.*
11.11.2015

День начинается с просмотра последних новостей в мире науки. Обычно я читаю журнал «Вестник Российской Академии Наук», так как хочу быть в курсе событий, ведь я – сотрудник научной лаборатории. Мы с сотрудниками занимаемся разработкой препарата, способного уничтожить раковые клетки и тем самым прекратить развитие заболевания. Часто мы собираемся вместе, чтобы отдохнуть и поделиться новыми идеями.

Пять часов вечера. Нечасто мне удаётся выбиться из лаборатории в такую рань. Обычно в это же время дочь приходит из школы. В отличии от меня, она увлекается точными науками. Мы с женой поддерживаем ее выбор. Мне же сегодня можно отдохнуть (хотя я терпеть не могу попусту тратить время), чтобы завтра с новыми силами начать постановку следующей серии экспериментов.

22. Write a "For" and "Against" essay (200-250 words) on one of the topics according the plan:

1) All our likes and dislikes are influenced by the environment. Agree or disagree.
2) Our future depends on our bringing-up. Agree or disagree.
3) The likes show the man as the morning shows the day.
4) Genius is not an inborn human feature.

The Plan for your "For" and "Against" essay:
Introduction. § 1
– present the topic and state the problem
– make a general remark about it without giving your opinion.
Main Body. § 2, 3
– arguments "for" (3 points)
– arguments "against" (3 points)
(support your arguments with examples)
Conclusion. § 4
– your opinion based on the given arguments

Unit 2

Education

You study at the university. Do you know when your university was founded?

Do you think if you have quite modern education or some things here are much to be desired?

1.Read and translate the text.

The History of Education

As long as we live we continue to learn, and the education we receive when we are young helps us to continue learning. We are taught to read and write, and we are taught many of the essential facts about the world and shown how to sort them out so that the later in life, we shall be able to find out things ourselves and not to ask other people.

The first teachers were fathers and mothers, but very early in the history of man children began to be taught by people other than their fathers and mothers. It is thought that schools first started in Egypt 5,000 to 6,000 years ago, and that it was the invention of writing which made them necessary. Reading and writing were quite different from the skills used in everyday

life, and writing made it possible to store up knowledge which grew with each generation. Specially trained people were therefore needed to teach it.

Only the sons of nobles attended the first Egyptian schools, which taught reading, physical education and good behavior. In ancient India the priestly caste decided what should be taught to each of the four castes, or groups, into which people were divided.

Only the priestly caste was allowed to learn the Hindu scriptures. In China, until 19th century, education was organized according to social classes, and consisted largely of learning the scriptures by heart.

A clear example of the way in which even neighboring peoples produce different types of education came from ancient Greece. Sparta and Athens were two Greek states. To Spartans, hard and warlike people gave a purely military education to their children. At the age of seven all boys of noble families were taken from their homes and sent to live in schools. They were kept under a very strict discipline and were taught hunting, military scouting, swimming and the use of weapons. The Spartans despised literature, and some people think they could not even read.

At the very same time, also for the nobles only, the Athenians were building what we call a liberal education – one that helps a man to develop all sides of his nature, helps him to make and appreciate beautiful things and helps him to find the best way of life. They thought it was important to educate the body as well as the mind, and had a program of physical training which consisted of running, jumping, wrestling and

throwing the discus. As time went on Athenian education paid special attention to reading, writing and literature and these were taught by a special teacher, known as the "grammatist". Common people were not educated; they were trained in craftsmanship, workmanship and trades.

Greek philosophers, or thinkers, always discussed what education should try to do and what it should include. Plato wrote a book called *The Republic*, which is one of the best books ever written on education, and since those days Greek ideas have influenced European education, especially secondary and university education.

The Romans were very good at organizing, and they were the first people to have schools run by government free of charge. Throughout their great empire there was a network of these schools which provided for three stages of education.

At six or seven all boys (and some girls) went to primary school, where they learned "three R's": reading, writing and arithmetic. Most children were not taught more than this; but at 12 or 13, boys of the rich families went on the "grammar" school to study Greek and Latin languages and literature, that is, what had been written in those languages. At 16, young nobles who wanted to enter politics or the service of their country went to schools of rhetoric to be trained in rhetoric, or public speaking.

In Great Britain the first teachers we read about were craftsmen. They taught children to read, write and count, to cook and mend their own shoes. In early

19th century the main system of teaching was the "Monitor" system. The teacher could manage a class of 100 or more by using older pupils or "monitors" to help him. The schools had long desks which were sometimes arranged in tiers so that the teacher could see every child in a large class.

Vocabulary

according to
appreciate (v)
as well as
be allowed to
behavior
by heart
common people
consist of (v)
decide (v)
despise (v)
develop (v)
early
essential
find out (v)
free of charge
hard people
include (v)
influence (v)
invention
keep under a discipline
knowledge
liberal education
necessary
pay special attention
possible
produce (v)
provide for (v)
quite different
run by (v)
sort out (v)
store up (v)
the use of weapons
therefore
throw(v)

2. Give Russian equivalents for the following words:

Primary school, secondary school, high school,

university, undergraduate studies, liberal arts/arts/liberals (humanities), sciences, major/to major, minor, undergrad(uate) students/undergrads.

3. *Translate into English.*

1) В течение всей жизни человек получает *знания*.

2) Также он изучал и другие *дисциплины*, такие как биохимия и иммунология.

3) Во время занятия преподаватель обратил внимание на спряжение неправильных глаголов.

4) В отличие от *начального и среднего, высшее образование* даже в развитых странах не является всеобщим.

5) После многочисленных неудач ученому удалось запатентовать свое оригинальное *изобретение*.

6) Образовательный процесс в частной школе *очень сильно отличается* от образования в государственной школе.

7) За последние четыре дня я видел эту картину четыре раза и знал ее почти *наизусть*.

8) Хороший студент должен обладать не только знаниями и умениями, но и дисциплинированным *поведением*.

9) Я *презирал* его за трусость и слабость.

10) В государственной школе образование должно быть *бесплатным*.

4. Give detailed answers to the questions.

1) Why do we need to be taught?

2) When and where the first school started?

3) What made possible to store up knowledge?

4) Who were the pupils of the first schools?

5) What was the organization of education in China until the 19th century?

6) What was the difference between Spartan and Athenian educational system?

7) What are the main principles of liberal education?

8) Who was the "grammatist"?

9) Were common people educated?

10) What is the impact of Greek philosophers into the history of education?

11) Who had the schools run by government free of charge?

12) What were the tree stages of Roman education?

13) Who were the first teachers in Britain?

14) What was the main system of teaching in the early 19th century?

15) Who were "monitors"?

5. Arrange the following statements in their logical order. Explain and expand them.

- Spartans gave a military education to their children
- Only the priestly caste was allowed to learn the Hindu scriptures
- Greek ideas influenced European education
- Schools first started in Egypt 5,000 to 6,000 years ago
- The Romans were very good at organizing
- The "Monitor" system
- The first teachers were fathers and mothers
- People were divided into the four castes
- In Great Britain the first teachers were craftsmen
- Sometimes neighboring peoples produced different types of education
- Liberal education helped a man to develop all sides of his nature

6. Speak on the new facts you found in the text. What wondered you or what information was new for you? Can you add some other historical information about the history of education?

7. Think over the ways of retelling the story to stir up the audience.

8. Find information about modern British and American education. Compare it with Russian according to the following table:

	American education	British Education	Russian Education
a. Children start and finish school b. age when school starts c. marks d. payment			

e. uniform f. exams g. other differences			

9. Translate it into English using the words you've learned.

Образование — это целенаправленный процесс воспитания и обучения в интересах человека, общества, государства.

Обычно образование подразумевает, что учитель обучает учеников чтению, письму, математике, истории и другим наукам. Преподаватели по узким специальностям, таким как астрофизика, право, география или зоология, могут обучать только данному предмету, обычно в университетах и других вузах. Существует также преподавание профессиональных навыков, например, вождения. Кроме образования в специальных учреждениях существует также самообразование, например, через Интернет, чтение, посещение музеев или личный опыт.

10. Write ***the plural form*** *of the following.*

story, play, glass, flag, photo, name, match, knife, bush, chief, page, radio, roof, prize, child, goose, man, foot, mouse, woman, sheep, person, deer, tooth, fellow-worker, merry-go-round, man-of-war, passer-by, sister-in-law, forget-me-not, room-mate.

11. Remember ***the numerals****. Answer the questions. Write the numbers in full.*

1) How many minutes are there in two hours? 2)

How many kilometers are there in a mile? 3) What is your normal temperature? 4) How much do you weigh? 5) How many cents are there in $2, 5? 6) How many days are there in a year? 7) When were you born? 8) What is your telephone number? 9) What is the number of your flat? 10) What is the approximate population of Russia?

12. Write these numbers in English.

1) 567	11) 3 August
2) 6 1/2	12) 969 64 85 (phone)
3) 3,267	13) - 3° C
4) 8.93	14) (In) 1907
5) 0.34	15) +15° F
6) 7 1/2	16) 3,000,000,000
7) 2,359,000	17) 7,082
8) 11.06	18) 40-0 (tennis game)
9) 58%	19) 37%
10) 9 May	20) 4-1 (football match)

13. Correct the mistakes (if any) in these sentences.

1) The radio said that there were more than ten thousand people taking parts in the meeting. 2) She bought two dozens eggs. 3) My birthday is on the twenty-one of March. 4) His telephone number is four six seven, five naught, nine two. 5) There are two hundred fifteen pages in this book. 6) Write down the following: zero point six hundred and twelve plus six point naught two. 7) This is twenty-five per cents of the total. 8) The game ended with the score three zero.

14. Remember ***Simple Past****. Choose out markers referring to this tense.*

Yesterday, now, never, 2 days ago, sometimes, for, today, 1 year before, at the present moment, the day before yesterday

15. Translate into English paying attention to ***Simple Past Tense.***

1) Он вынул часы из кармана и положил их на стол. 2) Этот поезд останавливался на каждой станции. 3) Во время каникул я побывал в Риме. 4) Он перепрыгнул через забор (fence), прошел через лужайку (lawn) и открыл дверь своим ключом. 5) Так как большинство домов в Лондоне в XVII веке было построено из дерева, они все сгорели во время пожара. 6) Вор (thief) проник в дом через окно, вынул драгоценности (jewelry) из сейфа, сорвал картину со стены, а затем вышел через дверь. 7) Я люблю путешествовать на велосипеде. В прошлом году я объехал всю Грецию на моем старом велосипеде. 8) Я случайно вскрыла ваше письмо.

16. Think of ***Simple Past and Past Progressive****. Choose the correct underlined answer.*

1) I studied/was studying politics at university.

2) He studied/was studying the effects of radiation when he suddenly died.

3) When I woke up this morning it rained/ was raining.

4) It rained/was raining every single day of the holidays.

5) It was 8.00 in the morning. A lot of people stood/were standing at the bus stop, waiting to go to work.

6) A magnificent oak tree stood/was standing in the middle of the garden.

17. Read this dialogue and choose the right variant of the answer:

Woman: I'd like to get a part-time job this semester since tuition's gone up so much.

Man: That makes sense. Just make sure you don't get in over your head; we're here to go to school, after all.

What does the man mean?

(A) He wants to go to school together.

(B) He thinks that she should work very hard and earn as much money as possible.

(C) He agrees that she should work her way through college.

(D) He thinks that she fell for him head over heels.

18. Translate other word-combinations referring schools and education. Use them in sentences of your own.

a school for gifted children, to be kept after school, comprehensive school, correspondence school, divinity school, private school;

broad education, compulsory education, health education, in-service education;

residential college, electoral college, College of Phy-

sicians.

19. Translate the following sentences paying attention to the words in bold type:

1) I'm **teaching** English to Italian students.
2) My father **taught** me to swim.
3) Next time he comes home late lock him out, that'll **teach** him a lesson!
4) I **pass** the sport center on the way to work
5) I **passed** my English exam yesterday.
6) Several years **had passed** before she realized the truth.
7) We **passed** each other on the staircase
8) Parliament **passed** a series of important measures in 1994.

20. Read the text.

The Kazan Institute of Biology

The Kazan Institute of Biology was established in 1945 and in the beginning it consisted of 5 institutes. In 1998 it was renamed as the Kazan Institute of Biochemistry and Biophysics of the Kazan Scientific Center of the Russian Academy of Sciences.

The first Director of the Institute was an outstanding morphologist-evolutionist Nikolai Livanov. He was the Director of the Institute from 1945 to 1949.

A new era in the life of the Institute began when professor Igor Tarcevsky was made the Director of the

Institute in 1974. Yong researchers-biologists, physicists, chemists came to work at the Institute. The investigations in the field of physical-chemical biology began to develop.

Now the Director of the institute is Aleksandr Grechkin. The main lines of investigations of the Kazan Institute of Biochemistry and Biophysics of Kazan Scientific Center of the Russian Academy of Sciences are:

- Signaling systems of plant cells and their role in adaptation and immunity

- Mechanisms of plant cell growth and differentiation
- Mechanisms of molecular dynamics and intermolecular interactions in protein functioning
- Intracellular interactions. Molecular mechanisms of neuromediation and chemoreception
- Mechanisms of transport processes in animal and plant cells

The institute is located in the center of Kazan on the Lobachevsky Street, 2/31.

21. Give the correct variant of the phrases according to this text.

a) The Kazan Institute was established in:
1. 1945 2. 1987 3. 2000

b) The first director was:
1.Aleksandr Grechkin2. Nikolai Livanov
3. Igor Tarchevsky

c) How many lines of investigation does the Kazan Institute have?
1. 82. 33. 5

d) The investigations in the field of physical-chemical biology began to develop from:
1. Igor Tarchevsky 2. Aleksandr Grechkin.
3. Nikolai Livanov

e) The Kazan Institute of Biology consisted of:
1. 9 institutes2. 3 institutes
3. 5 institutes.

22. Make your presentation about the biotechnological research center, institute or university you are interested in. Describe its location, infrastructure, aims and fields of research. Explain why you were interested especially in this institute.

23. Here is the next chapter of one scientist's diary. Translate it into English using the words you've learned.

13.11.2015.

Две недели назад мы с группой сотрудников нашего института ездили заграницу в один из университетов, где проходит подготовка специалистов

в биотехнологической сфере. Это университет штата Техас в США. Хотя мы провели короткий промежуток времени здесь, мы достаточно хорошо ознакомились с их оборудованием. Оно великолепно. Все лаборатории оснащены современным, многофункциональным оборудованием, с помощью которого можно проводить широкий спектр исследований от простейшего диализа до газовой хроматографии. Все студенты имеют доступ к нему и в процессе обучения узнают много новых методик проведения эксперимента. Кроме того, мы разговаривали с преподавателями и студентами этого университета, делились своим опытом друг с другом.

После этой поездки остались очень приятные воспоминания. Надеюсь, что она была не последней.

24. A personal letter. Put the parts of this letter in the correct order.

Anyway, I`ve got to go now. Loads of homework (unfortunately!).

I`m sorry to hear you`ve had an argument with your best friend and that you`re not speaking at the moment. Yes, it has happened to me too, and it`s

awful, isn`t it?

Carol

Dear Sally,

Write back soon!

Thanks for your letter. It was great to hear from you! Well done on passing your exams!

I think you need to ask yourself one question: what`s more important – that argument or your friendship? I remember when I asked myself that it all became clear. I realized my friendship with Chris was far more important. I called him immediately and told him. We became friends again immediately. Maybe you should do the same thing. Let me know what happens! Good luck!

23 Portland Street
Manchester
MN3 6YL
24th September

Lots of love,

25. You can see the part of a letter from your German pen-friend Claudia. Write her an answer. Remember the rules of letter writing.

...I'd like to improve my English. How long have you been learning it? Do you enjoy it? How do you learn new vocabulary? My friend said I should watch films in English. What do you think is the best way of learning English?

Write soon.

Love,

Claudia

26. Write an essay (a report) or give oral discussion on one of the topics:

1) Some Universities require all students to wear school uniforms. Other Universities (especially Russian) permit students to decide what to wear. Which of these two school policies do you think is better?

2) If you could make one important change in you University, what change would you make?

3) All system of education has its pluses and minuses. Compare some of them.

4) Modern methods and techniques of education. Do we have any progress since ancient times?

Unit 3

A place to live

Tell the things you like in your own city/town/village very much. Why do you like your living place?

Did your town grow naturally or was especially planned by architects?

Do you think if towns in the other countries different or the same?

1. Read and translate the text.

How to plan a town?

By George Mikes

Britain, far from being a 'decadent democracy', is a Spartan country. This is mainly due to the British way of building towns, which dispenses with the reasonable comfort enjoyed by all other weak and effeminate peoples of the world.

On the Continent doctors, lawyers, booksellers – just to mention a few examples – are sprinkled all over the city, so you can call on a good or at least expensive doctor in any district. In England the idea is that it is the address that makes the man. Doctors in London are crowded in Harley Street, solicitors in Lincoln's Inn Field, second-hand bookshops in Charring Cross Road, newspapers offices in Fleet Street, tailors in Saville Road, car-merchants in Great Port-

land Street, theatres around Piccadilly Circus, cinemas in Leicester Square, etc.

Now I should like to give you a little practical advice on how to build an English town.

You must understand that an English town is a vast conspiracy to mislead foreigners. You have to use century-old little practices and tricks.

1. First of all, never build a street straight. The English love privacy and do not want to see one end of the street from the other end. Make sudden curves in the streets and build them S-shaped too; the letters L, T, V, W and O are also becoming increasingly popular.

2. Never build the houses of the same street in a straight line. The British have always been a freedom-loving race and the 'freedom to build a muddle' is one of their most ancient civic rights.

3. Usually the peoples from the continent put even numbers on one side, odd number on the other, and you always know that small numbers start from the north to west. In England you have this system too; but you may start numbering your houses at one end, go up to a certain number on the same side, then continue on the other side, going back in the opposite direction.

You may leave out some numbers if you are superstitious; and you may continue numbering in a side street; you may also give the same number to two or three houses.

But this is far from the end. Many people refuse to have numbers altogether, and they choose names. It is very pleasant, for instance, to find a street with three hundred and fifty totally similar bungalows and look for 'The Bungalow'. Or to arrive in a street where all the houses have a charming view of a hill and try to find 'Hill View'. Or search for 'Seven Oaks' and find a house with three apple-trees.

4. Give a different name to the street whenever it bends; but if the curve is so sharp, that it really makes two different streets, you may keep the same name. On the other hand, if, owing to neglect, a street has been built in a straight line it must be called by many different names (High Holborn, New Oxford Street, Oxford Street, Noting Hill Gate and so on).

5. As some cute foreigners would be able to learn their way about even under such circumstances, some further precautions are necessary. Call streets by various names: street, road, place, mews, crescent, avenue, rise, lane, way, grove, park, gardens, alley, arch, path, walk, broadway, promenade, gate, terrace, vale, view, hill, etc. (The English have almost sixty synonyms for 'street'!).

6. Street names should be painted clearly and distinctly on large boards. Then hide these boards carefully. Place them too high or too low, in shadow and darkness, upside down and inside out, or, even

better, lock them up in a safe in your bank, otherwise they may give people some indication about names of the streets.

I have been told that my above-described theory is all wrong and is only due to my General European conceit, because the English do not care for the opinion of foreigners. In every other country people just built streets and towns following their own common sense. England is the only country of the world where there is a Ministry of Town and Country Planning. That is the real reason for the muddle.

Vocabulary

bungalow
circumstances
crowd (v)
curve
direction
distinctly
district
due to
even number
hide (v)
hill
indication
mislead (v)
muddle
number (v)
odd number
opposite
precautions
refuse (v)
sprinkle (v)
straight
vast
view

2. Give Russian equivalents for the following words:

Street, road, place, mews, crescent, avenue, rise,

lane, way, grove, park, gardens, alley, arch, path, walk, broadway, promenade, gate, terrace, vale, view, hill; terraced houses/ row houses, cottage, bungalow, semi-detached house/ duplex, detached house, council house, block of flats/ apartment building, ranch house.

3. Give English equivalent to the following phrases.

Страна, далекая от «упадочной демократии», слабые и изнеженные нации, вызвать доктора, небольшой практический совет, вводить в заблуждение иностранцев, вековая практика, англичане обожают уединение, в форме буквы S, свободолюбивая раса, гражданское право, противоположное направление, можно выпустить несколько номеров, люди отказываются нумеровать дома вообще, чарующий вид на холм, оставить то же название, дальнейшие предосторожности, запереть в сейф, англичан не волнует мнение иностранцев, причина путаницы.

4. Translate the following sentences paying attention to the words ***in italics.***

1) Необходимо *пронумеровать* страницы, чтобы не было *путаницы*.

2) Джон ушел в неизвестном *направлении*.

3) Вы уже *спрятались*? Я иду искать!

4) Мы *отказались* переехать из *квартиры в бунгало*.

5) *Указатель ввел* туриста *в заблуждение*, и он потратил *много* времени, чтобы добраться до отеля.

6) Только *благодаря* счастливым *обстоятельствам* мы купили *одноэтажный домик* у моря.

7) Если водитель видит крутой *поворот*, он должен выполнить ряд *предосторожностей*: снизить скорость и быть особенно внимательным.

8) Если вы пройдете *прямо* и поднимитесь на *холм*, вашему взору предстанет замечательный *вид*.

5. Think over the questions and give detailed answer.

1) What style does the text have? Is it humorous or scientific? Prove it with the quotations from the text.

2) Why does G. Mikes call Britain ‘the Spartan country’?

3) What is the difference between Continental doctors, lawyers, booksellers etc. and people of the same profession in Britain? What is their main principle in England?

4) The author recommends building a street straight, doesn’t he? Why?

5) How do the peoples from the continent place the numbers of houses on the street? Do the English do the same?

6) What does G. Mikes recommend you to do with the name of the street of your planning house?

7) And, at last, how is it recommended to show the board with the name of the street?

8) According to the author's opinion, what fact proves his theory about British towns?

6. According to the story by George Mikes what can you say about homes in Britain? Retell the gist of this story and enlarge it by speaking about homes in Russia.

7. Look at the various types of house below and match each with its correct description.

1) terraced houses *BrE*/ row houses *AmE*
2) cottage
3) bungalow
4) semi-detached house *BrE*/ duplex *AmE*
5) detached house
6) council house
7) block of flats *BrE*/ apartment building *AmE*
8) ranch house

a) a house which is joined to another on one side only.

b) a house in a row of houses which are joined altogether.

c) a house built in one level, usually with a roof that does not slope much.

d) a house which stands alone and is not joined to any other.

e) a small house which is often on one level.

f) house which is rented from a local authority.

g) a small house in the country, usually with a garden.

h) a large building divided into separate parts.

Think over these types of houses. Which type do you think would be:

- *the most expensive?*
- *the least expensive?*

Semi-detached house

8. Work in groups. Plan your ideal town. Begin thinking with the geographical position, climate, age of your town; include the structure of government, population, industry, art and so on. Also you can draw a plan of your ideal town. And don`t forget that your town must have everything for biotechnologists` needs.

9. Remember ***Future tenses****. Open the brackets and write the correct form of the verb meaning Future.*

1) There's no point in running now. We _____ (miss) the bus anyway.

2) Yes, I'll come out this evening. I _____(not/work).

3) You can relax. The match _____ (not/start) until four o'clock.

4) I _____ (go) to the market this afternoon. Do you want anything?

5) Are you OK, Donna? You look like you _____ (faint).

6) You realize that the boss ____ (not/like) this, don't you?

7) I _____ (cook) dinner this evening - as usual.

8) She _____ (look) for a new flat next year.

9) Don't worry. The shops ____ (not close) until eight o'clock tonight.

10. Translate sentences paying attention to Future forms of verbs.

1) Завтра я поработаю в лаборатории. 2) Завтра в пять часов я буду читать фундаментальные исследования о протеине. 3) К первому сентября моя сестра будет здесь работать уже 10 лет. 4) Я переведу все статьи к десяти часам. 5) Когда ты придешь, я буду печатать текст. 6) Мы узнаем результаты через неделю. 7) Студенты обсудят этот вопрос, до того как вы придете. 8) К концу

этого месяца я буду жить в Санкт-Петербурге уже пять лет. 9) Я буду помнить этот день всю свою жизнь. 10) Поезд уже придет к тому времени, когда мы приедем на вокзал. 11) Завтра утром будет ярко светить солнце. 12) Ему потребуется полчаса, чтобы добраться сюда. 13) Он приедет снова в следующем году. 14) Она будет убирать квартиру, когда они придут. 15)К утру дождь уже кончится.

11. Game about future tense

There is a box in the center of the room. Students should make paper planes, ask questions in future tense (for example, *will I be a pilot?).*Then they fly these paper planes. If they strike into a box, the answer is YES.

12. Read this extract from a short story.

In the laboratory the voice clock sang, *Tick-tock, eight o'clock, time to work, eight o'clock!* as if it were afraid that nobody would. The laboratory lay empty. The clock ticked on, repeating and repeating its sounds into the emptiness. *Eight-nine, electrophoresis time, seven-nine!*

In the laboratory the some reagent stove gave a hissing sign and ejected from its warm

interior eight tube of agarose, eight pipet, sixteen slice of analyzable substances, two buffer, and electrophoresis camera.

'Today is August 4, 2026,' said a second voice from the laboratory ceiling, 'in the city of Allendale, California.' It repeated the date three times for memory's sake. 'Today is Mr. Featherstone's birthday. Today is conference about human cloning. Insurance in the laboratory is payable, as are the water, gas and light bills.'

Eight-one, tick-tock, nine-one o'clock, off to do experiment, off to work, run, run, nine-one! But no doors slammed. It was raining outside. The weather box on the front door sang quietly: 'Rain, rain, go away; rubbers, raincoats for today…' And the rain tapped on the empty laboratory, echoing.

Outside the university, the garage chimed and lifted its door to reveal the waiting car. After a long wait the door swung down again…

• *What kind of gadgets does the laboratory have?*

• *Why do you think there is no one at laboratory?*

13. Discuss how you think the story continues. What happened to the Featherstone group? Use your imagination. Agree on:

1) *at least two things will happen.*
2) *which characters you will introduce.*

3) *where there will be any dialogue.*
4) *how the story ends.*

14. In groups, write a draft of the story. Check our use of verb forms, time conjunctions and prepositions.

15. Write a neat version of your story and then read it out to the rest of the class. Vote on the most interesting story.

16. Translate the text from Russian into English.

Тихие островки, посреди буйной жизни Токио

Согласно опросу 1994г. 75% горожан-японцев предпочли бы жить в деревне. Тихий квартал Синонамаси (Sinonamasi) интересен маршрутом, которого вы не найдёте на туристических картах. Съехав с бульвара, где на бешеной скорости несутся машины, попадаешь в другое пространство и время. Там с многоэтажками соседствуют богатые коттеджи в испанском стиле, а аристократические владения с фруктовыми садами упираются в прачечную-автомат. На стоянках, рядом с "Феррари", припаркованы велосипеды. Этот район – нечто среднее между Беверли Хилз и Калькуттой.

17. Topics for the discussion.

1) What is the difference between British and Russian towns? Which towns do you prefer and why?

2) The problems of megapolices and how to overcome them.

3) What kind of homes do the following people tend to chose: single people; young couples; old people? Why?

4) When people are looking for a house what are the most important things they need to consider? What kind of house would you choose for yourself?

Unit 4

Our nutrition

Do you like to eat in restaurants?

How often do you eat out? Is price a consideration when you go out?

Have you ever eaten in a restaurant alone? Did you enjoy it?

1. Read the text about different types of restaurants and translate it.

You are what you eat

All living things need food to sustain life. Plants can make their own food from soil, water, and sunshine. Animals eat either other animals or plants. Human beings eat all kinds of different foods from animal and plant sources, depending on what is available where they live and sometimes, too, on the restrictions of religious customs. Food supplies nutrients, the substances needed by the body for life and growth. They are proteins, fats, carbohydrates, vitamins, minerals, and water. A healthy balanced diet must consist of all six. In prehistoric times people ate what they could find by hunting and gather-

ing wild plants. Later they learned to keep animals and grow cereals and vegetables. Settled communities then became established. The plants that were cultivated were the plants that grew naturally in any particular climate.

Nutrition is the process by which plants and animals take in and use food. Food is needed to keep the body running smoothly. It provides energy for work and play, for breathing, and for the heart's beating. The building material for muscles, bones, and blood comes from food. You cannot have a healthy body without healthy eating and drinking. Not enough of some foods, or too much of others, can lead to illness. Experts on nutrition are called nutritionists. The food and drink you take in are called your *diet*. (This word is sometimes used in another way, to mean eating less food than normal in order to lose weight, as in "going on a diet".) A person's diet is so important because growth and health depend on it. Dieticians are people with knowledge of special diets (dietetics), such as those used for sick people in hospital. We should never forget that across the world 40 million people die each year from starvation and the diseases it brings. Fifteen million of them are babies and young children. For the millions more who suffer from malnutrition (not enough of the right foods), healthy eating is out of the question. It is hard enough just to stay alive.

The body needs many different nutrients. These are various substances necessary to provide energy

and the materials for growth, body-building, and body maintenance. Every day millions of cells in the body die and must be replaced by new ones. Not all foods contain all nutrients. So it is not just the quantity of food eaten that is important, but also the variety. People who have enough food available may still become ill because they are eating too much of one kind of food and not enough of another. To stay healthy, we need to eat a balanced diet. This means a diet containing the right proportions of the main nutrients: carbohydrates, proteins, fats, fiber, minerals, vitamins, and fluids. Many foods are a mixture of these basic nutrients. A balanced diet also contains enough energy (in the form of food) to power the chemical reactions of living.

Some people worry that a vegetarian diet will be short of protein, but this is not the case. Plenty of protein can be obtained from the great variety of nuts, seeds, pulses, cereals, and soy products (such as tofu) which are now widely available, and from eggs and milk products. It was once thought that plant proteins were inferior to animal proteins, being deficient in some amino acids. It is now known that a mixture of plant proteins complement one another. For example, a shortage of an amino acid in one plant food, such as pulses, is counterbalanced by an excess of that amino acid in a different plant food, such as a cereal. Protein combinations such as beans on toast, rice and lentils, bean stew with pot barley, oats and nuts (as in muesli), provide very high quality protein. All other nutrients

are present in adequate quantities in the lacto-vegetarian diet. If dairy products are not eaten, a supplement of vitamin B12 becomes essential. Many vegetarian foods are fortified with this vitamin (yeast extracts, some soy milks, some breakfast cereals, and so on). Vegetarians obtain iron from dried fruit, leafy green vegetables, wholemeal flour, pulses, oats, nuts, and brown rice. They obtain calcium from cheese, nuts, sesame seeds, leafy green vegetables, and soy. Vegetarians have been responsible for the invention of foods such as peanut butter; cornflakes, muesli, and high-protein vegetable foods made to taste like meat.

Vocabulary

amino acids
available
bone
carbohydrates
cereals
dairy products
diet
diseases
dried fruit
fats
fiber
fluids
maintenance
malnutrition
minerals
nutrients
nutrition
oat
proteins
pulses
responsible
seeds
shortage
soil
source
soy products
starvation
substance
complement (v)
keep the body running smoothly
sustain (v)

vitamins

2. Give Russian equivalents for the following words:

to sustain life, restriction, supply, nutrients, proteins, fats, carbohydrates, vitamins, minerals, consist of, cereals, nutrition, take in, to keep the body running smoothly, muscles, bones, blood, illness, starvation, substance, to provide, body maintenance, replace, fiber, minerals, vitamins, fluids, chemical reaction, inferior, deficient, mixture, complement, counterbalance, excess, supplement, essential.

3. Translate the sentences into English using the words you learned.

1) *Аминокислоты* — органические соединения, в молекуле которых одновременно содержатся карбоксильные и аминные группы.

2) В суточном рационе человека и животных преобладают *углеводы*.

3) Хлебные *зерновые культуры* выращивают на всех континентах нашей планеты.

4) *Соя* — один из богатейших белком растительных продуктов питания.

5) *Голодание* — состояние организма, вызванное недостаточным поступлением веществ, необходимых для поддержания гомеостаза.

6) Концентрация *витаминов* в тканях и суточная потребность в них невелики, но при недостаточном поступлении витаминов в организм наступают характерные и опасные патологические из-

менения.

7) При *недоедании* наблюдается дефицит энергетической ценности пищи (количества калорий), также человеку может не хватать белков, витаминов, микроэлементов.

8) *Диеты* различных культур могут иметь существенные различия и включать или исключать конкретные продукты питания.

9) *Молочные продукты* — продукты питания, изготовленные из молока (обычно коровьего, козьего).

10) Некоторые *питательные вещества* осуществляют множество функций в организме. Например, вода и минеральные вещества регулируют разнообразные функции, но не являются источниками энергии.

4. Are the following statements true or false? Correct the false ones.

1) Human beings eat all kinds of different foods from animal and plant sources.

2) In prehistoric times people ate what they could find in the shop.

3) Nutrition is the process 'by which plants and animals take in and use food.

4) The building material for muscles, bones, and blood comes from fluid.

5) Experts on nutrition are called dieticians.

6) Every day millions of cells in the body die and must be replaced by new ones.

7) People who have enough food available may

still become ill because they are eating too much different kind of food.

8) Plenty of protein can be obtained from the meat.

9) If dairy products are not eaten, a supplement of vitamin B12 becomes essential.

10) Vegetarians have been responsible for the invention of foods such as milk, sugar, butter

5. Comment the table on the next page. Make conclusion about the amount of food, its variety and quality. Using this table retell the text "You are what you eat".

6. Make a special diet for 3 types of people. Work out from the checklist the things you can and you can't eat. Take care about all necessary vitamins and elements. You can consult the table of vitamins on page 187.

a) **Vegan**. You strongly disagree with people eating meat, fish, eggs, cheese or milk.

b) **Vegetarian**. You do not eat fish or meat but see nothing wrong in eating dairy products.

c) **Gourmet**. You love good food, including meat, fish and dairy products.

Picture 1

7. Divide the following words into two columns: ***countable and uncountable*** *nouns (you must get 25 uncountable nouns).*

furniture, coffee, leaf, food, computer, list, blood, job, work, language, country, advice, information, money, progress, permit, permission, baggage, luggage, beach, traffic, weather, window, knowledge, air, water, holiday, damage, accommodation, scenery, scene, pigeon, bread, mountain, kick, news, accident, laugh, flour, laughter

8. Quantifiers. Fill in the spaces with ***much, many, few, a few, little, a little, a lot of, plenty of, a great number of, a great amount of, a great deal of*** *(you may get several variants).*

1) The living conditions in the district were very poor and there were only __ doctors available. 2) He is a very intelligent man. Do you know that he speaks ___ foreign languages? 3) The situation was becoming worse and worse. ___projects had to be postponed. 4) The show was poor. There was ___applause. 5) There were ___ people at the meeting, but most of them left early so there aren't ___left now. 6) Have you finished the chromatography of that protein solution? There is ___solution in the fridge if you need more. 7) We haven't had___rain this summer. The garden needs watering. 8) The party was a failure. Unfortunately, they invited___interesting people. 9) He didn't know ___facts about genetic engineering. 10) Did the storm make___ damage to the crops?

9. Translate from Russian into English. Use quantifiers.

1)Он написал довольно много статей на эту тему. 2) Я не могу идти с вами сегодня в театр. У меня так много работы в лаборатории. 3) В нашей библиотеке мало книг по биотехнологии. 4) На конференции было слишком много народа. 5) В пробирке было мало воды, и он налил (pour) ещё немного. 6) Мало кто понимает его. У него слишком много ошибок. 7) В прошлом году было опубликовано мало научных статей по биохимии. 8) Премьер-министр по образованию сказал журналистам лишь несколько слов. 9) Я встречал мало хороших биохимиков в своей жизни. Но Грин, наш сосед, дает нам массу полезных советов, ведь он – доктор биологических наук. 10) Можно мне немного кофе? — Нет, он слишком крепкий для тебя.

10. Remember articles with countable and uncountable nouns. Speak about the difference. Make an exercise. Fill in the blanks with the appropriate article where necessary.

1) He lives in___south of___Australia. 2) In his book James Dewey Watson, ___ famous American scientist, described___main process of___human organism. 3) Nothing could break ___ silence. Suddenly there was___scream, then___second and___third. 4) Can you plan___experiment? 5) He came in one morning when we were doing___dialysis in___laboratory of___ university and introduced himself. 6)___world tour costs ___lot of money. 7) I don't

believe you. I think you're telling ___lie. 8) Did you have___lovely time in___ Hague's laboratory? 9) It was ___ early evening but I was feeling sleepy. 10) He made___gross mistake. 11) Don't worry, we'll finish___experiment before___sunset. 12) I'd like to have___ salad with___oil for___breakfast. 13) My favorite subject at___school was___biology.

11. Translate into English paying attention to the articles.

1) Передай мне, пожалуйста, индикаторную бумагу. 2) Вечер был влажный (damp) и прохладный. 3) Был холодный и ветреный (windy) день. 4) Вино – типичный продукт биотехнологии. 5) Я люблю сухое вино. 6) Она нашла такую хорошую методику для проведения эксперимента. 7) Погода плохая. Ночь была очень холодная. Я не хочу идти в лабораторию в такую холодную погоду. Но нужно доделать начатый анализ. 8) Человек открыл инсулин много лет назад. 9) Это неожиданная новость. 10) Он обладает обширными знаниями в области медицины. 11) Пущино – известный научный центр в России. 12) Она прожила трудную жизнь, но сделала много для науки. 13) Нефть используют для производства (production) бензина. 14) Где учёные остановились? — В отеле «Континенталь». Этона Хай-стрит.

12. Read and understand the menu on the next pages.

Imagine you are having lunch at this restaurant. Make your selection from the menu. Add up the prices. What is your bill? Don't forget the tip. How much tip should you add?

13. Which items on the menu do you dislike? Why? What dish would you add? What are the ingredients? What elements can your organism get from your dish?

Picture 1

Appetizers

Buffalo Wings Hot, spicy, bleu cheese dressing, celery garnish . . . **6.95**

Shrimp Cocktail Five large shrimp, cocktail sauce . . . **6.95**

Onion Rings Homemade rings, breaded and deep-fried . . . **4.50**

Potato Skins Bacon and cheddar cheese, scallions, house dip . . . **4.95**

Soups

French Onion Soup Served in a crock with imported Swiss cheese . . . Bowl **3.95**

Matzo Ball Soup A bowl of Grandma's favorite . . . Bowl **3.95**

Homemade Chicken Soup Hearty chicken , rice & carrots . . . Cup **2.75** - Bowl **3.95**

New England Clam Chowder full of clams & potatoes . . . Cup **3.25** - Bowl **4.50**

Salads

Fresh Fruit **2.95**
A mix of the seasonal best

Greek Salad **5.95**
Stocked with feta cheese, Greek olives, herb and lemon dressing

Chef Julienne Salad **6.95**
Diced turkey, ham, Swiss and American cheese, hard-boiled egg, green pepper and tomato

Chicken Salad Bowl or Tuna Salad Bowl **6.95**
Tomato, cucumber, hard-boiled egg, onion, pepper & croutons

Cobb Salad **6.95**
Diced turkey, tomato, hard-boiled egg, avocado, bacon bits & Bleu Cheese

Oriental Chicken Salad **6.95**
Grilled chicken, mandarin oranges, vegetables, peanuts & noodles, with a sesame orange dressing

Sandwiches

Reuben **7.45**
Corned beef, Swiss cheese, Russian dressing, sauerkraut on marble rye with cole slaw and chips

Monte Cristo **7.45**
Grilled ham, turkey, Swiss cheese, dipped in egg batter, and strawberry preserves

French Dip **7.45**
Roast beef, thinly sliced on French bread, with dipping gravy

Corned Beef on Rye **7.45**

Roast Beef **6.95**

Baked Ham **6.45**

Hamburger (1/2 lb) **7.45**

Cheeseburger (1/2 lb) **7.95**

Mushroom Burger (1/2 lb) **7.95**

B.L.T. **6.95**
Bacon, lettuce and tomato

Sandwiches are served with French Fries, Coleslaw and a Pickle

Picture 2

Chicken/Beef/BBQ Entree

Stuffed Chicken Breast **7.50**
Boneless chicken filled with raisins, cheese, bread crumbs and spices with Supreme sauce.

Skewered Chicken **7.50**
Teriyaki marinade, mushrooms, peppers, onions and tomatoes.

Chicken Parmigiana **7.50**
Tender chicken, boneless and fried, prepared with marinara sauce and melted mozzarella.

N.Y. Sirloin Steak **7.95**
An 8 oz. choice boneless cut of sirloin steak.

Sirloin Tips **7.50**
Choice cuts of sirloin, marinated.

BBQ St. Louis Ribs Half rack of pork ribs. **7.50**

BBQ Chicken Half chicken. **7.50**

Seafood Entree

Fish & Chips **7.50**
Fresh fried Boston scrod.

Seafood Casserole **8.95**
Haddock, scallops, shrimp with garlic butter, sherry and cheese, lightly crumbed and baked.

Haddock **9.95**
A fresh filet lightly crumbed and broiled.

Salmon **8.95**
A fresh filet lightly crumbed and broiled.

Grilled Salmon **8.95**
A fresh filet marinated with soy, ginger and garlic.

Atlantic Scallops **9.95**
Baked with seasoned breadcrumbs.

Fried Scallops **9.95**
Fried golden brown with tartar sauce.

Entrees served with your choice of French fries, penne pasta or rice pilaf and tossed salad or coleslaw

Beverages

Coffee, Tea, Hot Chocolate, or Iced Tea/Coffee **1.50**
Soda, Milk, Juice . . . . . **1.25** **Espresso** . . . . . **1.95** **Cappuccino** **2.50**

Desserts

Fresh Fruit Tart . . . . . **3.45** **Chocolate Truffle** **3.45**
French Cheese Cake . . . . . **3.45** **Apple Pie** . . . . . **3.95** (à La Mode add $1.00)
Chocolate Mousse . . . . . **3.95** **Ice Cream or Sherbet** **2.45**
Selections from our pastry cart **3.45**

● *Please refrain from Pipe/Cigar Smoking, Thank You!* ●
● *We Reserve the Right to Seat our Patrons.* ●
● *Not Responsible for the loss or exchange of personal property.* ●
● *15% Gratuity added to Check for Parties of 10 or more.* ●

14. PIZZA HUNT: Walk around the classroom and find out from other students what they know about pizza. When you have finished, sit with your partner(s) and share and talk about what you heard. Did you learn anything new?

15. With your partner(s), talk about the food below. Rank them from the healthiest to the least healthy. Which do you eat regularly?

- pizza
- burgers
- fried chicken
- noodles
- rice dishes
- fish and chips

16. Talk about each of these pizza toppings. Would you choose to have them on your pizza?

mashed potato
pineapple
corn
chocolate
French fries
seaweed
curry sauce
apple and raisins

17. A DIFFERENT PIZZA: With your partner(s), design a new kind of pizza. What are the toppings? How is it different from a normal pizza? Have a class

vote on the tastiest-sounding ones.

18. Look at the following article's headline and guess whether these sentences are true or false from your point of view:

1) Scientists have discovered a pizza that helps you lose weight.
2) The secret to the new pizza is in how to bake the base.
3) Antioxidants in food help fight some life-threatening diseases.
4) Cooking the pizza at a low temperature means it is healthier.
5) Diet experts said the new pizza is healthier than eating fruit.
6) Another expert said people should choose their toppings carefully.
7) The expert said this research teaches us about healthy eating.
8) This study is good news for deep-pan pizza lovers.

19. Read this text and translate it properly. While reading, agree or disagree with the statements from the previous exercise. Also put the words into the gaps in the text. Read and translate it.

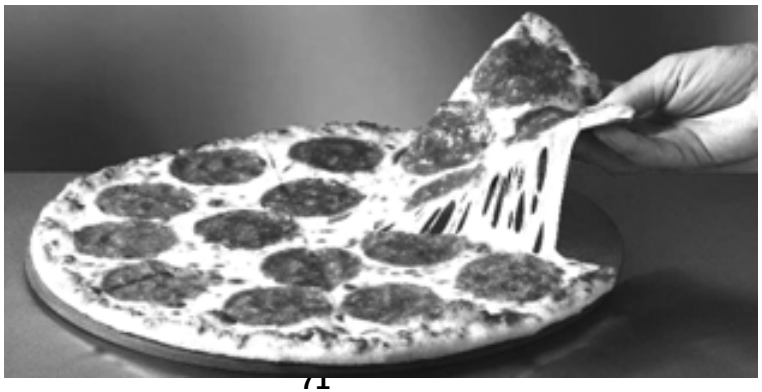
disease	heat	different
leaving	found	weight
welcome	amount	author

expert	likely	choose
better	sales	
although	outside	

Scientists discover healthier pizza

Food scientists and dieticians have _____ new ways to make pizza that is good for you. This is very _____ news for overweight pizza lovers and those who worry about their _____. Researchers in the USA looked at different ways of baking the pizza base. The team from Maryland University discovered that _____ pizza dough in the oven for a longer time made it healthier to eat. They said that doubling the _____ of baking time increased the levels of antioxidants in the mix by up to 100 percent. Antioxidants help fight cancer and heart _____ and are found in most healthy food. Furthermore, the team experimented with _____ cooking temperatures. Their results showed a higher _____ also made the dough healthier to eat.

This new research may help pizza _____



around the world. However, some diet experts warned that even though this research looks good, it is still _____ to eat fruit and vegetables. In addition, pizza that is baked longer may not be so healthy if people _____ unhealthy toppings. Jacqui Lowdon, a British diet _____, warned that although the pizza base might be good for you, people might be "more _____ to choose extra cheese". She added: "This isn't teaching people about healthy eating." Nevertheless, the study's _____, Jeffrey Moore, said his findings were good for people who like deep-pan pizzas. Meanwhile, _____ London's Pizza Hut today, pizza fan Jo Lambert said: "This new pizza sounds healthy, _____ not if we have too much or have cola and fries with it."

20. Find synonyms and arrange them in pairs:

Dietician, fat, welcome, enthusiast, overweight, pastry, dough, food, furthermore, writer, diet, nutritionist, choose, conclusions, author, also, findings, good, fan, select.

21. Match the following phrases from the article (sometimes more than one combination is possible):

1. dieticians have found new ways	a). amount of baking time
2. welcome	b). the pizza base
3. different ways of baking	c). people who like deep-pan pizzas

4. doubling the	d). may not be so healthy
5. Antioxidants help fight	e). to make pizza that is good for you
6. This new research may help pizza	f). with it
7. pizza that is baked longer	e). sales around the world
8. people might be more	g). news for overweight pizza lovers
9. his findings were good for	h). cancer and heart disease
10. have cola and fries	j). likely to choose extra cheese

22. As a specialist in nutrition express your opinion about such advanced idea of these scientists.

23. Translate the text from Russian into English.

Гусь или индейка?

Обычно декабрь ассоциируется с рождеством, и главное блюдо на рождественском столе – это большая птица, зажаренная целиком. Гусь или, чаще, индейка, фаршированная яблоками. Гусь, начиненный гречневой кашей, капустой, грибами и яблоками с давних времён считается традиционным блюдом русской кухни.

Однако, мясо гуся более жирное, чем индейки, что может грозить несварением желудка. Индейка – другое дело. В 100 граммах её богатого витамином РР мяса всего 60ккал, в нём почти не содержится жиров. Индейка – превосходный источник белка, который улучшает память и стимулирует умственную активность.

24. This is the next chapter of one scientist's diary. Translate it into English using the words you've learned.

17.11.2015

Этим утром я обнаружил, что забыл у руководителя лист с планом эксперимента на следующие четыре дня. Объектом нашего исследования является мышь. После предварительного анализа мы пришли к выводу, что животное необходимо посадить на диету для проведения дальнейших этапов диагностики влияния изучаемого препарата. Я позвонил моему руководителю и попросил дать рекомендации еще раз. Он был несколько огорчен моей рассеянностью (*distraction*), однако дал довольно четкие указания.

С этого дня я перевожу мышь на белковую диету, которая предполагает снижение потребления углеводов. Кроме

того, ежедневным продуктом питания для неё станет соя. Интересно, как повлияет эта диета на животное? Увидим через несколько дней. Хотя, я надеюсь, что наши ожидания оправдаются.

25. Choose a project you like and create it.

a) PIZZA POSTER: Make a poster about the different types of pizza around the world – especially those in Italy. Include pizza made in your country.

b) MAGAZINE ARTICLE: Write a magazine article about the new healthy wonder pizza. Write about how it might change all fast food and that one day, burgers might be health food.

c) LETTER: Write a personal letter to the researchers of the new pizza baking method. Give them three pieces of advice about pizza. Include three questions.

Unit 5

Chemistry and its branches

Do you like chemistry? What was your mark on chemistry at school?

What do you know about the history of chemistry?

Do you know the branches of chemistry? What branches of chemistry do you prefer?

1. Read the text and translate.

Ancient science

Chemistry is the science of matter and the changes it undergoes. Chemistry is concerned with the composition, behavior (or reaction), structure, and properties of matter, as well as the changes it undergoes during chemical reactions.

Ancient Egyptians pioneered the art of synthetic wet chemistry 4,000 years ago. Wet chemistry is a term used to refer to chemistry generally done in the liquid phase. By 1000 BC civilizations were using more complex forms of chemistry such as using plants

for medicine, extracting metal from ores, fermenting wine and making cosmetics.

The genesis of chemistry can be traced to the widely observed phenomenon of burning that led to metallurgy—the art and science of processing ores to get metals. The greed for gold led to the discovery of the process for its purification.

The earliest pioneers of chemistry, and inventors of the modern scientific method, were medieval Arab and Persian scholars. They introduced precise observation and controlled experimentation into the field and discovered numerous chemical substances. The emergence of chemistry in Europe was primarily due to the recurrent incidence of the plague and blights there during the so called Dark Ages. This gave rise to a need for medicines.

Chemistry indeed came of age when Antoine Lavoisier, developed the theory of Conservation of mass in 1783; and the development of the Atomic Theory by John Dalton around 1800.The discovery of the chemical elements has a long history from the days of alchemy and culminating in the discovery of the periodic table of the chemical elements by Dmitri Mendeleev and later discoveries of some synthetic elements.

Modern disciplines within chemistry are traditionally grouped by the type of matter being studied or the kind of study. These include inorganic chemistry - the study of inorganic matter, organic chemistry - the study of carbon based matter, biochemistry - the study of substances found in biological organisms, physical

chemistry - the study of chemical processes using physical concepts and analytical chemistry - the analysis of material samples to gain an understanding of their chemical composition and structure.

Many more specialized disciplines have emerged in recent years, e.g. neurochemistry the chemical study of the nervous system.

Vocabulary

analytical chemistry
behavior (reaction)
biochemistry
biological organisms
burning
changes
chemical processes
complex forms
composition
emerge (v)
extract (v)
gain (v)
give rise to
group (v)
inorganic chemistry
matter
organic chemistry
physical chemistry
precise observation
property
purification
sample
substance
undergo (v)
wet chemistry

2. Translate the sentences into English.

1) Химия изучает вещества, их свойства, строение и превращения, происходящие в результате химических реакций.

2) По признаку изучаемых веществ химию принято делить на неорганическую и органическую.

3) Многие химические *вещества* при трансформации могут принимать достаточно *сложные формы*.

4) Эти *образцы* можно рассмотреть под микроскопом.

5) Появилась серия статей, посвященных результатам 3х лет *точных наблюдений* космического микроволнового фона на спутнике WMAP.

6) Химия как наука *возникла* достаточно давно.

7) Соль сильной кислоты и сильного основания не подвергается гидролизу.

8) Как и все органические вещества пенополистерол при горении выделяет от 1000 до 3000 Мдж/кг.

3. Give Russian equivalent for the following word combinations. Use them in the sentences of your own.

The science of matter, liquid phase, complex forms of chemistry, fermenting wine, the genesis of chemistry, widely observed phenomenon, the greed for gold, the modern scientific method, numerous chemical substances, due to the recurrent incidence, a need for medicines, the theory of Conservation of mass, the days of alchemy, the discovery of the periodic table of the chemical elements, the kind of study, carbon based matter, physical concepts, an understanding of chemical composition and structure.

4. Answer the questions to the text:

1) What phenomena are studied by chemistry?
2) Who pioneered chemistry?
3) What is "wet chemistry"?
4) What forms of chemistry did civilizations use by 1000 BC? Give examples.
5) When was the genesis of chemistry?
6) What did the greed for gold lead to?
7) Who were the earliest inventors of the modern scientific methods of chemistry? What did they do?
8) How did chemistry emerge in Europe?
9) When did chemistry indeed come of age?
10) Who discovered the periodic table of the chemical elements?
11) How are disciplines within chemistry traditionally grouped?
12) What is studied by inorganic chemistry, organic chemistry?
13) What is studied by biochemistry, physical chemistry?

5. *Read the sentences and say if they are true to the text or false. Correct the mistakes*.

1) Chemistry is the science about immune system.
2) Chemistry is concerned with the changes matter undergoes during chemical reactions.

3) Ancient Egyptians pioneered the art of dry chemistry 4,000 years ago.
4) Wet chemistry means that chemistry is done in the solid phase.
5) The genesis of chemistry can be traced to the widely observed phenomenon of cooling.
6) Starving led to the discovery of the process of purification.
7) In the XXI century an epidemic of plague gave rise to a need for medicines.
8) Gregor Mendel developed the theory of Conservation of mass.
9) Dmitri Mendeleev discovered the periodic table of the chemical elements.
10) Inorganic chemistry is the study of carbon based matter.
11) Analytical chemistry is the analysis of material samples.

6. *Retell the history of chemistry enlarging it with your own facts.*

7. Match the book-names of chemistry sub disciplines and their definitions.

1) Analytical chemistry
2) Biochemistry
3) Inorganic chemistry

4) Materials chemistry
5) Neurochemistry
6) Nuclear chemistry
7) Organic chemistry
8) Physical chemistry

a) is the study of the structure, properties, composition, mechanisms, and reactions of organic compounds.

b) is the study of the properties and reactions of inorganic compounds.

c) is the study of the physical and fundamental basis of chemical systems and processes.

d) is the analysis of material samples to gain an understanding of their chemical composition and structure.

e) is the study of the chemicals, chemical reactions and chemical interactions that take place in living organisms.

f) is the study of how subatomic particles come together g) is the preparation, characterization, and understanding of substances with a useful function.

h) is the study of neurochemicals; including transmitters, peptides, proteins, lipids, sugars, and nucleic acids.

8. *Make the report about any branch of chemistry you like. Find interesting facts about the chosen branch.*

9. Make a scrapbooking project "My favorite branch of chemistry".

The scrapbooking is a book or album of blank pages in which to mount newspaper cuttings, pictures, etc.

Take a sheet of paperA3, photographs, pictures, newspaper cuttings, colored pencils, felt pens, watercolor and glue. Try to create one sheet of a scrapbooking. Gather the works of your mates and make the scrapbooking which is called "Our favorite branches of chemistry".

10. Study this table which is a guide to the adjective word order.

OPINION	SIZE, AGE, SHAPE	COLOR	PATTERN	NATIONALITY	MATERIAL	NOUN
a smart	young			French		man
a nice		brown	spotty			dog
a chic		red			silk	scarf

10. Put the following words into the correct order.

1) suede / Italian / new / red / soft / shoes. 2) elderly / tall / Englishman. 3) oval / Venetian / ancient / valuable / glass. 4) shiny / large / expensive / brown / leather / case. 5) square / wooden / old / nice / table. 6) modern / stone / large / beautiful / cottage. 7) porcelain / tea / blue / thin / old / cup. 8) young / blonde / handsome / tall / man. 9) old / several / English / beautiful / castles. 10) pretty / French / young / a lot of /

girls. 11) dark blue / best / silk / my / shirt. 12) young / many / factory / German / workers.

11. Study the table of the words of Greek and Latin origin. Add your examples to it.

Origin	*Singular ending*	*Plural ending*	*Examples*
Greek	-is	-es	basis, crisis, axis
Greek	-on	-a	criterion
Latin	-us	-i	radius, alumnus
Latin	-a	-ae	formula, vita
Latin	-um	-a	datum, medium
Latin	-ix / -ex	-ices	index, appendix

12. Give the plural form of the following words came from Latin and Greek and give Russian translation to them.

Phenomenon, basis, bacterium, thesis, index, focus, criterion, datum, equilibrium, medium, synthesis, analysis, curriculum, symposium, spectrum, maximum, vacuum, stratum, hypothesis, phases, nucleus.

13. Choose the correct variant of the given nouns.

1) This phenomena/phenomenon follows the Newton Law.

2) Data/datum speaks in favor of this theory.

3) This hydrolysis/hydrolyses follows the above scheme.

4) Conclusive proof for the dioxin structure of IV was acquired through an independent synthesis/syntheses.

5) This thesis/theses holds for more general cases of isomerization.

6) The free proton resembles a particle consists of a nuclei/nucleus without planetary electrons.

7) The motion of a valence electron in its orbital is equivalent to the flow of a current in the loci/locus of its motion.

8) The data fit accurately into this formulae/ formula.

9) Give the report when analysis/analyses are complete.

10) These workers examined the spectra/ spectrum of seventy nitrides.

14. Make your own sentences with these words. Pay attention to the plural and singular forms.

15. Remind all simple tenses. Play a game.

Tense Game

It is good for Past, Present and Future tense as well as for answering the questions "What did you do yesterday?", "What are you doing this weekend" etc. Divide your class into groups, allocate each group a

space on the blackboard and have a piece of chalk prepared for each space. Your teacher mention only 2/3 words (time, gender, activity) - i.e. girl, basketball, yesterday then shout **Go!** One student from each group is then to run to the board and in their allocated space write the sentence "She played basketball (yesterday)", or whatever sentence is correct for the three words your teacher mentioned. The rules are that each person in the team must have a turn and you are not allowed to write the answers on a piece of paper and then copy it onto the board. Instead you can have helpers telling you what to write.

Have fun!

16. Open the brackets using ***Present, Past or Future Simple.***

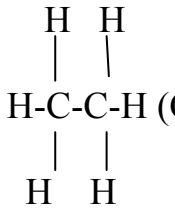
1) I (to go) to bed at ten o'clock every day. 2)I (to go) to bed at ten o'clock yesterday. 3) I (to go) to bed at ten o'clock tomorrow. 4) I (not to go) to the cinema every day. 5) I (not to go) to the cinema yesterday. 6) I (not to go) to the cinema tomorrow. 7) You (to watch) TV every day? 8) You (to watch) TV yesterday? 9) You (to watch) TV tomorrow? 10) When you (to leave) home for university every day? 11) When you (to leave) home for university yesterday? 12) When you (to leave) home for university tomorrow? 13) My brother (to go) to work every day. He (to leave) home at a quarter past eight. He (to walk) to his office. He (not to take) a bus. Yesterday he (not to go) to work. Yesterday he (to get) up at nine o'clock. 14) What you (to buy) at the shop yesterday? - I (to buy) a

book. 15) Yesterday my father (not to read) newspapers because he (to be) very busy. He (to read) newspapers tomorrow.

17. Read chemical formulas and equations. (Use appendix 1).

$N_2O_2 \leftrightarrow 2NO_2$

$CuSO_4 \leftrightarrow Cu^{2+} + SO_4^{2-}$(диссоциациясолей)



H-C-C-H (C_2H_6) (этан)

$C + O_2 \rightarrow CO_2$

$ZnCl_2 + H_2SO_4 \rightarrow ZnSO_4 + 2HCl$

$Zn + HCl \rightarrow ZnCl_2 + H_2\uparrow$

18. Read the text

Gas chromatography

Gas chromotography is a method for separating components of mixtures of volatile compounds. In most applications the separations are made to identify

and determine the quantity of each component of a sample of the mixture, and analytical gas chromatographic apparatus includes additional devices for this purpose. In some applications, separations are made for preparative purposes, but the scale is not generally greater than that required for quantities of the order of 100 g.

The central item in the apparatus for gas chromatography is the chromatographic column, a long tube packed permeably with some adsorbent. In the commonest technique of gas chromatography, the elution technique, a stream of inert gas, the carrier gas, passes continuously through the column, and the mixture to be separated is introduced at the beginning of the column as a sample either of a gas or a volatile liquid. Let us suppose that the sample consists of one pure component. After introduction, it is swept by the carrier gas on to the column, first evaporating to form a vapor if it is introduced as a liquid. When it reaches the column, it is largely adsorbed, but the equilibrium is set up between the column and the gas in the interstices of the column so that a proportion of the sample always remains in the gas phase. This portion moves a little further along the column in the carrier gas stream, where it again equilibrates with the column. At the same time, material already adsorbed in the column reenters the gas phase so as to: restore equilibrium with the clean carrier gas which follows up the zone of vapor.

The speed at which the zone moves depends on

two factors, the rate of flow of the carrier gas and the extent to which the vapor is adsorbed. The faster the flow of carrier gas, the faster the zone moves; and the more strongly the vapor is adsorbed on the column, the more slowly the zone moves. When two or more components are present in the sample, each usually behaves, independently of the others so that for a given carrier gas flow rate, the speed of the zone of each component will depend on the extent to which it is adsorbed. Since different substances differ in their adsorption, they may therefore be separated by making use of their different speeds of progress through the column. If they are eluted to the far end of the column they will appear one after the other in the gas stream, the fastest first and the slowest last.

Adsorbents such as carbon, alumina, or silica gel are used as the packing material for columns, but in more than 90% of applications, the column material is a liquid held in place on the column by being adsorbed on an inert solid support. Gas chromatography with this kind of column is called Gas Liquid Chromatography (G.L.C.). This method is used for separating solutes from mixed solutions.

19. Give Russian equivalents to the following phrases.

Gas chromatography, components of mixtures of volatile compounds, analytical gas chromatographic apparatus, additional devices, for preparative purposes, long tube, elution technique, stream of inert gas, carrier gas, volatile liquid, pure component, re-

store equilibrium, zone of vapor, separating solute.

20. Answer the following questions:

1) What does gas chromatography mean? 2) What is the central item in the apparatus for gas chromatography? 3) What gas passes through the column? 4) How does the process of chromatography pass? 5) What are adsorbents such as carbon, alumina, or silica gel used for? 6) What method is used for separating solutes from mixed solutions?

21. Read and translate the following derivatives:

1) analytical, analysis, analyse; 2) scheme, schematic, schematically; 3) compress, compression; 4) identify, identification; 5) include, inclusion, inclusive; 6) prepare, preparation, preparative; 7) adsorb, adsorbent, adsorption; 8) technique, technical, technician; 9) evaporation, vapor; 10) equilibrium, equilibrate, equilibration; 11)behavior, behave; 12) solute, solution, solvent, soluble, dissolve.

22. Chemistry is a fascinating science, full of unusual trivia! Here are some fun and interesting chemistry facts for you. Add your own ones.

➢ If you pour a handful of salt into a full glass of water, the water level will actually go down rather than overflowing the glass.

➢ A pure element can take many forms. For example, diamond and graphite both are forms of pure carbon.

➢ Lightning strikes produce O_3, which is ozone, and strengthen the ozone layer of the atmosphere.

➢ The element Californium is often called the most expensive substance in the world (as much as $68 million for one gram.)

➢ Hydrogen is the most abundant element in the universe, while oxygen is the most abundant element in the earth's atmosphere, crust, and oceans (about 49.5%).

➢ Helium balloons float because helium is lighter than air.

➢ Most of the human body is made up of water, H_2O, with cells consisting of 65-90% water by weight. Therefore, it isn't surprising that most of a human body's mass is oxygen. Carbon, the basic unit for organic molecules, comes in second. 99% of the mass of the human body is made up of just six elements: oxygen, carbon, hydrogen, nitrogen, calcium, and phosphorus.

➢ Gallium is a metal which melts on palm of the hand, due to its low melting point (29.76 °C).

➢ Astatine is the rarest element on Earth (approx 28g in the Earth's entire crust.)

➢ A rubber tire is actually one single giant molecule.

23. Translate the text into English.

История химии

Основы химии возникли ещё со времён появления человека разумного. Поскольку человек всегда так или иначе имел дело с химическими веществами, то его первые эксперименты с огнём, приготовлением пищи можно назвать основой практической химии. Постепенно практические знания накапливались, и в самом начале развития цивилизации люди умели готовить некоторые краски, яды и лекарства. Вначале человек использовал биологические процессы, такие, как брожение, но с освоением огня начал использовать процессы горения, сплавления. Использовались окислительно-восстановительные реакции, не протекающие в живой природе — например, восстановление металлов из их соединений.

24. Make a report or presentation about the famous chemist you know. Tell it to your group and vote for the most interesting report/ presentation.

Unit 6

Biology

How does biology refer to biotechnology?
Why should biotechnologists study biology?

1. Read the first abstract of the text and try to answer the questions given there.

2. Read the whole text about biology and translate.

The Science of Life

How can there be seedless grapes, and how do they reproduce? Why is carbon monoxide extremely poisonous? Why can`t you tickle yourself? What causes the smell after rain? How do vitamins work? What`s all this fuss about stem cells? What`s make us yawn? Why are frogs growing extra legs out of their legs? Which came first, the chicken or the egg?

Biology is the study of living things and their vital processes. Because biology covers such a broad area, it has been traditional to separate the study of plants (botany) from that of animals (zoology), and the study of structure of organisms (morphology) from that of function (physiology). Despite their apparent

differences, all the subdivisions are interrelated by basic principles, so current practice investigate those biological phenomena that all living things have in common. The advancement of knowledge and technology has resulted in further categorizations that include: cell biology, population biology, ecology, genetics, biochemistry, molecular biology, microbiology, physical anthropology, etc.

The foundations of modern biology include four components: cell theory; that life is made of fundamental units called cells; evolution, that life is not deliberately designed by rather evolves incrementally through random mutations and natural selection; gene theory, that tiny molecular sequences of DNA dictate the entire structure of an organism and are passed from parents to offspring; and homeostasis, that each organism's body includes a complex suite of processes designed to preserve its biochemistry from the entropic effects of the external environment.

It is not known when the study of biology originated, but it can be safely assumed that early humanoids had some experimental knowledge of the animals and plants around them. One's very survival relied on the recognition of poisonous plants and on the basic understanding of the habits of predators. Many of the earliest records of biology come from the bas-reliefs left behind by the Assyrians and Babylonians. There is growing evidence from China and India as early as 2500 BC that there were general practices of therapeutic healing, silkworm use to produce silk, biological control of crops, and agricultural cultiva-

tion.

With the arrival of Greek civilization, the study of biology shifted dramatically to a belief that every event has a cause and that a particular cause produces a particular effect. These philosophers of science assumed the existence of a natural law governing the universe. Although they established the **science** of biology, their greatest contribution to science was the idea of rational thought.

The basic picture in biology has stayed roughly the same since DNA was first imaged using x-ray crystallography in the 1950s, although there are constant refinements to the details, and life is so complex that it could be centuries or even millennia before we begin to understand it in its entirety. But it should be made clear that we are moving towards complete understanding: life, while complex, consists of a finite amount of complexity that only appreciably increases on relatively long timescales of hundreds of thousands or millions of years. Evolution, while creative, operates slowly.

In recent years, much excitement in biology has centered on the sequencing of genomes and their comparison, called genomics, and the creation of life with custom-written DNA programming, called synthetic biology. These fields are sure to continue grabbing the headlines in the near future.

Vocabulary

botany	in common
cause	morphology
cell theory	natural selection
complex	offspring
complex suite	operate (v)
consist of (v)	physiology
constant	preserve (v)
contribution	recognition
dictate (v)	refinement
establish (v)	rely on (v)
evolution	separate(v)
evolve (v)	shift (v)
finite amount	subdivision
foundation	survival
fundamental unit	vital processes
gene theory	x-ray crystallography
homeostasis	zoology

3. Give Russian equivalents:

A broad area, apparent differences, biological phenomena, the foundations of modern biology, random mutations, tiny molecular sequences of DNA, a complex suite of processes, early humanoids, poisonous plants, the habits of predators, growing evidence, therapeutic healing, every event has a cause, a natural law, greatest contribution, rational thought, constant refinements to the details, complete understanding, finite amount of complexity, sequencing of genomes,

custom-written DNA programming.

4. Translate these sentences using your vocabulary.

1) Мы смотрели передачу о том, как чистить (peel) и *разделять* на сегменты цитрусовые.

2) Наше тело – это *сложный набор* органических молекул.

3) Этот уникальный диетический продукт укрепляет иммунитет и способствует нормализации *жизненно важных процессов* в организме.

4) Способом *выживания* первобытного человека стало чувство его породнения (twinning) с грозной природной стихией.

5) На лекции мы узнали, что последовательность ДНК *определяет* структуру всего организма.

6) Ученые нашли биологическую *причину* того, что женщины находят спокойных, собранных мужчин более привлекательными.

7) Постановка и *постоянное уточнение* целей деятельности вызывают, поддерживают и переключают внимание.

8) *Рентгеновская кристаллография* использует рентгеновские лучи для выявления молекулярной структуры кристалла.

9) Михаил Васильевич Ломоносов внес *огромный вклад* в развитие науки в России.

5. Write all your associations with the words:

1) Botany

2) Zoology
3) Morphology
4) Physiology

6. Answer the following questions according the ideas of the text.

1) What is biology?
2) How is biology traditionally separated?
3) How are the subdivisions of biology interrelated?
4) What components do the foundations of modern biology include?
5) When did the study of biology originate?
6) Who were the first people having biological knowledge?
7) Where did the first records about biology come from?
8) What practiced in China in 2500 BC?
9) What did Greek civilization bring to biological knowledge?
10) When did the picture in biology become stable?
11) When will we probably understand the biological entity?
12) What is the most developing modern area of biology?

7. Say if these statements true or false according to the text. Correct if you find any mistakes.

1) Biology is the study of living things and their vital processes.
2) All the subdivisions of biology are interrelated by chemical structures of organisms.
3) The foundations of modern biology include five components.
4) Cell theory says that life is not designed by mutations and natural selection
5) Gene theory says that our genetic structure is passed from parents to offspring.
6) We definitely know when the study of biology originated
7) The earliest records of biology come from China.
8) With the arrival of Greek civilization people started to believe in the idea of rational thought.
9) The basic picture in biology has stayed stable since x-ray crystallography was used in Russian hospitals.
10) Evolution operates fast.
11) Synthetic biology deals with new agricultural products.

8. Make a plan of this text. Add key words in it if necessary.

9. Retell this text using your plan.

10. Use colored pencils and make a poster. Tell about the process of biosynthesis. Try to do it simple and teachable.

11. The Preposition. Fill in the blanks with the ***prepositions of time*** **in, on, at** *where necessary.*

1) I usually finish work early___Friday. I don't work ___the weekend. 2) Let's meet ___five ___Sunday, July 14. 3) I am busy___the moment. Come ___ten minutes' time, please. 4) There was a boat race in Southampton ___Easter Day. A lot of people usually come there ___Easter to see the race. 5) Can you imagine what the world will be ___.the year 2100? 6) When will you have your holiday, ___winter or___summer? — I'll have it late ___August. 7) We started the off ___midnight and reached the place of destination ___twelve hours ___noon. 8)I was in France in 1997. ___that time I was working as a waiter in a small cafe. 9) ___the age of sixteen he left his parents' house. 10)___her wedding day she got up ___dawn. 11) You must come and start doing electrophoresis ___next Thursday. Are you free ___Thursday? 12) I received a lot of presents ___ my birthday. 13) Leonardo da Vinci lived and worked __ the Middle Ages. 14)___every day he got up early ___the morning and went to bed late

___night. 15)___ the 19th century many people died of cholera and smallpox.

12. Fill in the blanks with ***prepositions of place*** **at, in, on.**

1) Excuse me, can you tell me where the concert hall is? — Turn___ the right___ the roundabout. It's ___ the corner of the square. 2) We spent our holiday___ the south coast of France. 3) He lives ___ the tenth floor ___ the centre of the city. 4) There was a black spot ___ the back of the cultivation tray. 5) There were no vacant chairs to sit ___ so he sat ___ the armchair __the corner. 6) Do you know that Englishmen drive ___ the left? 7) Look, how many stars there are ___the sky! 8) I'm going to the concert ___the Central Concert Hall tomorrow. 9) The delegation was met ___ the airport. 10) I don't want to sit ___the back row, let's sit ___the front. 11) At first it seemed that there wasn't his name ___the list, but then he found it ___ the bottom of the page. 12) __ my way home I saw Helen. She was standing____ the bus stop. 13) She did not want anybody to see her, so she sat ___the back of the car. 14) We were ___ the restaurant yesterday. There were a lot of delicious things ___ the menu.

13. Fill in the blanks with the appropriate prepositions where necessary.

1) I got lost ___Mike's house! I went ___my bedroom, walked ___a corridor, came ___the lounge, walked ___an arch, went ___some stairs and ___the

end I found myself ___my bedroom again. 2) Do you know that Alice is ___love ___Pete? 3) While you dress ___dinner, I'll go ___the shop ___the road. I'll be ____time. 4) The news ___the accident came ___a great shock___him. 5) Let's look at my school photo. Can you recogniseme___it? — I think you are___left corner. — No, you are mistaken. I am ___the back___ the last row. 6) ___the Middle Ages London was rather a big city. ___ the 16th century it became a prosperous capital. 7) Sit___ the armchair and write your name ___block letters ___ the top of the page. Write all dates ___words, not___ figures. 8) Sicily is an island ___the coast ___Italy. 9) I am afraid, I won't be able to find the theatre. — Oh, our town is rather small and you'll find it easily. Go___bus till Victoria Station. Turn right ___the square. ___the theatre there are two palms, and ___the theatre there is a swimming pool.___the theatre there is a coffee bar. 10) The typist sits ___the chair, with a lamp ___her.

14. Do you know what cytology is and what it studies? Is the kernel of a cell a subject of cytology? Why is knowledge of cytology necessary? Where can this knowledge be applied?

15. Read this text and translate it.

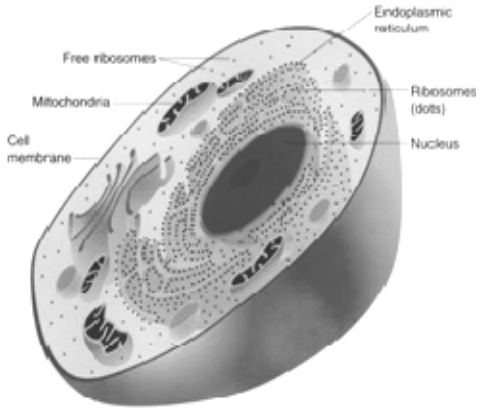
Cytology as a science.

Cytology means "the study of cells". Cytology is that branch of life science, which deals with the

study of cells in terms of structure, function and chemistry. Based on usage it can refer to cell biology.

Cell biology is a scientific discipline that studies cells – their physiological properties, their structure, the organelles they contain, interactions with their environment, their life cycle, division and death. This is done both on a microscopic and molecular level. Cell biology research encompasses both the great diversity of single-celled organisms like bacteria, as well as the many specialized cells in multicellular organisms such as humans.

The cell is the functional basic unit of life discovered by Robert Hooke. It is the smallest unit of life that is classified as a living thing, and is often called the building block of life. Some organisms, such as most bacteria, are unicellular (consist of a single cell). Other organisms, such as humans, are multicellular. Humans have about 100 trillion cells; a typical cell size is 10 micrometersand a typical cell mass is 1 nanogram. The largest known cells are unfertilized ostrichegg cells, which weigh 3.3 pounds.



The cell theory, first developed in 1839 by Matthias JakobSchleiden and Theodor Schwann, states that all organisms are composed of one or more cells, that all cells come from preexisting

cells, that vital functions of an organism occur within cells, and that all cells contain the hereditary information necessary for regulating cell functions and for transmitting information to the next generation of cells.

The word *cell* comes from the Latin *cellula*, meaning, a small room. The descriptive term for the smallest living biological structure was coined by Robert Hooke in a book he published in 1665 when he compared the cork cells he saw through his microscope to the small rooms monks lived in.

The cell consists of different proteins. Each type of protein is usually sent to a particular part of the cell. Most proteins are synthesized by ribosomes in the rough endoplasmic reticulum. This process is known as protein biosynthesis.

Appreciating the similarities and differences between cell types is particularly important to cell and molecular biology as well as to biomedical fields such as cancer research and developmental biology. Therefore, research in cell biology is closely related to genetics, biochemistry, molecular biology, immunology and developmental biology.

16. Give English equivalent to the following phrases.

Многоклеточные организмы, молекулярная биология, деление, клетка, наследственная информация, органеллы, яйцеклетка, исследование рака, раздел (науки), иметь дело с, бактерии, молекулярный уровень, цитология.

17. Translate the sentences into English using the words you learned.

1) *Биология клетки* — раздел биологии, изучающий живые клетки, их органоиды, их строение, функционирование, процессы клеточного размножения, старения и смерти.

2) Важнейшим дополнением *клеточной теории* явилось утверждение знаменитого немецкого натуралиста, что каждая клетка образуется в результате *деления* другой клетки.

3) *Биология развития* — раздел современной биологии, изучающий процессы индивидуального развитияорганизма.

4) Благодаря достижениям в области *иммунологии* создаются новые технологии для диагностики и лечения заболеваний, производства и применения лекарственных препаратов.

5) Надо рассматривать данный процесс на *молекулярном уровне*.

6) *Жизненный цикл* — закономерная смена всех поколений, характерных для данного вида живых организмов.

18. Answer the question according to the text.

1) What is cytology?

2) Is cytology and biology of a cell the same science?

3) What does cell biology study?

4) Who discovered the cell?

5) Is a cell the smallest unit of life?

6) Give examples of unicellular and multicellular organisms.

7) What cells are the largest known cells?

8) Who developed the cell theory?

9) Where does the word *cell* come from?

10) What is it inside the cell?

11) What is biosynthesis?

12) What sciences are related to the cell biology closely?

19. Put the words in the right order and write down the sentences:

1)that studies cells/ is / scientific / a/ cell biology / discipline /

2) basic /the /cell/ life/ functional/ of /is/ the/ unit /

3) of/ called/ life //the cell / often / the building block / is /

4) and/ 10 /mass /a /typical/ size/ nanogram/ is / a cell / is /1/cell /μm/typical/

5) for/ that /the next/ functions/ and /regulating/ all/ the /information /contain /for /cell/ hereditary/ to/ necessary/ generation / cells /cells /information/ of/ transmitting

6) provide/ differences /these /unifying/ similarities /and /theme fundamental /a

20. Write out the sentences expressing the main ideas of each logical part of the text.

21. Read and translate the text.

Не щекотно!

Ученые уже много лет гадают над смыслом боязни щекотки, которую могут испытывать не только люди, но и обезьяны, и крысы, ведь до сих пор непонятно, почему этот рефлекс не исчез в ходе эволюции.

Существует мнение, что тот, кому щекотно, испытывает вовсе не удовольствие, а страдание. В свое время римляне использовали щекотку как пытку. В Средневековье тоже прибегали к этому методу: голые ступни ног жертвы фиксировались, и каждый, кто проходил мимо, мог пощекотать их.

Но если пощекотать самого себя, смешно не будет. Еще Аристотель пришел к выводу, что исходящее от нас самих, независимо от того, щекотка ли это или что-то другое, не представляет для нас опасности, и наш организм это просто игнорирует.

Эту догадку подтверждает и Сара Блэкмор, исследовательница из Лондона. При помощи магнитно-резонансного томографа она проанализировала активность мозга людей, которых щекотал кто-то посторонний и которые щекотали себя сами. И пришла к выводу, что мозжечок тех, что щекотал сам себя, был менее активен, чем тех, кого щекотали. Мозг точно распознает, какое ощущение стоит ожидать, и эффекта неожиданности просто нет.

22. Create the project "Fantastic cells"

Think about unreal cells or cells of your dream and describe them (100-150 words). How do they look like? What properties do they have?

23. Give a detailed answer or write an essay on the following questions:

- The future of cytology.
- How cytology can help the mankind?

Unit 7

Embryology

What does embryology study?

How is an embryo developing?

What is a zygote?

1. Read this text and translate it.

What is Embryology?

Embryology is the study of the formation of life, part of the studies with which developmental biology is concerned. Developmental biology examines how all forms of life begin, and how they develop into fully formed and functioning organisms.

Embryology looks at the very beginning of life from the one-celled organism, egg or sperm. Embryologists examine fertilization and track the development of the embryo until it bears a resemblance to its progenitors. For example, in human conception, embryologists would be interested in both sperm and egg, and the meeting of the two, and then would follow egg implantation and the growth of an embryo until it reaches the fetal stage. So in humans, the study of an embryo would last until about the second month of a pregnancy.

Aristotle was one of the first to champion the theory of epigenesis, the concept that life forms develop into complex organisms from fertilization. This was not a popular concept and was largely discarded in favor of the theory of preformation, which suggested that each human sperm was already a person in waiting. In the mid 18th century, Caspar Fredriech Wolff again set forth the concept of epigenesis. Through his study of chick embryos, Wolff realized that the body of an organism has stages of development. Through vivisection, he observed the complexity of specific organs and contended that their development could not simply have occurred spontaneously, but must have developed over time.

Later scientists followed his studies, and with the development and subsequent improvements of the microscope, Wolff's theories were found to be quite accurate. Wolff is credited as the "Father of Embryology," even though he did not first conceptualize epigenesis. Today, the theories of embryology are easier to prove because of the accuracy with which we can examine DNA codes within a cell.

There are several practical applications of embryology in the modern world. Embryology has given doctors the tools to create fertilized eggs for in vitro implantation. Embryology can also identify risk factors for serious genetic conditions within the fertilized egg and select the most viable eggs for implantation. The study of embryology has led directly to the concept of cloning, either for a whole organism or parts of an organism.

Vocabulary

accuracy
accurate
application
bear (v)
complexity
concern (v)
developmental biology
doubt (v)
egg
embryo
embryologist
embryology
examine (v)
fertilization
fetal stage
field
formation
growth
implantation
in vitro
legislation
microscope
observe (v)
occur (v)
pregnancy
progenitor
reach (v)
regard
resemblance
sperm
theory of epigenesist
theory of preformation
tool
track (v)
vivisection

2. Translate the sentences into English.

1) *Эмбриология* — это наука, изучающая развитие зародыша.

2) *Зародышем* называют любой организм на ранних стадиях развития до рождения или вылупления, или до момента прорастания.

4) Различают *эмбриологию животных и человека и эмбриологию растений*.

5) Многие ученые не *сомневаются* в истинности данного предположения.

6) Во время исследования была обнаружена коммитированная (commited) клетка-*предшественник*.

7) На *стадии зародыша* можно оценить качество эмбриона по степени фрагментации.

8) Действующее *законодательство* регламентирует работу с персональными данными.

3. Use your English-English dictionary and write down the definitions to the following words:
Cloning, fetal stage, fertilization, pregnancy, in vitro.

*4. Read the text attentively again and say which statements are true to the fact or false***.**

1) Cytology is the study of the formation of life.

2) Embryology looks at the very beginning of life from the multi-celled organism, egg or sperm.

3) Embryologists examine fertilization.

4) So in humans, the study of an embryo would last until about the first month of a pregnancy.

5) Caspar Fredriech Wolff was one of the first to champion the theory of epigenesis.

6) Wolff realized that the body of an organism has stages of development.

7) Aristotle is credited as the "Father of Embryology," even though he did not first conceptualize epigenesis.

8) Today, the theories of embryology are easier to prove because of the accuracy with which we can examine RNA codes within a cell.

9) Embryology has given doctors the tools to cre-

ate fertilized eggs for in vivo implantation.

5. Speak on the new facts you found in the text. What wondered you or what information was new for you? Can you add any other information about the embryology?

6. Make a plan of this text. Add key words in it if necessary.

7. Retell this text using your plan and adding the information you found about embryology.

8. Choose the TOPICS you like for the presentations and make it with your partner:

- Ontogeny
- Embryogenesis
- Prenataldevelopment
- Epigenesis
- Developmentalbiology
- Morphogens

Speak about the history, development and new achievements in these fields.

9. Remind the ***pronouns*** *and choose the correct form of them in brackets.*

1) What color is the litmus paper? It is so far that I can't see (it's/its/it) color. 2) They rarely drive to (their/them/ theirs) lab. They live near (it's/it/its). 3)

Look at (me/ mine/my) new watch. Do you like (it/them/its)? 4) These books are (her/hers). Give (them/their/theirs) to (hers/ her). 5) Do you like (you/your/yours) new car? — Oh, (it's/it/its) has never let me down yet. 6)(Theirs/Their/ Them) work is much more difficult than (you/yours/ your) or (me/mine/my). 7) Why are (you/your/yours) sitting here? It is not (you/your/yours) desk, it is (me/ mine/my). 8) This tape recorder of (her/hers/she) is always out of order. — But so is (you/your/yours)! 9) She has not read a line of (you/your/yours), how can she criticize (you/your/yours) books? 10) The clock has stopped. Something may be wrong with (it's/it/its) spring.

10. Translate the sentences into English.

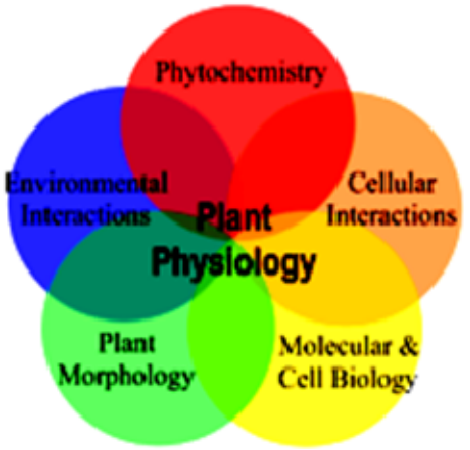
1) Кто там? — Откройте, это я. 2) Мой дом на правой стороне улицы, а их — на левой. 3)Их лодка была быстрее нашей. 4) Как зовут вашу собаку? — Ее зовут Квин. 5) В этом районе построена новая дорога. Ее длина более трехсот километров. 6) Это ваша ручка, а это его, но где же моя? 7) Она взяла мои ключи вместо своих. 8) Самый лучший план — ваш. 9) Чью работу будут проверять — Джона или Кэт? 10) Его автомобиль небольшой, но мотор (engine) у него мощный.

11. How many areas of physiology do you know? Do you study physiology? Read the text.

Physiology of plants and animals

Although you may place organisms without difficulty in either the plant or the animal kingdom, it is essential to know the basic differences between these two groups. That`s why we can distinguish physiology of plants and animals.

Plant physiology. It is a subdiscipline of botany concerned with the functioning, or physiology of plants. Closely related fields include plant morphology (structure of plants), plant ecology (interactions with the environment), photochemistry (biochemistry of plants), cell biology, and molecular biology. The scope of plant physiology as a discipline may be divided into several major areas of research.



First, the study of photochemistry (plant chemistry) is included within the domain of plant physiology. To function and survive, plants produce a wide array of chemical compounds not found in other organisms. Photosynthesis requires a large array of pigments, enzymes, and other compounds to function. Secondly, plant physiology includes the study of biological and chemical processes of individual plant

cells. Plant cells have a number of features that distinguish them from cells of animals, and which lead to major differences in the way that plant life behaves and responds differently from animal life. Thirdly, plant physiology deals with interactions between cells, tissues, and organs within a plant. Different cells and tissues are physically and chemically specialized to perform different functions. Fourthly, plant physiologists study the ways that plants control or regulate internal functions. Like animals, plants produce chemicals called hormones which are produced in one part of the plant to signal cells in another part of the plant to respond. Finally, plant physiology includes the study of how plants respond to conditions and variation in the environment, a field known as environmental physiology.

Animal physiology. It is the study of animal functions. Animal physiology is subdivided into the four main parts, such as general physiology, special physiology, comparative physiology and age physiology.

General physiology deals with the analysis of such universal and important processes as blood circulation, metabolism, respiration etc. Special physiology applies general physiological principles in order to investigate characteristics of a particular animal species. Comparative physiology concentrates on similarities and differences of physiological functions of various living organisms. The problem of how physiological functions change with animal age is of special interest to age physiology.

The main approach in animal physiology is to study the evolutionary origins of the physiological mechanisms in order to understand the significance of these mechanisms for modern animals. Modern physiology which is based on chemical, physical and anatomical methods investigates biological organization of the animal body at different levels, that is, cells, tissues, organs.

One of the parts of special physiology is devoted to farm animal physiology. The aim of this science is not only to study physiological functions of the farm animal body, but to control them in order to increase the production of eggs, offspring, milk, meat and wool.

Other major branches of scientific study that have grown out of physiology research include biochemistry, biophysics, biomechanics, pharmacology, cytology as well as genetics which are known as the biological bases for rational animal husbandry.

12. Translate the sentences into English using the words from the text.

1) *Физиология растений* — это наука о функциональной активности растительных организмов.

2) Задачи физиологии растений: изучение закономерностей жизнедеятельности растений, разработка теоретических основ получения максимальных урожаев сельскохозяйственных культур, разработка установок для осуществления процессов фотосинтеза в искусственных условиях.

3) *Фотосинтез* — процесс образования ор-

ганических веществ из углекислого газа и воды на свету при участии фотосинтетических пигментов.

4) Физиология растений – биологическая наука, изучающая общие закономерности жизнедеятельности *растительных организмов*.

5) Сегодня *молекулярная биология* располагает обширным арсеналом методов, позволяющих решать самые передовые и самые сложные задачи, стоящие перед учёными.

6) Вся история человеческого общества - это история его борьбы за выживание, история *взаимодействия с окружающей средой*.

7) Каждая *клетка растений* данного вида содержит в своем ядре одинаковый набор (или наборы) хромосом из строго определенного числа разных.

8) *Циркуляция крови* может быть восстановлена, например, с помощью следующих пищевых добавок: Витамин С улучшает тонус сосудов и в сочетании с витамином Е улучшает эндотелиальную функцию.

9) *Возрастная физиология* – раздел физиологии человека и животных, изучающий закономерности становления и развития физиологических функций организма на протяжении онтогенеза — от оплодотворения яйцеклетки до конца жизни.

13. Fill in the gaps in these sentences:

1) Plant physiology is a subdiscipline of _____concerned with the functioning, or

physiology of plants.

2) To function and survive, plants produce a wide array of _____not found in other organisms.

3) Plant cells have a _____which restricts the shape of plant cells and thereby limits the flexibility and mobility of plants.

4) Different cells and tissues are physically and chemically specialized to perform different _____.

5) Like animals, plants produce chemicals called _____which are produced in one part of the plant to signal cells in another part of the plant to respond.

6) Animal physiology is subdivided into the four main parts, such as_____, _____, _____ and _____.

7) The main approach in animal physiology is to study the _____of the physiological mechanisms in order to understand the significance of these mechanisms for modern animals.

14. Find the appropriate translation to the words:

living organism	кровообращение
agephysiology	лечить больных животных
blood circulation	дыхание
respiration	проблема, вызванная недостаточным питанием
To cure sick animals	Живой организм
Nutritional disorder	сравнительная физиология
comparative physiology	возрастная физиология

15. Answer the following questions according to the ideas of the text.

1) What does physiology study?
2) What are the main parts of physiology?
3) What stimulated the development of animal physiology?
4) What problems are of special interest to animal physiologists?
5) What are the main principles of physiological study?
6) How can the knowledge of physiological reactions help to maintain healthy farm animals?
7) What sciences are based on physiology research?
8) Tell the four main parts of animal physiology.
What is the main approach in animal physiology?

16. Arrange the following statements in their logical order. Explain and expand them.

- Plant physiology deals with interactions between cells, tissues, and organs within a plant.
- Plant physiology includes the study of biological and chemical processes of individual plant cells.
- Plant physiology is a subdiscipline of botany concerned with the functioning, or physiology of plants.
- Other major branches of scientific study that have grown out of physiology research.

- Plant physiology includes the study of how plants respond to conditions and variation in the environment.
- Animal physiology is the study of animal functions.
- The field of plant physiology includes the study of all the internal activities of plants
- The study of phytochemistry (plant chemistry) is included within the domain of plant physiology.
- The main approach in animal physiology is to study the evolutionary origins of the physiological mechanisms.

17. Make a plan of this text. Add key words in it if necessary.

18. Retell this text using your plan.

19. Translate the text into English using the words you've learned.

Оплодотворение у высших видов - это слияние яйцеклетки и сперматозоида. Оно происходит в яйцеводе. Наилучшие условия для этого обычно в пределах 12 ч. после выхода яйца из яичника. Многочисленные сперматозоиды приближаются к яйцеклетке, окружают ее, вступают в контакт с ее оболочкой.

Однако в яйцеклетку проникает только один сперматозоид, после чего вокруг яйцеклетки образуется оболочка оплодотворения, препятствующая проникновению других сперматозоидов. В резуль-

тате слияния двух ядер с галоидными наборами хромосом образуется диплоидная зигота (клетка, которая является одноклеточным организмом нового дочернего поколения).

20. Make a report:

"What problems are animal and plant physiologists investigating now?"

21. Study the example of CV (curriculum vitae).

Make Conclusions about the form of the resume.

CV (CURRICULUM VITAE)

Perminov Vitaly
14 apt., 161, Leninast.,
Izhevsk, Udmurt republic, Russia 426000
Phone: +7(3412) 891234
Mobile: +7 916 7894 689

SUMMARY OF QUALIFICATION

- Languages:English - very good, German – satisfactory
- Enthusiastic, cooperative and detail oriented. Studying very quickly.
- Good knowledge of laboratory equipment.

Date of birth: 07/03/1987
Marital status: Single
Nationality: Russian

EDUCATION:
Udmurt State University, Biotechnological Faculty. Major – biochemistry. Expecting graduating date - 2015.
Santa-Lingua language school, advanced course of English. Certificate.

WORK EXPERIENCE:
14.03.2008 - 06.07.2009 – Finam Ltd., economist in financial group.

- work with a bank
- work with clientele

06.07.2006 - 18.08.2007 – UdSU, lab assistant.

- work with lab equipment
- chromatography analysis

ADDITIONAL SKILLS:
Hobbies: chemistry (diploma for the 3rd place in regional tour in chemistry), swimming, boxing.

INTERSTS:
Any computer work, experience of office, seller skills, advertisement experience, took part in advancement of new medicines to foreign markets,

can swim well, housekeeping, kitchen works and take care of children.
Interesting in studying and improving my English skills, visit dif. countries (US best of all).

22. Write your own CV. You can imagine yourself a well-known scientist or write the CV from your student's position as well.

Unit 8

Biochemistry

Do you know the subject of biochemistry?
What is a biomolecule?
What kind of biomolecules do you know?
What is DNA?

1. Read the text about biochemistry and translate it.

Biological chemistry

Biochemistry, sometimes called biological chemistry, is the study of chemical processes in living organisms, including, but not limited to, living matter. Biochemistry governs all living organisms and living processes. By controlling information flow through biochemical signaling and the flow of chemical energy through metabolism, biochemical processes give rise to the incredible complexity of life. Much of biochemistry deals with the structures and functions of cellular components such as proteins, carbohy-

drates, lipids, nucleic acids and other biomolecules although increasingly processes rather than individual molecules are the main focus. Over the last 40 years biochemistry has become so successful at explaining living processes that now almost all areas of the life sciences from botany to medicine are engaged in biochemical research. Today the main focus of pure biochemistry is in understanding how biological molecules give rise to the processes that occur within living cells which in turn relates greatly to the study and understanding of whole organisms.

Among the vast number of different biomolecules, many are complex and large molecules (called biopolymers), which are composed of similar repeating subunits (called monomers). Each class of polymeric biomolecule has a different set of subunit types. For example, a protein is a polymer whose subunits are selected from a set of 20 or more amino acids. Biochemistry studies the chemical properties of important biological molecules, like proteins, and in particular the chemistry of enzyme-catalyzed reactions.

The biochemistry of cell metabolism and the endocrine system has been extensively described. Other areas of biochemistry include the genetic code (DNA, RNA), protein synthesis, cell membrane transport, and signal transduction.

Researchers in biochemistry use specific techniques native to biochemistry, but increasingly combine these with techniques and ideas from genetics, molecular biology and biophysics. There has never

been a hard-line between these disciplines in terms of content and technique. Today the terms molecular biology and biochemistry are nearly interchangeable.

Vocabulary

amino acid	in terms of
biopolymer	interchangeable
cell membrane	lipids
transport	living matter
complex (adj)	metabolism
endocrine system	monomer
engage (v)	nucleic acid
enzyme-catalyzed reaction	occur (v)
give rise to (v)	protein
govern (v)	subunit
	transduction

2. Fill in the gaps in this sentences:

1) Biochemistry is the study of _____ in living organisms.

2) Much of biochemistry deals with _____of cellular components such as _____.

3) Over the last _____ years biochemistry has become so successful at explaining living processes.

4) Today the main focus of pure biochemistry is in _____ how biological molecules give rise to the processes that _____within living cells.

5) Each class of polymeric _____ has a different set of subunit types.

6) _____ is a polymer whose subunits are se-

lected from a set of 20 or more amino acids.

7) The biochemistry of cell _____and the _____system has been extensively described.

8) Researchers in biochemistry use specific _____ native to biochemistry.

9) Today the terms _____and biochemistry are nearly interchangeable.

3. Make sentences in English with words stated below:

a) govern, give rise to, engage, occur;

b) protein, amino acid, carbohydrates, lipid, amino acid, endocrine system.

4. Circle any additional unknown words/phrases in the article. In pairs/groups, use your dictionaries to understand the meanings. Write definitions to 3 of them.

5. Answer the questions to check your comprehension.

1) What is an object for this study?

2) When did biochemistry become so successful at explaining living processes?

3) What is the main focus of pure biochemistry?

6. Prepare a report about the role of biochemistry in modern life. Include the following ideas:

- What is biochemistry

- What is biomolecule and what is its importance
- Biochemical techniques and its importance
- The application of biochemistry in modern life

Be ready to tell your report to your class.

7. Give definition of words:

Metabolism – ……..

Protein – ……..

Enzyme-catalyzed reaction – …….

Nucleic acid – ……..

Biopolymer – …….

8. Find the worlds from the previous exercise in the following table.

b	*e*	*r*	*a*	*r*	*y*	*a*	*r*	*t*	*y*	*u*	*d*	*l*
s	*i*	*c*	*f*	*g*	*h*	*j*	*k*	*h*	*l*	*a*	*s*	*i*
b	*i*	*o*	*p*	*o*	*l*	*y*	*m*	*e*	*r*	*g*	*q*	*p*
t	*f*	*v*	*c*	*i*	*w*	*v*	*z*	*d*	*g*	*e*	*s*	*i*
r	*s*	*m*	*n*	*h*	*b*	*v*	*u*	*i*	*r*	*n*	*d*	*d*
a	*p*	*r*	*o*	*t*	*e*	*i*	*n*	*i*	*o*	*g*	*j*	*f*
n	*f*	*l*	*g*	*s*	*c*	*m*	*s*	*m*	*k*	*a*	*n*	*d*
s	*a*	*n*	*l*	*e*	*i*	*o*	*i*	*m*	*i*	*g*	*c*	*b*
d	*m*	*u*	*c*	*i*	*c*	*n*	*w*	*s*	*k*	*e*	*a*	*x*
u	*k*	*r*	*w*	*e*	*a*	*o*	*l*	*i*	*t*	*f*	*d*	*z*
c	*z*	*l*	*s*	*d*	*c*	*m*	*o*	*b*	*l*	*r*	*p*	*a*
t	*q*	*b*	*x*	*c*	*i*	*e*	*t*	*a*	*i*	*p*	*y*	*h*
i	*o*	*n*	*m*	*b*	*d*	*r*	*b*	*c*	*f*	*o*	*h*	*j*

9. Study additional notions concerning biochemistry and explain them.

Chromotography
Coomassie dye
Electrophoresis
Peptides
ELSA
IgG
Enzyme
Isoelectric point
Centrifuge
Peptin
Polyacrylamide gel
Distillated water

10. Translate the sentences with the words from vocabulary after the text.

1) Четвертичная структура белка состоит из субъединиц-доменов.

2) ИФА применяется для качественного и количественного определения биомолекул.

3) Ферменты катализируют как прямую, так и обратную реакцию.

4) Передача нервного импульса идет посредством медиаторов.

5) Хромография – метод разделения белков по массе.

6) Краситель кумасси используется для окрашивания полиакриламидного геля.

7) Изоэлектрическая точка означает электро-

нейтральное положение белка.

8) Дистиллированная вода используется для мытья лабораторной посуды, добавления в растворы и многих других целях.

9) Нуклеиновые кислоты несут закодированную информацию.

10) При повышении температуры тела человека до 40° происходит денатурация белка.

11. Open the brackets and use the ***comparative form of the adjectives and adverbs****.*

1) This exercise is (simple) than that one. 2) Why are you talking? Please be (quiet). 3) New districts of Moscow are (beautiful) than the old ones. 4) He is (clever) than his brother. 5) My (old) sister is 4 years (old) than me. 6) There are (many) customers on Saturdays than on weekdays. 7) Are expensive things (good) than cheap ones? 8) Is English grammar (difficult) than Russian grammar? 9) He has made (few) mistakes than yesterday. 10) She had to give us (far) information though she didn't want to.

12. Translate into English using the proper degrees of the words in bold type.

1) Возьмите этот чемодан (suitcase), он легче вашего. 2) В районе West End находятся самые дорогие магазины. 3) Что ты собираешься делать дальше? 4) Я думаю, что он старше вас, помоложе меня. 5) Это самый талантливый студент в нашей группе. 6) Хотя у нас были самые плохие места, нам очень понравился спектакль (performance). 7)

Где ближайшее почтовое отделение? 8)Последний поезд прибывал в полночь. 9)Последние известия были совсем неинтересные. 10) Они получили дополнительные сведения по этому вопросу.

*13. Put **the adverbs** in the right place.*

E.g.: These books are old (very). — *These books are very old.*

1) I hate travelling by air (really). 2) She trusted him (entirely). 3) I understand your situation (fully). 4) It is not his fault. He did not want it to happen (at all). 5) The rain spoiled my day (completely). 6) We did the job quickly (fairly). 7) Though he tried to persuade her, she believed his story (hard, half). 8) He believes that he is right (firmly). 9) The prices are cheap at the hotel (reasonably). 10) I was tired to eat (too, even).

14. Open the brackets and give the comparative or superlative degree of the following adjectives and adverbs. Add articles if necessary.

1) That is (incredible) story I have ever heard. 2) It is not always (bright) students who do well in tests. 3) I think, cotton shirts are much (comfortable) to wear! 4) Which is (deep), Lake Michigan or Lake Superior? 5) She is far (self-confident) than she used to be. 6) (tall) man among the guests is a basketball player. 7) I like both of them, but I think Kate is (easy) to talk to. 8) Most people are (well off) than their parents used to be. 9) She has a lot to be thankful for; but (sad) thing of all is that she does not realize it. 10)

You look a lot (sad) than you did last time I saw you.

15. Read the text and title it.

Biochemical pathway sand processes

Biochemical processes mediate the interaction of cells with their environment and are responsible for most of the information processing inside the cell. Networks of interacting proteins underlie many of these processes. Three major types of biochemical processes are distinguished:

Metabolic pathways are sequences of chemical reactions, each catalyzed by enzymes, where certain product molecules are formed from other small substrates. Metabolites are usually small molecules while enzymes are proteins.

Signal transduction networks are pathways of molecular interactions that provide communication between the cell membrane and intracellular end-points, leading to some change in the cell. Signals are transduced by modification of one protein’s activity or location by another protein.

Gene regulation circuits determine whether or not a particular gene is expressed at any particular time. Transcription factors, proteins that promote or repress transcription, either directly or indirectly bind regulatory DNA elements.

Metabolic, transduction and regulatory circuits are interleaved and integrated. For example, gene regulation circuits are fed by external signals transmitted by signal transduction pathways. The high com-

plexity of these systems makes their proper understanding difficult.

16. Make 5 questions according the text.

17. Write difficult words and make sentences with them.

18. Name biochemical processes. Choose the one you like and explain it in details. You can use illustration if necessary.

19. Translate the text into English

Возникнув как наука о химии жизни в конце XIXвека, биохимия отличается от органической химии тем, что исследует только те вещества и химические реакции, которые имеют место в живых организмах, прежде всего в живой клетке. Согласно этому определению, биохимия охватывает также многие области клеточной биологии и включает в себя молекулярную биологию. Молекулярные биологи преимущественно работают с нуклеиновыми кислотами, изучая их структуру и функции, в то время как биохимики сосредоточились на белках, в особенности на ферментах, катализирующих биохимические реакции.

В основе биохимической методологии лежит фракционирование, анализ, изучение структуры и свойств отдельных компонентов живого вещества. Наиболее распространенными методами биохимии

являются хроматография, центрифугирование и электрофорез.

С конца XX в. в биохимии всё шире применяются методы молекулярной и клеточной биологии, в особенности искусственная экспрессия и нокаут генов в модельных клетках и целых организмах.

20. Make a report or composition on the following topics:

1) Biochemistry in Russia: what is a prospective?

2) Modification of proteins as a protection of biopreparation.

3) Enzyme as a biocatalyst.

4) Branches of biochemistry: what is more perspective?

5) Synthesis of proteins as a main process in our organism.

21. BIMs or Biologically Important Molecules can be split into four categories: Proteins, Carbohydrates, Lipids, and Nucleic Acids. Each of these groups is composed of different subunits and each performs different tasks within the human body. What are their functions?

Write a tale about proteins, lipids, nucleic acids and carbohydrates.

For example:

Once proteins, lipids and carbohydrates met and

decided to find out who is the most necessary for …

22. *Three biochemical methods are:*
    - *Chromatography*
    - *Centrifugation*
    - *Electrophoresis*

With the group of your colleagues choose one method and make a detailed presentation about it.

Unit 9

Biophysics

Have you studied biophysics? Say in your words what biophysics is.

What do biophysicists study?

How essential is biophysics to progress in biology and biotechnology?

What are the applications of biophysics?

Why is biophysics important right now?

1. Read the text and find the answers to the mentioned above question.

The bridge between biology and physics

Biology studies life in its variety and complexity. It describes how organisms go about getting food, communicating, sensing the environment, and reproducing. On the other hand, physics looks for mathematical laws of nature and makes detailed predictions about the forces that drive idealized systems. Spanning the distance between the complexity of life and the simplicity of physical laws is the challenge of biophysics. Biophysicists study life at every level, from at-

oms and molecules to cells, organisms, and environments.

Biophysics discovers such questions as how atoms are arranged to work in DNA and proteins. Protein molecules perform the body's chemical reactions. They push and pull in the muscles that move your limbs. Proteins make the parts of your eyes, ears, nose, and skin that sense your environment. They turn food into energy and light into vision. They are your immunity to illness. Proteins repair what is broken inside of cells, and regulate growth. They fire the electrical signals in your brain. They read the DNA blueprints in your body and copy the DNA for future generations. So, biophysicists discover how proteins work. Understanding these differences in people's respond to proteins opens new possibilities in drug design, diagnosis, and disease control.

Biophysics is a wellspring of innovation for our high-tech economy. The applications of biophysics depend on society's needs. In the 20th century, great progress was made in treating disease. Biophysics helped to create powerful vaccines against infectious diseases. It described and controlled diseases of metabolism, such as diabetes. And biophysics provided both the tools and the understanding for treating the diseases of growth as cancers. Today we are learning more about the biology of health and society is deeply concerned about the health of our planet.

Advanced instruments created by biophysicists provide the life-saving treatment methods of kidney dialysis, radiation therapy, cardiac defibrillators, and

pacemakers. Biophysicists invented instruments for detecting, purifying, imaging, and manipulating chemicals and materials.

Nowadays society is facing physical and biological problems of global proportions. How will we continue to get sufficient energy? How can we feed the world's population? How do we remediate global warming? How do we preserve biological diversity? How do we secure clean and plentiful water? Biophysics provides the insight and technologies for meeting these challenges, based on the principles of physics and the mechanisms of biology.

Biophysics discovers how to modify microorganisms for biofuel (replacing gasoline and diesel fuel) and bioelectricity (replacing petroleum products and coal for producing electricity). Biophysics discovers the biological cycles of heat, light, water, carbon, nitrogen, oxygen, heat, and organisms throughout our planet. Biophysics harnesses microorganisms to clean our water and to produce lifesaving drugs.

Vocabulary

advanced
arrange (v)
bioelectricity
biofuel
biological diversity
challenge
complexity
detailed predictions
detect (v)
DNA blueprint
face (v)
fire the signals
force
generation
image (v)
law

lifesaving drugs
manipulate (v)
perform (v)
preserve (v)
pull (v)
purify (v)
push (v)
regulate (v)
remediate (v)
repair (v)
respond (v)
secure (v)
simplicity
society's needs
variety

2. Try to explain the following terms:

Kidney dialysis, radiation therapy, cardiac defibrillator, pacemaker.

3. Translate the sentences with the words from your vocabulary.

1) Важнейшей задачей любого государства является удовлетворение *потребностей общества*.

2) Лекция «Величие и *простота* законов Ньютона» была прочитана 19 сентября в Большой демонстрационной аудитории.

3) Белки *регулируют* рост клетки.

4) Без *сохранения биологического разнообразия* невозможно устойчивое развитие биосферы.

5) Существуют проекты, направленные на получение *биотоплива* из целлюлозы (cellulose) и различного типа органических отходов.

6) Никотин *посылает* в мозг ложные *сигналы* о сытости.

7) *Передовые* инструменты, созданные биофизиками, были применены для повышения эффективности работы.

8) В последнее время человечество чаще стало *сталкиваться* с экологическими проблемами, приобретающими глобальный характер.

4. Continue the associative chain:

Biophysics – atoms – proteins - …

5. Answer the questions according to the text.

1) What does biology study?
2) What does physics study?
3) How does biophysics connect biology and physics?
4) What does biophysics discover about proteins?
5) Name the functions of proteins in our body.
6) What progress did biophysics make for society's needs in the 20th century?
7) What instruments or tool did biophysicists create?
8) What problems does modern society face?
9) Why does society need biofuel and bioelectricity?
10) Why does biophysics harness microorganisms?

6. Correct the order of the ideas according to how they were mentioned in the text.

1) Biophysics in the source of economical innovations.

2) Modern society faces many environmental problems.

3) Biophysics is the mixture of biology and physics.

4) Proteins' work is being discovered by biophysics.

5) Biofuel, bioelectricity, cleanup of water are the issues of biophysics.

6) Many life-saving tools are created by biophysics.

7. Write a summary of the text in your own words. Orally enlarge this summary and retell the text.

8. As innovations come out of physics and biology labs, biophysicists find new areas to explore where they can apply their expertise, create new tools, and learn new things. Biophysicists ask questions, such as:

How do protein machines work? Even though they are millions of times smaller than everyday machines, molecular machines work on the same principles. They use energy to do work. The kinesin machine shown here is carrying a load as it walks along a track. Biophysics reveals how each step is powered forward.

How do systems of nerve cells communicate? Biophysicists invented colored protein tags for the

chemicals used by cells. Each cell takes on a different color as it uses the tagged chemicals, making it possible to trace its many pathways.

Answer the following questions from the point of view of biophysicist.

- How do proteins pack DNA into viruses?
- How do viruses invade cells?
- How do plants harness sunlight to make food?

9. Remember ***Present Perfect tense****. Insert the following markers in the correct place.*

ever, never, for, since, already, just, yet

1) He's worked there many years, 1986, I believe.

2) I have loved anyone as much as I love you.

3) We've known Paul two years. Have you met him?

4) I've known him we went to school together, but I've met his parents.

5) We have sold two hundred tickets and there is still a month to go before the concert.

6) Have you thought of learning to fly?

7) I have received my exam result. It came ten minutes ago.

10. Find the difference between ***Present Perfect*** *and* ***Past Simple****.*

1) Barbara Lively_____ (write) a lot of books. She _____ (write) her first fifteen years ago.

2) _____ you ever _____ (try) Indian food?

3) I _____ never _____ (be) to Japan. When ___ you _____ (go) there?

4) I _____ (live) in London for eight years, and I don't want to move.

5) He _____ (live) in Oxford for two years, and then in 1995 he _____ (move) to London.

6) We _____ (meet) Tim and Maureen three years ago. How long _____ you _____ (know) them?

11. Translate sentences into English.

1)Я только что встретил его. 2)Я видел твоего брата вчера. 3) Я еще не разговаривал с ним. 4) Я уже пообедал. 5) Он жил в Сибири в детстве. 6) Я не видел его с детства. 7) Она встала, умылась, оделась и пошла в лабораторию. 8) Он пришел в 12 вчера вечером. 9) Он позвонил мне. 10) Он уже позвонил мне. 11) Они получили новую квартиру в этом году. 12)Они уже слышали эти новости. 13) Я познакомился с его отцом. 14) Вы когда-нибудь были за рубежом? 15) Он окончил школу в прошлом году. 16) Вы уже видели новую статью по микробиологии? 17) Вы уже испытали оборудование? 18) Когда я услышал стук, я подошел к двери и открыл ее. 19) Я уже провёл исследование. 20)Он собирал жуков, когда был ребенком.

12. Complete the sentences with the verbs from the box using the ***Past Perfect Continuous Tense****.*

Consider	Burn	Drive	Quarrel	Write
Practice	Work	Work	Rain	Try

1) He___the car for many hours before he came to the crossroads. 2) The pianist ___ the passage hour after hour till he mastered it. 3) When I met her, her eyes were red. She and Mike again____. 4) When I came, they___ this question for more than an hour. 5) It was evening and he was tired because he___since dawn. 6) He ___ to get her on the phone for 15 minutes before he heard her voice. 7) By 12 o'clock they _____ a composition for two hours. 8) The fire___for some time before a fire brigade came. 9) I___to meet her for ages when I bumped into her by chance. 10) When I left home, it was raining, and as it___since morning, the streets were muddy.

13. ***Present Perfect*** *and* ***Present Perfect Continuous****. Choose the correct sentence from each pair.*

1) I've cut my finger! - I've been cutting my finger!

2) Have you heard Paul Simon's latest record? - Have you been hearing Paul Simon's latest record?

3) She's tired because she's shopped all day. - She's tired because she'sbeen shopping all day.

4) Sorry. I'vebroken one of your glasses. - Sorry. I've been breaking one of your glasses.

5) How long have you had this book? - How long

have you been having this book?

6) They have lived here for three years. - They'vebeen living here for three years.

14. Read the text and translate it.

Three branches of biophysics.

Medical Biophysics studies physics to describe or affect biological process for the purpose of medical application. Like many areas of study that have emerged in recent times, it relies on broad interdisciplinary knowledge between the so-called traditional fields such as physics (i.e. medical physics, radiation physics or imaging physics) and advanced biology fields such as biochemistry, biophysics, physiology, neuroscience etc.

Some important areas of research in medical biophysics include medical imaging (e.g. MRI, computed tomography, and PET), oncology and cancerdiagnosis, and vasculature and circulatory system function.

Molecular biophysics is an evolving interdisciplinary area of research that combines concepts in physics, chemistry, engineering, mathematics and biology. It studies biomolecular systems and explain biological function in terms of molecular structure, structural organization, and dynamic behavior at various levels of complexity (from single molecules to supramolecular structures, viruses and small living systems). The discipline requires specialized equipment and procedures capable of imaging and manipulating minute living structures, as well as novel experimental approaches.

Biophysical chemistry is a relatively new branch of chemistry that covers a broad spectrum of research activities involving biological systems. The most common feature of the research in this subject is to seek explanation of the various phenomena in biological systems in terms of either the molecules that make up the system or the supra-molecular structure of these systems.

Biophysical chemists employ various techniques used in physical chemistry to probe the structure of biological systems. These techniques include spectroscopic methods like nuclear magnetic resonance (NMR) and X-ray diffraction. Also biophysical chemists studyprotein structure and the functional structure of cell membranes. For example, enzyme action can be explained in terms of the shape of a pocket in the protein molecule that matches the shape of the substrate molecule or its modification due to binding of a metal ion. Similarly the structure and function of the biomembranes may be understood through the study of model supramolecular structures as liposomes or phospholipidvesicles of different compositions and sizes.

15. Circle any additional unknown words/phrases in the article. In pairs/groups, use your dictionaries to understand the meanings. Write definitions to 3 of them.

16. Remember how the fragments were used, and complete the sentence from the article above.

1) Medical Biophysics studies physics to …

2) Medical Biophysics relies on broad interdisciplinary knowledge between…

3) Some important areas of research in medical biophysicsare…

4) Molecular biophysics is a rapidly evolving interdisciplinary area of research that …

5) Biophysical chemistry is a relatively new branch of chemistry that …

6) Biophysical chemists employ various techniques used in physical chemistry to …

7) Biophysical chemists study…

8) Enzyme action can be explained in terms of …

9) Similarly the structure and function of the biomembranes may be understood through …

17. Work with a partner to summarize the article in your own words.

18. Translate the text into English using the words you've learned.

Области применения биофизики.

Биологические объекты, как правило, очень

сложны и на протекающие в них процессы влияют многие факторы, которые часто зависят друг от друга. Физика позволяет создать упрощенные модели объекта, которые описываются законами термодинамики, электродинамики и т.д.

В физике имеется множество методов, которые в своей первоначальной форме не могут быть использованы для исследований биологических объектов. Поэтому ещё одной задачей биофизики является приспособление этих методов и методик для решения задач биологии. Сегодня для получения информации в биологических системах применяют различные оптические методы, рентгеноструктурный анализ, ЯМР - и ЭПР-спектроскопию, различные электрометрические методы, методы хемилюминесценции, лазерную спектроскопию, метод меченых атомов и др. Это используется, в частности, для медицинской диагностики и терапии.

19. Write an essay on the topic "Prospects of biophysics".

20. With the group of your colleagues make a presentation about the following selected topics in biophysics:

- *Biophysical mechanisms*
- *Biophysical techniques*
- *Molecular structure and behavior*

Unit 10

Physicochemical methods of analysis

What are the physicochemical methods of analysis?

What kinds of physicochemical methods do you know?

What is the basis of physicochemical methods of analysis?

1. Read this text and translate it.

Physicochemical Methods of Analysis: What Are These?

It seems that this term can be met only in Russian. In the English-language literature, they usually speak and write about instrumental methods of analysis. The name instrumental is evidently not ideal; analytical balances or titrimeters used in classical chemical methods also belong to instruments.

Physicochemical methods of analysis have wider application. Without them it is hard to control and manage production processes and research. It should be noted that physicochemical methods of analysis solve the problems of chemical control and analysis;

they constitute to one of the parts of analytical chemistry. The essence of the physical and chemical methods of analysis is to study relations between structure and properties of systems. For the analysis of substances chemical reactions are widely used. They are accompanied by changes in the physical properties of the analyzed system, for example, the color intensity of fluorescence, etc. So physicochemical methods of analysis is a field of analytical chemistry that investigates analyses using scientific instruments. There are several types of instrumental analyses.

Spectroscopy measures the interaction of the molecules with electromagnetic radiation. Spectroscopy consists of many different applications such as atomic absorption spectroscopy, atomic emission spectroscopy, ultraviolet-visible spectroscopy, x-ray fluorescence spectroscopy, infrared spectroscopy, Raman spectroscopy, nuclear magnetic resonance spectroscopy, photoemission spectroscopy and so on.

Mass spectrometry measures mass-to-charge ratio of molecules using electric and magnetic fields. There are several ionization methods: electron ionization, chemical ionization, electrospray, fast atom bombardment, matrix-assisted laser desorption/ionization, and others.

Crystallography is a technique that characterizes the chemical structure of materials at the atomic level by analyzing the diffraction patterns of electromagnetic radiation or particles that have been deflected by atoms in the material. X-rays are most commonly used. From the raw data the relative placement of at-

oms in space may be determined.

Electroanalytical methods measure the electric potential in volts and/or the electric current in amps in an electrochemical cell containing the analyte. These methods can be categorized according to which aspects of the cell are controlled and which are measured. The three main categories are potentiometry (the difference in electrode potentials is measured), coulometry (the cell's current is measured over time), and voltammetry (the cell's current is measured while actively altering the cell's potential).

Calorimetry and *thermogravimetric analysis* measure the interaction of a material and heat.

Separation processes are used to decrease the complexity of material mixtures. Chromatography and electrophoresis are representative of this field.

Microscopy. The visualization of single molecules, single biological cells, biological tissues and nanomaterials is very important and attractive approach in analytical science.

Also, hybridization with other traditional analytical tools is revolutionizing analytical science. Microscopy can be categorized into three different fields: optical microscopy, electron microscopy, and scanning probe microscopy. Recently, this field is rapidly progressing because of the rapid development of the computer and camera industries. Combinations of the above techniques produce a "hybrid" or "hyphenated" technique. Several examples are in popular use today and new hybrid techniques are under development, for example, gas chromatography-mass spectrometry, gas

chromatography-infrared spectroscopy, liquid chromatography-mass spectrometry and so on.

A general method for analysis of concentration involves the creation of a calibration curve. This allows for determination of the amount of a chemical in a material by comparing the results of unknown sample to those of a series known standards. If the concentration of element or compound in a sample is too high for the detection range of the technique, it can simply be diluted in a pure solvent. If the amount in the sample is below an instrument's range of measurement, the method of addition can be used. In this method a known quantity of the element or compound under study is added, and the difference between the concentration added, and the concentration observed is the amount actually in the sample.

Vocabulary

accompanied
analytical chemistry
atomic absorption spectroscopy
atomic emission spectroscopy
biological tissues
calibration curve
calorimetry
chemical structure
color intensity
coulometry
crystallography
decrease (v)
electric current
electric potential
electroanalytical method
electromagnetic radiation
electrospray
fast atom bombardment
fluorescence
hybridization

ionization methods
infrared spectroscopy
instrumental analyse
investigate (v)
mass spectrometry
mass-to-charge ratio
microscopy
resonance spectroscopy
photoemission spectroscopy
property
potentiometry
production processes
pure solvent
separation processes
single molecule
solve (v)
ultraviolet-visible spectroscopy
voltammetry
x-rayfluorescence

3. Translate the sentences with the words from vocabulary after the text.

1) *Флюоресценция* - свечение некоторых тел под влиянием освещения, по прекращении которого свечение не наблюдается.

2) *Чистый растворитель* не обладает запахом и не токсичен.

3) Достаточно знать *химический состав* вещества и его плотность, чтобы предсказать и все его прочие свойства.

4) Ученым необходимо измерить оптические линий *одиночных молекул*.

5) Спектроскопия обнаруживает и определяет вещества при помощи измерения их характеристических спектров.

6) После изучения теории ученые принялись *исследовать* новый материал.

7) В этом эксперименте необходимо *понизить* уровень абсорбации.

4. Fill in the gaps in this sentences:

1) Physicochemical methods of _____have wider application.

2) Spectroscopy measures the interaction of the molecules with _____.

3) From the raw data the relative placement of _____in space may be determined.

4) Separation processes are used to decrease the complexity of_____.

5) The visualization of single molecules, single biological cells, biological tissues and nanomaterials is very important and attractive approach in_____.

6) Microscopy can be categorized into three different fields: _____, _____, and scanning probe microscopy.

4. Write out the sentences expressing the main ideas of each logical part of the text.

5. Write a summary of the text in your own words making use of plan and the sentences you've written out.

6. Choose the type of instrumental analysis and make a detailed presentation about it.

7. ***Past Perfect*** *and* ***Past Perfect Progressive****. Choose the correct sentence from each pair.*

1) I knew the facts of the case because I had

read / had been reading the report.

2) My eyes ached because I had read / had been reading for three hours.

3) The children were filthy. They had played / had been playing in the garden, and they were covered in mud.

4) I was very nervous at the beginning of the match. I had never played/ had never been playing her before, and I didn't know how good she was.

5) Donald excelled himself as a cook. He had cooked / had been cooking a wonderful Spanish dish.

6) Donald was very cross. He had worked/ had been working in the kitchen all morning, and none had offered to help.

8. Define if the verb tenses in these sentences are correct.

1) He had been sitting here for 40 minutes when the telephone rang.

2) I had tried to get him on the phone all day.

3) When Sarah arrived at the party, Paul had been already going home.

4) When we got back the babysitter had gone home.

5) Tom had done his homework for an hour when his friend came to see him.

6) They had hoped to get the summit but Travers fell ill at base camp.

7) When we got home last night, we found that somebody had been breaking into the flat.

8) At eight in the morning we had been driving for six hours.

9. Read this text and translate it.

What Is a Biochemistry Laboratory?

A biochemistry laboratory is an area in which a biochemist studies the chemical processes within living organisms. Traditional biochemistry examines the chemistry of reactions catalyzed by enzymes, but biochemical research has expanded to cover topics of signal transduction, transport within cells, and molecular interactions.

All biochemistry labs have the basic components of science research labs, such a pH meter, a balance for weighing out chemicals, a variety of buffers and other chemicals, and refrigerators and freezers for storing supplies. They also have a special freezer kept at -94° F (-70° C) for the long-term storage of proteins and tissues. Such facilities have centrifuges and access to an ultracentrifuge. An ice machine is generally essential for generating ice to keep enzymes and reagents chilled and stable. Virtually all biochemistry labs have gel electrophoresis supplies for examining proteins, along with the equipment for running Western blots.

For biochemistry research, a spectrophotometer is frequently necessary to measure protein concentrations or enzyme reactions. Usually, a UV-Vis spectrophotometer suffices, but some labs require a fluores-

cence spectrophotometer for more specialized applications.

Other biochemistry labs may have more specialized equipment, like particular chromatography equipment. This type of technology separates molecules. For instance, the lab may have a high-pressure liquid chromatography (HPLC) system to separate peptides or conduct enzyme assays on small molecules. Another type of instrument one might have is a gas chromatography (GC) system. This unit separates volatile compounds.

A protein biochemistry laboratory may have a fast-pressure liquid chromatography (FPLC) system to purify large amounts of protein to study. It would have a variety of gel matrices, with differing chemical properties to use with the FPLC to separate the proteins. There would be glass columns of varying proportions to hold the matrices. Protein biochemistry laboratories generally have a cold room, so that proteins can be isolated and purified at cold temperatures to keep them stable.

The techniques of genetic engineering involve manipulating DNA or RNA in microorganisms, so sterile conditions are required. Such a lab would have a sterile hood that can be wiped down with ethanol

and has a germicidal lamp. It blows sterile air across its work surface.

The lab would have agar, which forms a gel that the microorganisms grow on. There would be a variety of other of supplies for media, and antibiotics for growing up the genetically-altered microorganisms. It would have incubators and shakers that could be warmed up to grow bacteria or yeast. Also necessary is access to an autoclave, to sterilize the supplies for growth and RNA manipulation, and to destroy the recombinant material after the experiments are finished.

A medical biochemistry laboratory would have many of the items of other biochemistry labs, depending on its specialty. The difference would be in the source of the material for study.

10. Find the appropriate Russian equivalent to English term.

signal transduction	буфер
transport within cells	холодильник
and molecular interactions	ультрацентрифуга
buffer	центрифуга
refrigerator	Преобразование сигнала
freezer	Электрофоретический гель
centrifuge	Внутриклеточный транспорт
ultracentrifuge	Вестерн-блоттинг
gel electrophoresis supplies	спектрофотометр

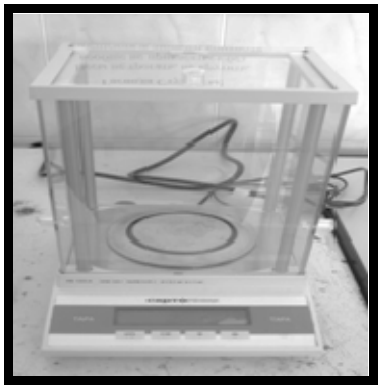
Western blots	Молекулярное взаимодействие
spectrophotometer	Морозильная камера
UV-Vis spectrophotometer suffices	агар
fluorescence spectrophotometer	газовая хроматография
high-pressure liquid chromatography (HPLC) system	жидкостная хроматография низкого давления
gas chromatography (GC) system	межклеточный материал
volatile compounds	бактерицидная лампа
fast-pressure liquid chromatography (FPLC) system	инкубатор
matrices	автоклав
sterile hood	Аналитический спектрофотометр с видимой и ультрафиолетовой областью
germicidal lamp	шейкер
agar	стерильный вытяжной шкаф
incubator	жидкостная хроматография высокого давления
shaker	летучее соединение
autoclave	Флуоресцентный спектрофотометр

11. There are many laboratory devices in the biochemistry laboratory. Try to match the definition of the equipment with the picture:

1. A device for immune-enzyme analysis: consists of a computer and a vertical spectrophotometer.
2. Weigher: is used for weighting of substances.
3. Collector: collects fraction in chromatography.
4. Spectrophotometer: measures optical density.
5. pH instrument: for measuring of pH.
6. Centrifuge: for sedimentation.
7. Instrument for electrophoresis.

1. 

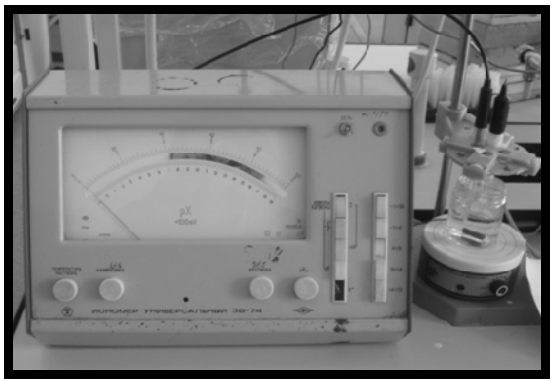
2.



3.

4.

5.



6.

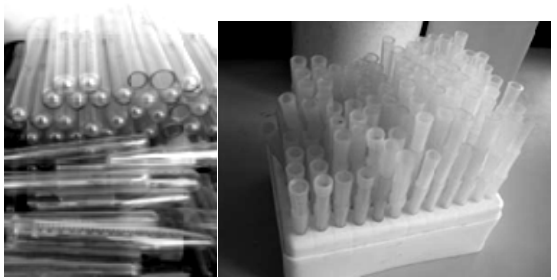
7.

12. As you know usually in work a biochemist uses different methods. Try to make a plan of the laboratory work using all instruments from Ex.10.

13. Look at the picture and say what is what? Where can theay be used?

Chemical dishes: funnel, flask, plastic glass, gradated cylinder, test tube, automatic pipet, spouts.





14. Make your investigation. Design a plan for preparing caustic potash solution using all pictures from Ex.13.

15. As you know usually in work biochemist use different methods. Translate the plan of laboratory work.

Белки как одни из основных биополимеров нашего организма являются объектом биохимических исследований. При анализе белковых растворов одной из задач является выделение индивидуальных белков. Плазма крови, полученная путём центрифугирования, используется в таких исследованиях в качестве сырья. На первом этапе проводят электрофоретическое разделение исходной смеси. Электрофорез с использованием полиакриламидного геля позволяет получить до 33 полос относительно индивидуальных белков. Для подтверждения гомогенности полученных зон белков проводят хроматографическое разделение отдельных зон. Для сбора фракций используют автоматический коллектор. Обычно регистрация сигнала (оптическая плотность и т.д.) производится авто-

матически и также автоматически выводится хроматограмма. При отсутствии автоматической регистрации, после сбора фракций измеряется оптическая плотность отдельной фракции с использованием спектрофотометра. После этого строится графическая зависимость оптической плотности от номера фракции, т.е. хроматографический профиль или хроматограмма.

Очищенные таким образом белки могут быть использованы для дальнейших исследований. Например, иммуноглобулины входят в состав конъюгатов с ферментом пероксидазой хрена, которые используются в иммуноферментном анализе. Кроме того, белки подвергаются модификации, т.е. изменению физических и(или) химических свойств, для создания новых биопрепаратов. Модификация проводится с использованием pH-метра для постоянного контроля изменения ионных характеристик раствора.

16. Investigation work. Try to use your laboratory to carry out any of experiment with the help of these methods. Make photos and show them to your group. Make the presentation on the following topics:

1) Electrochemical methods
2) Chromatographic methods
3) Spectral methods
4) Radiometric methods

17. Write a story "Once I accidentally leaked the solution into the mass spectrometer…"

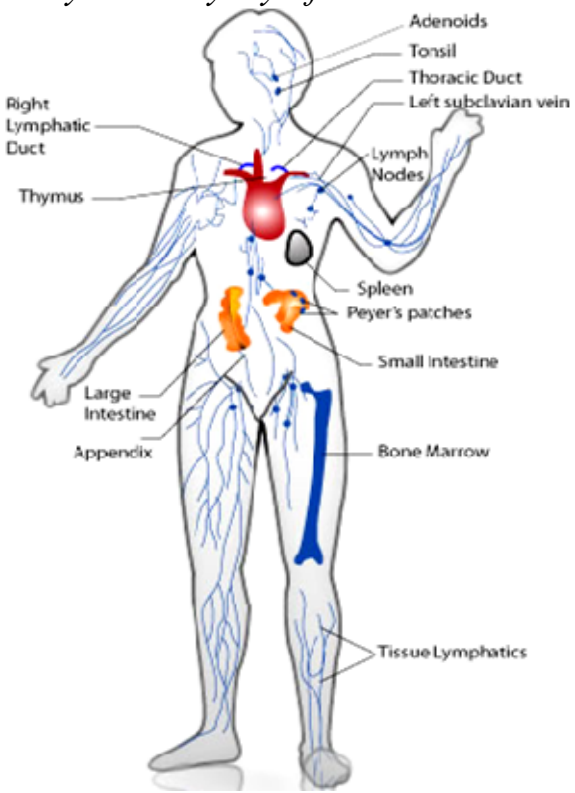
Unit 11

Immune System. Immunology

Why do we need an immune system?

Nowadays we have many supplements (БАД) on the market. Can all they replace our immune system?

In what context have you heard about immune system in your everyday life?



Look at the picture and say if you know all parts of the immune system. Consult the dictionary if necessary.

1. Read the text and translate it properly.

A magnificent protector

Inside your body there is an amazing protection mechanism called the immune system. It is designed to defend you against millions of bacteria, microbes, viruses, toxins and parasites that would love to invade your body. To understand the power of the immune system, all that you have to do is to have a look at one's death. That sounds gross, but it will show you important things about your immune system.

When something dies, its immune system (along with everything else) shuts down. In a matter of hours, the body is invaded by all sorts of bacteria, microbes, parasites... None of these things are able to get in when your immune system is working, but the moment your immune system stops the door is wide open. Once you die it only takes a few weeks for these organisms to completely dismantle your body and carry it away, until all that's left is a skeleton. Obviously your immune system is doing something amazing to keep all of that dismantling from happening when you are alive.

When a virus or bacteria (also known generically as a germ) invades your body and reproduces, it normally causes problems. Generally the germ's presence produces some side effect that makes you sick. For example, the strep throat bacteria (Streptococcus) re-

leases a toxin that causes inflammation in your throat. The polio virus releases toxins that destroy nerve cells (often leading to paralysis). Some bacteria are benign or beneficial (for example, we all have millions of bacteria in our intestines and they help digest food), but many are harmful ones; they get into the body or the bloodstream.

The job of your immune system is to protect your body from these infections. The immune system protects you in three different ways. First and foremost, it creates a barrier that prevents bacteria and viruses from entering your body. Then, if a bacteria or virus does get into the body, the immune system tries to detect and eliminate it before it can make itself at home and reproduce. Thirdly, when the virus or bacteria is able to reproduce and start causing problems, your immune system is in charge of eliminating it.

There are many diseases that, if you catch them once, you will never catch again. Measles is a good example, as is chicken pox. What happens with these diseases is that they make it into your body and start reproducing. The immune system gears up to eliminate them. Cells recognize the virus and produce antibodies for it. This process takes time, but the disease runs it course and is eventually eliminated.

A vaccine is a weakened form of a disease. It is either a killed form of the disease, or it is a similar but less virulent strain. Once inside your body your immune system mounts the same defense, but because the disease is different or weaker you get few or no symptoms of the disease. Now, when the real disease

invades your body, your body is able to eliminate it immediately.

Many diseases cannot be cured by vaccines, however. The common cold and influenza are two good examples. These diseases either mutate so quickly or have so many different strains in the wild that it is impossible to inject all of them into your body. Each time you get the flu, for example, you are getting a different strain of the same disease. Thus, it's only our immune system which helps us to be defended.

Vocabulary

a matter of hours
adenoids
amazing
antibody
appendix
be in charge of
benign
beneficial
bloodstream
bone marrow
catch a disease
cold
cure (v)
defend (v)
defended
defense
detect (v)
digest (v)
dismantle (v)
flu
germ
harmful
infection
inflammation
influenza
invade (v)
large intestine
lymph nodes
lymphatic duct
make smb sick
mutate (v)
payer's patches
prevent (v)
protection

release (v)
reproduce (v)
shut down (v)
small intestine
spleen
subclavian vein
wide
thoracic duct
throat.
thymus
tonsil
vaccine[vǽksi:n]
virulentstrain

2. Translate the following sentences from Russian into English using the words from vocabulary.

1) Ученые считают, что возникновение *вредоносных* раковых опухолей – это следствие многоклеточного строения организма.

2) При попадании в организм *бактерии* начинают активно *размножаться*, а продуктами их жизнедеятельности являются *токсины*, *несущие огромный вред*.

3) У пациента поднялась температура, все симптомы говорили о *воспалении,* вызванном *инфекцией.*

4) Доктор, у меня есть риск заболеть *полиомиелитом*?

5) Еще в детстве вам должны были поставить *вакцину* против этой болезни. Если вы проходили вакцинацию, вы исключаетесь из группы риска.

6) Вирус *гриппа* быстро *мутирует*.

7) Более 30 лет назад были открыты *антитела*, и доказано, что они способствуют *ускорению* иммунного ответа при повторном контакте с

антигеном.

8) *Селезенка* тоже является частью иммунной системы.

3. Give the definitions to at least three of the following terms:

Adenoids, bone marrow, large intestine, lymph nodes, lymphatic duct, payer's patches, small intestine, spleen, subclavian vein, thoracic duct, throat, thymus.

4. Fill in the gaps in these sentences:

1) Inside your body there is an amazing_____called the immune system.

2) Obviously your immune system is doing something amazing to keep all of that _____from happening when you are alive.

3) When _____or ____ invades your body and reproduces, it normally causes problems.

4) The strep throat bacteria releases a _____ that causes inflammation in your throat.

5) The job of your immune system is to protect your body from these_____.

6) If a bacteria or virus does get into the body, the immune system tries to _____ and _____it before it can make itself at home and reproduce.

7) _____recognize the virus and produce antibodies for it.

8) A vaccine is a weakened form of a_____.

9) Many diseases cannot be _____by vaccines.

10) These diseases either _____quickly or have so many different strains in the wild.

5. Answer the questions about this text.

1) What is the immune system? What is the basic function of the immune system?

2) How can we understand the power of the immune system?

3) What happens when somebody dies?

4) What are the synonyms of the word "virus"?

5) What happens when the germ invades one's body?

6) What are benign bacteria?

7) How many ways of the immune system protection can you name?

8) Are there the diseases which you catch once and then never again?

9) What is a vaccine? How does it work?

10) Are there any vaccines unable to be cured by vaccines?

11) What happens each time you get flu?

6. Speak on the new facts you found in the text. What wondered you or what information was new for you? Can you add any other information about the immune system?

7. Do you agree with the following statements? Choose one of them, explain and expand your idea and create a small report.

1) The strep throat bacteria (Streptococcus) releases a toxin that causes inflammation in your throat.

2) The Immune system doesn't work against viruses. It deals only with cells.

3) Bacteria have no nucleus.

4) Erythrocytes are not the part of immune system.

5) Bacteria and viruses work in the same way.

6) A vaccine is a form of a disease.

8. Make a plan of this text.Add key words in it if necessary.

9. Retell this text using your plan.

10. Complete the sentences with the verbs in the ***Future Perfect Tense.***

go	learn	paint
tidy up	type	receive
pack	buy	cook
		see

1) She _ an urgent paper for the conference. 2) Bob __ his room by his mother coming. 3) He already _____ a portrait for the exhibition. 4) Peter _ dinner by the time his wife comes. 5) She__ a wedding dress by the time her wedding takes place. 6) They __ by the time we come here. 7) I _____ letter by the end of the week. 8) The train is to leave at nine o'clock. They ___their suitcase by that time. 9) I _____ the film by 9

o'clock. 10) She ____ new words for the spelling test, which her teacher is going to give tomorrow.

11. Open the brackets and put the verbs into the ***Future Indefinite****, the* ***Future Perfect****, the* ***Present Indefinite*** *or the* ***Present Perfect Tense.***

1) By 8 o'clock they (have) dinner. 2) By the end of the week he (finish) the translation. 3) Before you (come) I (do) all the work. 4) She (look) through the article by 12 o'clock. 5) They (receive) our letter by Monday. 6) By the time we (get) to the forest the rain (stop). 7) 1 think he (answer) the letter by this time. 8) We (begin) to work after we (read) all the instructions. 9) We (not do) anything until he (take) necessary steps. 10) The committee (prepare) the plan by tomorrow. 11) I suppose when my letter (reach) you I already (return) from your voyage. 12) He (pass) an exam after he (learn) all the material. 13) I am afraid they (not discuss) all the questions by the time they (come). 14) We (not be able) to start the experiment before we (obtain) the necessary data. 15) The secretary already (look) through all the papers before the boss (come). 16) My train (leave) by the time you (come) to the station.

12. Translate into English.

1) Боюсь, к тому времени, когда вы придете с деньгами, они уже все распродадут. 2) Позвоните мне после того, как вы прочитаете книгу. 3) Мы сделаем все упражнения к его приходу, а затем все вместе поедем на каток (skatingrink). 4) Я напишу ему после того, как увижусь с его родителями. 5)

Наш завод выпустит (produce) новый автомобиль к концу года. 6) Не знаю, напишет ли он статью к первому сентября. Если она будет готова к этому времени, мы ее напечатаем. 7) Я уже уйду в театр, если вы придете так поздно. 8) Боюсь, вы опоздаете. Они уже закончат переговоры (talks) к 5 часам. 9) К сожалению, вы его не застанете. К этому времени он уже уедет на вокзал. 10) К воскресенью они закончат ремонт (repairs) и переедут на новую квартиру.

13. Open the brackets and use the ***Future Perfect Continuous Tense.***

1) They already (rehearse) for an hour when we come. 2) I (work) in this company for 10 years next April. 3) By next year he (writing) the novel for three years. 4) The thieves are sure that they (drive) for 6 hours when the police discover the robbery in the morning. 5) They (study) for 3 hours when you come.

14. Read the text and translate.

Immunology

Immunology is a branch of biomedical science that covers the study of all aspects of the immune system in all organisms. It deals with the physiological functioning of the immune system in states of both health and disease; malfunctions of the immune system in immunological disorders; the physical, chemical and physiological characteristics of the components of the immune system in vitro, in situ, and in vivo.

Even before the concept of immunity was developed, numerous early physicians characterized organs that would later prove to be part of the immune system. When health conditions warrant, immune system organs including the thymus, spleen, portions of bone marrow, lymph nodes and secondary lymphatic tissues can be surgically excised for examination while patients are still alive.

Classical immunology studies the relationship between the body systems, pathogens, and immunity. The earliest written mention of immunity can be traced back to the plague of Athens in 430 BCE.

The study of the molecular and cellular components that comprise the immune system, including their function and interaction, is the central science of immunology.

In the 21st century, immunology has broadened its horizons with much research being performed in the more specialized niches of immunology. This includes the immunological function of cells, organs and

systems not normally associated with the immune system, as well as the function of the immune system outside classical models of immunity.

15. Give the definitions to at least three of the following words:

- immunology
- immune system
- in vitro
- in situ*(на месте нахождения)*
- in vivo
- classical immunology

16. Write out the sentences expressing the main ideas of each logical part of the text.

17. Check your knowledge about the immune system? Do you know the answers to these questions?

1) Is a monocyte a red or white blood cell?
2) What is the largest lymphoid structure?
3) What common allergic disorder was named for the illness first described in those exposed to the farmlands of England?
4) What is a substance that can cause a person to become sensitive to, and produce antibodies against it?
5) What type of immunity is developed through exposure to a disease?
6) Which part of the body does NOT contain lymph nodes?

7) Which organ is NOT part of the immune system?
8) What is a specialist in immunology called?

If there are problems in answering this, you can find the solutions in the end of this unit.

18. Speak on the new facts you found. What wondered you or what information was new for you? Can you add some other information about the history of immunology or some interesting immunological facts?

19. Read the text.

A useful vitamin

You'd have to eat a couple dozen oranges to get the same effect as one Vitamin C tablet that contains 500 mg of Vitamin C. Perhaps everyone knows that vitamin C and immune system of humans are interconnected principles. Ascorbic acid is a nutrient that has been shown to have a strong jolt on human health. Researchers originally intended that considerable doses of Vitamin C can reduce the severity and the rate of the common cold due to its using in oxidation-reduction in the human body.

Vitamin C is on the top

of immune boosters list and there are many reasons for that. Perhaps, the greatest number of nutrient investigations was devoted to vitamin C and immune system. Ascorbic acid addendums are inexpensive to make, and it is very good that vitamin C is available naturally in many vegetables and fruits. There is another possibility to get Ascorbic acid - you can buy at any chemist's shop vitamin-C-fortified version. Now let's take a brief review of vitamin C and immune system benefit of it.

Ascorbic acid increases the infection-fighting production antibodies and white blood cells and increases interferon levels, the antibody that covers surface of cells, which are favorable for the viruses` entry. Vitamin C diminished the cardiovascular disease risk with the help of raising HDL levels cholesterol while decreasing blood pressure and importunate with the proceeding during which fat is transformed to plaque in the human arteries. It is also interesting about vitamin C and immune system that people who have diets with higher vitamin C concentration have lower rates of prostate, colon and even breast cancer.

20. Study this text and express it in your words not using any plan.

21. Study the list of vitamins and explain in your words what vitamins we need for healthy lifestyle and what problems the lack or overdose of vitamins can cause.

Each vitamin is typically used in multiple reactions, and, therefore, most have multiple functions.

Vitamin	Deficiency disease	Overdose disease	Good sources
Vitamin A	Night-blindness, Hyperkeratosis, and Keratomalacia	Hypervitaminosis A	Orange vegetables carrots, pumpkin, squash, spinach
Vitamin B_1	Beriberi, Wernicke-Korsakoffsyndrome	Drowsiness or muscle relaxation.	Oatmeal, brown rice, vegetables, cauliflower, potatoes, liver, eggs
Vitamin B_2	Ariboflavinosis		Dairy products, bananas, popcorn, green beans, asparagus
Vitamin B_3	Pellagra	Liver damage and other problems	Meat, fish, eggs, many vegetables, mushrooms, tree nuts
Vitamin B_5	Paresthesia	Diarrhea, nausea and heartburn.	Meat, broccoli, avocados
Vitamin	Anemia,	Impairment	Meat, vegetables,

Vitamin	Deficiency disease	Overdose disease	Good sources
B_6	peripheral neuropathy.	of proprioception, nerve damage	tree nuts, bananas
Vitamin B_7	Dermatitis, enteritis		Raw egg yolk, liver, peanuts, certain vegetables
Vitamin B_9	Megaloblast and Deficiency during pregnancy is associated with birth defects, such as neural tube defects	May mask symptoms of vitamin B_{12} deficiency; other effects.	Leafy vegetables, pasta, bread, cereal, liver
Vitamin B_{12}	Megaloblasticanemia	Acne-like rash	Meat and other animal products
Vitamin C	Scurvy	Vitamin C megadosag	Many fruits and vegetables, liver

Vitamin	Deficiency disease	Overdose disease	Good sources
		e	
Vitamin D	RicketsandOsteomalacia	Hypervitaminosis D	Fish, eggs, liver, mushrooms
Vitamin E	Deficiency is very rare; mild hemolytic anemia in newborn infants.	Increased congestive heart failure seen in one large randomized study.	Manyfruitsandvegetables
Vitamin K	Bleeding diathesis	Increases coagulation in patients taking warfarin.	Leafy green vegetables such as spinach

22. Translate the text into English using the vocabulary and grammar patterns you have learned.

Иммунная система — подсистема, существующая у позвоночных животных и объединяющая органы и ткани, которые защищают организм от заболеваний. Иммунная система распознает множество разнообразных возбудителей: от

вирусов до паразитических червей, и отличает их от биомолекул собственных клеток. Распознавание возбудителей усложняется их адаптацией и эволюционным развитием новых методов успешного инфицирования организма-хозяина.

Конечной целью иммунной системы является уничтожение чужеродного агента. Этим достигается биологическая индивидуальность организма. В иммунной системе развитых организмов существует множество способов обнаружения и удаления чужеродных агентов, этот процесс называется иммунным ответом.

23. Make a conversation according to this situation:

You are working out a new supplement (БАД) for stimulating human's immune system. You have to assure your colleagues that your medicine is the most effective one.

Your partner's aim is to ask you as much as possible about the supplement`s effects on immune system.

24. Creative composition.

You are one of the white blood cells. Some antigen has infiltrated your master's body. What are your actions?

➢ *Answers to the questions in exercise 19.*

a. **White.** A monocyte is a white blood cell found in lymph nodes, the spleen, and bone marrow. It is a phagocytic cell that engulfs and kills bacteria and plays a role in killing tumor cells.

b. **Spleen.** The spleen is located in the upper left quadrant of the abdomen, behind the stomach. Red blood cells are filtered through the spleen, where old blood cells are destroyed.

c. **Hay fever.** It was originally called 'farmer's lung' and was caused by an allergic reaction to the fungi and spores in the hay.

d. **Antigen**.

e. **Acquired active immunity.** In acquired active immunity, antibodies are produced that protect the body upon second exposure.

f. **Feet.** Lymph nodes provide one of the most important defense mechanisms for the body.

g. Brain.

h. **Immunologist**. The emergence of AIDS in the 1980s has prompted extensive research and an expanded understanding of the immune system.

Unit 12

AIDS/ HIV

What are viruses AID and HIV? Do you know if there is any difference?

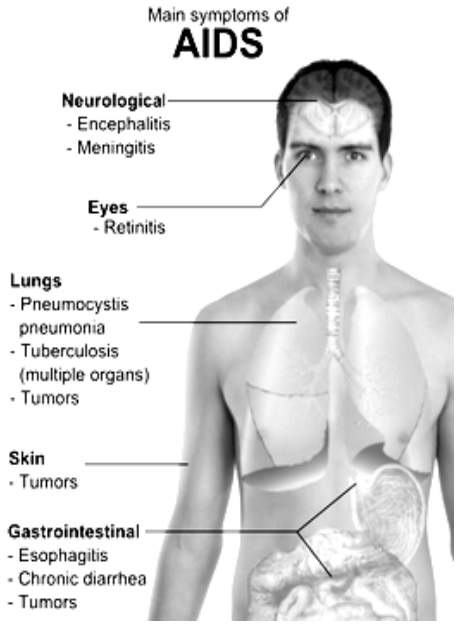
Do these viruses influence on our immune system? Do you know how?

What are the main symptoms of AIDS?

1. *Read the following text and translate.*

Basic things about AIDS and HIV

In 1985, scientists discovered the human immunodeficiency virus (HIV). HIV is a virus that is transmitted from person to person through the exchange of body fluids such as blood, semen, breast milk and vaginal secretions. Sexual contact is the most common way to spread HIV, but it can also be transmitted by sharing needles when injecting drugs, or during childbirth and breastfeeding. As HIV reproduces, it damages the body's immune system and the body becomes



susceptible to illness and infection. There is no known cure for HIV infection nowadays.

Acquired immune deficiency syndrome, or AIDS, is a condition that describes an advanced state of HIV infection. With AIDS, the virus has progressed, causing significant loss of white blood cells or any of the cancers or infections that result from immune system damage.

Once inside the body the virus attacks specialized immune system cells known as CD4 cells. The virus attaches to these cells and infects them by injecting HIV nucleic acids (DNA and RNA) into the cell. New HIV virus then infects other CD4 cells as the cycle repeats itself.

Is HIV and AIDS the same thing? HIV is the virus which damages the body's immune system. While AIDS defining infections means a person is diagnosed with AIDS. A person can be infected for years without having AIDS. Having HIV infection does not mean you have AIDS. Simply put, HIV and AIDS are not the same thing, but they are related to one another.

Before HIV infection became widespread in the human population, AIDS defining infections were rare, and almost exclusively in individuals with immune suppression, such as chemotherapy and certain types of cancers. AIDS was first recognized in the early 1980s in healthy homosexual men. Adding to the oddity, these men had no recognized cause for immune suppression. An infectious cause of AIDS was suggested by geographic clustering of cases, links among cases by sexual contact, mother-to-infant

transmission, and transmission by blood transfusion. Later, isolation of HIV from patients with AIDS strongly suggested that this virus was the cause of AIDS.

Medications can successfully treat many of the symptoms of early symptomatic HIV infection. Antiretroviral therapy slows the growth of the HIV virus in the body. It works very well in reducing the number of HIV particles in the bloodstream. Although people have suppressed levels of HIV, they can still spread the virus to others through sex or sharing needles. Antiretroviral therapy is not a cure for HIV, but the treatment slows disease progression and may strengthen the immune system.

People should never forget that HIV/AIDS is more than a physical ailment; it affects the whole person, emotional and physical. Often our treatments focus on the physical only but the emotional needs addressed as well.

Vocabulary

HIV (human immunodeficiency virus)
AIDS (Acquired immune deficiency syndrome)

antiretroviral therapy
attach (v)
blood transfusion
bloodstream
breastfeeding
clustering
cure
diagnose (v)
exclusively
fluid
immune system
infection
infect (v)
inject (v)

isolation
loss
medications
mother-to-infant transmission
needle
oddity
particle
progression
secretion
semen
significant
suppression
susceptible
specialize (v)
strengthen (v)
transmit (v)
white blood cells
widespread

2. Change the Russian words into the English using the correct forms. Use proper articles if necessary.

1) Грудное вскармливание is very important for babies.

2) Вич-частицы may be found in кровоток.

3) Many viruses can распространяться very quickly.

4) Everybody knows Dr. House`s странности.

5) This virus can be transmitted от матери младенца.

6) Our clinic специализируется on HIV terapy.

7) Эритроциты plays a great role in the blood circle.

8) This лечение wasn`t very effective.

9) Антиретровирусная терапия can slow the HIV virus speading.

3. Translate the following sentences paying attention to the words in italic.

1) Требуется обслуживающий персонал в центр по *переливанию крови.*

2) Хирург обработал края раны антисептиком, чтобы избежать попадания *инфекции* в ткани.

3) Еще в средние века доктора научились готовить вакцины путем разделения антигенов на отдельные белковые *частицы*.

4) Если вы хотите полностью вылечить болезнь, а не просто снять ее симптомы, необходимо пройти полный *курс лечения*.

5) Улучшение методов изучения *рака* поможет врачам *диагностировать* патологию на более ранних этапах.

6) Высокая активность *иммунной системы* совсем не означает гарантию абсолютного *снижения* риска заболеваний.

7) *Переливание крови* сейчас стало вполне обычным и *распространенным* явлением.

8) Чем сильнее *подавлена* иммунная система, тем больше организм *подвержен* риску заболевания *синдромом иммунодефицита человека*.

9) Когда правительство осознало, насколько велик риск возникновения эпидемии, оно начало вести политику *укрепления* здоровья населения и увеличило пропаганду здорового образа жизни. Но в нашем обществе это не привело к *значительным* результатам.

4. Answer the following questions according to the sense of the text.

1) What is AIDS?
2) What is HIV?
3) Is there any difference between them? How are they similar?
4) What are the ways of transition of the virus from one human to another? Do you know any other variants?
5) How does the virus affect the immune system, the body?
6) Who was the first person with AIDS symptoms?
7) Are there any borders for the infection?
8) What are the ways of treatment? Can AIDS be cured?
9) How does antiretroviral therapy work?
10) Is this disease only physical?

5. Find the propriet definitions to the following words.

1) HIV
2) AIDS
3) Immune system
4) Infection
5) Symptom
6) Antiretroviral therapy

a) detrimental colonization of a host organism by a foreign species;

b) manifestation of a disease, indicating the nature

of the disease, which is noticed by the patient;

c) the virus that causes acquired immune deficiency syndrome;

d) medications for the treatment of infection by retroviruses, primarily HIV;

e) the set of cells, and their activity against antigens, or infectious agents, that comprise the body's defense system against disease;

f)a set of symptoms and infections resulting from the damage to the human immune system caused by the human immunodeficiency virus.

6. Read the text again and express the idea of each paragraph in questions..

7. Retell the texts from the point of view of:

- a man having acquired immune deficiency syndrome
- a doctor dealing with these diseases
- a girl whose boyfriend is ill.

8. EPIDEM~ / VIRU~: Look in the dictionary to find words beginning with each of these prefix-like forms. Write them down. Make your own sentences with them.

9. ***Tenses revision.*** *Choose the correct tense.*

1. Мой друг читает статью с тех пор, как он пришел из университета. 2. Она уже вернулась с конференции. 3. Вчера в десять часов вечера я

проводил исследование по электрофорезу. 4. Я переведу все статьи к десяти часам. 5. Я жила в Санкт-Петербурге, прежде чем переехать в Москву. 6. До нашего приезда два дня шел сильный снег. 7. Студенты обсудят этот вопрос, до того как вы придете. 8. К концу этого месяца я буду жить в Санкт-Петербурге уже пять лет. 9. Мы уже два года живем в новой квартире. 10. Завтра в пять часов я буду делать анализ крови. 11. Он пересек улицу и пошел по направлению к парку. 12. Он проспал всю дорогу, поэтому он чувствовал себя бодрым и отдохнувшим, когда он приехал. 13. Мой брат только что вернулся из Америки. – Здорово, мы пригласим его на нашу вечеринку. 14. Наш самолёт улетит в 14.00. 15. Когда я вошел, они сидели за столом. Родители смотрели телевизор, Кэйт вязала, остальные читали.

10. ***Tenses revision****. Choose the correct variant.*

1) Where is your luggage? — I (to leave) it at the station.

a) have left b) leftc) had left

2) The train (to arrive) at 5 o'clock tomorrow.

a) will arrive b) arrive c) arrives

3) If I (to have) time, I'll go with you

a) will have b) has c) have

4) Mike (to write) a letter at the moment

a) writes b) wrote c) is writing

5) I (to live) in London 5 years ago
a) had lived b) has lived c) lived

6) My mother (to watch) TV at 5 o'clock yesterday
a) watched b) was watching c) has watched

7) Mary (to do) all her homework by 5 o'clock yesterday
a) had done b) did c) has done

8) I (not to go) to school tomorrow
a) will not go b) don't go c) didn't go

9) We (to play) football at 7 o'clock tomorrow
a) will play b) will be playing c) will playing

10) My parents (to live) together since 1972.
a) have lived b) live c) are living

11. Try to complete the following abbreviations and provide a definition for each one (you may need a dictionary):

- *A _ q _ _ _ _ d Im _ _ n _ D _f _ _ _ _ _ _ y Sy _ d _ _ _ _*
- *H _ m _ _n I _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ y*
- *V _ r _ s*
- *W _ _ _ d H _ _ l _ _ O _ _ _ _ _ z _ _ _ _ n*
- *R _ p r _ d _ _ _ _ v _ H _ _ _ t h*
- *R_dR_bb_n*

12. Predict whether the following statements are true or false:

1) AIDS is now on the decrease. T / F
2) AIDS is accelerating. T / F
3) AIDS has now been a major world health problem for 23 years. T / F
4) North America is the world's worst hit region. T / F
5) China has experienced an explosion in AIDS cases. T / F
6) It's easier for a woman to contract AIDS than a man. T / F

13. Read the text and entitle it.

On November 24, 2004 the United Nations warned that the world was facing a "unique development challenge" with acceleration in the spread of AIDS. New data revealed there are nearly 40 million HIV sufferers worldwide. Of these 3 million will die of AIDS this year, a record toll in the 23-year history of the killer virus.

The report says Sub-Saharan Africa remains by far the worst-affected region in the world. In South Africa 5.3 million people are infected, with "no sign yet of a decline in the epidemic." India has the second largest number of HIV sufferers in the world (5.1 million), while East Asia has seen a 56 percent increase in HIV cases, mainly attributable to an explosive rise in China. Women now constitute over half of all new cases contracting HIV/AIDS due to poor sexual education, the sex trade, unprotected sexual intercourse, and a greater natural susceptibility to contract the vi-

rus than men.

However, if you are diagnosed with HIV, your physical health is not the only issue you have to deal with. Along with the physical illness are mental health conditions that may come up. Mental health refers to the overall well-being of a person, including a person's mood, emotions, and behavior.

HIV/AIDS can have a major impact on many parts of human life. People with HIV and those close to them are subject to many things that may affect their mental health.

Many people are surprised when they learn that they have been diagnosed with HIV. Some people feel overwhelmed by the changes that they will need to make in their lives. It is normal to have strong reactions when you find out you are HIV positive, including feelings such as fear, anger, and a sense of being overwhelmed. Often people feel helpless, sad, and anxious about the illness.

Although the society doesn't forget people affected with this devastating disease. The red ribbon, a ribbon colored red, is the symbol of solidarity of people living with HIV/AIDS.

The Red Ribbon Project was created by the New York artists in 1991. The artists wished to create a visual symbol to demonstrate compassion for people living with AIDS and their caregivers. The color red was chosen for it as the connection to blood and the idea of passion - not only anger, but love, like a valentine. First worn publicly by Jeremy Irons at the 1991 Tony Awards, the ribbon soon became renowned as an international symbol of AIDS awareness, becoming a politically correct fashion accessory on the lapels of celebrities. The Red Ribbon continues to be a powerful force in the fight to increase public awareness of HIV/AIDS and in the lobbying efforts to increase funding for AIDS services and research.

14. Pairs/Groups write down questions based on the article. Ask them your partner.

15Use a dictionary to build up more associations / collocations of the words: compassion, red ribbon.

16. Give a short talk on:

- The present-day situation in spreading of AIDS.
- Mental health conditions of an infected person.
- Red Ribbon project history.

17. Write a letter to the President of the Russian Federation explaining your concerns for AIDS victims and explaining what you feel the leader of the free world should do.

18. Translate this text into Russian using the words from the topic you studied.

Продолжительность жизни ВИЧ-инфицированных пациентов со временем может

изменяться по двум причинам: постоянно разрабатываются новые лекарственные средства и методы лечения, а ВИЧ, в свою очередь, вырабатывает устойчивость к лекарствам. В отсутствие антиретровирусной терапии смерть пациента наступает в течение одного года с момента постановки диагноза СПИД. Считается, что ВИЧ-инфицированный, получающий терапию, может прожить несколько десятилетий без развития СПИД. Однако стоимость лечения может составлять от 385 до 619 тысяч долларов США. Значительное влияние на качество и продолжительность жизни оказывают побочные эффекты от приема лекарственных препаратов. Особенности развития ВИЧ-инфекции зависят от многих факторов, в том числе: от количества CD4 лимфоцитов и числа копий вирусной РНК на момент начала лечения, возраста пациента, уровня доступной медицинской помощи, приверженности больного лечению и появления резистентных штаммов вируса.

Большинство пациентов умирают от оппортунистических инфекций или опухолей, связанных с нарушением работы иммунной системы. Клинические симптомы значительно отличаются между пациентами и зависят от многих факторов, среди которых: восприимчивость организма хозяина к инфекции, иммунный статус пациента, качество оказываемой медицинской помощи, сопутствующие инфекции, а также штамм вируса, которым инфицирован пациент.

19. Role-play dialogue.

You came to the blood transfusion center. You are going to donate blood. Ask the doctor about the measures they take to prevent everybody to catch HIV. Your goal is to be as sure as possible in your safety. The doctor’s aim is to make you sure that only in their center they take maximum care about donators.

20. Write a composition/ presentation.

You are the doctor sent to some high school to tell students about the measures to prevent catching of HIV. Prepare your speech to tell them as much as possible.

Unit13

Microbiology

Say in your words what microbiology is.

How many areas of microbiology do you know?

What is the main subject of microbiological research?

1) Read this text.

The fantastic world

Microbiology is the study of microorganisms, which are microscopic and unicellular organisms. This includes eukaryotes such as fungi and protists, and prokaryotes. Viruses, though not classed as living organisms, are also studied. Microbiology typically includes the study of the immune system, or Immunology. And immune systems obviously interact with pathogenic microbes.

Microbiology includes virology, mycology, parasitology, bacteriology and other branches. Microbiological procedures usually must be aseptic, and use a variety of tools such as light microscopes with a combination of stains and dyes, agar plates in petri dishes, biochemical test and running tests against particular growth conditions.

Microbiology is researched actively. Many microbes are responsible for beneficial processes such as industrial fermentation, antibiotic production and others. Bacteria can be used for the industrial production of amino acids. *Corynebacteriumglutamicum* is one of the most important bacterial species with an annual production of more than two million tons of amino acids.

A variety of biopolymers, such as polysaccharides, polyesters, and polyamides, are produced by microorganisms. Microorganisms are used for the biotechnological production of biopolymers with tailored properties suitable for high-value medical application such as tissue engineering and drug delivery.

Microorganisms are beneficial for microbial biodegradation of domestic, agricultural and industrial wastes. The ability of each microorganism to degrade toxic waste depends on the nature of each contaminant.

There are also various claims concerning the contributions to human and animal health by consuming probiotics (bacteria potentially beneficial to the digestive system) and/or prebiotics (substances consumed to promote the growth of probiotic microorganisms). Recent research has suggested that microorganisms could be useful in the treatment of cancer.

Vocabulary

agar plate
amino acids
antibiotic
biochemical test
biodegradation
biopolymers
class (v)
contaminant
degrade (v)
depend on (v)
drug delivery
dye
enzymes
eukaryotes
growth conditions
include (v)
interact (v)
light microscope
microbial
microorganism
pathogenic
petri dish
prebiotics
probiotics
prokaryotes
protists
running test
stain
tissue engineering
toxic waste
virus

2. Translate these sentences.

1) *Микроорганизмы* сложно увидеть невооружённым глазом (naked eye).

2) *Вирус* несет в себе наследственную информацию.

3) Инфекция – сложный биологический процесс, возникающий в результате проникновения *патогенных микробов* в организм и нарушения постоянства его внутренней среды.

4) *Прокариоты* используются в медицине.

5) *Эксплуатационные испытания* приборов производятся в соответствии с государственными

стандартами.

6) *Токсичные отходы* можно разбить на несколько групп: мышьяксодержащие неорганические твердые отходы; ртутьсодержащие отходы и др.

7) *Биохимические тесты* применяются для скрининга – выявления болезни на доклинической стадии.

8) У *эукариот* имеется нуклеотидный состав отдельных последовательностей ДНК.

9) *Штамм* – экочистая культура первого вида, у которого одинаковые морфологические и физиологические особенности.

10) Химическое разрушение материалов под действием факторов окружающей среды является *биоразлагаемостью*.

3. Fill in the gaps in these sentences:

1) Microbiology is the study of_____, which are microscopic and unicellular organisms.

2) Viruses, though not classed as_____, are also studied.

3) Many microbes are responsible for _____such as industrial fermentation, antibiotic production and others.

4) _____are beneficial for microbial biodegradation of domestic, agricultural and industrial wastes.

5) Recent research has suggested that microorganisms could be useful in the _____of cancer.

6) Microorganisms are used for the

_____of biopolymers with tailored properties suitable for high-value medical application.

4. Give the full answers to these questions:

1) What is microbiology?
2) Is microbiology connected with immunology? How?
3) Which branches of microbiology do you know?
4) Where are microbes used?
5) What do you know about *Corynebacterium-glutamicum*?
6) What is produced by microorganisms?
7) What is probiotic? What is prebiotic? What is the difference between them?
8) How can we biodegrade different wastes?
9) Could microorganisms be useful in the treatment of cancer?

5. Read the text attentively again and say which statements are true to the fact or false.

a) Microbiology is the study of microorganisms.
b) Microbiology typically includes the study of the immune system.
c) A virologist is a specialist in microbiology.
d) Microbiology is researched passively.
e) Bacteria can be used for the industrial production of all acids.
f) The ability of each microorganism to degrade toxic waste depends on the nature of each contaminant.

g) Probiotics are the substances consumed to promote the growth of probiotic microorganisms.

6. Write a summary of the text in your own words. Add key words in it if necessary.

7. Retell this text using your plan.

8. Find the appropriate definitions to the following words:

eukaryotes	small infectious agents that can replicate only inside the living cells of organisms
viruses	biological scientists who study organisms so small that, generally, they can only be seen with a microscope.
antibiotics	organisms whose cells contain complex structures enclosed within membranes
enzymes	a class of diseases in which a group of cells display uncontrolled growth
mycology	the branch of biology concerned with the study of fungi
cancer	organisms that lack a cell nucleus or any other membrane-bound organelles
microbiologist	proteins that catalyze (i.e., increase or decrease the rates of) chemical reactions
prokaryotes	powerful medicines that fight bacterial infections

9. Find the worlds from the previous exercise in the following table.

e	*p*	*o*	*m*	*g*	*e*	*m*	*j*	*a*	*s*	*g*	*s*	*p*
u	*k*	*a*	*r*	*u*	*p*	*i*	*w*	*a*	*h*	*l*	*d*	*o*
k	*v*	*i*	*t*	*o*	*r*	*e*	*b*	*c*	*a*	*w*	*z*	*k*
a	*m*	*i*	*c*	*r*	*o*	*b*	*i*	*o*	*g*	*i*	*s*	*t*
r	*y*	*p*	*a*	*p*	*k*	*h*	*l*	*o*	*k*	*e*	*e*	*u*
y	*c*	*c*	*n*	*l*	*a*	*f*	*e*	*r*	*n*	*a*	*n*	*h*
o	*o*	*a*	*c*	*i*	*r*	*o*	*g*	*i*	*s*	*r*	*z*	*i*
t	*l*	*m*	*e*	*v*	*y*	*r*	*u*	*s*	*p*	*f*	*y*	*l*
e	*o*	*y*	*r*	*u*	*o*	*t*	*i*	*c*	*a*	*f*	*m*	*u*
s	*g*	*o*	*n*	*z*	*t*	*q*	*a*	*g*	*h*	*j*	*e*	*s*
r	*y*	*u*	*t*	*s*	*e*	*d*	*o*	*i*	*n*	*u*	*s*	*o*
a	*n*	*t*	*i*	*b*	*i*	*o*	*t*	*i*	*c*	*s*	*l*	*j*
h	*o*	*v*	*i*	*r*	*u*	*s*	*e*	*s*	*o*	*c*	*e*	*k*

10. Spend one minute writing down all of the different words you associate with the world 'microbiology'. Share your words with your partner/group and talk about them.

11. Look at the words below. Try to recall exactly how these were used in the text:

- pathogenic microbes
- beneficial processes
- amino acids
- polyamides
- high-value medical application
- domestic

- contaminant
- the digestive system
- to promote
- treatment

*12. Remember **Passive Voice**. Change the sentences into Passive wherever it is necessary.*

Example: They gave her a clock. She was given a clock.

1) Students are doing a lot of the work. 2) We have already washed the clothes. 3) He expected us to offer him the job. 4) They showed her the easiest way to do it. 5) Lightning struck the old oak. 6) Titian couldn't have painted it as people didn't wear that style of dress till after his death. 7) Did the idea interest you? 8) The lawyer gave him the details of his uncle's will. 9) They used to start these engines by hand. Now they start them by electricity. 10) Who wrote it? 11) The Prime Minister opened the new school. 12) We will not admit children under sixteen.

*13. Translate into English using the **Passive Voice**.*

1) К сожалению, на конференции такие вопросы не затрагивались (touchupon). 2) Кто вам сказал, что соглашение (agreement) подписано? 3) Здесь говорят только на английском. 4) Ей разрешили заниматься спортом. 5) Посетителей принимают каждый день. 6) Бетти не разрешают приходить сюда. 7) В больнице за ним ухаживали плохо.

8) За ним уже послано? — Да, ему позвонили и велели придти в восемь. 9) На нашей улице строят новый кинотеатр. 10) Не говори это, а то (otherwise) над тобой будут смеяться. 11) Мне еще ничего об этом не говорили. 12) Мы поедем завтра за город, если будет дождь? — Да, мы должны туда поехать, нас там будут ждать. 13) Это здание было только что построено, когда мы приехали сюда. 14) К вечеру работа была закончена. 15)Когдамывернулись, онирассказалимногоинтересныхновостей.

14. Read the text about Antonie van Leeuwenhoek (Антони ванн Левенгук) and other pioneers of microbiology, translate and title it and add the facts you know about these famous scientists.

Antonie van Leeuwen-hoek was the first to observe microorganisms using a microscope. In 1676 he observed bacteria and other microorganisms, using a single-lens microscope of his own design.

The field of bacteriology was founded in the 19th century by Ferdinand Cohn, a botanist who describes several bacteria. Cohn was also the first to formulate the taxonomic classification of bacteria and discover spores. Louis Pasteur and Robert Koch were

contemporaries of Cohn's and are often considered to be the father of Microbiology and medical microbiology.

Pasteur is most famous for his experiments designed to disprove the theory of spontaneous generation. Pasteur also designed methods for food preservation (pasteurization) and vaccines against several diseases such as fowl cholera and rabies. Koch is best known for his contributions to the germ theory of disease, proving that specific diseases were caused by specific pathogenic microorganisms. He developed a series of criteria that have become known as the Koch's postulates. Koch was one of the first scientists to focus on the isolation of bacteria in pure culture resulting in his description of several novel bacteria including Mycobacterium tuberculosis, the causative agent of tuberculosis.

Martinus Beijerinck and Sergei Winogradsky are considered to be the founders of general microbiology. Beijerinck made two major contributions to microbiology: the discovery of viruses and the development of enrichment culture techniques. While his work on the Tobacco Mosaic Virus established the basic principles of virology, it was his development of enrichment culturing that had the most immediate impact on microbiology by allowing for the cultivation of a wide range of microbes. Winogradsky was the first to develop the concept of chemolithotrophy. He was responsible for the first isolation and description of nitrogen-fixing bacteria.

15. Speak on the facts you found in the text. What information was new for you?

16. Write down 5 questions based on this text.

17. Fill up the table about the famous scientist. Add there scientists not mentioned in the text.

scientist	*Impact in microbiology*

18. Choose the scientist whose impact you appreciate most and enlarge the information from the text with your own. Tell your report to the class.

19. Translate the text into English. You can use a dictionary if necessary.

Люди издревле имели представление о микробиологических процессах, однако не знали о причинах, вызывающих их. Это не мешало делать наблюдения и даже использовать эти процесс в быту. Многие философы делали умозрительные (speculative) заключения о причинах тех или иных явлений. При этом наиболее близко к открытию

микромира еше в 14 веке подошел Фракасторо, предположивший, что инфекции вызывают маленькие тельца, передающиеся при контакте и сохраняющиеся на вещах больного. Однако в то время невозможно было удостовериться в правильности его идей.

20. Take one theme and create a presentation to present to the other students:

- Food microbiology
- Environmental microbiology
- Eukaryote
- Bacteria
- Prokaryote
- Virology
- Viruses
- Archaea
- Escherichia coli

Unit 14

Virology

What is a virus?
Are you afraid of viruses?
Can people living in the closed spaces without any contacts be protected from viruses?
What do you know about virology?

1. Read this text and translate it.

Virology and viruses

Virology is the study of viruses and virus-like agents: their structure, classification and evolution, their ways to infect and exploit cells for virus reproduction, the diseases they cause, the techniques to isolate and culture them, and their use in research and therapy. Virology is often considered as a part of microbiology.

A major branch of virology is virus classification. Viruses can be classified according to the host cell they infect: animal viruses, plant viruses, fungal viruses, and bacteriophages (viruses infecting bacteria, which include the most complex viruses). Another classification uses the geometrical shape of their capsid (often a helix or an icosahedron) or the virus's structure (e.g. presence or absence of a lipidenvelope). Viruses range in size from about 30 nm to about 450 nm, which means that most of them cannot be seen with light microscopes. The shape and structure of viruses has been studied by electron microscopy, NMR spectroscopy, and X-ray crystallography.

A virus is a small infectious agent that can replicate only inside the living cells of organisms. Viruses infect all types of organisms, from animals and plants to bacteria. Since the initial discovery of the tobacco mosaic virus in 1898, about 5,000 viruses have been described in detail, although there are millions of different types. Viruses are found in almost every ecosystem on Earth.

Virus particles (known as virions) consist of two or three parts: the genetic material made from either DNA or RNA, long molecules that carry genetic information; a protein coat that protects these genes; and in some cases an envelope of lipids that surrounds the protein coat when they are outside a cell. The average virus is about one one-hundredth the size of the average bacterium.

Viruses cause a number of diseases in eukaryotes. In humans, smallpox, the common cold, influenza,

herpes, polio, rabies and AIDS are examples of viral diseases.

Viral infections in animals provoke an immune response that usually eliminates the infecting virus. Immune responses can also be produced by vaccines. However, some viruses including those causing AIDS and viral hepatitis evade these immune responses and result in chronic infections. Antibiotics have no effect on viruses, but several antiviral drugs have been developed.

The origins of viruses in the evolutionary history of life are unclear: some may have evolved from plasmids – pieces of DNA that can move between cells – while others may have evolved from bacteria.

The evolution of viruses, which often occurs in concert with the evolution of their hosts, is studied in the field of viral evolution.

While viruses reproduce and evolve, they don't engage in metabolism and depend on a host cell for reproduction. The often-debated question of whether they are alive or not is a matter of definition that does not affect the biological reality of viruses.

Vocabulary

AIDS [eidz]
antibiotics
antiviral drugs
bacteria
bacteriophage
capsid
classification
common cold
electron microscopy
eliminate (v)
engage (v)
eukaryotes

evolution
evolve (v)
exploit (v)
genetic material
herpes
host cell
immune response
infect (v)
infectious agent
influenza
initial discovery
light microscope
NMR spectroscopy
plasmids
polio
protein coat
provoke (v)
rabies
replicate (v)
reproduction
smallpox
structure
technique
tobacco mosaic virus
vaccine
viral evolution
virology
virus
X-ray crystallography

2. Give Russian equivalents for the following words:

Virus-like agents, is often considered as, a major branch, can be classified according to, range in size from about …. nm to about….nm, all types of organisms, describe in detail, consist of, carry genetic information, the average virus, can be produced by, have no effect on, the evolution of viruses, in the field of viral evolution, depend on.

3. Translate the following sentences from Russian into English using the words from vocabulary.

1) *СПИД* — это стадия ВИЧ-инфекции, при которой развиваются бактериальные, грибковые,

вирусные, протозойные инфекции (оппортунистические инфекции) и неинфекционные заболевания.

2) Воспаление — одна из наиболее ранних *реакций иммунной системы* на инфекцию.

3) Ученые создали *вакцину* от опасного менингита В.

4) Уже много лет не было эпидемий *оспы*.

5) *Полиомиелит*–это острое инфекционное заболевание , поражающее центральную нервную систему.

6) Человеческий рино-вирус (HRV) ответственен за 30 – 50 % случаев общей простуды.

7) Световые микроскопы могут увеличивать объект в 1500 раз, а электронные – в 20 000 раз.

8) Вирус тотачной мозаики передается механическим путем от больного растения к здоровому или с семенами.

9) Традиционный метод ЯМР-спектроскопии (ядерной магнитно-резонансной) имен множество недостатков.

4. Fill in the gaps in these sentences:

1) Virology is often considered as a part of_____.

2) Viruses can be classified according to _____they infect.

3) Another classification uses the geometrical shape of their ____or the virus's structure.

4) A virus is a small _____that can replicate only inside the living cells of organisms.

5) Viruses are found in almost every _____on

Earth.

6) Viruses cause a number of diseases in _____.

7) Viral infections in animals provoke _____that usually eliminates the infecting virus.

8) The evolution of viruses, which often occurs in concert with the evolution of their hosts, is studied in the field of_____.

9) While viruses _____and_____, they don't engage in metabolism and depend on a host cell for reproduction.

5. Remember how the fragments were used, and complete the sentence from today's article.

1) Virology is the study of viruses and virus-like agents: ...

2) Viruses can be classified according to the host cell they infect: ...

3) The shape and structure of viruses has been studied by...

4) Since the initial discovery of the tobacco mosaic virus in 1898, about 5,000 viruses have been described in detail, although...

5) Viral infections in animals provoke an immune response that...

6) Antibiotics have no effect on viruses, but …

7) The often-debated question of whether they are alive or not is a matter of definition that...

6. Find the appropriate definitions to the follow-

ing words:

AIDS	a small infectious agent that can replicate only inside the living cells of organisms
Influenza	a compound or substance that kills or slows down the growth of bacteria
Virus	an infectious disease caused by RNA viruses of the family Orthomyxoviridae, that affects birds and mammals
Eukaryote	a living cell in which a virus reproduces
Host cell	a disease of the human immune systemcaused by the human immunodeficiency virus (HIV)
Antibacterial	an organism whose cells contain complex structures enclosed within membranes

7. Make 10 questions covering the gist of the text.

8. Make a plan of the text. Add key words in it if necessary.

9. Retell this text using your plan.

10. Remind ***sequence of tenses*** *and* ***Indirect speech****. Insert the necessary form of verbs.*

1) They noticed they __ (fly) for three hours al-

ready.

2) Tom said that it __ (take) him an hour to get to the station.

3) She asked them if they___ (play) tennis in the afternoon.

4) Peter and John told me they ___ (go) to the Kremlin the day before yesterday.

5) Mother said she ___ (have) a bad headache. Don't bother her.

6) Dorothy asked Margaret if she ___ (be) going to buy a new dress in the nearest future.

7) They told us they ___ (visit) the Tretyakovskaya gallery next Sunday.

8) Jack said that he already _____ (write) the letter.

9) They asked if the work _____ (finish) by tomorrow.

11. Translate the following sentences.

1) Я знал, что он болен. 2) Я думал, что вы уехали из Англии. 3) Я думал, что ты его друг. 4) Салли сказала, что не любит шоколад. 5) Он сказал, что они смотрят телевизор. 6) Джек удостоверил, что сам отправит письмо. 7) Она сказала, что бывала в Лондоне. 8) Он сказал мне, что потерял книгу. 9) Диктор объявила, что самолет прибыл в аэропорт. 10)Он знал, что металлы проводят электричество. 11) Мы знали, что они работали в саду с самого утра. 12) Я думал, что ты пойдешь в школу. 13) Я знал, что вы поймете меня. 14) Анна сказала, что она закончит упражнения к 7 часам. 15) Я

знал, что он говорил ей, что он пишет пьесу. 16)Галилей доказал, что Земля вращается вокруг Солнца.

12. Read the text.

The history of vaccination

A very early form of vaccination known as variolation was developed several thousand years ago in China. It involved the application of materials from smallpox sufferers in order to immunize others. In 1796 Edward Jenner developed a safe method, using cowpox to successfully immunize a young boy against smallpox, and this practice was widely adopted. Vaccinations against other viral diseases followed, including the successful rabies vaccination by Louis Pasteur in 1886. The nature of viruses however was not clear to these researchers.

In 1892 Dimitri Ivanovski showed that a disease of tobacco plants, tobacco mosaic disease, could be transmitted by extracts that were passed through filters fine enough to exclude even the smallest known bacteria.

In 1903 it was suggested for the first time that transduction by viruses might cause cancer. Such an oncovirus in chickens was described by Francis Peyton Rous in 1911; it was later called Rous sarcoma virus 1 and understood to be a retrovirus. Several other cancer-causing retroviruses have since been described.

While plant viruses and bacteriophages can be grown comparatively easily, animal viruses normally require a living host animal, which complicates their study immensely. In 1931 it was shown that influenza virus could be grown in fertilized chicken eggs, a method that is still used today to produce vaccines. In 1937, Max Theiler managed to grow the yellow fever virus in chicken eggs and produced a vaccine from an attenuated virus strain; this vaccine saved millions of lives and is still being used today.

The first virus that could be crystalized and whose structure could therefore be elucidated in detail was tobacco mosaic virus (TMV), the virus that had been studied earlier by Ivanovski and Beijerink. In 1935, Wendell Stanley achieved its crystallization for electron microscopy and showed that it remains active even after crystallization. Clear X-ray diffraction pictures of the crystallized virus were obtained by Bernal and Fankuchen in 1941.

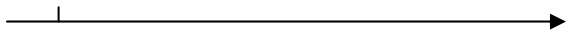
In 1975 the functioning of oncoviruses was clarified considerably. Until that time, it was thought that these viruses carried certain genes called oncogenes which, when inserted into the host's genome, would cause cancer.

A worldwide vaccination campaign led by the UN World Health Organization resulted in the eradication of smallpox in 1979.

13. Make 15 sentences covering the whole text.

14. Draw a line of history and point all virologists on it.

E. Jenner



1796

15. Translate the sentences into English using the words you learned.

1) Человек на протяжении всей жизни подвергается опасности заразиться и заболеть какой-либо вирусной инфекцией.

2) Размножаясь, вирусы истощают клеточные ресурсы, глубоко нарушают обмен веществ, и, в конечном счёте, являются причиной гибели клеток.

3) По своему строению и свойствам вирусы занимают промежуточное место между сложнейшими химическими веществами (полимерами, макромолекулами) и простейшими организмами (бактериями).

4) Долгое время полагали, что вирусы вызывают острые массовые заболевания. К настоящему времени накоплено много доказательств того, что вирусы являются причиной и различных хронических болезней, длящихся годами и даже десятилетиями.

5) Молекула РНК вируса табачной мозаики заключена в белковый капсид, состоящий из 2130

идентичных полипептидных субъединиц.

6) Современная классификация вирусов основана на виде и формы их нуклеиновой кислоты.

16. Do you know what retrovirus is? Can you describe the mechanism of its activity? Why can this virus be very dangerous for our cells? What are the typical diseases caused by retrovirus? Make a poster / scheme and explain to the class how retrovirus works.

17. Translate the text about retrovirus.

Хроническую усталость вызывает ретровирус

Бешеный ритм современной жизни легко может довести до постели, аптечки и «синдрома хронической усталости». Но медик нашли причину депрессий, усталости и снижения иммунитета офисных трудоголиков – это инфекция. Этот ретровирус XMRV, хорошо знакомый врачам и биологам, вызывает лейкемию у мышей и часто встречается в тканях опухолей у мужчин.

Причины синдрома хронической усталости искала группа ученых под руководством доктора Джужи Микоиц (JudyMikovits) из института Уиттмора Питерсона (WHittemorePetersonInstitute, Невада, США). Кровь испытуемых тестировалась на наличие антител к разного рода вирусам, в том числе к мышечному XMRV. По анализам определили присутствие вируса в организме восьми из

218 здоровых людей, что составило всего3,7 %, в то время как среди «хронически устающих» ретровирус был обнаружен у 68 человек, а это уже 67 % выборки.

Синдром хронической усталости впервые был выведен как отдельный диагноз в конце 1980 года, его первоначальное название «грипп яппи». Однако многие медики и сегодня сомневаются в реальности существования данного синдрома. Его симптоматика расплывчата: от депрессии до обмороков, от суставных болей до анемии. Кроме того, неизвестны и причины. Психологи обвиняют во всем стрессы и давление цивилизационной жизни, клиницисты склоняются к вирусной этиологии хронической усталости, например, к вирусу Эпштейна-Барра, энтеровирусами, вирусу простого герпеса и, наконец, ретровирусу XMRV.

18. Write a creative composition "If viruses take over the world...".

19. Are you for or against vaccination? Make your argument and express your opinion in 'opinion essay'.

Unit 15

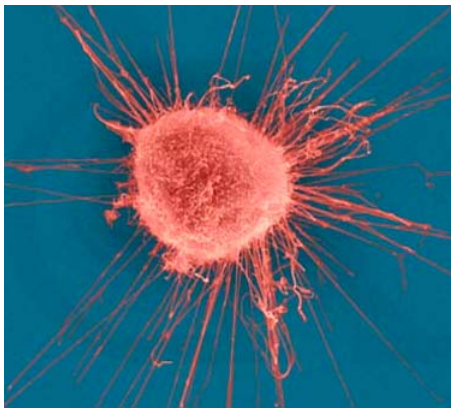
Cancer

Do you know what cancer is?
Is it up-to-date or out-of-date disease?
Do you know the statistics about cancer?
How can biotechnologists help to cure this disease?
When do you think the vaccine against this disease will be invented?

1. Read the text and translate it.

A devastating disease

Cancer (medical term: malignant neoplasm) is a class of diseases in which a group of cells display uncontrolled growth (division beyond the normal limits), invasion (intrusion on and destruction of adjacent tissues), and sometimes metastasis (spread to other locations in the body via lymph or blood). These three properties of cancers differentiate them from benign tumors, which are self-limited, do not invade or metastasize. Most cancers form a tumor but some, like leuke-



mia, do not. The branch of medicine concerned with the study, diagnosis, treatment, and prevention of cancer is oncology.

Cancer may affect people at all ages, even fetuses, but the risk increases with age. Cancer causes about 13% of all deaths. Cancers can affect all animals.

Nearly all cancers are caused by abnormalities in the genetic material of the transformed cells. These abnormalities may be due to the effects of carcinogens, such as tobacco smoke, radiation, chemicals, or infectious agents. Other cancer-promoting genetic abnormalities may be randomly acquired through errors in DNA replication, or are inherited, and thus present in all cells from birth. The heritability of cancers is usually affected by complex interactions between carcinogens and the host's genome.

Genetic abnormalities found in cancer typically affect two general classes of genes. Cancer-promoting oncogenes are typically activated in cancer cells, giving those cells new properties, such as hyperactive growth and division, protection against programmed cell death, loss of normal tissue boundaries, and the ability to enter in adjust tissue. Tumor suppressor genes are then inactivated in cancer cells, resulting in the loss of normal functions in those cells, such as accurate DNA replication, control over the cell cycle, orientation and adhesion within tissues, and interaction with protective cells of the immune system.

Diagnosis usually requires the histological examination of a tissue biopsy made by a pathologist.

Most cancers can be treated and some cured, depending on the specific type, location, and stage. Once diagnosed, cancer is usually treated with a combination of surgery, chemotherapy and radiotherapy.

In conclusion it should be said that cancer is one of the most complex and devastating diseases that claim the life of many humans. Today there are one in three people worldwide who are affected by cancer, and almost 60% of these people will almost certainly die.

Vocabulary

abnormality
acquire (v)
activate (v)
adhesion
adjacent tissues
affect (v)
be caused (v)
carcinogen
[k:'sinədʒən]
cell cycle
chemicals
complex
concern (v)
destruction
differentiate (v)
display (v)
division
DNA replication
form (v)
genome
heritability
host
inherit (v)
interaction
intrusion
invade (v)
invasion
lymph
malignant neoplasm
metastasis
metastasize (v)
prevention
property
spread (v)
tumor
uncontrolled growth

via [viə]

2. Complete the sentences using the words from the vocabulary list.

1) The medical term for ‘cancer’ is _____.
2) Uncontrolled growth, invasion and metastasis _____ cancer from benign tumor.
3) Cancer cells spread to other locations via _____ or _____.
4) Tobacco smoke, radiation, chemicals are _____.
5) Cancer-promoting oncogenes are ____ in cancer cells, while tumor suppressor genes are _____.
6) Pathologist makes _____.
7) With the help of a combination of surgery, chemotherapy and radiotherapy cancer can be _____.

3. Find Russian equivalents to these English word combinations.

Oncogenes	Неконтролируемый рост
Transformed cell	Утробный плод
Oncology	Люди всех возрастов
Benign tumor	Запрограммированная гибель клетки
Heritability	Пагубный для здоровья
Uncontrolled growth	Трансформированная клетка
Fetuses	Аномалии генетического материала
Inherited	
Devastating	
Tumor suppressor gene	

Due to	Трансформирующий ген, онкоген
Histologic examination	Гиперактивный рост и деление
Abnormalities in the genetic material	Подавляющий опухоль ген
Infectious agent	Унаследованный
People at all ages	Наследуемость
Hyperactive growth and division	Благодаря
Programmed cell death	Потеря нормальных границ ткани
Loss of normal tissue boundaries	Доброкачественная опухоль
	Онкология
	Инфекционный агент
	Гистологическое обследование

4. Give definitions of the following terms:

1) Intrusion
2) Destruction
3) Division
4) Metastasis
5) Examination

5. Answer the questions according to the sense of the text.

1) What is the definition of the term ‘cancer’?
2) What is the medical term for ‘cancer’?
3) Do all cancers form a tumor?

4) What is oncology?

5) Whom can cancer affect?

6) What causes cancer?

7) How can abnormalities in the genetic material appear?

8) What do genetic abnormalities affect?

9) How do cancer-promoting oncogenes influence on cells?

10) What information did you read about tumor suppressor genes?

11) What does diagnosis usually require?

12) Can cancers be treated or cured and how?

13) What is the statistics of cancer affects?

6. Are the following sentences true or false? Correct the false statements if any.

1) When a person has cancer, he can control the growth of infected cells.

2) Leukemia is a form of cancer.

3) Mostly children have cancer.

4) Cancer cannot affect different animals.

5) Abnormalities in the genetic material can be the reason of cancer.

6) Cancer can never be inherited.

7) The host's genome do not influence on the cancer heritability.

8) Cancer-promoting oncogenes do not endow cells with new properties.

9) Tumor suppressor genes are activated in cancer cells.

10) Pathologist makes the histological examination.

11) It is impossible even to treat cancer.

12) Cancer is of the mildest diseases and can be treated with aspirin.

7. Put the words in the correct order to make sentences or questions.

1) Differentiate/ uncontrolled growth, invasion/ benign tumor/ and metastasis/ cancer/ from.

2) Of getting/ with age/ does/ the risk/ cancer/ increase?

3) Can/ all/cancers/ affect/ animals.

4) due to/may be/ abnormalities/ in the genetic material/ of carcinogens/ of the transformed cells/ the effects

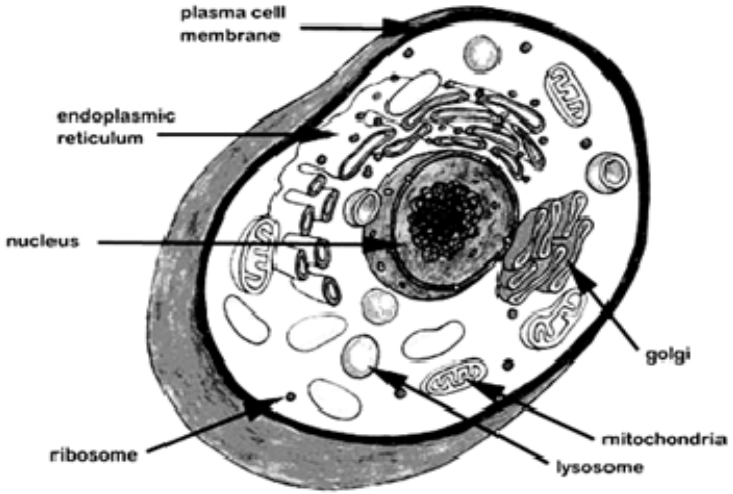
5) and/the heritability of cancers/ is/ by carcinogens/ the host's genome/affected?

6) Diagnosis/ usually/ the histological examination/requires/of a tissue biopsy/ of cancer.

8. Make a detailed plan of the text. You can add some key-words to it if necessary.

11. Retell the information given in the text with your own words using your plan from the previous exercise.

10. Comment the drawing below. What are the functions of those cell parts? What does cancer affect?



11. Make your investigation and find out the origin and history of the term 'cancer'.

12. Study all types of ***the conditional sentences****. Open the brackets in the conditional sentences making necessary changes. Translate them properly into Russian.*

Example*:* If he (come) tomorrow, he will help us. — If he comes tomorrow, he will help us.

1) If you (put) salt on ice, it will melt. 2) Provided that she (service) the car, we'll be able to drive to the country. 3) Unless he (do) his homework, he'll stay at home. 4) If you met the president, what you (do)? 5) If he (live) nearer, we would see each other more often. 6) Where you (go) if you were on leave? 7) She (notice) this mistake if she had been more attentive. 8) If we (know) that you were there, we would have called on you. 9) If I had known of his

arrival, I (meet) him. 10) Nobody told me about your trouble. I would have helped you if I (know) about it.

13. Translate into English.

1) Ты бы расстроился (beupset), если бы я не пришел? 2) Будь он осторожнее, он бы не упал. 3) Если бы он не приехал на машине встретить нас, нам бы самим пришлось нести свои вещи. 4) Ты бы пошла куда-нибудь вечером, если бы он тебя пригласил? 5) Мы бы поехали сегодня в бассейн, если бы вы позвонили вчера вечером. 6) Если бы он мог дать положительный (positive) ответ, он бы давно это сделал. 7) Я бы на твоем месте не стал бы поднимать такой шум (raiseaclamor). 8) Если бы ты принял его предложение, ты бы давно работал в хорошей фирме. 9) Будь я на вашем месте, я бы пошел пораньше, чтобы застать его. 10) Если бы он вел машину осторожнее, никакой бы аварии не произошло.

14. Spend one minute writing down all of the different words you associate with the word ***'sunshine'****. Share your words with your partner / group and talk about them.*

15. In pairs / groups, decide which of these opinions you agree with. Discuss how much truth there is in each one.

1) The sun is good for you.

2) You must wear sun block / sunscreen every time you go outside.

3) Being in the sun is bad because it causes wrinkles and makes you look older.

4) Sun tanned skin doesn't look good.

5) Buying vitamin D supplements is a waste of time. The sun is free.

6) People worry too much about UV rays.

7) Sunshine is dangerous in areas where there is a hole in the ozone layer.

8) People who sunbathe are crazy.

9) Feeling the warmth of the sun on your skin is one of life's greatest pleasures.

10) Our bodies need sunshine.

16. Look at the article's headline in the next exercise and guess whether these sentences are true (T) or false (F):

1) Scientists have told us for many years that sunshine is healthy.

2) Researchers say there is a link between studying and cancer.

3) Doctors and scientists have changed their minds about UV rays.

4) Vitamin C is called the "sunshine vitamin".

5) Vitamin D may prevent 30 deaths for each one caused by skin cancer.

6) Sunscreen might not be so necessary now.

7) Our bodies need five hours a day in direct sunlight.

8) There is less cancer in sunnier parts of the world.

17. Read this article and translate it. Pay attention to the underlined phrases and correct the word order.

Sunshine may prevent cancer

Scientists have years for us told many that the sun can harm our health. Researchers have produced many studies that link exposure to the sun to cancer. Doctors
about us warn continually the dangers of ultraviolet (UV) rays. Well, all of this might now change. Doctors and scientists may soon be telling us the opposite. New research suggests that sunshine bodies is for our necessary. Our skin absorbs the UV rays and produces vitamin D, also known as the 'sunshine vitamin'.

Dr. Edward Giovannucci of Harvard University says that vitamin D contains many anti-cancer benefits. He believes vitamin D might help to prevent of 30% more deaths than caused by skin cancer. It might now put the time to be sunscreen away. Doctors may soon recommend us to spend fifteen minutes a day in direct sunlight. They say this will allow our skin to produce the vitamin D we need. Researchers highlight the fact that there are fewer people with cancer in the world parts of sunnier.

18. Match the following synonyms from the article:

1)	harm	aka
2)	studies	includes
3)	exposure	damage
4)	suggests	urge
5)	also known as	contact
6)	contains	a quarter of an hour
7)	prevent	point out
8)	fifteen minutes	reports
9)	recommend	stop
10)	highlight	indicates

19. Match the following phrases from the article (sometimes more than one combination is possible):

1)	Scientists have told us	skin cancer
2)	Harm	'sunshine vitamin'
3)	warn us about	benefits
4)	may soon be telling us the	our health
5)	also known as the	Opposite
6)	contains many anti-cancer	Sunlight
7)	vitamin D might help to prevent	of the world
8)	caused by	for many years
9)	direct	the dangers
10)	sunnier parts	More than 30% of

deaths

20. Look at the words below. With your partner, try to recall exactly how these were used in the text:

many years	Harvard University
link	benefits
UV	deaths
opposite	direct
necessary	produce
also known as	sunnier

*21. Look in your dictionaries to find collocates, other meanings, information, synonyms for the words '**sun**' and '**shine**'.*

- Share your findings with your partners.
- Make questions using the words you found.
- Ask your partner / group your questions.

22. In pairs / groups write down questions about sunshine.

- Ask other classmates your questions and note down their answers.
- Go back to your original partner / group and compare your findings.
- Make a mini-presentation to another group / the class on your findings.

23. Read this conversation. Translate it, paying attention to the explained in the following vocabulary phrases.

A: Hey, you look great. Did you just get back from vacation?

B: No. Why?

A: What do you mean why? It's the middle of winter and everyone else is as white as a ghost. You look like you've been lying on a beach somewhere.

B: Alright, I'll tell you. But I don't want to hear any of your negativity. I've been hitting the tanning salon once a week.

A: I don't see anything wrong with that. I'd actually like to try it. What's it like?

B: The place I go you have to pay by the minute. It costs about 75 cents per minute and you really just need to go for one, twelve-minute session per week. You can get 20% off if you buy their $25 VIP card.

A: What do you think about the safety of them?

B: Many experts warn of the cancer causing risks of tanning. They say that overexposure to UVA

and UVB rays cause genetic mutations that lead to skin cancer. I try to play it fairly safe and make sure I don't go too often. I also don't go in for longer than 12 minutes.

A: That's a good idea. How long do some people go?

B: Some people seem to get addicted to it. I've met several people who go 5 times a week and tan for 20 minutes per session. I'd personally be afraid to do that much, not only because of the cancer risk, but also because of the pre-mature aging of the skin.

A: Are there any health benefits associated with tanning indoors?

B: Your skin does absorb some vitamin D from the UVB rays, but many experts say that the risks outweigh the benefits.

Phrases and Vocabulary used:

What do you mean why?: This is a rhetorical question (which means a question you don't expect to be answered).

White as a ghost: During the winter when there isn't as much sunlight, we sometimes joke with each other as "looking white as a ghost". Many people believe that looking too white or pale skinned is not very attractive or healthy looking. It makes people want to get a suntan.

I don't want to hear any of your negativity: If you say this sentence to someone, it means that you don't want to hear any bad or negative opinion that they have.

Hitting the tanning salon: The tanning salon is a small business with indoor tanning beds. These tanning beds are made with special lights that simulate the sun's rays. You can go there to get an artificial suntan. "Hitting the tanning salon" means "going to the tanning salon".

Overexposure: If you are "overexposed" to something it means that you are in the presence of that thing too much and it is unhealthy.

Pre-mature aging: If something is "pre-mature" it means that it is happening before it is supposed to. If someone's skin has aged pre-maturely, it means that their skin looks older than it really is.

The risks outweigh the benefits: This means that there are more dangers or risks than there are potential benefits.

24. Study this dialogue by heart or make your own dialogue on the same topic using the vocabulary phrases.

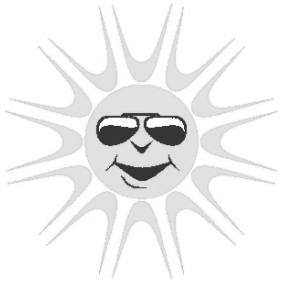
25. Translate this text.

Витамин Д, солнце, рак и загар

Витамин Д, или кальциферол, - это общее название для животного витамина Д3 и растительного витамина Д2. Название «кальциферол» происходит от слов: calcium и ferro (нести). Недостаток витамина Д вызывает сходное с рахитом заболевание, характеризующееся всеми симптомами не-

достатка кальция в организме: повышенной нервной возбудимостью, беспокойством, нарушением мышечного тонуса, слабыми подёргиваниями мышц, отложением камней в почках, кариесом, остеомаляцией (размягчением костей).

Организм может черпать готовый витамин Д3 из пищи. Однако не пища является основным источником кальциферола. Витамин способен синтезироваться в коже человека под влиянием ультрафиолетовых лучей солнца. Всемирно известный биохимик А. Ленинджер говорит, что если лицо ребёнка ежедневно хотя бы в течение 30 минут



будет находиться под прямыми солнечными лучами, этого достаточно для обеспечения минимума суточной потребности в витамине Д. Солнце необходимо человеку в любом возрасте и при любом заболевании. Всё дело в дозе облучения.

Солнечный спектр включает ультрафиолетовые лучи. А они при длительном воздействии небезопасны. Но солнечные лучи, профильтрованные через обычное стекло, т. е. лишенные ультрафиолетовой части спектра, полностью теряют канцерогенную активность. Экспериментальные исследования указывают на возможность радиозащитного действия загара. Вместе с этим солнечные лучи повышают адаптационные возможности организма, укрепляют иммунную систему. Ультрафиолетовое излучение стимулирует кроветворение,

улучшает усвоение железа.

26. Role play game.

THE UNIVERSE" ROLE PLAY: This role play is to discuss and decide which is the most important part of the universe. Team up with classmates who have been assigned the same role to develop your roles and discuss ideas and "strategies" before the role play begins.

Introduce yourself to the other role players before the role play begins.

Role A – **Sun**

Some of your benefits:

You are the centre of the universe. There can be no life without you. You give warmth, light and energy.

Write why you are better than the moon and earth.

Role B – **Moon**

Some of your benefits:

You are mysterious. You control the movement of the earth's oceans. You will not die one day like the sun. After the earth dies, people will live on you.

Why you are better than the sun and earth.

Role C – **Earth**

Some of your benefits:

You are the most important part of the universe.

The most beautiful creatures and things live on you. Without earth there is nothing.

Why you are better than the moon and sun.

27. Make an information sheet about the benefits and dangers of UV rays. Write a for-and-against essay.

28. Write a letter of thanks to the sun. Explain how important you think the sun is and what part it plays in your everyday life. Next lesson show your letter to your classmates. Compare the things you wrote about.

Unit 16

Biotechnology.
General knowledge

You study at the faculty of Medical Biotechnology. Why did you choose this faculty?

What field of biotechnology are you going to study in future?

Say in your words what biotechnology is.

1. Read this text and translate it.

What is biotechnology?

The term "Biotechnology" (sometimes shortened to "biotech") consists of two parts. *Bio* is a Greek word for "life" and *technology* gives an indication of human intervention. Biotechnology can be based on the pure biological sciences (genetics, microbiology, animal cell culture, molecular biology, biochemistry, embryology, cell biology). Also its interests can be outside the sphere of biology (chemical engineering, bioprocess engineering, information technology, biorobotics). Biotechnology deals with brewing, manufacture of human insulin, interferon, and human growth hormone, medical diagnostics, cell cloning and reproductive cloning, the genetic modification of crops, bioconversion of organic waste and the use of genetically altered bacteria in the cleanup of oil spills, stem cell research and much more.

As a matter of fact, biotechnology is very ancient. Six thousand years ago, micro-organisms were used to brew beers and to produce wine, bread and cheese.Yeast makes dough rise and converts sugars into alcohol. Lactic acid bacteria in milk create cheese and yoghurt. This application of biotechnology is the directed use of organisms for the manufacture of organic products (examples include beer and milk products). In this way, *classical biotechnology* refers to the traditional techniques used to breed animals and plants, as well as to the application of bacteria, yeasts and molds to make bread or cheese.

*Modern biotechnolog*y came into being during the nineteen seventies. Ithas often been divided into several categories; every field of this science is sometimes connected with the definite color.

Green biotechnology is biotechnology applied to agricultural processes. An example would be the selection and domestication of plants via micro propagation. Another example is the designing of transgenic plants to grow under specific environments in the presence (or absence) of chemicals. One hope is that green biotechnology might produce more environmentally friendly solutions than traditional industrial agriculture, although this is still a topic of considerable debate.

Red biotechnology is applied to medical processes. Some examples are the designing of organisms

to produce antibiotics, and the engineering of genetic cures through genetic manipulation.

White biotechnology, also known as *industrial biotechnology*, is biotechnology applied to industrial processes. An example is using naturally present bacteria by the mining industry in bioleaching; so it is the designing of an organism to produce a useful chemicalor destroy hazardous/polluting chemicals. White biotechnology tends to consume less in resources than traditional processes used to produce industrial goods.

Blue biotechnology is a term that has been used to describe the marine and aquatic applications of biotechnology, but its use is relatively rare.

Bioinformatics is an interdisciplinary field which addresses biological problems using computational techniques, and makes the rapid organization and analysis of biological data possible. Bioinformatics plays a key role in various areas, such as functional genomics, structural genomics, and proteomics, and forms a key component in the biotechnology and pharmaceutical sector.

In conclusion biotechnology can berefered to any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use.

Vocabulary

absence
antibiotics
bioconversion
brew (v)
chamicals
cleanup

computational technique
consume (v)
convert (v)
deal with (v)
domestication
genetic manipulation
hazardous
hormone
indicate (v)
interferon
intervention
key role
marine
molecule
pharmaceutical sector
polluting
presenxe
produce (v)
rare
selection
solution
stem cell research
technique
transgenic plant

2. Translate the sentences into English using the words you learned.

1) Все живые организмы либо, как многоклеточные животные, растения и грибы, состоят из множества *клеток*, либо, как многие простейшие и бактерии, являются одноклеточными организмами.

2) *Антибиотики* подавляюn рост бактерий и других микробов, а также вирусов и клеток.

3) *Генетический* код — свойственный всем живым организмам способ кодирования аминокислотной последовательности белков при помощи последовательности нуклеотидов.

4) В настоящее время существуют различные способы ликвидации *разливов нефти* на почву, такие как, механические, физико-химические, агротехнические и биологические.

5) *Гормоны* есть у всех млекопитающих, включая человека.

6) Биотехнологи *производят* лекарственные препараты из трупных ядов, обычно считающихся *опасными химическими веществами*.

7) *Ключевую роль* в исследовании трансгенных растений играют последние открытия.

8) Развитие *фармацевтического сектора указывает* на увеличение открытий в сфере фармацевтики.

3. Give detailed answers to the questions.

1) What does the term 'biotechnology' consist of?
2) Can you count the areas of biotechnology?
3) Is biotechnology a new science or not? Give facts to prove it.
4) What is classical and modern biotechnology?
5) When did modern biotechnology begin?
6) What is bioinformatics? What is its role?
7) What biotechnology applies to agricultural processes?
8) What can green biotechnology design?
9) What does red biotechnology deal with?
10) Give the examples of industrial biotechnology using?
11) What does blue biotechnology deal with?

4. Write out the sentences expressing the main ideas of each logical part of the text.

5. Write a summary of the text in your own words making use of plan and the sentences you've written out.

6. Orally enlarge this summary and retell the text.

7. Test your knowledge in biotechnology. Choose the correct answer.

1. The vector (DNA carrier) we used to put the glowing gene into the bacteria is called a…

a) Chromosome
b) Virus
c) Pipet
d) Plasmid

2. During a gel electrophoresis experiment, the small segment of DNA will move….

a) Backwards
b) Fast
c) Slow
d) Sideways

3. What tool do you use in lab to take very small samples of a liquid?

a) A beaker
b) A graduated cylinder
c) A micropipette
d) Safety glasses

4. In electrophoresis, where do the DNA samples go?

a) Straight up into the air
b) They move through the gel
c) Nowhere
d) Into a micropipette

5. What do you need to use so that you can estimate the size of the DNA bands?

a) A micropipette
b) A meter stick
c) An electronic balance
d) A DNA standard

6. When doing gel electrophoresis, how do you know that your gel is running and the electricity is on?

a) You see bubbles
b) You see sparks
c) You hear a noise
d) The light flashes

7. What makes the DNA move during gel electrophoresis?

a) Electricity
b) Gravity
c) Water
d) Wind

8. All the cells in your body have the same DNA, even though they do not look the same or have the same job.

a) True
b) False

9. Stem sells can be found in your heart.

a) True
b) False

10. DNA fingerprinting can be used to identify a criminal.

a) True
b) False

11. The DNA for the glowing gene came from:

a) Bacteria
b) Octopus
c) Fireflies
d) Jellyfish
e) Glow worms

12. A small piece of extra DNA found in bacteria is called…

a) Chromosome
b) Base pair
c) Double helix
d) Plasmid
e) Nucleus

13. The letter PCR stands for…

a) Pretty cool reaction
b) Polymerase chain reaction
c) Partly complete RNA
d) Partly complete reaction
e) Pure chain reaction

14. GEP (green fluorescent protein) makes jellyfish….

a) Reproduce
b) Glow
c) Shrink
d) Bigger
e) sleepy

8. Study ***the Gerund****. Complete the following sentences using gerunds.*

1) (Be) free and alone is a good thing if you are tired of big cities. 2) (Find) you here was a quite a surprise. 3) If this is what you intend (ask) me, stop (waste) your time. 4) They kept on (talk) though the band began (play). 5) Everyone enjoyed (swim) in the river. 6) My watch needs (repair). 7) He never men-

tioned (live) in Prague. 8) He does not seem to mind (air) the room. 9) Just imagine (go) there together! 10) Don't put of (do) it now. If you postpone (receive) a visa again, you will miss an excellent opportunity of (go) there.

9. Translate into English using gerunds where possible.

1) Я настаиваю, чтобы ты показал нам свой новый автомобиль. 2) Маленький мальчик гордился тем, что у него такой благородный (noble) друг. 3) Этот фильм стоит посмотреть. Вам не сможет не понравиться прекрасная игра (performance) актеров. 4) Было невозможно достать билет, и ему пришлось отказаться от мысли послушать знаменитого пианиста. 5) Я помню, он громко смеялся, когда рассказывал эту историю. 6) Она была уверена, что мальчики уже давно перестали работать и убежали на речку. 7) Она сидела в гостиной (drawingroom), не говоря ни слова и не обращая внимания на болтовню (chat) своей сестры. 8) Не отвечая на приветствия, он быстро прошел в зал. 9) Он намеревался начать свое расследование (investigation) с осмотра сада. 10) Он терпеть не может, когда его хвалят.

10. Study ***the Participle****. Find the difference between Participles I and II. Open the brackets and fill in with the proper participle.*

1) He fell asleep (exhaust) by the journey. 2) She entered the dining room (accompany) by her husband

and her father. 3) A snake (sleep) in the grass will bite if anyone treads upon it. 4) (Fill) his pockets with apples the boy was about to run away when he saw the owner of the garden with a stick in his hand. 5) It was a bright Sunday morning of early summer (promise) heat. 6) When I came home, I found the table (lay). 7) (Judge) by the color of the sun it should be windy tomorrow. 8) (Arrive) at a big seaport, I started to look for a job. 9) He had received an urgent message (ask) him to telephone Sir Matthew. 10) He looked at groups of young girls (walk) arm in arm. 11) In the wood they sat down on a (fall) tree. 12) (See) from the hill the city looks magnificent. 13) (Not know) where to go he turned to a passer-by. 14) (Lock) in her room she threw a fit. 15) (Address) the parcel, I went out at once to post it.

11. Translate into English using participles where possible.

1) Будьте внимательны, когда ведете машину. 2) На листе бумаги было несколько строк, написанных карандашом. 3) Получив телеграмму, моя сестра немедленно выехала в Глазго. 4) Я не знаю человека, говорящего по телефону. 5) Уехав вечером, мы прибыли в город в 6 утра. 6) Полученное известие взволновало всех. 7) Я оставила ей записку, не застав ее дома. 8) Чувствуя усталость, они решили передохнуть. 9) Я не запомнил имя человека, звонившего вам вчера. 10) Мы сидели на террасе, наслаждаясь чудесным видом гор, окружающих наш отель.

12. Read this text and translate it.

Medical biotechnology

Medical biotechnology is the use of living cell materials to research and produce pharmaceutical and diagnostic products that help to treat and prevent humane diseases. Most medical biotechnologists work in academic of industrial settings.

Medical and pharmaceutical biotechnology can speed diagnosis, prevention, and certain therapies. Biotech medicine includes the creation of new vaccines, neutraceuticals, cosmetics with active biological ingredients, and medicines from transgenic animals and plants.

Due to the new basis, lack of experience and ignorance, the implementation of results of some areas of biotechnology (such as about stem cells, genetic enhancement, cell cloning, testing of new drugs in developing nations, controls of transgenic crops, and international regulation and enforcement) met severe resistance of society. Recombinant DNA and hybridoma technologies have been applied long time ago for manufacturing of rare and unique drugs (mainly protein) for human and veterinary medicine. Presently more than 150 recombinant proteins are approved or are in clinical trials for medical use.

Biotechnology met new challenges after the year 2000 when the human genome was sequenced. Although the function of 95% of the human 31 000 genes is still obscure, they all are of potential interest for the pharmaceutical biotechnology. The sequencing of human genome laid the foundations of a new branch of biotechnology called “genomic technologies”. They include not only sequencing of new genes and genomes but also development of molecular (DNA and RNA) markers and microarray chips for detecting mutant genes and methods for specific gene silencing (suppression) and/or repair of defective genes for the purposes of gene therapy.

The fields of application of modern biotechnology techniques are medicines, vaccines, diagnostics, gene therapy, bioactive therapeutic, clinical and contract research and neutraceuticals.

13. Give Russian equivalents for the following words:

powerful techniques, recombinant DNA, hybridoma technologies, fermentation technologies, natural materials, achievements of genetic and cell engineering, medical and pharmaceutical biotechnology, diagnosis, prevention, biotech medicine, creation of new vaccines, active biological ingredients, transgenic animals and plants, stem cells, genetic enhancement, cell cloning, veterinary medicine, recombinant proteins, human genome, pharmaceutical biotechnology, genomic technologies, development of molecular markers and microarray chips, gene therapy, bioactive

therapeutic.

14. Translate the sentences into English.

1) *Трансгенный* организм — живой организм, в геном которого искусственно введен *ген* другого организма.

2) Пациенту была назначена музыкальная *терапия*.

3) Ему поставили *диагноз*– менингит.

4) В *клинических исследованиях* принимают участие ведущие медики страны.

5) Ученые должны *ускорить* темп работы, если они хотят закончить к условленному сроку.

6) *Рекомбинантная ДНК* - составлена из фрагментов разного происхождения.

7) *Рекомбинантные белки* - это белки, ДНК которых была создана искусственно.

15. Give detailed answers to the questions.

1) What does biotech medicine include?

2) Why did some areas of biotechnology meet severe resistance of society?

3) How were recombinant DNA and hybridoma technologies used?

4) How many recombinant proteins are approved in clinics?

5) When did biotechnology meet new challenges?

6) What is “genomic technologies”?

7) List the fields of application of modern biotechnology techniques.

16. Speak on the new facts you found in the text. What wondered you or what information was new for you? Can you add some other information about the biotechnology?

17. Discover the difference in the sense of the following words:

Medicine, drug, tablets, medication, remedy, cure, medicament, preparation, physic, therapeutic, doctor's stuff.

18. Make sentences showing the difference of these words.

19. Read the text again and make questions to each paragraph.

20. Give a summary of this text. Check if all ideas from this text were used.

21 Translate this text about the topic you study.

Впервые термин «биотехнология» применил венгерский инженер Карл Эреки в 1917 году.

Использование в промышленном производстве микроорганизмов или их ферментов, обеспечивающих технологический процесс известны издревле.

В начале XX века активно развивалась бродильная и микробиологическая промышленность. В эти же годы были предприняты первые попытки

наладить производство антибиотиков, пищевых концентратов, полученных из дрожжей, осуществить контроль ферментации продуктов растительного и животного происхождения. Первый антибиотик — пенициллин — удалось выделить и очистить до приемлемого уровня в 1940 году. Это дало новые задачи: поиск и производство лекарственных веществ, продуцируемых микроорганизмамии повышением уровня биобезопасности новых лекарственных препаратов.

22. Give a detailed answer or write an essay on the following questions:

- The future of biotechnology.
- What scientist will I be? And how will I help humanity?
- What color of biotechnology is necessary to add?

** The answers to the exercise 7(1-d, 2-b, 3-c, 4-b, 5-d, 6-a, 7-a, 8-a, 9-b, 10-a, 11-d, 12-d, 13-b, 14-b).*

Unit 17

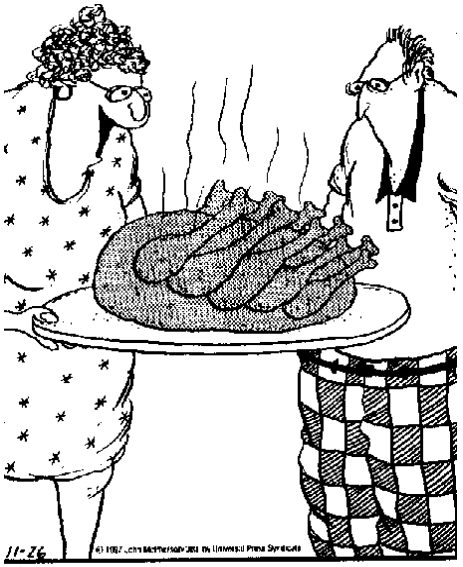
Genetic Engineering

What areas of biotechnology do you know?

What does genetic engineering deal with?

Where can biotechnologists apply the products of genetic engineering?

Comment the joke on the picture. How do you understand it?



"Isn't genetic engineering amazing? Two years ago who would have even imagined such a thing as a Turkipede?!"

1. Read this text and translate.

The scope of genetic engineering

Genetic engineering is the area of biotechnology concerned with the directed alteration of genetic material.

Biotechnology has already had countless applications in industry, agriculture, and medicine. It is a hotbed* of research. The finishing of the human genome project – a “rough draft” of the entire human genome was published in the year 2000 – was a scientific milestone** by anyone’s standards. Research is now shifting to decoding the functions and inter-

actions of all these different genes and to developing applications based on this information. The potential medical benefits are too many to list; researchers are working on every common disease, with varying degrees of success. Progress takes place not only in the development of drugs and diagnostics but also in the creation of better tools and research methodologies, which in turn accelerates progress.

When considering what developments are likely over the long term, such improvements in the research process itself must be factored in***. The human genome project was completed ahead of schedule (it usually takes ten years to get from proof-of-concept to successful commercialization).

Genetic therapies are of two sorts: somatic and germ-line. In somatic gene therapy, a virus is typically used as a vector to insert genetic material into the cells of the recipient's body. The effects of such interventions do not carry over into the next generation. Germ-line genetic therapy is performed on sperm or egg cells, or on the early zygote, and can be inheritable. Embryo screening, in which embryos are tested for genetic defects or other traits and then selectively implanted, can also count as a kind of germ-line intervention. Human gene therapy, except for some forms of embryo screening, is still experimental. Nonetheless, it holds promise for the prevention and treatment of many diseases, as well as for uses in enhancement medicine.

The potential scope of genetic medicine is vast: virtually all disease and all human traits – intelligence,

extroversion, conscientiousness, physical appearance, etc. – involve genetic predispositions. Single-gene disorders, such as cystic fibrosis, sickle cell anemia, and Huntington's disease are likely to be among the first targets for genetic intervention. Polygenic traits and disorders, in which more than one gene is implicated, may follow later, although even polygenic conditions can sometimes be influenced in a beneficial direction by targeting a single gene.

Notes

*hotbed – a place where a lot of particular kind of activity happens.

**milestone – a very important event in the development of smth.

***to factor in – to include a particular thing in your calculations about how long something will take, how much it will cost etc.

Vocabulary

accelerate (v)
application
benefit
carry over (v)
common disease
concern with (v)
consider (v)
decode (v)
degree
diagnostic
disease
disorder
drug
embryo
generation
genetic engineering
germ-line therapy
implicate (v)

improve (v)
improvement
inheritable
insert (v)
interaction
intervention
involve (v)
list (v)
predisposition
prevention
project
recipient
screening
shift (v)
somatic therapy
sort
sort (v)
target (v)
therapy
tool
trait
virus
zygote

2. Give Russian equivalents for the following words:

genetic engineering, genetic material, human genome, potential medical benefits, research methodologies, proof-of-concept, somatic gene therapy, recipient's body, germ-line genetic therapy, egg cells, zygote, embryo screening, enhancement medicine, potential scope of genetic medicine, single-gene disorders.

3. Put the words in the right order and write down the sentences:

1) is /biotechnology /research /of /a hotbed

2) different genes /and /research /of /decodes /the functions /interactions

3) into /the effects /the next generation /do not carry over

4) are /genetic defects /embryos /tested for

5) human /still experimental/ therapy /is /gene

6) involve /and /predispositions /all disease /all human traits /genetic

4. Complete the sentences using the words from the box in the correct form.

Concern germ-line embryo screening intervention common disease interactions inheritable somatic embryos

1) Genetic engineering ____ with the directed alteration of genetic material.

2) Germ-line genetic therapy can be_____.

3) Human gene therapy, except for some forms of _____, is still experimental.

4) Research wants to decode the functions and _____ of all these different genes.

5) Genetic therapies are of two sorts: _____ and _____.

6) Researchers are working on every _____ with varying degrees of success.

7) Embryo screening tests _____ for genetic defects or other traits.

8) Single-gene disorders are the first targets for genetic _____.

5. Use your English-English dictionary and write down the definitions to the following words:

Decode, disorder,d iagnostic, predisposition, virus, zygote.

6. Translate the following sentences paying attention to the words ***in italics.***

1) Врачи выявили у пациента наследственное *предрасположение* к серьезной болезни.

2) После осмотра больному была прописана музыкальная *терапия*.

3) Имеется много штаммов вируса гриппа (flu).

4) Правительство должно *ускорить* реализацию программы приватизации.

5) После длительного лечения у пациента наблюдалось значительное *улучшение* состояния здоровья.

6) В природе существует тесное *взаимодействие* растительного и животного мира.

7) Они были на семейной встрече, на которой присутствовало три *поколения*; младшее из них было самым многочисленным.

8) Генная терапия человека, исключая некоторые формы скрининга эмбрионов, до сих пор находится на экспериментальном уровне.

7. Answer to the questions according to the sense of the text.

1) What is genetic engineering?

2) Where does biotechnology have its applications?

3) What is human genome project?

4) Is there any sense of genetic engineering for medicine?

5) How much time does it usually take to get from proof-of-concept to successful commercialization? What about human genome project?

6) Genetic therapies are of two sorts, aren't they? Can you name them?

7) What is somatic gene therapy?

8) What is the main idea, principle of germ-line genetic therapy?

9) What is the potential scope of genetic medicine?

10) How can polygenic conditions sometimes be influenced?

8. Make a plan of this text. Add it with the keywords.

9. Retell this text using your plan.

10. Find the sentence with the word combination 'common disease'. What is the translation? Match English words and their corresponding Russian equivalents.

common word	обычный человек
in common	впроголодь
common ground	общий смысл
commonwealth	нарицательное слово
common man	общинная земля
on short common	банальность

common sense commonplace	совместно государство, федерация

11. Translate the following one-rooted words:

Industry – industrial – industrialism – industrialist – industrialize – industrious;
Apply - applicant - application;
Gene – genealogy – genetics – genome – genetic;
Therapy – therapist – therapeutic – therapeutics;
Intervene – intervention – intervening – interventionism.

12. Read the text and translate it.

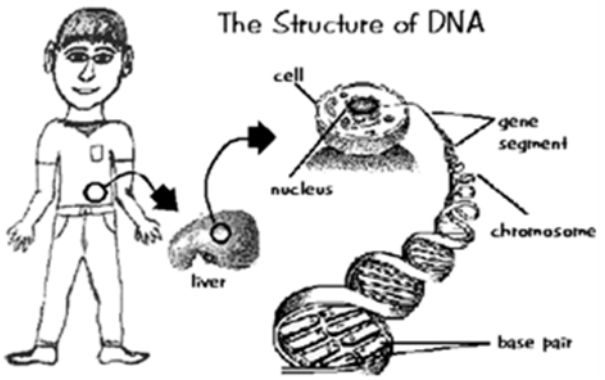
The Human Genome Project.

Eyes of brown? or blue?… Curly hair? or straight?… Dimples?…Freckles? …

It's in our genes. Heredity. Our mothers and fathers passed on all our traits when we were born. There are also many things in our genes that we would rather avoid, such as heart disease, diabetes, cancer, arthritis, muscular dystrophy, and other illnesses.

Many diseases come from alterations in our genes. To decipher our genetic code, a scientific journey has begun called The Human Genome Project. The genetic code is the complete instructions of all the genes that tell our body how to develop.

Over the years, some genes have been discovered for certain diseases. People who have a family history of these diseases can be tested for the specific



gene. They will then know if they have this disease, even if no symptoms are present. But there are many more diseases with genetic components that have not yet been uncovered. Scientists are still unclear what or which genes affect those diseases. Francis Collins MD, PHD, is the Project Director at the National Center for Human Genome Research. He said that "by uncovering all 30,000 to 40,000 genes in the human genome, we should at the same time uncover the heredity basis of most diseases and that would put us in a position to diagnose them better, treat them better and practice better preventative medicine."

What are Genes? They are found in the part of the cell called the nucleus. Human cells contain 23 pairs of chromosomes, 46 in all. One member of each pair comes from the mother and one from the father. Genes occur in pairs, like the chromosomes. A chromosome is a very long chemical molecule called DNA. Genes are segments of DNA molecules. DNA is shaped like a twisted ladder. Rungs of the ladder are chemicals called "base pairs". Chemical "A" is always paired up with "T" and "G"

is always with "C". The complete human genome (all our DNA) contains three billion "base pairs". The Human Genome Project will find the sequence of all of them. This knowledge will revolutionize our understanding of the way genes influence disease, because the genes' "base pair" sequence is the code that determines what it does.

What do genes do? They give cells the instructions they need to make complex molecules called proteins. Each gene code is for a different protein. A cell first converts DNA to a similar molecule called RNA. RNA carries the gene's instructions to another part of the cell that acts like a protein factory. Most proteins that come out of the factory are enzymes. Other proteins form cell structures.

Occasionally, the gene that codes for a protein has an error in its based pair sequence. The cell then makes a protein that is not able to do what it should. This is called a mutated gene. Mutated genes play a major role in human diseases. Since genes are incredibly small, it is difficult for scientists to isolate them. Making it easier for scientists to find disease-causing genes is the main goal of the Human Genome Project.

13. Read the text again and answer the following questions:

1) What is the main goal of The Human Genome Project?

2) How many genes are there in the human genome?

3) What is the name of the Project Director at the National Center for Human Genome Research?

4) How many chromosomes does A human cell contain?

5) What kind of a molecule is a protein?

6) What is the shape of DNA?

7) How many based pairs does a complete human genome contain?

8) How is an error gene called?

9) What similar molecule does a cell convert DNA to?

10) What do many diseases come from?

14. Find the appropriate definitions to the following words:

Cells	- Specific segments of DNA that control cell structure and function; the functional units of inheritance.
Chromosomes	- Structures in the nucleus of a cell.
DNA	- These molecules contain the Base Pairs which hold genetic information.
Genes	- the unit of living matter of which all living things are made.
Nucleus	

	- The most prominent part in living cells.

Give at least two definitions of any terms from the text.

15. Summarize what is ***Heredity.*** *Talk about what you have inherited from each parent. Do you favor one parent? Do you have sisters and brothers? What have they inherited from your parents?*

16. Look at these pictures and answer the following questions:

Is she/he
obese
fat
slightly overweight
well-built
heavily built
of average build
slim
thin / skinny / bony
tall
short?
nice shapely legs
firm belly
muscles
lovely figure

Is she/he
thin

attractive
lovely and charming
nice and friendly?
medium height
shortish

short / tiny
Does she/he have ...
round / oval / square / heart shaped face
bushy / thick / thin eyebrows
round / almond / narrow / close-set eyes
broad / flat / sharp / button / fake nose
full / thin / well-defined lips
broad smile / charming smile
healthy / damaged teeth /braces
wrinkles / freckles / pimples / smooth skin
moustache / beard ?

Does she/he have…

thick/rich/strong /healthy/shiny hair
thin hair/receding hair

straight/wavy/curly hair
spiky hair
fringe
colored / dyed hair
pigtails / ponytail / braids / bun / dreads
long / short / shoulder-length?

17. Play a game! Think a person in your class. Describe him/her so that the other people can guess. Use the vocabulary from the previous exercise.

18. Take a partner of the other sex or find a picture of your favorite artist/ actress etc. Imagine you would have a baby. What traits would you pass him?

19. Remember ***Modal verbs*** *and its equivalents. Finish the second sentence with the same idea like in the first. Mind that sometimes you need the other modal verb!*

1) She can ski really well.
2) She _____ really well when she was five.
3) I can finish it by Friday but it won't be easy.
4) I _____ it by Friday but it wasn't be easy.
5) John can't live here. It's the wrong street.
6) Shakespeare _____ in that house. It wasn't built until 1840.
7) I must check the oil before we leave.
8) I _____ check the oil before we left.
9) It must be raining. Everyone has their umbrella up.

10) It _____. The ground is wet.
11) Thank you very much. You needn't give me a lift, but it's very kind.
12) You _____ me a lift, but it was very kind.
13) He needn't collect me from the station. I'll walk.
14) He _____ me from the station. I walked.
15) Why don't you take the exam? You might pass.
16) Why didn't you take the exam? You _____.
17) He should stop smoking before it's too late.
18) He _____ stop smoking before it was too late.
19) I could visit you next Sunday.
20) I _____ you last Sunday. Why didn't you ask me?
21) There's the phone. It'll be Paul.
22) Did he have a deep voice? It_____Paul.
23) He'll sit in the armchair for hours, staring into space.
24) He_____ in the armchair for hours, staring into space.
25) Let's take the map. We may get lost.
26) I wonder where they are. They _____.

20. Fill in the gaps with the verbs ***could, may, must, have to, should*** *and the appropriate infinitive.*

1) Einstein's theory predicted that the universe was not static, but _____ (be) either expending or contracting.

2) Because the universe is expanding it _____ (cool), which means that it _____ (be) much hotter when it was young.

3) Therefore, a significant fraction of the universe ____ (consist) of non-baryonic matter.

4) There were no longer free electrons to absorb and scatter light, and photons _____ (travel) freely through the universe.

5) These fluctuations _____ (cause) by something that happened even earlier.

6) We _____, however, (be) careful about taking these models too seriously; they all _____ (be) wrong.

21. Translate into English using ***modal verbs****.*

1) Тебе следовало позвонить ему вчера. 2) Ему не следовало говорить с ней таким тоном (tone). Его тон, должно быть, и обидел (hurt) ее. 3) Это должно было произойти. Всем известна его забывчивость (forgetfulness). 4) Она должна была выяснить все до того, как начинать работу. Теперь ей нужно многое переделывать. 5) Ей следовало принести все документы давным-давно. Теперь слишком поздно. 6) Детям нельзя смотреть фильмы ужасов.7) Мне их проводить (see off)? — Нет, не нужно. Мне придется сделать

это самому. 8) В чужой стране необходимо приспосабливаться (adapt oneself) к новым условиям жизни. 9) Зря ты купил это пальто. 10) Мы, должно быть, не заметили его в этой толпе (crowd). 11) Нам не надо было спешить, поэтому мы решили пойти пешком. 12)Почему я должен это делать?

22. Read the text and translate.

GM Food

One of the best-known and controversial applications of genetic engineering is the creation of genetically modified food. There are three generations of genetically modified crops. First generation crops have been commercialized and most provide protection from insects and/or resistance to herbicides. There are also fungal and virus resistant crops developed or in development. They have been developed to make the insect and weed management of crops easier and can indirectly increase crop yield.

The second generation of genetically modified crops being developed aim to directly improve yield by improving salt, cold or drought tolerance and to increase the nutritional value of the crops. The third generation consists of pharmaceutical crops, crops that contain edible vaccines and other drugs. Some agriculturally important animals have been genetically modified with growth hormones to increase their size while others have been engineered to express

drugs and other proteins in their milk.

The genetic engineering of agricultural crops can increase the growth rates and resistance to different diseases caused by pathogens and parasites. These modified crops would also reduce the usage of chemicals, such as fertilizers and pesticides, and therefore decrease the frequency of the damages produced by these chemical pollution.

Ethical and safety concerns have been raised around the use of genetically modified food. A major safety concern relates to the human health implications of eating genetically modified food, in particular whether toxic or allergic reactions could occur. Gene flow into related non-transgenic crops, off target effects on beneficial organisms and the impact on biodiversity are important environmental issues. Ethical concerns involve religious issues, corporate control of the food supply, intellectual property rights and the level of labeling needed on genetically modified products.

23. Study this text and enlarge it with your knowledge about genetically modified food.

24. Search the Internet and find all new GM findings: foods and animals and so on. Present then to your class.

25. Read the text about GM food and translate it close to the text.

Генетически модифицированные организмы создаются методами генной инженерии - науки, которая позволяет вводить в геном растения, животного или микроорганизма фрагмент ДНК из любого другого организма с целью придания ему определенных свойств. Например, томаты получили ген морозоустойчивости от арктической камбалы, картофель получил ген бактерии, чей яд смертелен для колорадского жука, рис получил ген человека, отвечающий за состав женского молока, который делает злак более питательным.

Экспериментальное создание генетически модифицированных организмов началось еще в 70-е годы XX века. С этого времени производство ГМП набирало обороты и сейчас мы можем встретить ГМ сою, кукурузу, рис, картофель, помидоры, рапс, сахарную свеклу, пшеницу, горох, подсолнечник, папайю, хлопок, табак, коров с повышенной жирностью молока, лосося, который может жить как в соленой, так и в пресной воде и многих других организмов.

Неконтролируемое потребление генетически модифицированных продуктов может иметь непредсказуемые последствия в будущем. Чтобы полностью понять все риски употребления в пищу трансгенных продуктов, должно пройти несколько десятков лет и смениться несколько поколений, питавшихся ГМП.

Но нельзя говорить со стопроцентной уверенностью о вреде всех трансгенных продуктов. И в природе существуют организмы, непригодные в пищу для человека (ядовитые и мутагенные). Человек сам вправе выбирать, как жить и чем питаться. Главное, чтобы этот выбор был осознанным и основывался на научно доказанных фактах, а не на слухах.

26. Create the project "Genetically modified food". Choose the product you want to create and qualities you can endow your GM product. What are they? Where can you take them from? Make a poster of your product and tell about the procedure you made to create such unique GM product.

27. Write a 'for-and against' essay about pluses and minuses of

- *creating GM product.*
- *using GM food.*

Unit 18

Stem cells

What does a "stem cell" mean? Can you use it in a sentence?

Do you know how stem cell is used in treatment of different diseases?

Are stem cells used nowadays? How?

1. Read this text and compare your idea of stem cells and the one given below.

Our future hope?

Stem cells are cells found in most, if not all, multicellular organisms. They are characterized by the ability to renew themselves through mitotic cell division and differentiating into a range of specialized cell types. Research in the stem cell field grew out of findings by Canadian scientists Ernest McCulloch and James Till in the 1960s.

The two types of mammalian stem cells are: embryonic stem cells that are found in blastocysts, and adult stem cells that are found in adult tissues. In a developing embryo, stem cells can differentiate into all of the specialized embryonic tissues. In adult organisms, stem cells and progenitor cells act as a repair system for the body, replenishing specialized cells, but also maintain the normal turnover of regenerative organs, such as blood, skin or intestinal tissues.

To ensure self-renewal, stem cells undergo two types of cell division. Symmetric division gives rise to two identical daughter cells both endowed with stem cell properties. Asymmetric division, on the other hand, produces only one stem cell and a progenitor cell with limited self-renewal potential. Progenitors can go through several rounds of cell division before terminally differentiating into a mature cell. It is possible that the molecular distinction between symmetric and asymmetric divisions lies in differential segregation of cell membrane proteins (such as receptors) between the daughter cells.

Stem cells can now be grown and transformed into specialized cells with characteristics consistent with cells of various tissues such as muscles or nerves through cell culture. However, their use in medical therapies has been proposed.

The classical definition of a stem cell requires that it possess two properties:

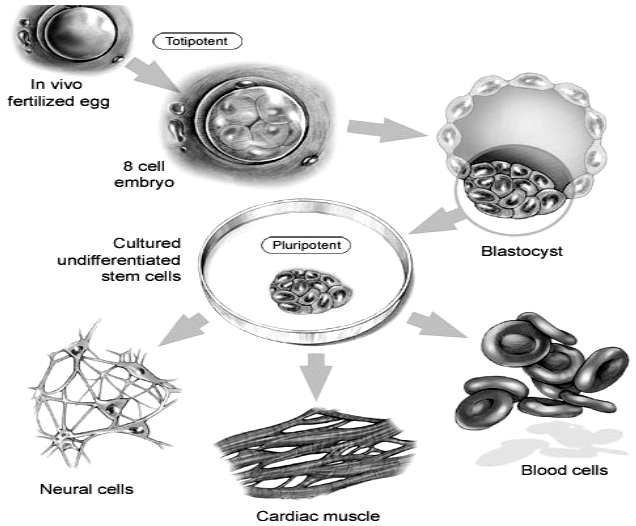
Self-renewal - the ability to go through numerous cycles of cell division while maintaining the undifferentiated state.

Potency - the capacity to differentiate into specialized cell types.

Properties of stem cells can be illustrated in vitro, using methods such as clonogenic assays, where single cells are characterized by their ability to differentiate and self-renew. As well, stem cells can be isolated based on a distinctive set of cell surface markers. However, in vitro culture conditions can alter the behavior of cells, making it unclear whether the cells

will behave in a similar manner in vivo. Considerable debate exists whether some proposed adult cell populations are truly stem cells.

Medical researchers believe that stem cell therapy has the potential to dramatically change the treatment of human disease. A number of adult stem cell therapies already exist, particularly bone marrow transplants that are used to treat leukemia. In the future, medical researchers anticipate being able to use tech-



nologies derived from stem cell research to treat a wider variety of diseases including cancer, Parkinson's disease, Alzheimer’s disease, spinal cord injuries, Amyotrophic lateral sclerosis and muscle damage, amongst a number of other impairments and conditions. However, there still exists a great deal of social and scientific uncertainty surrounding stem cell research, which could possibly be overcome through public debate and future research, and further educa-

tion of the public.

Notes

* *Cancer* - a disease in which cells in the body grow without control, or a serious medical condition caused by this disease.

**Alzheimer's (disease)* - a disease that results in the gradual loss of memory, speech, movement, and the ability to think clearly, and that is common esp. among older people.

* *Parkinson's disease* - is a degenerative disorder of the central nervous system that often impairs the sufferer's motor skills, speech, and other functions.

* *Amyotrophic lateral sclerosis* - a progressive, usually fatal, neurodegenerative disease caused by the degeneration of motor neurons, the nerve cells in the central nervous system that control voluntary muscle movement.

Vocabulary

act (v)
adult stem cells
assay
capacity
cycle
derive (v)
disease
distinction
division
embryonic stem cells
endow (v)
exist (v)
finding
impairment
in vitro
in vivo
injury
mammalian

marrow
mature
potency
progenitor
property
propose (v)
protein
renew (v)
self-renewal
set
similar
spinal cord
surface
surround (v)
therapy
tissue
transform (v)
turnover
uncertainty
undergo (v)

2. Translate into English.

1) Терапия *взрослыми стволовыми клетками* активно используется для лечения лейкемии.

2) *Способности* стволовых клеток часто демонстрируют в пробирке, используя методы клеточного *анализа*.

3) Ученые наблюдали за стволовыми клетками *в пробирке* и сделали вывод, что *найденные поврежденные* стволовые клетки переходят в раковые клетки.

4) Многие ученые обещают, что через несколько десятков лет стволовыми клетками можно будет вылечить почти все *болезни* человека.

5) Существуют *различия* в жизненных *циклах* разных клеток.

6) *Эмбриональные стволовые клетки* способны к *делению*, тем самым они восстанавливают те стволовые клетки, которые погибли или были использованы.

7) У взрослых организмов стволовые клетки и

клетки предшественники *выступают* в качестве ремонта системы для тела, пополнение специализированных клеток и поддержание нормальной регенеративности органов, например, крови, кожи или кишечной ткани.

8) В естественных условиях стволовые клетки, возможно, ведут себя не так как в пробирке.

9) В будущем врачи смогут лечить *повреждения* спинного мозга.

10) *Стволовые клетки млекопитающих* бывают двух типов.

11) Чтобы обеспечить *самообновление* стволовые клетки подвергаются делению.

12) В настоящее время стволовые клетки используются в *терапии*.

13) В исследовании стволовых клеток есть еще много *неопределенностей*.

14) Трансплантация *спинного мозга* используется в лечении лейкемии.

15) Сальные железы выделяют свой секрет на *поверхность* кожи.

16) Мышечная *ткань* обеспечивает двигательную активность животного организма.

17) Стволовые клетки обладают свойствами *самообновления*.

18) Каждая клетка обладает определенным *набором* генов.

19) В результате симметричного деления образуются две *похожие* клетки.

20) *Костный мозг* вырабатывает форменные элементы крови.

21)Стволовые клетки в процессе клеточного деления дифференцируются в *зрелые* клетки.

22) *Потенциал* – способность дифференцироваться в различные типы клеток.

23) *Клетки предшественники* могут пройти несколько этапов клеточного деления.

24) *Свойства* стволовых клеток можно проиллюстрировать методом клоногенного анализа.

3. Give definitions of the following notions:

1) Stem cells
2) Embryonic stem cells
3) Adult stem cells
4) Symmetric division
5) Asymmetric division
6) Self-renewal
7) Potency

4. Answer the questions according to the text.

1) What ability do stem sells have?
2) Who was the first investigator of stem cells?
3) What are the types of mammalian stem cells?
4) How do stem cells and progenitor cells act in adult organisms?
5) What types of cell division do you know? What is the difference between them?
6) How can stem cells be grown and transformed?
7) What are the properties of stem cells?
8) What is the method of clonogenic assay?

9) Will stem cell therapy cure many diseases or not?

10) Are there any existing adult stem cell therapies?

11) Are all people sure about the necessity of stem sells research?

5. Read the text again and entitle it.

6. Be ready to speak about stem sells. Use this text and enlarge it with your new information.

7. Remember the use and forms of ***the Infinitive****. Open the brackets and choose the Infinitive in the Active or Passive Voice.*

1) They are glad (invite/be invited) to the party. 2) I don't like (interrupt/be interrupted). 3) He will be happy (see/be seen) you. 4) I was glad (meet/be met) at the station. 5) Children like (tell/be told) tales and always (listen/be listened) to them with interest. 6) I did not think (interrupt/be interrupted) you. 7) He is glad (send/be sent) abroad. 8) He likes (ask/be asked) his professor questions.9)He does not like (ask/be asked) questions because he does not know how to answer them. 10) Be careful with him. He is a very resentful person. He can't bear (joke/be joked at). 11) He does not like (laugh/be laughed) at other people. 12) Look, a ship can (see/be seen) in the distance. Can you (see/be seen) it?

8. Study ***the Complex Object****. Open the brackets and use the Complex Object.*

Example: He expected (they, arrive) at 5. — He expected them to arrive at 5.

1) Do you want (they, stay) at the hotel or with us? 2. I'd like (the professor, look through) my report. 3) Do you want (I, show) you the sights of the city? 4) We expect (he, arrange) everything by the time we come. 5) I want (she, tell) me the news in brief. 6) He expected (the meeting, hold) in the Red Room. 7) I would like (they, fix) an appointment for me for Tuesday. 8) We want (she, introduce) us to the president. 9) I don't want (they, be late) for dinner. 10) He expected (she, invite) to the party by the Smiths. 11) I'd like (the dress, buy) by Saturday. 12) I don't want (she, treat) like Alice. 13) We considered (he, be) an honest person. 14) I don't like (she, prevent) me from doing it. 15) I suspect (he, help) by her.

9. Translate into English using the Complex Object.

1) Я не ожидал, что этот полицейский будет таким невежливым (impolite) человеком. 2) Мы бы хотели, чтобы вы доставили (deliver) товары к концу июня. 3) Я ожидал, что ее пригласят туда. 4) Они не ожидали, что его спросят об этом. 5) Я слышал, как его имя несколько раз упоминалось на собрании. 6) Он не заметил, как мы подошли к нему. 7) Вы видели, как они над чем-то смеялись? 8) Мы не ожидали, что об этом объявят (announce) по радио. 9) Мне бы хотелось, чтобы она сказала

нам, что она будет делать сегодня вечером. 10) Я думаю, что сегодня вы услышите, как она поет. 11) Когда он услышал, что его сын плачет, он встал и пошел в детскую комнату (nursery). 12) Я бы хотел, чтобы никто не брал мои вещи.

10. Study this stem cell research vocabulary. Match the words in column A with the best choice in column B.

a. technique	q. use
b. embryo	r. exaggerate
c. single	s. therefore
d. employ	t. method
e. implant	u. hurt
f. admit	v. one
g. hence	w. moral
h. ethical	x. tell
i. harm	y. baby
j. overstate	z. insert

11. Fill in the blank with the correct word. Choose them out of the words in the box:

ethical overstating embryos harmed admitted employed implanted hence technique single

1) Researchers at Advanced Cell Technology (ACT), Inc. have found a new (…) to gather stem cells.

2) They took a single cell from an eight-cell human (…).

3) The removal of a (…) cell isn't a new.

4) It has been (…) in fertility clinics to test for diseases.

5) Doctors and fertility specialists do this before the embryo is (…) in the womb.

6) ACT, Inc. later (…) that scientists removed more than a single cell.

7) (…) the embryos were destroyed.

8) The new process left no embryos alive, and solves no (…) problem.

9) Some U.S. Senators also criticized the experiment, because the company (…) the field.

10) By (…) their results, ACT, Inc. hurt stem cell research.

12. Find the words from the previous exercise in the following table. Time yourself, and see how many words you can find in three minutes.

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

13. Read the text and underline the words you found in the exercises before.

Embryo-Safe Stem Cell Research

Researchers at Advanced Cell Technology, Inc. have found a new technique to gather stem cells. They took a single cell from an eight-cell human embryo, claiming that the process does no harm. The removal of a single cell isn't new, and has been employed in fertility clinics to test for diseases. Doctors and fertility specialists do this before the embryo is implanted in the womb.

Human embryonic stem cell research is controversial because, with the present state of technology, starting a stem cell line requires the destruction of a human embryo and/or therapeutic cloning. Such re-

productive cloning can fundamentally devalue human life. Those in the pro-life movement argue that a human embryo is a human life and is therefore entitled to protection.

Contrarily, supporters of embryonic stem cell research argue that such research should be pursued because the resultant treatments could have significant medical potential. It is also noted that excess embryos created for in vitro fertilization could be donated with consent and used for the research.

Although critics quickly pointed out that all sixteen embryos used in the experiment were destroyed. ACT, Inc. later admitted that scientists removed more than a single cell, and hence their destruction. In addition, scientists developed stem cell lines from only two of the ninety-one cells removed. An official of the United States Conference of Catholic Bishops disapproved of the experiment, saying "it left no embryos alive, and solves no ethical problem."

14. Circle any additional unknown words/phrases in the article. In pairs/groups, use your dictionaries to understand the meanings. Write definitions to 3 of them.

15. Answer the questions to check comprehension.

1) What did Advanced Cell Technique, Inc. do?

2) What do fertility clinics usually do?

3) What is the position of the supporters?

4) And what are the critics doing because of the research?

5) What ethical reasons do critics disapprove stem cell research?

16. Answer whether the sentence is true or false. If false, correct the sentence.

a. Researchers developed a new way to harvest stem cells from human embryos only a few days old.	T/ F
b. Fertility clinics have used this technique for years.	T/ F
c. Supporters hope stem cell research will lead to treatments and cures for many illnesses.	T/ F
d. U.S. Bishops criticized the experiment for the usual ethical reasons.	T/ F

17. Remember how the fragments were used, and complete the sentence from the previous text.

1) Researchers at Advanced Cell Technology, Inc….

2) Human embryonic stem cell research is controversial because….

3) Supporters of embryonic stem cell….

4) But critics quickly pointed out that…

5) An official of the United States Conference of Catholic Bishops disapproved of the experiment, saying…

18. Work with a partner to summarize the article above in your own words in 3-5 sentences.

19. Translate the text about stem cells.

Стволовые клетки являются той основой ("стволом"), из которой развивается "древо" всего организма. На самых ранних стадиях своего развития зародыш полностью состоит из стволовых недифференцированных клеток, затем начинаются этапы дифференцировки и из них образуются органы и ткани организма. Во взрослом организме стволовые клетки содержатся в небольших количествах в крови и костном мозге и в еще меньших количествах во всех органах и тканях. Поскольку эти клетки могут преобразовываться в клетки любых органов и тканей, они играют роль своего рода экстренной помощи: если где-то в организме неполадка, стволовые клетки направляются туда и, преобразуясь в клетки поврежденного органа, способствуют восстановлению его функции. С возрастом количество стволовых клеток становится все меньше, и, соответственно, восстановительные возможности организма снижаются. Так, когда мы

рождаемся, у нас в костном мозге на 10 тыс. кроветворных клеток приходится одна стволовая клетка. У растущих подростков стволовых клеток уже в 10 раз меньше. К 50-ти годам на 0,5 млн обычных клеток приходится 1 стволовая, в 70 лет – 1 стволовая клетка на миллион. Из-за этого возможности человека по регенерации сильно ограничены. В результате страдает способность ткани к физиологической регенерации и к восстановлению после болезни или травмы.

20. Role-play: Assume the following roles and talk about the following:

1) Stem cells for Parkinson's and Alzheimer's disease.

2) Stem cells for beauty treatments.

3) Stem cells for extending one's life to 150 years.

Scientist: Stem cells will provide a real chance to cure diseases like cancer, Parkinson's, and Alzheimer's. They may also extend life and allow older people a better lifestyle. It's very important to support new research.

Politician: Stem cells may provide a cure to terrible diseases, but the price is too high--the death of unborn children! And some people will misuse stem cells for less important diseases. Funding for other research is better!

20-something: You're healthy... now. Two of your grandparents developed Alzheimer's early in life,

so you could develop the disease, too. Although you're not sure if stem cells will provide an answer, we should invest in additional research.

21. Talk about the following questions in pairs/groups. Make a report or write an essay on these questions.

1) Is it unethical to collect stem cells if it means that an embryo will be destroyed? Why/ not?

2) Do you think these kinds of experiments are like scientists playing God? Why/ not?

3) What would happen if scientists could cure all diseases some day?

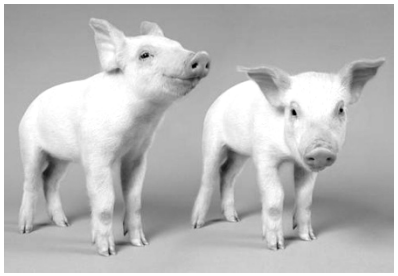
4) If your husband/wife had Alzheimer's, would you want science to find a cure as soon as possible? What if it meant conducting stem cell research?

5) Who is right, those who follow religion or those who follow science? Why?

6) What will happen if stem cell treatment becomes a reality? What about population, the rich and poor, etc.?

Unit 19

Cloning



Do you agree or disagree with the following statements? Why?

- People will someday be cloned for spare parts.
- Cloning is a dangerous technology that should be illegal.
- The cloning of endangered animals will someday be an important science.
- If my pet died, I would want to clone him.
- When I die, I want to be cloned.

1. Read and translate the text about cloning.

Cloning and concerns about it

Cloning in biology is the process of producing similar populations of genetically identical individuals that occurs in nature when organisms such as bacteria, insects or plants reproduce asexually. Cloning in biotechnology refers to processes used to create copies of DNA fragments (molecular cloning), cells (cell cloning), or organisms.

Molecular cloning refers to the process of making multiple molecules. It is used in a wide array of

biological experiments and practical applications ranging from genetic fingerprinting to large scale protein production.

Cloning of any DNA fragment essentially involves four steps. First is fragmentation - breaking apart a strand of DNA; second is ligation - gluing together pieces of DNA in a desired sequence; third is transfection - inserting the newly formed pieces of DNA into cells and the last is screening or selection - selecting out the cells that were successfully transfected with the new DNA. Cloning a cell means to derive a population of cells from a single cell. In the case of unicellular organisms such as bacteria and yeast, this process is remarkably simple and essentially only requires the inoculation of the appropriate medium. However, in the case of cell cultures from multicellular organisms, cell cloning is an arduous task as these cells will not readily grow in standard media.

Organism cloning (also called reproductive cloning) refers to the procedure of creating a new multicellular organism, genetically identical to another. In essence this form of cloning is an asexual method of reproduction, where fertilization or inter-gamete contact does not take place. Asexual reproduction is a naturally occurring phenomenon in many species, including most plants (vegetative reproduction) and some insects. Scientists have made some major achievements with cloning, including the asexual reproduction of sheep and cows.

There is a lot of ethical debate over whether or not cloning should be used. However, in the United

States, the human consumption of meat and other products from cloned animals was approved by the FDA (The Food and Drug Administration) on December 28, 2006, with no special labeling required. Cloned beef and other products have since been regularly consumed in the US without distinction.

Because of recent technological advancements, the cloning of animals (and potentially humans) has been an issue. The Catholic Church and many religious organizations oppose all forms of cloning, on the grounds that life begins at conception. They concern about the protection of the identity of the individual and the right to protect one's genetic identity.

Another concern is that the biotechnologies used on animals may someday be used on humans. Researchers have found several abnormalities in cloned organisms, particularly in mice. The cloned organism may be born normal and resemble its non-cloned counterpart, but majority of the time will express changes in its genome later on in life. The concern with cloning humans is that the changes in genomes may not only result in changes in appearance, but in psychological and personality changes as well. The theory behind this is that the biological blueprint of the genes is the same in cloned animals as it is in normal ones, but they are read and expressed incorrectly. Results of these abnormally expressed genes in the cloned mice were premature death, pneumonia, liver failure and obesity.

Vocabulary

asexual reproduction
biological blueprint
break apart (v)
concern
consumption
counterpart
derive (v)
fertilization
fragment (v)
fragmentation
genetic fingerprinting
glue (v)
identical
inoculation
insert (v)
inter-gamete contact
large scale
ligation
multicellular organism
non-coding sequence
occur (v)
oppose (v)
premature
protect (v)
randomly
resemble (v)
result (v)
strand
transfect (v)
transfection
unicellular organism

2. Translate into English.

1) Большой масштаб в изучении клонировании человека будет достигнут в будущем.

2) *Клонирование* широко распространено в природе у различных организмов.

3) Молекулярное клонирование занимается молекулами *ДНК,* их частями и даже отдельными генами.

4) Принимай это лекарство регулярно, оно *защитит* тебя от рецидива болезни.

5) По мере того как молекулярная *цепь* удлиняете, меняются и свойства веществ, состоящих из

этих молекул.

6) В книге профессора В.М. Беликова «Пища будущего» затрагивается вопрос потребления мяса и этики отношения к животным.

7) Фрагменты ДНК будут разрезаны в случайных местах.

8) ДНК представляет собой несколько цепочек, состоящих из нуклеотидов.

9) Маша не просто похожа на маму, она вообще ее копия!

10) Во время трансфекции генетическая информация переносится в эукариотические клетки с помощью очищенной ДНК.

11) Нить ДНК состоит из фрагментов и разрывается на части при процессе размножении.

12) Бесполое размножение защищает организм от введения другой биологической программы.

3. Fill in the gaps in these sentences according to the text you`ve read:

1) Cloning in biotechnology refers to processes used to create copies of _____, _____, or _____.

2) Cloning is commonly used to amplify DNA fragments containing whole_____.

3) In the case of unicellular organisms such as bacteria and yeast, this process is remarkably simple and essentially only requires _____of the appropriate medium.

4) Organism cloning refers to the procedure of

creating a new_____, genetically identical to another.

5) _____is a naturally occurring phenomenon in many species, including most plants and some insects.

6) Researchers have found several abnormalities in_____, particularly in mice.

4. a) Make sentences in Russian with the words from vocabulary and give them to your partner to translate into English.

b) Put these ideas in the order as they were given in the text.

- Religious organizations oppose cloning
- There are 3 types of cloning
- Diseases caused by cloning
- Cloning produces similar populations or identical individuals
- Organism cloning creates new multicellular organism asexually
- Multiple molecules can be made by molecular cloning
- Cloned meat have been consumed in the US without distinction
- Cell cloning derives a population of cells from a single cell

5. a) Make 10 questions covering the gist of the text.

b) Retell the text from the point of view of:

- *Scientist*
- *Cloned meat producer*
- *Religious official*

Add your reasons pro or contra cloning.

6. Read interesting facts about cloning, discuss them and find your own.

Did you know…?

✓ Dolly the cloned sheep was named after country singer Dolly Parton, because she started life as a mammary cell.

✓ We leave our DNA around all the time, everywhere: on the door, on the table, on the keyboard… For the moment we couldn't clone from it, but hey, perhaps later we may be able to clone you from the tiny bits of DNA you leave about!

✓ Humans have far fewer genes than expected at 35,000 to 42,000, compared to the nematode worm with 18,000 and the fruit fly with 13,000. However, scientists say we may still have more – we don't know the whole genome set yet and we may have missed some genes.

✓ The difference between humans and fruit flies

or worms is that human genes work differently, are capable of multitasking, and we have more control genes.

✓ Most mutations occur in males.

✓ In each of our cells, there are six feet of DNA packed into a chromosome only 0.0004 inches across.

✓ Lining up all of the DNA in the human body, it would reach to the sun and back more than 600 times.

✓ The information would fill 200 500-page telephone directories.

✓ Our DNA is 99.9% identical to all other members of the human race.

7. Talk with your partner(s) about cloning the people / animals in the table. What are the pros and cons of each? Change partners and share your ideas.

_____ dogs to sniff out drugs at airports
_____ yourself
_____ super-intelligent scientists
_____ expert soldiers
_____ cows that produce lots of milk
_____ world class sports stars
_____ very kind voluntary workers
_____ endangered species

*8. Study the **Complex Subject**. Open the brackets and use the Complex Subject.*

Example: He is thought (study) now. — He is thought to be studying now.

1) He is considered (be) a good musician. 2) They are thought (go away) some days ago. 3) James

is expected (make) a report next Wednesday. 4) Steve is known (help) them to solve a problem when they were in trouble. 5) Mozart is known (compose) a lot of wonderful pieces of music. 6) The film is considered (be) the worst of the year. 7) She is supposed (work) in the laboratory from 2 to 6 p.m. tomorrow. 8) They are known (make) a new discovery a month ago. 9) He is expected (manage) the business himself. 10) He is said (be) at the customs office now.

9. Translate into English using the ***Complex Subject****.*

1) Стивен обязательно выиграет эту игру. 2) Известно, что Питер уехал в Осло. 3) Предполагают, что президент выступит на конференции. 4) Эту пьесу считают самой интересной в театре. 5) Кажется, она готовит яблочный пирог (applepie). Пахнет очень вкусно. 6) Боб, наверное, нам поможет. — Он наверняка нам поможет. 7) Полагают, что они уехали вчера. 8) По-видимому, переговоры (talks) закончатся завтра. 9) Полагают, что эта работа была выполнена успешно. 10) Вряд ли этот факт имеет большое значение (be of great importance). 11) Это, вероятно, случится, если ветер не переменится. 12) Говорят, что делегаты на конференцию уже приехали. 13) Известно, что этот комитет был создан несколько лет тому назад. 14) Он, по-видимому, пишет новую книгу. 15) Предполагают, что они смогут решить этот вопрос тотчас же. 16) Известно, что Джек Лондон написал много прекрасных книг.

10. Read the following text and translate it.

Human cloning

Human cloning is the creation of a genetically identical copy of an existing or previously existing human. There are two commonly discussed types of human cloning: therapeutic cloning and reproductive cloning. Therapeutic cloning involves cloning cells from an adult for use in medicine and is an active area of research. Reproductive cloning would involve making cloned human beings. Such reproductive cloning has not been performed and is illegal in many countries. A third type of cloning called replacement cloning. It is a theoretical possibility, and would be a combination of therapeutic and reproductive cloning. Replacement cloning would entail the replacement of an extensively damaged, failed, or failing body through cloning followed by whole or partial brain transplant.

"Went in for a simple blood test and got cloned by mistake."

Some people and groups oppose therapeutic cloning, but most scientific, governmental and religious organizations oppose reproductive cloning. Many scientific organizations have made public statements suggesting that human reproductive cloning be banned

until safety issues are resolved. Serious ethical concerns have been raised by the idea that it might be possible in the future to harvest organs from clones. Some people have considered the idea of growing organs separately from a human organism - in doing this, a new organ supply could be established without the moral implications of harvesting them from humans.

The first human hybrid human clone was created in November 1998, by American Cell Technologies. It was created from a man's leg cell, and a cow's egg whose DNA was removed. It was destroyed after 12 days.

On January, 2008, Wood and Andrew French, Stemagen's chief scientific officer in California, announced that they successfully created the first 5 mature human embryos using DNA from adult skin cells, aiming to provide a source of viable embryonic stem cells. It is not clear if the embryos produced would have been capable of further development, but Dr. Wood stated that if that were possible, using the technology for reproductive cloning would be both unethical and illegal. Thus, the 5 cloned embryos were destroyed.

11. Write the gist of the text in about 10 sentences. Then enlarge it with your own information concerning cloning.

12. Talk about the following questions in pairs/groups. Remember to support your answers!

1) In your opinion will reproductive cloning be legal in future?

2) Grandpa just died. Would you consider cloning him? Why/ not?

3) What do you think will happen in 10 years regarding cloning? 25 years? 100 years?

4) What do you think about the whole business of cloning? Will it be possible and profitable in future?

5) Would you like to have a cloned version of yourself? For spare part of just to have a brother/ friend?

13. Write a magazine article about two people - one is the clone of the other. Include imaginary interviews with them.

Optional activity: take an interview from two (three) clones.

14. Translate an abstract.

Проблема клонирования связана с потенциальными рисками для здоровья будущего клона, в частности, возможность его преждевременного старения. Известный ученый Алексей Оловников еще в 1971 году обратил внимание на проблему укорачивания хромосом в клетках в результате делений. Ученый предположил, что укорачивание хромосом не может идти вечно – в какой-то момент клетка состарится и потеряет способность делиться. Но почему наши хромосомы не короче

хромосом наших предков? Оказалось, что на концах хромосом есть специальные участки – теломеры. При удвоении хромосом эти участки действительно укорачиваются, однако специальный фермент – теломераза, активный в некоторых клетках (например, в стволовых), может достраивать теломеры до исходного размера. Получается, что при наличии фермента теломеразы клетки способны делиться без особых ограничений, не «стареть». Отсутствие теломеразы в большинстве клеток является одним из защитных механизмов от неконтролируемого деления, то есть рака.

16. Write a letter to a scientist involved in cloning. Give him/her three pieces of advice on what (s) he should do to make sure cloning is safe. Ask him/her three questions about cloning. Read your letter to your partner(s). Your partner(s) will answer your questions.

17. You have a clone. Your clone is 13 years old. Write your diary entry for one day you spent with him/her. Include the conversations you had and the advice you gave him/her.

18. Do we have a right to clone dead people? What if they didn't want to be cloned? Make a report/ essay on this topic.

19. Study the example of the official letter. Make a conclusion about the rules of letter writing.

Nikolay Petrov
34 Pushkinskayast., Apt.16
Izhevsk 426000
Udmurtia, Russia

25 April, 2009

Malcolm Anderson, ScD
25 North Road, Apt. 5
London W2 4RH
England

Dear Mr. Anderson,

The purpose of this letter is to follow up on the discussion we had in your office last week. This letter details the steps we discussed to make your project a reality.

Since my letter of December 10, there has been a number of changing circumstances that necessitate different approach is used to develop the project. Would it be possible to meet you either in Moscow or St. Petersburg to discuss this further?

I look forward to working with you on this project.

Sincerely yours,
Petrov Nikolay.

20. Write your own formal (official) letter.

On July, 10 you discussed and made a draft of a document about the problems of cloning ethics with

your colleague David Bellmore from Brookline University. Since that time you have made some corrections and changes in the document. Inform about it your colleague and suggest the date of new meeting.

21. Role Play Game.
You are in 2102 on the debates "Should we legalize cloning?" Choose a role for yourself and prepare to speak from the part of it.
A person who has a clone: I like my clone because he is both my friend and a guarantee against hard diseases. Moreover,…
His clone: I like my counterpart because…
An unsatisfied clone: I want to be a human because…
A doctor: Clones may have constant pain and suffering. They grow quicker, so…
A psychologist: Clones may have psychological problems, for example, the absence of parent can cause depression…
A priest: Life begins at conception…
A person who wants to have a clone because…
A businessman: It's great business now because…

Unit 20

Biotechnological ethics

What do you know about ethical issues?
Why are some people against biotechnological research?

1. Read the text about ethical issues in biotechnology and translate it.

Ethical issues in biotech

From the time when the earliest pioneers of medicine took the Hippocratic Oath, the importance of ethical considerations about actions affecting living entities has been recognized by professionals. The general principles are still of fundamental importance: respect for life and the need for a balance of benefit over harm resulting from any intervention.

There are three particular contemporary features that account for the public concern on the threshold of the 21st century. First, much of the current development in biotechnology results from an advanced understanding of the nature of genetics and the ability to perform manipulations in the genomes

of plants and animals. Some feel that 'respect for life' implies that there should be no interference with it in this basic way. Obviously, heart transplants are as radically unnatural as gene transplants, but most people consider them to be ethically acceptable.

Second, the pace of discovery in genetics-based biotechnology is very rapid and there is anxiety that technology will drive developments ahead of proper ethical considerations. The moratorium on human germ-line therapy is an example that there must be ethical restraints on the use of what is technically feasible. Part of the reason for this restriction is uncertainty about the long-term effects of such interventions. There is also uncertainty about the environmental consequences of the genetic manipulation of plants. These issues are scientific questions that need to be answered before we have an adequate basis of knowledge for final ethical decisions.

Third, advanced technology involves processes that are only well understood by the experts who develop and use them. This places considerable power in the hands of the companies that employ these experts. Currently, there is much public suspicion about the reliability and independence of this 'expert' advice. Although some of this suspicion comes from a difficulty in understanding that certain answers cannot be given to complex questions.

There is also much suspicion of transnational corporations, which want to maximize their profits by making users dependent on their products and then controlling availability. But the ethical use of

biotechnology should clearly include it being provided only on a fair and just basis.

Vocabulary

anxiety
acceptable
consequence
consider (v)
drive (v)
employ (v)
ethical decision
harm
Hippocratic Oath
genetics-based
imply (v)
interference with
involve (v)
living entity
long-term
manipulation
moratorium
perform (v)
public suspicion
rapid
reliability
respect for life
restraints
restriction
heart transplants

2. Give Russian equivalents for the following words. Use some of them in the sentences of your own.

earliest pioneers, ethical considerations, in relation to, living entities, general principles, respect for life, contemporary features, account for, nature of genetics, manipulations in the genomes of plants and animals, heart transplants, gene transplants, to be ethically acceptable, genetics-based biotechnology, pace of discovery, drive developments, human germ-line therapy, ethical restraints, long-term effects, environmental consequences, scientific question, adequate ba-

sis of knowledge, ethical decision, advanced technology, public suspicion, 'expert' advice, transnational corporations.

3. Translate the sentences into English using the words you learned.

1) Этот исследователь был главным в этом проекте, и он нес всю ответственность за *последствия*.

2) *Геном* – это совокупность хромосомных наследственных факторов.

3) Испытание на *надёжность* прошло успешно.

4) Пациенту была назначена операция по *пересадке* органа.

5) *Мир живых существ* насчитывает несколько миллионов видов.

6) Больному был назначен *долгосрочный* уход.

7) Феномен генетической *рестрикции* лежит также в основе развития ряда иммунопатологий.

8) Исследователь получил *положительные отзывы* коллег о своих достижениях.

4. Put the words in the right order and write down the sentences:

1) genetics-based / The / of / very / discovery / rapid / is / pace / in / biotechnology.

2) is / about / uncertainty / the / of / There / environmental / genetic / the / of / plants / consequences / manipulation.

3) as / transplants / Heart / radically / are / gene / unnatural / as / transplants.

4) There / much / about /reliability /and / of / is /'expert' / the / independence / suspicion / public / advice.

5) a /suspicions / from / Some / difficulty/ derive / in / understanding.

5. Answer the questions according the text.

1) When did ethical considerations start to be recognized?

2) What are the general ethics principles?

3) What do some people think about interference in life in its basic way?

4) What anxiety appears in connection with the rapid development of genetic-based biotechnology?

5) What example does the moratorium on human germ-line therapy shows?

6) What anxiety does public have about the experts?

7) Is there any suspicion about the transnational corporations` activity?

8) What basis should ethics of biotechnology have?

6. Write out the sentences expressing the main ideas of each logical part of the text.

7. Write a summary of the text in your own words making use of plan and the sentences you've written out.

8. Orally enlarge this summary and retell the text.

9. ***Phrasal verbs.*** *Translate sentences and pay attention to the underlined adverbs in these sentences.*

Example: There`s a film on television. Can I put it on?

1) We finished all the food up.
2) I`m writing in pencil so I can rub out my mistake.
3) Martin didn`t answer. He just went on reading.
4) A woman in the audience shouted something out.
5) I`ll just read over what I`ve written.
6) The water was off for an hour today.
7) Ellie has an aggressive manner which frightens people off.
8) The company is trying to get its costs down.
9) The embassy was burnt down by terrorists.
10) I`ve got this form that I have to fill out.
11) Social workers were giving out soup to the hungry.
12) The boss is optimistic. The sales figures are

moving up again.

10. ***Phrasal verbs.*** *Put in the correct adverb.*

1) Everything is so expensive. Prices seem to go *up* all the time. – Yes, and the government is supposed to be bringing inflation_____.
2) You shouldn`t leave the television_____ all night. – Sorry, I forgot. I usually turn it_____.
3) I`ve written the wrong here. – Well, rub it_____. – I can`t. It`s in biro. I`ll have to write it all _____ again.
4) They`re going to pull_____ this beautiful old building. – I know. There are some protestots handing _____ leaflets about it.
5) Hold _____ a minute. I thought I heard some call_____. – You imagined it. Come _____, or we`ll be late.
6) Why don`t you read _____ the letter so that we all know what`s in it? – Yes, and could you speak_____ so that everyone can hear you.

11. Read the text and translate it.

Genetically modified foods ethics

Selective breeding has been used since agriculture began, with the development of cultivated crops from wild species and of domestic herds from wild animals. However, it is now possible to carry out gene transfers that could not occur in nature, even

gene transfers from the animal kingdom to the plant kingdom.

Some people have characterized this as 'playing God', with the implication that it is ethically unacceptable to interfere with nature. However, human beings are themselves part of nature and many religious people would see the responsible exercise of scientific skills as being the employment of God-given abilities.

One of the major concerns about GM crops is their possible environmental effects. Insect-resistant strains may reduce the use of insecticides, but will genes spread from herbicide-resistant strains to produce 'superweeds'? All interventions in nature run the risk of unanticipated upsets to its balance and, from the time that humans with stone axes began felling trees, agriculture has had significant environmental consequences. Because consequences are difficult to predict accurately, it is important that carefully controlled and monitored trials are used to gain the detailed knowledge on which ethically responsible decisions can be based.

It is predicted that the world population, currently approximately six billion, will rise to approximately eight billion by the year 2020. Present agricultural resources, if their produce was fairly distributed, could sustain approximately 6.4 billion people. Biotechnology offers considerable possibilities to help eliminate the anticipated shortfall. However, there is also considerable concern that small-

scale farmers should not be exploited by large international companies.

To these considerations must be added the universal ethical obligation to respect the duty of safety. With regard to food safety, GM products do not seem to raise issues or demand the monitoring of techniques, different to those employed to assess the effects of ordinary foods.

12. Give the definitions to at least three of the following words:

Genetically modified foods, selective breeding, cultivated crops, gene transfers, environmental effects, insecticides, superweeds, herbicide-resistant strains, insect-resistant strains, agricultural resources, small-scale farmers, food safety.

13. Make a plan of this text. Add it with the keywords.

14. Retell this text using your plan.

15. Read the text about human genetics ethics and translate it.

Human genetics ethics

The use of biotechnology in relation to human beings is governed by the Hippocratic principle that interventions must be for the benefit of the individ-

ual person concerned. Controversy in this area is not generated by dissent from this principle but by disagreement about what constitutes a human person, with all the moral rights appertaining to that status.

Some believe that this status is established at the moment of conception. If that is the case then no manipulation of the early embryo, other than for its own direct benefit, could be ethically justified. Others, however, take a more developmental view of the way in which a human fetus grows into a person, with the dawning of sentience and eventually of mentality. Currently, that research is also limited to projects investigating aspects of human fertility.

Although the repair of damaged tissues in the ill or injured is seen as being highly desirable, the creation of a 'replacement person' is not so acceptable. Respect for the human person forbids this - not because there is an intrinsic human right to possess a unique genome but because a human being is to be valued for their self and not used as a surrogate for another. The same moral intuition leads to an abhorrence of the idea of using genetic manipulation to produce 'designer babies' with qualities according to parental specification. Persons are never to be commodified: ethically, they are never means but always ends.

Science, by gaining knowledge, confers power; if that power is to be used to choose the good and refuse the bad then wisdom must be added to knowledge. This quest for judicious decisions will involve the participation of at least three parties: the experts,

the community of possible beneficiaries and the general public.

If this prospect of a rational debate about biotechnology is to be realized, a considerable educational program will be required. It is clear that many people still lack the rudimentary degree of scientific understanding that is indispensable as the basis for reaching informed, ethical conclusions on these issues.

16. Answer the following questions:

1) What is the Hippocratic principle?

2) Is there a controversy in this area?

3) Who is a 'replacement person'?

4) What do people think about the creation of a ‘replacement person’?

5) What will involve the participation of at least three parties: the experts, the community of possible beneficiaries and the general public?

17. Write down questions to each paragraph.

18. Read and translate the text properly.

3Dсимуляторы лабораторных животных

Лабораторные животные наиболее часто используются в медико-биологических экспериментах, испытаниях на безопасность и в образовательных целях. Исследователи используют животных в попытке понять различные уровни функ-

ционирования организма, его болезни и физиологическое состояние, создать новые вакцины и методы для лечения различных заболеваний.

Во всех этих случаях, животные подвергаются насилию и боли в той или иной степени, что не является естественной частью их среды обитания. Поэтому мы должны быть заинтересованы в поиске новых альтернатив использованию животных в экспериментах, стараться уменьшить число животных, по возможности максимально облегчить их страдания.

Замена использования животных включает в себя методы, в которых животные не используются совсем (абсолютная замена) или методы, в которых применяются ткани и клеточные культуры (относительная замена). При этом часто происходит отказ от методов invivo в пользу методов invitro.

Однако в виртуальной лаборатории студентам не всегда просто научиться, например, изолировать кровеносные сосуды, правильно обращаться с подопытными животными, работать совместно с другими исследователями. Трудно смоделировать на компьютере акт убийства живого существа и таким образом поставить исследователя перед моральными вопросами так же, как это происходит в реальности, а не на пластиковых моделях или на уже убитых животных.

К сожалению, абсолютная или относительная замена лабораторных животных не всегда возможна. Некоторые важные исследования (по крайней мере, в настоящее время) не могут быть произве-

дены без использования животных. В таких случаях исследователи стараются уменьшить число животных, задействованных в эксперименте. Тщательное планирование эксперимента и применение современных методов статистического анализа данных часто позволяют существенно сократить число подопытных животных, сохраняя при этом значимость окончательного результата.

19. Be ready for the discussion. What do you think about using virtual 3D models for laboratory experiments? Give your arguments for and against this problem. Continue the following table and discuss it with your classmates.

Arguments for the virtual using of pet/ organ models in the lab	*Arguments against the virtual using of pet/ organ models in the lab*
1) You can save pets' life 2) You can you this program many times 3) …	1) You can't predict the result in the case of new drug testing or so on 2) A person may behave the other way in real conditions. ...

20. Create a code of ethics regulations for biotechnologists. Write what they should do and what they must not do.

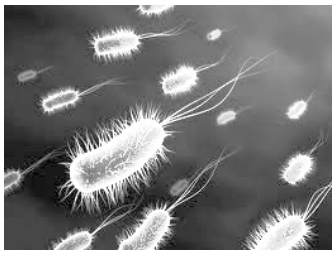
Unit 21

Nanotechnology

What does the word "nanotechnology" mean?
What does nanotechnology research?
How many proteins do you know?

1. Read this text and compare your notion of "nanotechnology" and the one given below.

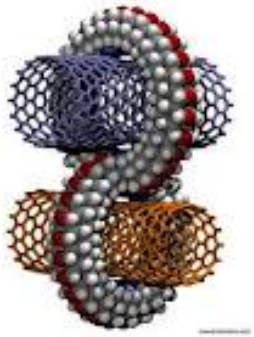
Nanotechnology



Nanotechnology (sometimes shortened to "nanotech") is the study of manipulating matter on an atomic and molecular scale.

Nanotechnology may be able to create many new materials and devices with a vast range of applications, such as in medicine, electronics, biomaterials and energy production. But also nanotechnology raises many concerns about the toxicity and environmental impact of nanomaterials, and their potential effects on global economics.

Nanotechnology is the engineering of functional systems at the molecular scale. In its original sense, nanotechnology refers to the projected ability to construct items from the bottom up, using techniques and tools being developed today to make complete, high performance products.



One nanometer (nm) is one billionth of a meter. By comparison, a DNA double-helix has a diameter around 2 nm. On the other hand, the smallest cellular life-forms, the bacteria of the genus Mycoplasma, are around 200 nm in length. By convention, nanotechnology is taken as the scale range 1 to 100 nm. The lower limit is set by the size of atoms (hydrogen has the smallest atoms, which are approximately a quarter of 1 nm diameter) since nanotechnology must build its devices from atoms and molecules. The upper limit is more or less arbitrary but is around the size that phenomena not observed in larger structures start to become apparent and can be made use of in the nano device.

Two main approaches are used in nanotechnology. In the "bottom-up" approach, materials and devices are built from molecular components which assemble themselves chemically by principles of molecular recognition. In the "top-down" approach, nano-objects are constructed from larger entities without atomic-level control.

Areas of physics such as nanoelectronics, nanomechanics, nanophotonics and nanoionics have evolved during the last few decades to provide a basic scientific foundation of nanotechnology.

Vocabulary

advanced
approach
approximately
atomic
biomaterials
device (v)
electronics
evolve (v)
impact
issues
manipulate (v)
molecular
molecular recognition
nanoelectronics
nanoionics
nanomaterials
nanomechanics
nanometre
nanophotonics
nanotechnology
observe (v)
phenomena
raise (v)
scientific foundation
toxicity

2. Find Russian equivalents to English and study the vocabulary. Make your own sentences with any 5 of them.

Atomic and molecular scale, vast range of applications, toxicity, environmental impact, potential effects, engineering of functional systems, in its original sense, by comparison, cellular life-form, by convention, upper limit, "bottom-up" approach, molecular recognition, "top-down" approach, atomic-level control.

3. Translate these sentences

1) Журнал "Нано Дайджест" собрал наиболее интересные достижения ученых в сфере *нанотехнологий*.

2) *Нанометр* — единица измерения длины в метрической системе, равная одной миллиардной части метра.

3) *Токсичность* оказывает вредное действие на организм человека, животных и растений.

4) Огромный вклад науки в духовную жизнь общества бесспорен.

5) В настоящее время развивается такая область химии, как *молекулярный* дизайн.

6) Одним из преимуществ интернет – исследования является *высокая эффективность*.

7) *Наблюдать* за нано-объектами можно различными способами.

8) Чтобы подтвердить эту теорию необходимо научное обоснование.

4. Are the following statements true or false? Correct the false ones.

1) Nanotechnology is the study of manipulating matter on only molecular scale.

2) Generally, nanotechnology deals with structures sized between 10 to 100 nanometre.

3) Nanotechnology may be able to create many new materials and devices with a vast range of applications.

4) Nanoelectronics is the engineering of functional systems at the molecular scale.

5) Nanotechnology refers to the projected ability to construct items from the bottom up.

6) One nanometer (nm) is one billionth, or 10^{-9}, of a meter.

7) Nanotechnology is taken as the scale range 1 to 100 nm.

8) The upper limit is set by the size of atoms.

9) Four main approaches are used in nanotechnology.

10) Only nanoelectronics have evolved during the last few decades to provide a basic scientific foundation of nanotechnology.

5. Write out the sentences expressing the main ideas of each logical part of the text.

6. Be ready to speak about nanotechnology. Use this text and enlarge it with your new information.

7. Take word (toxity) from the text. Use a dictionary to build up more associations / collocations of each word.

For example: nanomaterial

Nanomaterial – molecular scale – nanometer – DNA douple – helix.

8. Look in your dictionaries to find collocates, other meanings, information, synonyms for the word 'nano'.

- Share your findings with your partners.
- Make questions using the words you found.
- Ask your partner / group your questions.

9. Look at the words below. With your partner, try to give definitions of these words:

- silver nanoparticles
- stress response
- nano-titanium dioxide
- carbon nanotubes
- organic food

10. Make an information sheet about the implications of nanotechnology.

11. Revision. Choose the correct variant.

1) My mother _____in a very big hospital in London.

a) work b) is working c) works d) are working

2) What _____this evening?

a) do you do b) are you doing) you do

d) were you doing

3) Have you ever _____ the portrait of Mona Lisa?

a) Seenb) seec) seeingв) saw

4) The children will call you if they _____ anything.

a) Need b) will need c) needed

b) d) have needed

5) "Your mother was here a minute ago". "Oh, _____?"

a) did she b) has she c)was she
b) is she

6) Alice is_____than her sister.
a) Taller b) more taller c) tallest
b) more taller

7) 6254_____
a) six thousand and two hundred fifty-four
b) six hundred two thousand and fifty-four
c) six thousand two hundred fifty-four
d) six thousand two hundred and fifty-four

8) There isn`t_____butter in the fridge.
a) Some b) no c) any d) a

9) How_____ water is there in the cup?
a) little b) much c) many d) big

10) This house was built_____ the 18th century.
a) In b) on c) at d) by

11) Talk_____me, please!
a) With b) to c) for d) on

12) Christmas is_____popular holiday in Great Britain.
a) Most b) the most
c) most of all d) very

13) _____I come in?
a) Can b) should c) may d) am

14) I`m sorry, I_____go.
a) ought to b) must
c) need to d) have to

15) You_____come to school in time.
a) ought to b) should
c) need d) may

16) She is likely to help them._____
a) Ей нравится помогать им.
b) Она, вероятно, поможет им.
c) Она вряд ли поможет им.
d) Ей нравится, когда они ей помогают.

17) She was born_____19 May, 1950.
a) In b) On c) At d) By

18) You are angry with me, _____you?
a) aren`t b) shall c) won`t d) will

19) Let me give you_____.
a) an advice b) the advice
c) some advice d) some advices

20) We would like_____you a present.
a) Give b) giving
c) to give d) to giving

21) We have very_____money left.
a) Few b) little c) a few d) a little

22) The_____ pens and pencils are on the desk.
a) Childrenb) childrens
c) children`s d) childrens`

23) The mice_____the cheese.
a) have eaten
b) have been eaten
c) has eaten
d) has been eaten

24) I wonder where _____.
a) he did go b) he went
c) did he go d) went he

25) Don`t touch this ball! It`s_____!
a) Her b) mine c) my d) your

26) _____the more you get fat.
a) When you eat more
b) Eating more
c) The more you eat
d) More eaten

27) Can you look_____the baby for 10 minutes?
a) Out b) to c) for d) after

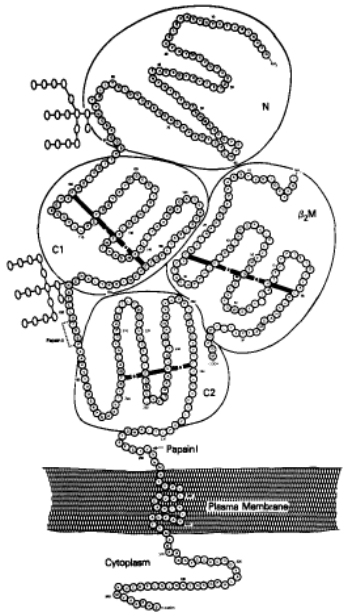
28) It was _____yesterday!
a) such nice weather
b) too nice weather
c) so nice weather
d) such a nice weather

29) I want one and_____of pears, please.
a) half kilo b) a half kilo
c) half kilos d) a half kilo

12. Read and translate the text

Proteins

Structure and size: proteins are linear, unbranched polymers constructed from 20 different α-amino acids that are encoded in the DNA of the genome. All living organisms use the same 20 amino acids and the same genetic code. Proteins are large molecules with molecular weight ranging from 10 to 50 kdal for single-chain proteins. Multichain proteins of 150 to 200 kdal are frequently encountered.



Proteins serve a wide range of functions in living organisms. They are involved in the following:

•enzymatic catalysis (all known enzymes are proteins);

• transport and storage of small molecules and ions;

•systematic movements (both striated and smooth muscle are composed chiefly of protein, as are structures involved in the motility of certain free-living cells;

•the structure of skin and bone (collagen, the most abundant protein in body, gives these structures high tensile strength);

•the immune defense system (antibodies are specialized proteins recognizing self and nonself);

•hormonal regulation (some hormones are proteins; the cellular receptors that recognize hormones and neutrotransmitters are proteins);

•control of genetic expression (repressor molecules in bacteria are proteins that suppress certain DNA sequences; protein initiation and termination factors serve in the transcription phases of gene function).

Proteins show an exquisite specificity of biologic function – a consequence of the uniqueness of the three-dimensional structural shape, or conformation, of each protein. In humans, disease states are often related to the altered function of a protein. This is due to an anomaly in the structure of the protein, which in turn may be due to a deficiency in its synthesis.

Amino acids. The fundamental units of protein polymers are α-amino acids. They are composed of an

amino group, a carboxyl group, a hydrogen atom, and a distinctive side chain, all boned to a carbon atom. One of the 20 amino acids, proline, is an imino acid, not an α-amino acids as are the other 19. A few other amino acids are found in a number of proteins but are not coded for in DNA; they are derived from one or another of the 20 fundamental amino acids after these have been incorporated into the protein chain (post-translational modification).

Peptides and polypeptides. The peptide bond is the bond formed between the α-carboxyl group of one amino acid and the α-amino group of another. It is formed by removal of the elements of water. The process is highly endergonic and requires the concomitant hydrolysis of high-energy prosphate bonds. The peptide bond is a planar structure with the two adjacent α-carbons, a carbonyl oxygen, and α-amino-N and its associated H atom, and the carbonyl carbon all lying in the same plane. The – CN – bond has a partial double-bond character that prevents rotation about the bond axis. The linking together of many amino acids by peptide bonds produces polypeptide chains. Amino acids, when in polypeptide chains, are customarily referred to as residues. Protein polypeptide chains are typically more than 100 amino acid residues long. Smaller peptides, however, are common and often have important biologic roles. By convention, peptide structures are written from left to right, starting with the amino acid residue having a free α-amino group (the so-called N-terminal amino acid) and ending with the residue having a free α-carboxyl

group (the C-terminal). Either the three-letter abbreviations of the single-letter abbreviations are used.

13. Game. Sentence Race

1. Prepare a list of review vocabulary words.
2. Write each word on two small pieces of paper. That means writing the word twice, once on each paper.
3. Organize the pieces like bundles, 2 bundles, 2 sets of identical words.
4. Divide the class into 2 teams. Get them to make creative team names.
5. Distribute each list of words to both teams. Every student on each team should have a paper. Both teams have the same words.
6. When you call a word, 2 students should stand up, one from each team. The students must then run to the blackboard and race to write a sentence using their word.

The winner is the one with a correct and clearly written sentence.

14. Translate the text into English using the words you have learned.

Наночастицы.

Современная тенденция к миниатюризации показала, что вещество может иметь совершенно

новые свойства, если взять очень маленькую частицу этого вещества. Частицы размерами от 1 до 100 нанометров обычно называют «наночастицами». Так, например, оказалось, что наночастицы некоторых материалов имеют очень хорошие каталитические и адсорбционные свойства. Другие материалы показывают удивительные оптические свойства.

Удается добиться взаимодействия искусственных наночастиц с природными объектами наноразмеров — белками, нуклеиновыми кислотами и др. Тщательно очищенные наночастицы могут самовыстраиваться в определённые структуры. Такая структура содержит строго упорядоченные наночастицы и также зачастую проявляет необычные свойства.

15. Write down 5 questions based on the article.

16. Summarize the idea of the text. What information is new for you?

17. Role-play game.

“THE NANOWORLD” ROLE PLAY: This role play is to discuss and decide which is the most important part of the nanoworld. Team up with classmates who have been assigned the same role to develop your roles and discuss ideas and “strategies” before the role play begins.

Introduce yourself to the other role players before

the role play begins.

Role A – **a protein**

Some of your benefits:

Proteins are the chief actors within the cell, said to be carrying out the duties specified by the information encoded in genes. Proteins make up half the dry weight of an *Escherichia coli* cell, whereas other macromolecules such as DNA and RNA make up only 3% and 20%, respectively.

Why you are better than the nucleic acids and the carbon nanotubes?

Role B – **nucleic acids**

Some of your benefits:

Nucleic acids are biological molecules essential for life, and include DNA (deoxyribonucleic acid) and RNA (ribonucleic acid). Together with proteins, nucleic acids make up the most important macromolecules; each is found in abundance in all living things.

a) Deoxyribonucleic acid is a nucleic acid that contains the genetic instructions used in the development and functioning of all known living organisms. The main role of DNA molecules is the long-term storage of information and DNA is often compared to a set of blueprints, since it contains the instructions needed to construct other components of cells, such as proteins and RNA molecules.

b) Ribonucleic acid functions in converting genetic information from genes into the amino acid sequences of proteins.

Why are you better than the protein and the carbon nanotubes?

Role C – **a carbon nanotubes** and other fullerenes

Some of your benefits:

Carbon nanotubes are allotropes of carbon with a cylindrical nanostructure. Nanotubes are members of the fullerene structural. These cylindrical carbonmolecules have novel properties, making them potentially useful in many applications in nanotechnology, electronics, optics, and other fields of materials science, as well as potential uses in architectural fields. They may also have applications in the construction of body armor. They exhibit extraordinary strength and unique electrical properties, and are efficient thermal conductors.

Why you are better than the nucleic acids and the protein?

Appendix 1

Additional grammar revision test

1) Who speaks French in your family? I……
   a) Have b) do c) am

2) When….you buy the new TV set?
   a) Did b) were c) are

3) We…never been to London.
   a) Had b) were c) have

4) Where….you going when I met you last night?
   a) Did b) were c) are

5) ….your friend like to watch TV in the evening?
   a) Do b) does c) is

6) What are you doing? – I…..reading a book.
   a) Was b) am c) shall

7) We thought they…..be late.
   a) Would b) shall c)will

8) Many new building……built in our town last year.
   a) Had b) are c) were

9) The letter…..sent tomorrow.
   a) will be b) has c) will

10) We want him to help us. Что мы хотим?
   a) Помочь ему
   b) Чтобы он помог нам

11) He is known to have been a gifted designer. Что известно о нем?
   a) Он был талантливым дизайнером
   b) Он является талантливым дизайнером

12) My friend`s son has already brought the book. Кто принес книгу?
   a) Сын друга b) Друг сына

13) She is being looked at by him. Кто на кого смотрит?
   a) Она на него b) Он на нее

14) Students are often asked by the teacher. Кто кого спрашивает?
   a) Студенты преподавателя
   b) Преподаватель студентов

15) She was followed by them. Кто за кем последовал?
   a) Она за ними b) Они за ней

16) Students are being examined. Экзамен закончился или продолжается?
   a) Продолжается b) закончился

17) We knew of his having been invited to our party. Кто кого пригласил?
a) Он пригласил b) Его пригласили

18) All their work was good for nothing. Как сделали работу?
a) Хорошо b) Плохо

19) Anyone knows about it. Кто знает об этом?
a) Все b) Кто-то

20) The meeting (началось) at 5 o`clock.
a. Has begun b) Began c) Was beginning

21) At 5 o`clock yesterday I (ехал) to the station to catch the 5.15 train.
a. Was going b) Was gone c) Went

22) I (не перевел) this article yet.
a. Was not translating
b. Have not translated
c. Did not translate

23) She says that lectures on art (посещают) by many students.
a. Were attended
b. Are attended
c. Are attending

24) He (пришлось) read a lot of books to make this report

a. Was able to b) Had to c) Was allowed to

25) He said that he (учится) at the Institute.
a. Is studying b) Studies c) Studied

26) I shall not (не смогу) to go to the skating-rink with you tomorrow.
a. Be able b) Cannot c) Have

27) He will (разрешат) to go in for sports again.
a. Be able b) Have c) Be allowed

28) You (должны были) finish this work two weeks ago.
a. Had to be b) Had to c) Must be

29) (Умеет) your brother speak French?
a. Can b) May c) Must

30) When the academic year (закончится) we shall go to the country.
a. Is over
b. Will be over
c. Will have been over

31) We thought that you (приняли) their invitation.
a. Had accepted
b. Accepted
c. Have accepted

32) We were sure that you (будите принимать участие) in these sports events.
a. Will take part
b. Would take part
c. Would be taken

33) She says that he (будет слушать) to the tape.
a. Will listen b) Would listen c) Will be listen

34) Have you given them (какую-нибудь) work?
a. Some b) Any c) Something

35) (Кто-то) rang you up.
a. Somewhere b) Everybody c) Somebody

36) You can get this book (везде).
a. Everywhere b) Somewhere c) Anywhere

37) What language do you speak (лучше) English or French?
a. Better b) Worse c) Best

38) The weather today is (хуже) than yesterday.
a. Worse b) More c) Worst

39) Is there (что-нибудь) on the table?
a. Anything b) Something c) Everything

40) There isn`t (ничего) on the table.
a. Anything b) nothing c)some

41) He saw (никого).
a. Somebody b) anybody c) nobody

Appendix 2

Additional texts

HIV's history traced

Helen Pearson

New evidence has emerged that HIV was racing through the US population long before doctors woke up to a new killer disease called AIDS. The study might also help the hunt for an HIV vaccine.

Researchers have reconstructed the virus' past using the few remaining blood samples taken during the 1980s from AIDS patients in New York, California and Georgia. They fed the HIV genetic sequences into a new type of statistical analysis that compares them with more contemporary ones, to estimate how fast the virus has changed and spread. The technique "looks back in time", says researcher Kenneth form Georgia.

The results support the idea that HIV arrived in the United States around 1968, long before the first AIDS cases appeared. AIDS was first reported in 1981 and was retrospectively recognized as having struck in the late 1970s. This is compatible with HIV's roughly ten-year incubation period. From the start, the virus probably spread like wildfire. The rapid spread of the virus might help to explain why the disease finally came to light. It could have been because spiraling numbers passed a critical point.

HIV is thought to have jumped from African chimpanzees into humans, perhaps when they ate infected meat. Then one strain, called HIV-1, spread all over the world.

Researchers are still unclear exactly how HIV arrived in the United States. One hypothesis suggests that Canadian air steward GaetanDugas - dubbed Patient Zero - brought in the disease and spread it to many homosexual partners.

The latest study, which includes Patient Zero's genetic sequence, fits a different scenario: that the disease entered many different times independently. Even early in the epidemic, the group found, the viruses in different cities were distinct from one another.

This supports another popular theory: that HIV may have hitched a ride with tourists arriving from Haiti. The historical reconstruction also contains a lesson for today's vaccine researchers. Contemporary strains are more closely related to their ancestral ones than they are to each other.

This suggests that future vaccines, which researchers hope will prime the immune system to attack any HIV strain that they encounter, would be best based on an ancestral sequence. Early work on such vaccines is already under way, says Kenneth.

Bad news for HIV-vaccines?

Tom Clarke

A patient with some immunity to one strain of HIV virus has become infected with another strain. This could spell trouble for urgently needed HIV vaccines, warn researchers. Others think the case has little

bearing on immunizing healthy people.

This alarming controversy has emerged on the eve of World AIDS day, as the United Nations announces that more than 40 million people worldwide are now infected with the virus.

The patient had been on 'stop-start' HIV therapy. Under this regimen, a patient takes anti-HIV drugs until the virus is suppressed, and then they stop. When the virus rebounds, undamaged parts of their immune system that had recovered during treatment keep the virus in check, often for months. As the virus gradually beats the immune system, they start taking the drugs again.

Several cycles into his treatment, the patient had "an extremely vigorous response to his virus", says Bruce Walker of Harvard Medical School in Boston, Massachusetts, who led the study. The patient then caught a second, different strain of HIV - probably from sex with another HIV-infected person - and his immune system collapsed rapidly.

This is the first case of so-called 'super infection' in someone who had immunity to their initial infection. "We thought for a long time that if you get infected with one strain of HIV that you are well protected from another," says Walker.

There are countless strains of HIV. The hope has been that a vaccination against one would lead to immunity to the rest. The patient's second infection was caused by a closely related strain that is common in North America. "But it clearly was not something his immune system could deal with," says Walker.

Hopes for an effective HIV vaccine are far from dashed, however. It's probably not good news, but vaccinated healthy people are likely to be very different. Even at its best, the immune response of someone with HIV is never going to function normally. Indeed, the patient lacked cells that produce neutralizing antibodies to help destroy pathogens. Half his immune system was missing.

It is also possible that Walker's patient was a very rare case. It is not known how many HIV-positive people are exposed to other strains of the virus and fight them off.

There is one concrete conclusion from the study: it is imperative that safer sex be practiced during each encounter, even when both partners are HIV-infected.

Parasite that makes cat-lovers neurotic

By Roger Highfield

Cat-lovers may be more neurotic than other people as a result of a feline parasite that could ultimately also be responsible for international cultural differences, according to a radical theory published today.

More than a quarter of the world's population - ranging from about seven per cent of the UK population to almost 70 per cent in Brazil - is infected with *Toxoplasma -gondii*, a relative of the malaria bug, which also infects rats, giving them a suicidal attraction to cats.

"Some of us have a parasite in our brains that

does its best to change our personalities," writes Dr Kevin Lafferty, of the University of California at Santa Barbara in the Proceedings of the Royal Society, Biology. "In populations where this parasite is very common, mass personality modification could result in cultural change."

He suggests that attitudes to ego, money, material wealth, work and rules may be affected by the parasite. Those infected by T. gondii are prone to guilt. It has been shown that, in rats at least, this helps the parasite to complete its life-cycle. An infected rat's behaviour alters so that it becomes more active, less cautious and therefore more likely to be eaten by a cat.

Dr Lafferty suggested that climate affects the persistence of Toxoplasma and therefore that there are cultural ramifications. The parasite's eggs live longer in humid, low-altitude regions that have infrequent freezing and thawing.

Earlier research at Imperial College London suggested that the parasite may also trigger schizophrenia. It showed that anti--psychotic drugs used to treat the illness prevented changes in the behaviour of rats that were infected with the parasite.

Yum, amino acids

John Whitfield

Researchers have pinpointed the receptor that allows us to taste proteins' building blocks. The amino-acid receptor triggers the lip-smacking *umami* taste that flavor enhancers exploit. Its discovery might help

the design of new additives.

Mice's version of the receptor responds to nearly all of the 20 amino acids found in proteins, Charles Zuker of the University of California, San Diego, and colleagues have found. The human version of the receptor is most sensitive to the chemical glutamate. Glutamate is one of the most common amino acids in our diets. It gives high-protein food its meaty, umami flavor. About 1.5 million tons of monosodium glutamate is used to make food tasty each year.

Humans' more specialized receptor need not be a disadvantage, or reflect differing diets, says Zuker. It could just be a quirk of evolution. "Food rich in amino acids probably contains all 20." The ability to taste amino acids "guides us to proteins", which themselves have no taste.

Two years ago, a different research group announced the discovery of an umami receptor. Whether this is the real thing has been controversial. Mice lacking that receptor can still taste umami, for example, and its shape raises questions about its possible function.

The new receptor comprises two molecules, T1R1 and T1R3. Related molecules sense bitter and sweet flavors: T1R3 is also part of a recently discovered sweet-taste receptor, in tandem with another molecule T1R2. Taste receptors are big business. The US market for artificial sweeteners exceeds $600 million each year. As well as making snacks moreish, flavor enhancers could make food more appetizing to the elderly, who have less sensitive taste buds, or could

help ill people suffering from loss of appetite.

Different species and individuals inhabit different taste worlds. Variation in the receptor gene between human and mouse, and between individual humans, reflects this. "I'd bet that human taste preferences - whether you have a sweet tooth or not, say - are down to nothing but differences in receptor repertoire. We are starting to translate behavior into simple genetic differences," says Zuker.

His team experimented on isolated receptor-bearing taste bud cells. Next the group hopes to work out what messages these cells send to the brain, and what the brain does with this information. "We don't know how the brain determines the final taste of an amino acid," says Zuker. "I've tasted every single amino acid. Not all of them taste umami."

Knowing the molecular lock should help us design keys to fit it, he says. "We could design tastes on a computer."

GM could hold back the tears

Tom Clarke

A new finding could lead to genetically modified onions that don't make us cry as we chop them. Researchers in Japan have identified the enzyme that releases a tear-duct-tickling chemical when an onion is cut. Onion's tear-jerker is a compound called *propanthial S-oxide*. It is made by an enzyme known as lachrymatory-factor synthase, Shinsuke Imai, Japan, and his colleagues have discovered. Their investigations

involved a mix of genetic sleuthing and old-fashioned biochemistry.

Previous studies had suggested that onions' flavor compounds were behind the effect. Chopping was thought to make them react with a common onion enzyme, allinase, producing propanthial S-oxide. This suggested that in order to breed or genetically engineer a non-irritant onion, scientists would have to tamper with its flavor. Indeed, onions bred to be tear-free, like the Veri Sweet vegetable recently marketed in Washington State, have a characteristically different taste.

The latest study puts paid to this idea. "The chemistry is not new," says Imai. "But the way it occurs in the plant is not as was first thought." Now that a single, flavor-independent enzyme has been identified, it would be simple to create an onion in which the enzyme was absent, or suppressed, Imai's team suggests. "Anyone skilled in the art" should be able to produce such a modified onion, says the researcher.

It's not exactly what the world has been crying out for, but S. Imai argues that it could be one of the first GM organisms acceptable to consumers. It won't require the addition of a foreign gene, simply the silencing of an existing one. Onion's irritant is thought to have evolved to protect the nutritious bulbs from being eaten.

For cooks the world over, this onion would have direct benefits that most existing genetically modified crops lack. "A non-lachrymatory onion would perhaps be one of the first examples where the consumer was

the main beneficiary," Imai says.

Atkins-style diets can be life-threatening, doctors warn

Owen Bowcott

Low carbohydrate diets, such as the Atkins plan, can lead to life-threatening conditions, a medical journal warned yesterday. The Lancet described the case of an obese woman who had adhered strictly to the high-protein diet for a month before being admitted to hospital as an emergency.

The 40-year-old, who had taken vitamin supplements recommended by the Atkins plan, needed treatment in the intensive care unit of a New York hospital. She had ketoacidosis, a condition triggered by the liver's production of ketones, the acids which appear during periods of starvation or when there is a lack of insulin in the body due to diabetes.

When first admitted the patient felt nauseous and was dehydrated after vomiting for several days. She was short of breath and in "moderate distress". Four days later, after a dextrose drip, she was well enough to be discharged. The doctors said the Atkins diet was largely to blame.

Professor Klaus-Dieter Lessnau, who led the team from the New York School of Medicine, wrote: "Our patient had an underlying ketosis caused by the Atkins diet ... this problem may become more recognised because this diet is becoming increasingly popular worldwide." The Atkins diet maintains that you

can lose weight rapidly by cutting carbohydrates entirely from meals.

For a month before she fell ill the woman admitted to the US hospital had lived on meat, cheese and salads. She had also taken vitamins recommended by the diet.

As instructed in the original Atkins diet book, she monitored her urine twice daily. During this month-long period, she lost about 9kg.

Commenting on the case elsewhere in the Lancet, Lyn Steffen, a doctor, and Jennifer Nettleton, from the University of Minnesota School of Public Health delivered a further warning about Atkins and other carb-cutting diets. The pair wrote: "While the rapid weight loss seems to be an obvious benefit of the Atkins diet, bigger questions remain."

First, is the diet safe? ... low carbohydrate diets for weight management are far from healthy, given their association with ketosis, constipation or diarrhoea, halitosis, headache, and general fatigue to name a few side effects.

These diets also increase the protein load to the kidneys and alter the acid balance in the body, which can result in loss of minerals from bone stores, thus compromising bone integrity.

Combinational adenovirus-mediated gene therapy and dendritic cell vaccine in combating well-established tumors

Recent developments in tumor immunology and

biotechnology have made cancer gene therapy and immunotherapy feasible. The current efforts for cancer gene therapy mainly focus on using immunogenes, chemogenes and tumor suppressor genes. Central to all these therapies is the development of efficient vectors for gene therapy. By far, adenovirus (AdV)-mediated gene therapy is one of the most promising approaches, as has confirmed by studies relating to animal tumor models and clinical trials. Dendritic cells (DCs) are highly efficient, specialized antigen-presenting cells, and DC-based tumor vaccines are regarded as having much potential in cancer immunotherapy. Vaccination with DCs pulsed with tumor peptides, lysates, or RNA, or loaded with apoptotic/necrotic tumor cells, or engineered to express certain cytokines or chemokines could induce significant antitumor cytotoxic T lymphocyte (CTL) responses and antitumor immunity. Although both AdV-mediated gene therapy and DC vaccine can both stimulate antitumor immune responses, their therapeutic efficiency has been limited to generation of prophylactic antitumor immunity against re-challenge with the parental tumor cells or to growth inhibition of small tumors. However, this approach has been unsuccessful in combating well-established tumors in animal models. Therefore, a major strategic goal of current cancer immunotherapy has become the development of novel therapeutic strategies that can combat well-established tumors, thus resembling real clinical practice since a good proportion of cancer patients generally present with significant disease. In this paper, we review the recent progress in AdV-mediated cancer gene therapy and DC-based cancer vaccines, and discuss combined immunotherapy including gene therapy and DC vaccines. We underscore the fact that combined therapy may have some advantages in combating well-established tumors vis-a-vis either modality administered as a monotherapy.

Light smokers escape heart risk three years after quitting

Nic Fleming

Light smokers who quit are no more likely to suffer heart attacks than non-smokers after about three years of abstinence, according to new research.

An international study of more than 27,000 people found that those who smoked fewer than 10 cigarettes per day had no increased risk of having a heart attack three to five years after quitting.

There are about 1.3 billion smokers in the world. However heavy smokers, who had smoked 20 or more cigarettes per day, were still 22 per cent more likely than non-smokers to have an attack two decades after giving up.

While the link between smoking and the increased danger from heart attacks has been shown in previous research, the new study published today in The Lancet, shows all forms of tobacco exposure multiply the risks.

In addition to smoking cigarettes, chewing tobacco, passive smoking and puffing on sheeshas,

which are popular in the Middle East, were found to be harmful to the heart.

Prof Salim Yusuf from McMaster University in Ontario, Canada, who led the study, said: "Since the risks of heart attack associated with smoking dissipate substantially after smoking cessation, public health efforts to prevent people from starting the habit and promote quitting, will have a large impact in the prevention of heart attacks worldwide. Chewing tobacco, which is increasingly being promoted as a safe alternative to smoking, is also harmful."

The researchers studied 27,089 individuals from 52 countries, and assessed the relationship between their risk of suffering a heart attack and whether they were a smoker or former smoker, how they consumed tobacco, amount smoked and exposure to second-hand smoke.

Current smokers were on average three times more likely to have a heart attack. Chewing tobacco doubled the chances of having a heart attack, as did smoking eight to 10 cigarettes a day.

Heart attack risk was found to be linked directly to the number of cigarettes a person smoked, increasing, compared with non-smokers, by 63 per cent for people smoking one to nine cigarettes a day, 159 per cent for 10 to 19 cigarettes, 359 per cent for 20 or more cigarettes, and 816 per cent for 40 or more.

Non-smokers who were exposed to second-hand smoke for 22 hours or more per week were 62 per cent more likely to have a heart attack.

The researchers estimate that about 100 million

people died from tobacco-related diseases worldwide during the 20th century. Across the world there are estimated to be 1.3 billion smokers, four-fifths of whom live in developing countries.

Ruairi O'Connor, from the British Heart Foundation, said: "This study provides further evidence that tobacco exposure - whether it be smoking, chewing or inhaling - is seriously bad news for your heart health. The good news for smokers is that much of the added risk of a heart attack recedes after quitting - a great reason to kick the tobacco habit for good."

Amanda Sandford, the research manager of the anti-smoking group Ash said: "Millions of people are suffering heart attacks because they have smoked or chewed tobacco or have been exposed to other people's smoke.If current trends persist about one billion people will die of tobacco-related conditions in this century.Most of these deaths will be in poorer nations where there are few resources to combat the tobacco epidemic," she said."This study highlights the need for the rapid implementation of the global treaty on tobacco control."

Восстановление поврежденного спинного мозга возможно

Ученые из Калифорнийского Университета (UniversityofCalifornia) недавно сообщили, что существует возможность стимулировать регенерацию отростков нейронов в центральной нервной системе (ЦНС) у крыс с повреждениями спинного

мозга, даже если терапия была начата спустя год после нанесения травмы.

«Если аксоны – отростки нервных клеток – не были полностью перерваны при повреждении, то с помощью комбинированной терапии их можно заставить регенерировать, - говорит ведущий автор исследования профессор MarkTuszynski, директор Центра Неврологического Восстановления в Сан-Диего (CenterforNeuralRepair), - поврежденный аксон еще не мертв».

Каждый год только в США происходит около 10 000 случаев травмирования спинного мозга, и примерно 250 000 пациентов в стране живут с его хроническим повреждением. Все ранние исследования в этой области сосредотачивались на терапевтическом воздействии немедленно после травмы, поскольку, как считается, восстановить нервную ткань после столь давнего повреждения невозможно, и до настоящего времени не было показано ни одного случая восстановления спинного мозга при его хроническом повреждении.

В октябре 2009 г. в журнале Neuron была опубликована статья, где описан метод успешного восстановления аксонов спинного мозга взрослого животного в случае, когда повреждение было локализовано в шейном отделе органа. Лечение было начато спустя от 6 недель до 15 месяцев после нанесения травмы.

Ряд естественных механизмов препятствует регенерации аксонов после повреждения. В их числе: образование на границе повреждения так

называемого глиального рубца, невысокая способность самих нейронов к регенерации, продукция в зоне повреждения факторов ингибирования роста и, в некоторых случаях, мощная воспалительная реакция. Хронически поврежденные нейроны демонстрируют потерю экспрессии генов, чьи продукты ответственны за регенерацию, в результате чего белое вещество спинного мозга вокруг зоны повреждения начинает постепенно дегенерировать.

Даже в идеальных лабораторных условиях восстановление отростков нервных клеток крайне сложно и требует по крайней мере трех условий: формирования клеточного «мостика» между поврежденными аксонами, присутствия в зоне повреждения нейротрофических ростовых факторов, ответственных за рост аксонов, и стимуляции поврежденного нейрона, активирующей экспрессию генов, чьи продукты ответственны за регенерацию. Команде исследователей из Калифорнийского Университета удалось совместить эти три условия и добиться восстановления структуры и функций спинного мозга даже спустя 15 месяцев после повреждения.

Ученые также провели генетическое исследование, оценив, какие именно гены должны быть активированы в нейронах для успешной регенерации спустя длительное время после повреждения. Оказалось, что, несмотря на долгое время, прошедшее с момента повреждения отростка нейрона, активация набора определенных генов в клетке

приводит к росту аксонов denovo.

Биотехнологические препараты крови

В настоящее время в развитых странах получение медицинских препаратов из плазмы донорской крови регламентируется жесткими стандартами контроля, исключающими заражение продукции не только антигенами гепатита В и С, СПИД, венерических инфекций, но и цитомегаловируса и Т–клеточного лейкоза. Фракционирование плазмы позволяет получить более 20 препаратов, в том числе факторы свертывания VII, VIII, IX.. Однако и такое производство препаратов крови в настоящее время не считается достаточно современным, так как при самом строгом контроле качественные препараты крови гарантированно безопасны только в отношении переноса ВИЧ, гепатита В и С, но могут содержать безоболочечные вирусы (гепатит А, парвовирус В19 и др.). Значительно более безопасны рекомбинантные концентраты факторов крови, относительно которых нет ни одного примера переноса вирусов. В настоящее время на рекомбинантные препараты крови обязательно переводятся новорожденные. Общий объем рынка медикаментов для лечения заболеваний крови, в том числе рекомбинантных факторов свертывания крови, препаратов для лечения анемии, препаратов восстанавливающих формулу крови, в 1999 году превысил 5 млрд. долларов.

В России из плазмы донорской крови получа-

ют препараты протеин, альбумин, иммуноглобулин, а так же компоненты; криопреципитат и концентрат нативной плазмы с повышенным содержанием фактора IX. Производство очищенных факторов крови – как рекомбинантных, так и плазменных – в настоящее время отсутствует. Экономическая ситуация не позволяет в достаточной мере реализовывать принципы стандартизации в производстве препаратов крови, которые, соответственно, часто оказываются инфицированными.

Стволовые клетки против инфаркта миокарда

Ученые уже много лет работают над использованием стволовых клеток для регенерации различных органов. В частности, они пытаются превращать их в сердечную ткань, способную заменить участки, претерпевшие омертвение в результате инфаркта. Несмотря на отдельные интересные результаты, в целом эти усилия пока не увенчались реальными достижениями. Чтобы стволовые клетки стали надежным инструментом кардиологии, их надо заставить гарантированно давать начало именно тканям сердечной мышцы и обеспечить надежное выживание этих тканей после пересадки больному. Пока что ни одну из этих задач не удалось осуществить.

Недавно исследователи университета штата Вашингтон в Сиэттле вместе с сотрудниками ка-

лифорнийской биотехнологической фирмы GeronCorporation значительно продвинулись на пути к разрешению этих проблем. Они размножили культуру эмбриональных стволовых клеток человека на питательной среде, которая содержала два специально подобранных белка, влияющих на направление дифференциации этих клеток. Благодаря присутствию этих протеинов, так называемых факторов роста, свыше 80% процентов стволовых клеток дали начало кардиомиоцитам, специализированны клеткам сердечной мышцы. Это очень серьезное достижение, поскольку до сих пор выход кардиомиоцитов не превышал одного процента.

Полученные кардиомиоциты ученые подсадили непосредственно в сердца крыс, у которых четырьмя днями ранее был искусственно вызван инфаркт миокарда. Однако предварительно эти клетки были смешаны с несколькими веществами, облегчающими интеграцию новой ткани и защищающими ее от преждевременной смерти. Использование такого коктейля привело практически к стопроцентному приживлению трансплантата и заметно улучшило работу сердечной мышцы больных животных. Когда ученые в контрольных опытах подсадили послеинфарктным крысам одни лишь кардиомиоциты без защитных добавок, степень приживляемости не превысила 18 процентов.

Добившись успеха в опытах на крысах, исследователи планируют начать серию аналогичных экспериментов на более крупных животных, на-

пример, свиньях и овцах. Если эти опыты закончатся столь же благополучно, ученые через пару лет смогут приступить к начальному этапу клинических испытаний своего метода.

Антифермент против увеита

Офтальмологи из Техасского университета успешно опробовали на животных экспериментальный метод лечения воспалений сосудистой оболочки глаза. Такие воспаления называются увеитом. Они могут распространяться на всю глазную оболочку или на отдельные ее части, например, радужку. Увеит считается весьма опасным заболеванием. Он способен быстро прогрессировать и приводить к таким тяжелым осложнениям, как глаукома и отслоение сетчатки.

У увеита нет единой причины. Иногда его вызывают болезнетворные бактерии или паразиты, которые подавляются антибиотиками. Однако он может возникать и как следствие заболеваний, вызванных сбоями в работе иммунной системы, например, волчанки и ревматоидного артрита. В таких случаях больным обычно помогают только антивоспалительные стероидные препараты. Однако эти лекарства вызывают серьезные осложнения, особенно при длительном использовании. Поэтому специалисты по глазным болезням уже давно ищут новые способы борьбы с этой опасной болезнью.

Техасские ученые решили разорвать цепочку молекулярных сигналов, которые дают команды

на развитие увеита. В них участвует фермент альдозоредуктаза, который превращает глюкозу в многоатомные спирты. Такие спирты опасны и сами по себе, поскольку они могут накапливаться в глазном хрусталике и вызывать его помутнение. Исследователи искусственно вызывали увеит у крыс, а затем вводили им экспериментальный препарат зополрестат, подавляющий активность альдозоредуктазы. Они обнаружили, что такое лечение может быстро приводить к прекращению увеита.

Руководитель этих исследований профессор СатишСривастава пока не планирует клинические испытания этого метода, однако считает, что они уже не за горами. Если эффективность новой терапии будет доказана, увеит можно будет излечивать с помощью глазных капель, содержащих зополрестат или другие вещества, нейтрализующие альдозоредуктазу.

Спасительный лейцин

Американские ученые опробовали на животных еще один экспериментальный метод борьбы с ожирением. Кристофер Линч и его коллеги сконструировали генноинженерных мышей, которые постоянно переедают и при этом не только не толстеют, но даже отличаются несколько сниженным весом. Эти животные постоянно производит и разрушают белки, которые вовсе не нужны для их жизнедеятельности. Такие циклы бесполезных хи-

мических превращений поглощают энергию избыточных пищевых калорий, которая поэтому не идет на формирование жировых запасов.

Подопытные мыши отличаются от нормальных лишь тем, что у них отсутствует ген, работа которого приводит к очистке крови от аминокислоты лейцина. Это вещество совершенно необходимо и животным, и растениям, поскольку оно входит в состав почти всех белков. Однако избыточный лейцин запускает в организме мышей цепочки биохимических процессов, которые как раз и приводят к синтезу и утилизации ненужных протеинов.

Физиологи уже давно подозревали, что организм может бороться с угрозой тучности, постоянно производя и уничтожая бесполезные протеины. Существует даже гипотеза, что способность некоторых людей есть в свое удовольствие и не толстеть может объясняться как раз тем, что природа наградила их этой способностью. Однако до сих пор еще никому не удавалось экспериментально доказать, что такие белковые превращения существуют не только в теории.

В последние годы в литературе появлялись сообщения, что прием препаратов лейцина может способствовать похудению. Исследования Линча и его коллег показывают, что для этого имеются физиологические основания. Конечно, никто не считает, что людей можно излечивать от ожирения с помощью генетических операций. Однако не исключено, что фармакологам удастся создать пре-

парат, который будет блокировать работу фермента, расщепляющего лейцин. Но до этого ученым предстоит убедиться, что манипуляции с этой аминокислотой полностью безвредны и помогают не только мышам, но и человеку. Судя по всему, на это потребуется не один год. А пока что лучше сохранять нормальный вес с помощью разумного питания и физических упражнений. Так оно надежней.

Малярийный сахар

Американские микробиологи получили важную информацию о жизненном цикле возбудителя малярии. Эту болезнь вызывают паразитические одноклеточные организмы, малярийные плазмодии. Однако здоровый человек не может заразиться малярией при физическом контакте с больным или его вещами. Возбудителя малярии переносят самки кровососущих насекомых, в основном комара-анофелеса. Всасывая кровь больного, они поглощают эритроциты, содержащие половые клетки плазмодия, гаметоциты. В кишечнике комара эти клетки выходят на свободу, сливаются и прикрепляются к его стенке. Затем споры плазмодия претерпевают ряд изменений и в конечном счете попадают в слюнные железы насекомого. Инфицированные комары в свою очередь заражают человека.

Теперь к этим давно известным фактам из жизни плазмодия прибавилась новая информация.

Сотрудники Института по изучению малярии при университете им. Джонса Хопкинса выявили вещество, с помощью которого его споры прикрепляются к клеткам, выстилающим внутренность комариного кишечника. Им оказался сульфат хондроитина, сложный углевод из группы мукополисахаридов. В его отсутствие споры так и остаются внутри пищеварительного тракта комара и не попадают в слюнные железы.

Конечно, экспериментаторы не могли заставить обычного анофелеса снизить выработку сульфата хондроитина. Однако они сконструировали генноинженерную версию этого насекомого, в организме которого был подавлен синтез фермента, участвующего в производстве этого сахара. Такие комары практически не могли служить переносчиками плазмодия, поскольку его споры лишь изредка прикреплялись к стенкам их кишечника. Не исключено, что открытие профессора МарселоДжейкобс-Лорена и его коллег поможет в борьбе с малярией.

Appendix 3

How to read chemical formulas and equations.

H^+- hydrogen ion / univalent positive hydrogen ion
Cu^{++}- divalent positive cuprum ion
Al^{++} - trivalent positive aluminium ion
Cl^- - negative chlorine ion / negative univalent chlorine ion
"**-**"/ "**:**" – нечитается
"**=**"/ "**::**" – нечитается
Знаки:
"+" – plus/ and/ together with
"=" – give/ form
"→" – give/ pass over to/ lead to
"↔" – forms/ is formed from

The list of chemical elements with transcription:

Ag	argentum	серебро
Al	aluminium	алюминий
Ar	argon	аргон
As	arsenic	мышьяк
Au	aurum	золото
B	boron	бор
Ba	barium	барий
Be	beryllium	бериллий
Bi	bismuth	висмут
Br	boromine	бром
C	carbon	углерод

Ca	calcium	кальций
Ce	cerium	церий
Cd	cadmium	кадмий
Cl	chlorine	хлор
Co	cobalt	кобальт
Cr	chromium	хром
Cs	caesium	цезий
Cu	copper	медь
F	fluorine	фтор
Fe	ferrum	железо
Ga	gallium	галлий
Ge	germanium	германий
H	hydrogen	водород
He	helium	гелий
Hg	hydrargyrum	ртуть
I	iodine	йод
Ir	iridium	иридий
K	kalium	калий
Li	lithium	литий
Mg	magnesium	магний
Mn	manganese	марганец
Mo	molybdenum	молибден
N	nitrogen	азот
Na	natrium	натрий
Ne	neon	неон
Ni	nickel	никель
O	oxygen	кислород
P	phosphorus	фосфор
Pb	plumbum	свинец
Pt	platnum	платина

Pu	plutonium	плутоний
Ra	radium	радий
Rb	rubidium	рубидий
S	sulphur	сера
Sb	antimony	сурьма
Sc	scandium	скандий
Se	selenium	селен
Si	silicone	кремний
Sn	stannum	олово
Sr	strotium	стронций
Te	tellurium	теллур
Th	thorium	торий
Ti	Titanium	титан
U	uranium	уран
W	wolfram	вольфрам
Zn	zinc	цинк
Zr	ziroconium	цирконий

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