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С.С. Тадевосян

Английский для медиков

Учебно-методическое пособие

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Учебно-методическое пособие включает основные и дополнительные тексты, а также лексико-грамматические упражнения и задания для развития письменной и устной речи. Текстовой материал содержит лексический минимум, специально отобранный с учетом принципа функциональной и профессиональной медицинской направленности. В пособии использованы современные оригинальные тексты из английских и американских журналов, в учебных целях они частично сокращены. Учебно-методическое пособие предназначено в помощь студентам медико-биологического, фармацевтического факультета и факультета биоинженерии Российско-Армянского государственного университета. Учебно-методическое пособие может быть использовано специалистами медицинского профиля, врачами, научными сотрудниками, аспирантами.

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CONTENT

Структура и содержание учебно-методического пособия

Настоящее учебно-методическое пособие «Английский для медиков» предназначено для студентов-медиков, желающих изучить английский язык. Пособие подготовлено по принципу практической направленности с учетом профессиональных потребностей будущих специалистов.

Основной задачей пособия является формирование у студентов-медиков умения использовать английский язык как средство профессионального общения и самообразования. Пособие предусматривает развитие у студентов навыков и умения чтения, общения на английском языке, в частности, на материале лексики и грамматических структур, типичных для медицинской литературы.

Лексико-грамматические материалы предполагают знание основных грамматических норм. Тематика текстового материала соответствует требованиям программы и отражает содержание профессиональной подготовки студента-медика. Тексты, как правило, заимствованы из оригинальной научной и научно-популярной литературы, в учебных целях они частично сокращены.

Цель учебного-методического пособия – обучить чтению и переводу английских специальных текстов, ведению беседы по различным сферам медицины. Оно состоит из тематического словаря после каждого урока, основного текста, грамматических, лексических упражнений, различных заданий для развития навыков перевода, пересказа и дискуссий для практического применения изученного материала. Дополнительные материалы представлены в разделах: **Supplementary Reading, Most Important Medical Discoveries,**

Facts about Human Brain, Food Preservation, On Diet, First Aid, Bioinformatics in Medical Research.

Данное пособие направлено на: а) коррекцию, систематизацию и совершенствование знаний, умений и навыков, полученных в средней школе – на материале профессионально-ориентированной лексики и базовых грамматических структур; б) выработку умений и навыков, необходимых для использования английского языка как средства получения информации по специальности и профессионального общения.

Текстовой материал учебника должен обеспечить постепенный переход к чтению специальной литературы.

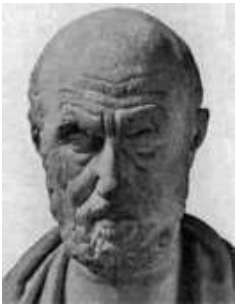
С целью повторения и усвоения грамматических конструкций (как правило, глагольных), специально отобраны наиболее частые в научном медицинском тексте грамматические явления. Материал составлен таким образом, чтобы его усвоение, закрепленное упражнениями, обеспечивало успешную информационную деятельность специалиста-медика.

Учебно-методическое пособие может быть использовано для самостоятельного обучения как специалистами медицинского профиля, врачами, так и научными сотрудниками, аспирантами.

От автора

The Hippocratic Oath
The full text from the "Harvard Classics" Translation.

Original, translated into English:



I swear by Apollo, the healer, Asclepius, Hygieia, and Panacea, and I take to witness all the gods, all the goddesses, to keep according to my ability and my judgment, the following Oath and agreement:

To consider dear to me, as my parents, him who taught me this art; to live in common with him and, if necessary, to share my goods with him; to look upon his children as my own brothers, to teach them this art.

I will prescribe regimens for the good of my patients according to my ability and my judgment and never do harm to anyone.

I will not give a lethal drug to anyone if I am asked, nor will I advise such a plan; and similarly I will not give a woman a pessary to cause an abortion.

But I will preserve the purity of my life and my arts.

I will not cut for stone, even for patients in whom the disease is manifest; I will leave this operation to be performed by practitioners, specialists in this art.

In every house where I come I will enter only for the good of my patients, keeping myself far from all intentional ill-doing and all seduction and especially from the pleasures of love with women or with men, be they free or slaves.

All that may come to my knowledge in the exercise of my profession or in daily commerce with men, which ought not to be spread abroad, I will keep secret and will never reveal. If I keep this oath faithfully, may I enjoy my life and practice my art, respected by all men and in all times; but if I swerve from it or violate it, may the reverse be my lot.

UNIT I

HEALTH

Happiness lies, first, in health.
George William Curtis

KEY VOCABULARY:

owe [əu] – 1. быть должным (кому-л.); 2. приписывать (успех, открытие); to owe a debt – быть должником, быть должным; owe fealty to friends – быть преданным своим друзьям; owe no thanks to – не иметь причин для благодарности; owe reverence and obedience to – быть обязанным почитать и повиноваться; owe a favour – считать необходимым ответить услугой за услугу.

unfit [ʌn'fɪt] – 1. негодный, неподходящий, непригодный; Syn: unsuitable, inappropriate; 2. неспособный, неумелый, некомпетентный; 3. больной, нездоровый, негодный, недееспособный; physically unfit – имеющий физические недостатки; unfit for military service – негодный к военной службе; mentally unfit – умственно отсталый; psychologically unfit – психически неуравновешенный.

indispensable [ɪndɪ'spensəbl] – 1. обязательный, не допускающий исключений (о правиле); 2. важный, необходимый; indispensable to life – жизненно необходимый.

impure [ɪm'pjuə] – 1. нечистый, запачканный, грязный; Syn: dirty, muddy; 2. смешанный, с примесью, неоднородный; Syn: mixed, compound; 3. грязный, непристойный, гнусный.

minute [maɪ'nju:t] – мелкий, мельчайший; to measure very minute changes of temperature – измерять малейшие изменения температуры; *w. comb.* – minute anatomy – Syn: infinitesimal, miniature, minuscule; Ant: large, massive, tremendous.
pore [pɔ:] – пора; mushrooms with pores – грибы с порами.
cell [sel] – 1. секция, отсек, камера, ячейка; Syn: pigeonhole; 2. клетка; *w. comb.* – blood cell, cancer cell, egg cell, germ cell.
coarse [kɔ:s] – 1. грубый; coarse thread – грубая, суровая нитка; Ant: fine; 2. шероховатый, грубый, невежливый; Syn: rough, unrefined.
mend [mend] – 1. починка; Syn: repair; 2. улучшение; to be on the mend – идти на поправку, улучшаться; Syn: repair, treat; 3. улучшаться, поправляться (о здоровье).
invigorate [ɪn'vɪg(ə)reɪt] – 1. давать силы, укреплять, вселять энергию; 2. воодушевлять, вдохновлять.
purify ['pjuərɪfaɪ] – очищать (от чего-л.).
swallow ['swɔləu] – 1. глоток; to drink smth. at one swallow – выпить что-л. одним глотком; Syn: draught, gulp; 2. глотание; Syn: deglutition; 3. глотка; Syn: gluttony; swallow down– глотать, проглатывать; to swallow nervously / hard – нервно сглотнуть; 4. swallow up – поглощать.
moderate ['mɔd(ə)rət] – умеренный.
wholesale ['həulseɪl] – полностью, целиком; Syn: complete.
intemperance [ɪn'temp(ə)r(ə)ns] – горячность, несдержанность, невоздержанность; злоупотребление спиртным; intemperance – пьянство; habitual intemperance, intemperance in drink – пристрастие к спиртным напиткам; невоздержанность; backslide into intemperance – снова запить.

stupefy ['stju:pıfaı] – притуплять, лишать чувствительности, приводить в оцепенение; Syn: benumb, deaden, поражать; Syn: stun, astound, amaze.
recreation [rıekrı'eıʃ(ə)n] – отдых, восстановление здоровья, душевных и физических сил; выздоровление; Syn: rest, relaxation.
abstain [əb'steın] – воздерживаться; Syn: forbear, refrain.
vessel ['ves(ə)l] – сосуд (для жидкости); communicating vessels – сообщающиеся сосуды
lung [lʌŋ] – лёгкое; the lungs – лёгкие.

Ex. I. Read the text, translate it paying attention to the key vocabulary:

THE LAWS OF HEALTH

One of the first duties we **owe** to ourselves is to keep our bodies in perfect health. If our body suffers from any disorder, our mind suffers with it, and we are unable to make much progress in knowledge, and we are **unfit** to perform those duties which are required of us in social life.

There are certain laws of health which deserve particular attention and they are so simple that even a child can learn them. A constant supply of pure fresh air is **indispensable** to good health. To secure this, nothing **impure** should remain either within or near our homes, and every room in the house especially the bedrooms, should be properly cleaned and ventilated every day.

Perfect cleanliness is also essential. The whole body should be washed as often as possible. The skin is full of **minute pores, cells**, blood **vessels** and nerves. It “breathes” the way the lungs do. Therefore, it should always be clean.

Besides its importance to health, there is a great charm in cleanliness. We like to look at one who is tidy and clean. If the skin is kept clean, the teeth thoroughly brushed, the hair neatly combed, and the finger-nails in order, we feel pleased with the person, even though his (her) clothes may be **coarse** and much **mended.**

A certain amount of exercise is necessary to keep the body in perfect condition. All the powers (mental and bodily) we possess are strengthened by use and weakened by disuse. Therefore, labor and study should succeed each other. The best way of getting exercise is to engage in some work that is useful and at the same time interesting to the mind. It is most essential for the old and the young to do morning exercises with the windows wide open in your room or, if possible, in the open air.

Remember that exercises warm, **invigorate** and **purify** the body. Rest is also necessary to the health of both body and mind. The best time for sleep is during the darkness and stillness of the night.

Late hours are very harmful to the health as they exhaust the nervous system. We should go to bed early. It is a good rule “to rise with the lark and go to bed with the lark”.

Most essential to our body is food. Our body is continually wasting, and requires to be repaired by fresh substance. Therefore food, which is to repair the loss, should be taken with due regard to the exercise and waste of the body. Be **moderate** in eating. If you eat slowly, you will not overeat. Never **swallow** your food **wholesale** – you are provided with teeth for the purpose of chewing your food - and you will never complain of indigestion. We should **abstain** from everything that intoxicates.

The evils of intemperance, especially of alcohol, are too well known.

Intemperance excites bad passions and leads to quarrels and crimes. Alcohol costs a lot of money, which might be used for better purposes. The mind is **stupefied** by drink and the person who drinks will, in course of time, become unfit for his duties. Both health and character are often ruined.

Thus we must remember that moderation in eating and drinking, reasonable hours of labour and study, regularity in exercise, **recreation** and rest, cleanliness and many other essentials lay the foundations for good health and long life.

Ex. II. Read the text again and speak on the following issues:

1. The necessity to keep the body in perfect condition.
2. The effect of food to our body.
3. Intemperance and its consequences.
4. The importance of cleanliness of the body.

Ex. III. Find in the text above the English equivalents for the following:

Отдых; поражать; быть должником, быть должным; нервно сглотнуть; очищать; задолжать кому-л. за (что-л.); пристрастие к спиртным напиткам; идти на поправку; укреплять; грубая нитка; клетка; невоздержанность; жизненно необходимый; иметь трёхмесячную задолженность по квартплате; измерять малейшие изменения температуры; считать необходимым ответить услугой за услугу; несдержанность в выражениях; психически неуравновешенный; нечистый; выпить что-л. одним глотком; притуплять; обаяние; сосуд;

быть преданным своим друзьям; лёгкие; трезвенник; достичь успеха благодаря благоприятной ситуации; привычное пьянство.

Ex. IV. Match the following definitions with the terms:

1. excite	a) extremely small.
2. moderate	b) (of a thing) not of the necessary quality or standard to meet a particular purpose.
3. minute	c) cause (someone) to feel very enthusiastic and eager.
4. impure	d) average in amount, intensity, quality, or degree.
5. unfit	e) mixed with foreign matter; adulterated.
6. indispensable	f) excess in action and immoderate indulgence of bodily appetites, especially in passion or indulgence.
7. intemperance	g) absolutely necessary; vitally necessary.
8. swallow	h) a person who refrains from drinking intoxicating beverages.
9. abstain	i) vessel.
10. vessel	j) to move your throat in order to make food or drink go down.
11. praise	k) to express strong approval or admiration for someone or something, especially in public.
12. osmosis	l) spontaneous net movement of solvent molecules through a selectively permeable membrane into a region of higher solute concentration, in the direction that tends to equalize the solute concentrations on the two sides.

Ex. V. Fill in the gaps with prepositions:

1. I haven't heard anything ……. his being sent ……. a sanatorium. 2. His failing to follow the doctor's advice resulted ……. a relapse. 3. What do you think ……. transferring him ……. another ward? 4. Do you object ……. my making an incision and insert a drainage tube? 5. Doctors are successfully working ……. methods ……. treating glaucoma …..... means ……. lasers. 6. The term "chemotherapy" was first applied ……. the treatment ……. infectious diseases. 7. Inquiry and observation furnish the data ……. diagnosis. 8. She took the drug ……. a long time which resulted ……. harmful side-effects. 9. The symptoms ……. oxygen deficiency are panting, palpitation, dizziness. 10. Alcohol costs a lot ……. money, which might be used …… better purposes.

Ex. VI. Use the required tenses instead of the infinitives in brackets:

1. The students _____ (be) usually taught by Mrs. Monty. However, this week they _____ (teach) taught by Mr. Tanzer.
2. He _____ (not speak) to the Headmaster yet.
3. The situation _____ (become) more serious in recent years.
4. When _____ you (see) him last?
5. She's my best friend. – "How long _____ you (know) her?"
6. He _____ (come) here three years ago
7. I _____ never (be) to Malaysia.
8. I _____ (meet) them when they _____ (be) in Singapore last year.

9. Hi! I _____ (not see) you for ages.
10. My friend _____ (just, arrive) from England.
11. I _____ (start) studying Chinese three years ago.
12. When we _____ (arrive), dinner _____ already (begin).
13. My friend _____ (not see) me for many years when I _____ (meet) him last week.
14. He _____ already (learn) English before he _____ (leave) for Australia.
15. I _____ (be) surprised that he _____ (not contact) me sooner.
16. He _____ (ask) me if I _____ (find) the way easily.
17. The river _____ (become) deeper after it _____ (rain)heavily.
18. I _____ not yet (do) half of the work when he _____ (come) in.
19. When he _____ (be) young, he _____ (like) collecting stamps.
20. After I (have) _____ some dry biscuits, I _____ (have)a drink.
21. I _____ (see) him the moment he _____ (enter).

Ex. VII. Match the halves of the sentences:

1. Many processes designed to preserve food involve	a) can kill any existing microbes.
2.Salt accelerates the drying	b) it would immediately blow up into a world war.

3. Boiling liquid food items	c) he cannot succeed.
4. Mary lowered her eyes so that he should not see	d) process using osmosis.
5.Should a conflict ever flare up in Europe,	e) more than one food preservation method.
6.He spoke so clearly that	f) it would still not excuse their actions.
7. Though he should make every effort,	g) I would not have known how to address her.
8.Were it all true,	h) the effect might very well be disastrous.
9. Had she not worn an apron,	i) we could understand every word.
10. If the facts leaked out,	j) the faint dream of amusement in them.

Ex. VIII. Translate the sentences into English using the active vocabulary of the text:

1. Одна и та же грубая одежда служила им и зимой, и летом.
2. В этом районе всю воду очистили от нежелательных химикатов.
3. Я глотнул бренди.
4. Очень трудно принимать противные на вкус лекарства.
5. Мэр Диксон высоко оценил усилия тех, кто участвовал в спасении.
6. На верфи было огромное судно.
7. Неужели Вы ему так много должны?
8. Он должен мне пять долларов.
9. Я должен тебе выпивку.
10. Я должен банку много денег.
11. Всем этим я обязан вам.

12. Я вам чрезвычайно благодарен.
13. Он был обязан своим состоянием отцу.
14. Я задолжал своему брату пятьдесят долларов.
15. Не возвратился ли я к невоздержанности и безрассудству?

Ex. IX. Fill in the gaps with the words given below:

Learning and Forgetting Languages

A study by Benjamin Levy, psychologist at the University of Oregon and his colleague Dr. Michael Anderson …….. in Psychological Science has found that people who forget …….. in their native tongue while …… a new language may be demonstrating an adaptive strategy to the learning …… . Researchers suggest that the ……, known as first-language ……, does not reflect lack of use, but active …… of familiar native language words that may act as distractions.

Participants who had completed one year or more of Spanish at college ……, but whose first language was English were asked to …… name objects in Spanish. The more they did so, the harder they found it to give the English equivalent. …… suggest that naming objects in another language has an …… effect, making it more difficult to retrieve …… terms in the …… tongue. Fluent bilingual participants were far less likely to demonstrate these …… .

Researchers suggest that suppression of …… to facilitate learning may seem counterintuitive. However, they argue that it is crucial in the early stages of learning a new language when students have to actively ignore …… native language words to progress. This becomes less necessary as fluency increases.

(native, tackling, published, phenomenon, corresponding, knowledge, inhibitory, repeatedly, inhibition, level, words, process, attrition, researchers, familiar, effects, facilitate)

Ex. X. Read the information and speak on your own acquisition of English as a second language:

International adoption sheds light on language learning.

"First-language attrition provides a striking example of how it can be adaptive to (at least temporarily) forget things one has learned."

Research by Jesse Snedeker of Harvard University and his colleagues published in *Psychological Science* has found that milestones of language development are not simply a function of cognitive development but a consequence of the learning process itself. The study found that older trans-nationally adopted children who rapidly lose their original language and become fluent in that of their adoptive family go through similar stages to those experienced in infants learning their first language.

Researchers explain that infants initially say one word at a time, mostly using nouns (especially names for things that can be presented visually) or social words. As they grow, sentences become longer and more complex, with the introduction of verbs and other forms of grammar.

In the current study, researchers monitored the acquisition of English as a second language in children adopted from China between the ages of two and six years during their first 12 months in the US. They found that they replicated the stages of language development in infants, initially learning many nouns but few verbs or grammatical words. Similarly, they expressed single words at first, then very short sentences. However, the

adopted children progressed through these milestones more rapidly than infants, suggesting that many will eventually catch up with their peers.

Ex. XI. Comment on the proverbs about health:

1. “When the head aches, all the body is the worse.” – English Proverb.
2. “Joyfulness is half your health.” – Czech Proverb.
3. “The beginning of health is sleep.” – Irish Proverb.
4. “Good health is the sister of beauty.” – Maltese Proverb.
5. “A healthy man is a successful man.” – English Proverb.
6. “If you want to live long, be healthy and fat, drink like a dog and eat like a cat.” – German Proverb.
7. “Work is half of health.” – Swedish Proverb
8. “Eat well, drink in moderation, and sleep sound, in these three good health abound.” – Latin Proverb.

Ex. XII. Do an independent essay writing on the topics:

1. When I first got ill.
2. My last visit to the doctor.

UNIT II

OPERATION

No pain; no gain.
English proverb

KEY VOCABULARY:

hinge [hɪndʒ] – петля (например, дверная); стержень.
saw-horse – пильные козлы.
scarcely ['skɛəslɪ] – едва, почти не; scarcely ever – почти никогда.
stiff [stɪf] – жёсткий, тугой, негибкий, неэластичный; stiff muscles – неэластичные мышцы; Syn: rigid – плотный; переполненный, битком набитый.
squeezing – сжатие; сдавливание.
outlandish [aut'lændɪʃ] – странный; нелепый; Syn: bizarre, strange, odd.
fad [fæd] – 1. прихоть; 2. причуда; фантазия; 3. преходящее увлечение; latest fad – последняя мода; this is a passing fad – это преходящее /кратковременное/ увлечение.
realm [relm] – сфера, область; Syn: sphere, field realm.
messy ['mesɪ] – 1. грязный, запачканный; Syn: dirty, muddy; 2. аморальный, безнравственный; 3. беспорядочный; Syn: disorderly, confused messy.
fastidious [fæs'tɪdɪəs] – 1. привередливый; 2. разборчивый; 3. брезгливый.

loose [lu:s] – 1. свободный; to let loose – выпускать; to get loose – сбежать; 2. несвязанный; неупакованный; Syn: unbound, untied, unfastened, free, unfettered, unattached, unconnected; 3. буйный, неукротимый.
boil [bɔıl] – 1. кипятить; 2. кипеть.
clip [klıp] – 1. скрепка, зажим, зажимные клещи; 2. зажимная скоба; Syn: fastener; 2. зажимать, сжимать; крепко схватить; Syn: clutch; 3. скреплять (скрепками).
garment ['gɑ:mənt] – предмет одежды, одежда, одеяние.
soiling ['sɔılıŋ] – загрязнение, грязь, порча; Syn: contamination, defilement, pollution, impurity.
spot [spɔt] – 1. увидеть, заметить, узнать; 2. определить; to spot the symptoms of a disease –заметить симптомы болезни; to spot the reason of the trouble – определить причину неполадок.

Ex. I. Read the text, translate it paying attention to the key vocabulary:

Operation a Hundred Years Ago

Obviously Dr. Mayo did not operate in a well ordered world of men in white. His was “kitchen surgery”. The theatre was usually the patient's home, the operating-table one from the kitchen or the parlour sofa, or even a door taken off its **hinges** and laid across two **saw-horses**. The room was seldom large enough and Dr. Mayo often refused to permit the presence of anyone but those who were helping him.

Modern men accustomed to strict asepsis in operative routine and surroundings can **scarcely** credit the stories of pre-antiseptic methods, stories of men who operated in whatever shirt or coat, they happened to be wearing, covering it perhaps with a

linen duster or an apron **stiff** with the stains of previous operations; who stropped their knives on the soles of their shoes before they began and while using one knife held another ready between their teeth; who economized on water that had to be carried in from the well by **squeezing** the blood from the sponge instead of washing it out; who washed their hands after and not before the operation.

Word of the work of Pasteur and Lister was getting around by 1880 but more as the story of an **outlandish fad** than as a report of scientific truth. Microbes still belonged to the **realm** of fantasy, and the concept of cleanliness was still beyond the comprehension of most men.

As for cleanliness of instruments, sponges, towels – well, wasn't it rather silly when the operation itself was so **messy**. Little is known specially of Dr. Mayo's methods. Being **fastidious** in dress and person he may have kept his few instruments fairly clean, free at least of dried blood between operations, but they were certainly not sterile. Some of them he carried in a little case or` even **loose** in his vest pocket where he could reach them easily to lance a **boil** or **clip** the ragged edges of a minor wound.

He may have removed his long black coat for the task to allow himself greater freedom of movement or to save the **garment** from **soiling.** But perhaps he shared that peculiar sense of value which made it a matter of pride for the surgeons to perform an amputation without **spotting** the whiteness of shirt cuff or front. It is said that Henry J. Bigelow of Boston, one of the nation's ablest surgeons at that time always operated in a well-valeted dark blue coat with a rose in the buttonhole.

Ex. II. Read the text again and describe:

1. “kitchen surgery.”
2. pre-anti-septic methods of operation.
3. Dr. Mayo and his method of work.

Ex. III. Find in the text above the English equivalents for the following phrases:

Преходящее увлечение; зажимная скоба; почти никогда; загрязнение; заметить симптомы болезни; свободный; сжимать; сфера; снять боль; неэластичные мышцы; кипятить; странный; брезгливый; стержень; одежда; сдавливание; запачканный; увидеть, заметить; определить причину неполадок; определить.

Ex. IV. Fill in the gaps with prepositions:

1. The patient has been told to strip ..... the waist. 2. The thermometer was inserted ……. the armpit. 3. The doctor asked the patient to lie ..... ……... the couch ..... taking the mixture ……. his cough. 4. Tell him to wash ..... all the dirty vessels ……. the lab. 5. Rinse your mouth ..... an antiseptic mouthwash. 6. The sick man was taken ..... the X-ray room. 7. You have to carry ..... the doctor’s orders. 8. I’ll rely ..... your findings. 9. We often refer ..... her work. 10. Tell him to fill ……. in the case-reports. 11. The laboratory animals were taken care ..... .

Ex. V. Make up dialogues using the text below:

You have had a bad fall and injured your head. You go to the surgeon at the first- aid station and tell him about your accident. The doctor on duty examines you and tells you about his findings. There is no outward wound or injury. He detects some

bruises. He asks you about some symptoms. He is interested whether you have had any nausea, whether you lost consciousness, whether you felt dizzy or had buzzing in the ears. You tell him about your symptoms. He makes a diagnosis and tells you what to do.

Ex. VI. Match the following definitions with the terms:

1. bruise	a) a feeling of sickness with an inclination to vomit.
2. wound	b) an injury appearing as an area of discolored skin on the body, caused by a blow or impact rupturing underlying blood vessels.
3. nausea	c) very attentive to and concerned about accuracy and detail.
4. consciousness	d) an injury to living tissue caused by a cut, blow, or other impact, typically one in which the skin is cut or broken.
5. fastidious	e) the state of being aware of and responsive to one's surroundings.
6. scarcely	f) not compact or dense in structure or arrangement.
7. loose	g) only a very short time before.
8. realm	h) to see or notice something or someone, especially suddenly.
9. spot	i) a domain in which something is dominant.
10. stiff	j) not easy to move.

Revise your Grammar:

If Clauses: Type I – Form

In the **if clause** of a Conditional Sentence Type I, we use ***Present Simple*** .

In the **main clause** of a Conditional Sentence Type I, we **use Future Simple**

Ex. VII. Complete the Conditional Sentences Type I:

a) using the verbs in brackets

1. If you (eat) an ice-cream, I (have) a hot chocolate.
2. If she (need) a computer, her brother (give) her his computer.
3. If we (have / not) time this afternoon, we (meet) tomorrow.
4. He (talk) to her if you (want / not) to do it.

5. You (win / not) [ ] the game if you (know / not) [ ] the rules.

b) using the verbs of your own:

1. If we [ ] to London, we [ ] the Tower.
2. If the shop [ ] open, I [ ] a souvenir.
3. If she [ ] the bus, she [ ] here on time.
4. He [ ] me if he [ ] the answer.
5. Jane [ ] you in if I [ ] here.

Ex. VIII. Choose the right option for the following conditional sentences:

1. What ….. if they ..… to your party?

- (•) a) will you think, don't come.
- ( ) b) do you think, don't come.
- ( ) c) will you think, won't come.
- ( ) d) do you think, won't come.

2. Mary ….. very happy if she ….. her exam.

- a) will be, will pass.
- b) is, pass.
- c) will be, passes.
- d) is, will pass.

3. When ….. tonight?

- a) do you come.
- b) you come.
- c) will you come.
- d) you will come.

4. Please, phone me when you ….. something from them.

- a) hear.
- b) heard.
- c) will hear.
- d) are hearing.

5. If you ..… it again, I ..… very angry!

- a) will do, will be.
- b) will do, am.

c) do, will be.

d) do, am.

6. You can do it when you ..… time.

a) will have.

b) have.

c) had.

d) has.

7. I don't know what ….. if you ..… this information.

a) happens, forget.

b) happens, will forget.

c) will happen, will forget.

d) will happen, forget.

8. If you …... ice in a warm place it ..… into water.

a) will put, will turn.

b) put, turns.

c) will put, turns.

d) put, turn.

9. She ..… the washing when the child ….. asleep.

- a) will do, will be.
- b) do, is.
- c) do, will be.
- d) will do, is.

10. When ….. ?

- a) will the concert begin.
- b) the concert will begin.
- c) does the concert begin.
- d) the concert begins.

Ex. IX. Translate the sentences into English using the active vocabulary of the text:

1. Есть почти нечего.
2. Я его почти не знаю.
3. Будучи далеко не привередливым, он всё же отказался от такой еды.
4. Вода кипит уже десять минут.
5. Обычно считается, что сырое мясо усваивается хуже, чем варёное или жареное.
6. Жёсткий шарнир.
7. Ручка на этой двери довольно жёсткая.
8. Они едва поели, когда раздался звонок в дверь.
9. Если вы заметили какие-либо ошибки в статье, просто отметьте их карандашом.

10. Они несут ответственность за защиту королевства.
11. Охранник едва скрылся из виду, когда он услышал высокий крик позади него.
12. Подъём царства хлопка на юге.
13. Можете ли вы определить разницу между этими двумя картинками?
14. Он всегда следует последним веяниям моды.
15. Интерес к органической пище – не сиюминутная прихоть, он задержится надолго.
16. Она всегда интересуется последней модой.
17. Как только мода на такую музыку прошла, больше вообще никто не хотел её слушать.

Ex. X. Read the following passage and answer the questions:

A person whose health is good is a healthy person. A healthy person is usually well or fit. A person who is not well is ill. One who often falls ill is a sickly person. A sickly person suffers from various diseases.

A person who is not well may consult a doctor at the outpatient department. If he is too ill to go and see a doctor himself at the policlinic, he may send for one. There are various specialists working at the policlinic, such as therapeutists, surgeons, oculists, ear nose and throat specialists and dentists.

A person who is not quite well consults a physician for various complaints. He may complain of weakness, fever, temperature and all kinds of pains and aches. The pain may be mild or slight and bad or severe. If a person has caught a cold, he is running a temperature and complains of a headache, sore throat, cold in the head, chills and cough. A person who suffers from indigestion complains of lack of appetite, nausea, diarrhea, constipation

and vomiting. A person who has some kind of heart trouble may complain of shortness of breath. A surgeon is usually consulted for a wound, an injury, or when a person has hurt himself. An oculist is consulted for eye diseases, an otolaryngologist for ear, nose and throat diseases. A person who suffers from toothache goes and sees a dentist.

1. Who does a sick person consult?
2. What are the usual complaints of an outpatient?
3. Whom do you usually consult for …

a) a broken leg?
b) a sore throat?
c) indigestion?
d) if your eyes need attention?
e) an attack of appendicitis?
f) heart problem?
g) bad cold?
h) if your child falls ill?
i) a bad toothache?
j) an earache?

Ex. XI. Read the story and retell it:

Florence Nightingale

The story goes back to the middle of the 19th century. England was at war with Russia, and the English army was fighting in the Crimea. William Russel, "The Times" reporter, described the terrible conditions in the hospitals where wounded men were being treated. The chief hospital, the one at Scutari in Turkey, was

an old barrack. It was overcrowded. There were hardly any beds, and men were dying in thousands, not for their wounds so much as of sickness. The only nurses were old soldiers long past fighting age, who knew nothing of nursing and were quite unable to do the work.

Sidney Herbert, the Minister of War, wrote to Florence Nightingale asking if she would go out to the Crimea with a band of nurses. Within a week she was ready to sail for Scutari.

In those days nursing was done only by women of the lowest moral class, dirty, drunken creatures such as Dickens had drawn in his picture of Mrs. Gamp in "Martin Chuzzlewit."

The Nightingales moved in the highest society. Cabinet Ministers were frequent visitors to their house. Their daughter Florence (she was called so because she was born in the city of Florence in 1820) was highly educated in music, art, literature, Latin and Greek. She spoke Italian, French, German with ease, was attractive, and was expected to marry one of the numerous admirers who came to the Nightingales' home. But ever since she was a child she had nursed the sick dogs and cats and horses round her home and had a passion to be a nurse. Her parents were horrified and did all they could to prevent it, but Florence was not to be turned aside. She spent some weeks as a sister in a hospital in Paris and 3 months in a nursing school at Kaiserwerth in Germany.

When she arrived at Scutari, she found that everything was lacking: furniture, clothes, towels, soap, knives, plates. There were no bandages, few medicines and scarcely any proper food. She bought boots, socks, shirts by the thousand.

She spared no one, least of all herself. She often worked for 24 hours, dressing wounds, helping surgeons in their operations,

easing the pain of the sick. Every night, carrying a little oil-lamp to light her way, she walked by the beds. To the soldiers she was the "Lady with the Lamp".

She was also a hard and practical woman. She and her nurses got down to their knees and scrubbed floors and walls. She organized the cooking of the men's food and the washing of their clothes.

In 1855 she was made Inspector of all hospitals in the Crimea. It meant long, uncomfortable journey in snow and rain and cold. She took fever but continued her work from her bed. She refused to go home until the last soldier went. It was not until after peace was declared in 1856 that she returned home, an invalid for life. She changed the whole system of hospital organization in the army. She wrote books on nursing. Foreign governments consulted her on the health services for their countries, and in 1907 she was given the Order of Merit, the highest civil honour the Government can give and the first ever given to a woman.

Three years later, a very old, tired woman of 90, died quietly in her sleep.

Ex. XII. Do an independent essay writing on the topics:

1. Two things prolong your life: a quiet heart and a loving wife.
2. It isn't over till it's over / Do not anticipate the end of something; specifically, do not give up hope until you have actually lost or failed" /.
3. Well begun is half done. / Starting properly ensures the speedy completion of a process. One or more obstacles (potential barriers) the removal of which may ensure the smooth course of the process often block a beginning /.

UNIT III

HUMAN BODY

"Take care of your body.
It's the only place you have to live."
Jim Rohn

KEY VOCABULARY:

trunk [trʌŋk] – туловище, тело (человека или животного).
windpipe ['wɪn(d)paɪp] – дыхательное горло.
gullet ['gʌlɪt] – 1. пищевод; Syn: esophagus; 2. глотка – throat.
chest [ʧest] – грудная клетка; chest pain – боль в грудной клетке; weak chest – слабые лёгкие; chest trouble – хроническая болезнь лёгких; to beat the chest – бить себя кулаком в грудь.
belly (potbelly) ['belɪ] – 1. живот, брюхо, пузо; Syn: abdomen, paunch; 2. желудок; Syn: stomach; 3. матка; Syn: womb, uterus; 4. чрево, утроба; 5. внутренности; Syn: interior, paunch, tummy, abdomen, venter.
cavity ['kævətɪ] – полость, дупло (в зубе); abdominal cavity – брюшная полость; oral / mouth cavity – полость рта, ротовая полость; to fill a cavity (in a tooth) – запломбировать зуб; chest cavity – грудина.
gall bladder – жёлчный пузырь.
urinary ['juərɪn(ə)rɪ] – мочевой; Syn: uric.
excrete [eks'kri:t] – 1. выделять, извергать; Syn: disgorge, throw out; 2. выводить шлаки из организма.
intestine [ɪn'testɪn] – (обычно) кишечник, кишки; *w. comb.* – small intestine – large intestine; Syn: bowels.

alimentary [ælı'ment(ə)rı] – 1. пищевой; Syn: food; 2. питательный; связанный с питанием; alimentary therapeutics – диетотерапия; 3. пищеварительный.
bladder ['blædə] – пузырь; мочевой пузырь; полость.
digestion [daı'ʤesʧ(ə)n] – пищеварение, переваривание пищи; усвоение пищи; easy of digestion – легко усваиваемый; hard of digestion – трудно усваиваемый.
girdle ['gɜ:dl] – пояс, ремень; Syn: belt, sash.
joint [ʤɔınt] – сочленение, сустав; *w. comb.* – elbow joint - hip joint – knee joint – shoulder joint – pain in joints – dislocate a joint – set the joint – put a bone into joint again; Syn: articulation
extremity [ık'stremətı], [ek'stremətı] – 1. конец, край; 2. конечность; the lower extremities – нижние конечности, the upper extremities – верхние конечности; Syn: limb.
patella [pə'telə] – коленная чашечка.
heel [hi:l] – пятка, пята (часть ноги); Syn: spur, hallux.
sole I [səul] – 1. подошва; ступня; 2. след ступни, подошвы.
instep ['ınstep] – подъём ноги; *w. comb.* – instep supporter – instep raiser.
toe [təu] – палец ноги; big toe – большой палец (ноги); little toe – мизинец (ноги); to curl one's toes – поджимать пальцы на ногах; toe in the door – удачная для старта позиция; toe to toe – лицом к лицу; один на один; from top to toe – с головы до пят; сверху донизу.

Ex. I. Read the text, translate it paying attention to the key vocabulary:

The Head

The head is connected with the **trunk** by the neck. The **windpipe (trachea)** and the **gullet** (esophagus) pass through the neck.

The trunk consists of the **chest**, the belly (abdomen) and the back. In the trunk, there are large cavities. The upper **cavity,** the thorax is above the diaphragm. It contains the heart and **lungs**. In the lower cavity below the diaphragm – in the abdomen – there are the stomach, the liver, the **gall-bladder**, the kidneys, the **urinary** bladder and the intestines or bowels.

The lungs belong to the respiratory system. We breathe with our lungs. The kidneys and the **bladder** are parts of the urinary system. They **excrete** waste products. The heart, the arteries, the capillaries and the veins constitute the cardiovascular system. The mouth, the gullet, the stomach and the intestines form the **alimentary** canal. The juices of many glands further the process of the **digestion** of our food.

We have four limbs: two arms and two legs. The arms with the shoulder girdle are the upper **extremities.** The pelvic **girdle** and the two legs form the lower extremities. The upper extremity is divided into the shoulder, the upper arm, the forearm and the hand. Between the upper arm and the forearm there is the elbow. The **joint** between the forearm and the hand is called the wrist. Each hand has four fingers and one thumb. At the tips of the fingers there are the fingernails. The parts of the lower **extremity** are the thigh, the lower leg and the foot. The back of the lower leg is called the calf. Between thigh and lower leg there is the knee-joint, which is protected by the **patella** or kneecap. The joints between the lower legs and the feet are the ankles. The foot consists of the **heel**, the **sole**, the ball of the foot, the **instep** and the **toes.**

Ex. II. Read the text again and answer the following questions:

1. Which are the main parts of the human body?

2. What is the function of the respiratory system?
3. What are the two extremities?
4. What constitutes the cardiovascular system?
5. What does the foot consist of?

Ex. III. Find in the text above the English equivalents for the following:

Пищевод; коленная чашечка; с головы до пят; сверху донизу; утроба; пищеварительный; полость; легко усваиваемый; нижние конечности; сустав; пята; верхние конечности; диетотерапия; удачная для старта позиция; кишки; жёлчный пузырь; боль в грудной клетке; хроническая болезнь лёгких; дыхательное горло; туловище; пояс; брюшная полость; хроническая болезнь лёгких; выводить шлаки из организма; мочевой; мочевой пузырь; лицом к лицу; один на один.

Ex. IV. Match the following definitions with the terms:

1. cavity	a) when your body changes food in your stomach into substances that it can use.
2. digestion	b) of or providing nourishment.
3. chest	c) the part of the alimentary canal between the stomach and the anus.
4. alimentary	d) (anatomy) a natural hollow or sinus within the body.
5. intestine	e) the bottom of a shoe or boot; the back part of a shoe or boot that touches the ground and provides elevation. The back part of the human foot.
6. heel	f) the front part of the human body between one's chest and one's legs.
7. gullet	g) a place in your body where two bones meet.

8. toe	h) the front part of your body, between your neck and your waist, containing your heart and your lungs.
9. joint	i) the passage between the pharynx and the stomach.
10. belly	j) one of the five separate parts at the end of your foot.

Ex. V. Translate the sentences into English using the active vocabulary of the text:

1. Оказывается, Ник попадает в детский госпиталь со вздутым животом, как у голодающего.
2. Световые органы на брюхе сверкают, плавники светятся.
3. Чем розовее брюшко, тем лучше система.
4. Он уснул с полным животом и счастливо.
5. Она скрестила руки на груди.
6. Эти таблетки помогут Вам снять спазмы пищевода и вернуться к нормальному питанию.
7. Гладкие клетки составляют желудок, кишечник, кровеносные сосуды и другие органы.
8. Обычно считается, что сырое мясо усваивается хуже, чем варёное или жареное.
9. Стоматолог запломбировал мне две полости (каверны), «дупла» в зубе.
10. У меня нет кариеса (т.е. дырок в зубах).
11. Разместите приправы внутри брюшной полости рыбы.
12. Амфорическое дыхание указывает на наличие в лёгких полости.
13. Задник моего ботинка трётся о пятку и натирает мне волдырь.

14. Основанием ладони крепко прижмите тесто, придавая ему форму.
15. Подошвы его ног были покрыты грязью.

Ex. VI. Fill in the gaps with prepositions:

1. Many scientists have accumulated extensive experience ……. how ……. perform kidney transplant. 2. Ball valves are successfully used when disorders …….. the heart and aorta are treated. 3. The optimal conditions …….. the conservation ……. graft tissues are hypothermia (-70˚C). 4. Is the transplantation ……. a heart, kidney or liver the only way ..... how ……. treat worn ... or injured organs? 5. The work ……. obtaining and studying new vitamin preparations is carried ……. ..... the vitamin laboratory ..... the Institute …….. Biochemistry. 6. He was not aware ..... his being watched ……. some students? 7. The effectiveness ..... laser……. operations ..... heavily bleeding organs is already common knowledge. 8. Diagnosis calls ..... a knowledge ..... phenomena ..... health and disease. 9. Treating bone fractures ..... ultrasound welding is not a new method. 10. The heart operation passed normally, but the general serious conditions ..... the patient ..... surgery had caused progressive weakening ..... the heart.

Revise your Grammar: Modal verbs

Can, could, must, ought to	**express**	**permission, obligation**
Have to, have got to	**express**	**obligation**
Need	**expresses**	**necessity**
To be able to, to be allowed to	**express**	**possibility, permission**

Ex. VII. Choose the correct modal verb:

1. I understand it very well. You ..… explain further.
   A. needn't
   B. shouldn't
   C. wouldn't
   D. ? mustn't
2. ..… you wait a moment, please?
   A. should
   B. can
   C. need
   D. must
3. The situation was bad but it ….. worse.
   A. should be
   B. would have been
   C. could have been
   D. could
4. My grandfather ..… speak six languages many years ago.
   A. need
   B. could
   C. should
   D. shall
5. ..… you help me carry this downstairs?
   A. could
   B. must
   C. should
   D. may
6. The phone is ringing. It ….. be Jack.
   A. could
   B. must
   C. would

D. can

7. You ….. have left your purse in the shop.
   A. shall
   B. could
   C. should
   D. ought to
8. Jim gave me a letter to post. I ….. remember to post it.
   A. can
   B. may
   C. must
   D. needn't
9. I'll ….. go now. My friends are waiting.
   A. need
   B. have to
   C. must
   D. be able to
10. I recommend you to apologize. You .…. apologize.
   A. should
   B. would
   C. must
   D. shall
11. He must ….. to Saint-Petersburg before.
   A. been
   B. has been
   C. be
   D. have been
12. Where is Nick? He .…. be in his office.
   A. should
   B. might
   C. would

D. ought to

13. Jane was
    A. could
    B. have
    C. must
    D. should
14. You look tired. You ….. go to bed.
    A. must
    B. should
    C. would
    D. could

Ex. VIII. Make up a situation using the words given below:

A middle aged man; to suffer in a car crash; injure; face rated wound; dislocated knee; two fractured ribs; to call an ambulance; to take to the emergency hospital; first-aid station; to examine; to suture; to repair; to dress wound; to bandage the chest; to end in a surgical ward; in a few weeks; to recover.

Ex. IX. Read the following passages and retell them:

The Skeleton

The skeleton consists of bones and constitutes the framework which sustains the softer parts of the human organism. The backbone or the spine serves to support the body. It consists of thirty-three to thirty-four vertebrae. In man there are seven cervical, twelve thoracic and five lumbar vertebrae. Besides there are false vertebrae consisting of five sacral, four or five coccygeal or caudal vertebrae. The sacrum forms the basis of the vertebral column.

The Trunk

The skeleton of the trunk consists of the spinal column made of a series of specially shaped bony rings called the vertebrae to which are attached the skull; the thoracic cage and the pelvic bones. The bones of the lower extremities articulate with the latter. Those of the upper extremities extend from the shoulder girdle (collar-bones or clavicles; scapulae or shoulder-blades) which in turn attaches to the thoracic cage. The spinal column (spine, vertebral column, backbone) consists of separate bones. Through the centre of this column runs a canal which contains the spinal cord. The vertebrae form an elastic pillar which supports the trunk and the skull. The thoracic cage is formed by the vertebrae behind, by the sternum (breast-bone) in front, and by 12 pairs of ribs curving around them.

The trunk is divided into two large cavities by the diaphragm. The chest (thorax) is the upper of these cavities, the belly (abdomen) – the lower.

Inside the chest we find the lungs and the heart. The organs of the abdominal cavity are the stomach, the liver, the gallbladder, the urinary bladder, the kidneys, the spleen and the bowels or intestines.

The Upper Limbs

The upper extremity is divided into the shoulder, the upper arm, the forearm and the hand. The elbow is the joint between the upper arm and forearm. The joint between the forearm and hand is called the wrist. Each hand has four fingers and one thumb. The parts of the fingers are the finger-tips and the fingernails. The sense of touch is particularly fine in the finger-tips. Of

the parts of the hand, let us mention the back and the palm of the hand and the ball of the thumb.

The Abdomen

The abdomen is the largest cavity of the body. The roof of the cavity is formed by the diaphragm which extends as a dome over the abdomen, so that the cavity ascends into the bony thorax. The floor is formed by the muscles and fasciae or the pelvic diaphragm.

The abdomen contains the greater part of the digestive tract. It also contains the liver, pancreas, spleen, kidneys and suprarenal glands. Most of these structures are more or less covered by an extensive and complicated serous membrane, termed called peritoneum.

The Lungs

The lungs are the essential organs of breathing. They are spongy organs situated on either side of the thoracic cavity. In adults, they arc usually slaty-blue in colour, but in infants, they are quite pink. This change of colour is due to staining by particles of dust. These membranous sacs are made up of man minute sacs the surfaces of which are in intimate contact with the air they enclose. In the membranous walls of the lungs down to the finest pouches and sacs (infundibula and alveoli), there is a rich supply of blood vessels.

Ex. X. Read the idioms and make up a situation to use them:

1. Foam at the mouth – в бешенстве; с пеной у рта.
2. Head over heels – влюбиться по уши.

3. It is not my cup of tea – это не мое; не в моём вкусе; буквально «не моя чашка чая».
4. The neighbor's grass is greener – у соседа трава зеленее; завуалированное выражение зависти.
5. Every dog has his day – есть похожее выражение в русском языке: «будет и на нашей улице праздник».
6. It's Greek to me – о непонятном; это китайская грамота для меня.
7. Ball and chain – буквально «чугунный шар на ноге каторжника», обуза. Часто используется в разговоре о жене.
8. To be in the red – быть убыточным. Происхождение идиомы объясняется довольно просто: в бухгалтерии расход пишется красным цветом, а приход – чёрным. Отсюда и "Black Friday."
9. All in a good time – всему свое время.
10. No pain; no gain – без боли нет прогресса; в русском языке есть похожие выражения «под лежачий камень вода не течет», «без труда не вытащишь рыбку из пруда», и т.д.

Ex. XI. Speak on the following proverbs:

1. "He who has health has hope, and he who has hope has everything." Arabic proverb.
2. "Health comes before making a livelihood." Yiddish proverb.
3. "Limit your desires and you will improve your health." Spanish proverb.
4. "The healthy die first." Italian proverb.
5. "No time for your health today, will result in no health for your time tomorrow." Irish proverb.
6. "Hygiene is two-thirds health." Lebanese proverb.
7. "When the heart is at ease, the body is healthy" Chinese proverb.

8. “Laughter is the best medicine.” English proverb.
9. “One day in perfect health is a lot.” Arabian proverb.
10. “A man too busy to take care of his health is like a mechanic too busy to take care of his tools.” English proverb.
11. “One who eats plain food is healthy.” Japanese proverb.

Ex. XII. Write an independent essay on the following topics:

1. “Health is better than wealth.”
2. “Three diseases without shame: Love, itch and thirst.”

UNIT IV

BLOOD

“Blood is thicker than water.”
Mawr, E.B.

KEY VOCABULARY:

measure ['meʒə] – мера; единица измерения.
pressure ['preʃə] –1. давление; 2. сжатие; 3. стискивание.
rubber ['rʌbə] – резина; каучук.
cuff [kʌf] – манжета; обшлаг.
mercury ['mɜ:kj(ə)rɪ, 'mɜ:kjurɪ] – 1. ртуть; 2. ртутный столб; 3. температура или давление
bulb [bʌlb] – 1. шарик (термометра); 2. колба (электрической лампы); 3. груша.
flow [fləu] – струиться, течь; to flow from / out of – литься из; to flow (in)to – впадать в.
release [rɪ'li:s] – избавлять, освобождать.
considerably [kən'sɪd(ə)rəblɪ] – значительно, много.
column ['kɔləm] – 1. колонна; 2. столб(-ик) (воды, воздуха); column of mercury – столбик ртути (в термометре).
wrap [ræp] – 1. завёртывать, сворачивать, складывать; Syn: bundle up; 2. окутывать, обёртывать.
pump [pʌmp] – 1. насос; помпа; to prime a pump - заливать насос (перед пуском); to work a pump – эксплуатировать насос; blow down pump – воздуходувка; centrifugal pump - центробежный насос; 2. а) работать насосом; закачивать (воздух и пр.); б) выкачивать; опорожнять; to pump the air out of the receiver – выкачивать воздух из резервуара.

entirely [ɪn'taɪəlɪ] – вполне, всецело, полностью, совершенно, совсем; Syn: completely, utterly.
occur [ə'kɜ:] – происходить, случаться, совершаться; to occur again – повторяться, случаться снова; Syn: happen, befall.
alongside [ə:lɔŋ'saɪd] – 1. около, возле, рядом; 2. вдоль (чего-л.), параллельно (чему-л.); alongside of a sheet of water – вдоль поверхности.
escape [ɪs'keɪp] – 1. бежать; Syn: flee, run away; Ant: remain; 2. уходить.
represent [reprɪ'zent] – 1. изображать; представлять (в виде кого-л./чего-л.); 2. представлять.
certainty ['sɜ:t(ə)ntɪ] – 1. несомненный факт; 2. уверенность; with certainty – с уверенностью absolute / dead certainty – полная уверенность; moral certainty – моральная устойчивость; Syn: confidence, certitude, conviction; 3. достоверность.

Ex. I. Read the text, translate it paying attention to the key vocabulary:

Measuring the Blood Pressure

A doctor usually **measures** the blood **pressure** in the artery of the upper arm with an instrument called a sphygmo (mano)-meter. This consists of a rubber cuff that is connected to a glass tube containing a column of mercury. **Alongside** the glass tube are numbers that indicate the height of the column of mercury in millimeters. The doctor **wraps** the **rubber cuff** about the patient's arm and then **pumps** air into the cuff by means of a rubber **bulb**. As the pressure inside the rubber cuff increases, the **flow** of blood through the artery is momentarily checked. The pressure within the cuff causes the **mercury** to rise. The doctor then places a phonendoscope over the artery at the elbow and slowly

releases the air pressure within the cuff. The pressure begins to fall slowly. As soon as the blood begins to flow through the artery again, tapping sounds can be heard through the phonendoscope. This is the pulse. When the first tapping sound is heard, the doctor notes the pressure. This is the systolic pressure.

As the air pressure continues to escape from the cuff, the tapping sound grows louder. A point is reached at which the sound changes suddenly to very soft and then disappears **entirely.** The point at which the change from loud to soft **occurs** is the diastolic pressure and the doctor again notes the reading.

The blood pressure is usually written and spoken of as one number over another – for example, 120/80 or "one twenty over eighty". The first number **represents** the systolic pressure and the second is the diastolic pressure, both recorded in millimeters of mercury.

What is "normal" blood pressure? It is difficult to say with **certainty**. The systolic blood pressure can vary **considerably** between the sexes among different age groups and even between individuals. In young people, it varies normally from 100 to 140 millimeters and in people at 60 years of age from 140 to about 170 millimeters.

Ex. II. Read the text again and:

1. Describe the action of measuring blood pressure.
2. Measure blood pressure of one of your friends.

Ex. III. Find in the text above the English equivalents for the following:

Впадать в; значительно; колба; единица измерения; резина; манжета; освобождать; достоверность; струиться; исчезать;

сжатие; прослушивание; меняться; полностью; происходить; выкачивать; обёртывать; столб(-ик); бежать; представлять; складывать; вдоль поверхности; стискивание; ртутный столб; насос; уверенность.

Ex. IV. Fill in the gaps with prepositions:

CHECK BLOOD CIRCULATION

A. Check the person's blood circulation. Press firmly ……. the skin ……. the fracture site. (For example, if the fracture is ……..... the leg, press ……..... the foot). It should first blanch white and then "pink …….. "…….. ……..... about two seconds. Other signs that circulation is inadequate include pale or blue skin, numbness or tingling, and loss ……..... pulse. If circulation is poor, and trained personnel are NOT quickly available, try to realign the limb ……..... a normal resting position. This will reduce swelling, pain, and damage ……..... the tissues ……..... from lack ……..... blood.

B. 1. Experiments ……..... animals proved it to be effective ……..... treating sclerotic mutations …… the cardiovascular system. 2. Doctor ..... Biology M. Smith has worked …….. 40 methods ..... how to perform heart transplants. 3. B_{12} has proved useful ……..... cases ……..…. poisoning ……..... chloroform. 4. The necessity ……..…. changing the patient's heart valves was established. 5. It is possible to save the life ……..…. a patient ……..……. by replacing his heart ……..…. with the heart taken ……..……. a recently dead person. 6. Who ..... you has been told ..... professor N arriving today ? 7. Scientists are looking ……..…..... the ways ..... using

lasers ..... delicate operations ..... inner organs. 8. Do you know anything ..... his having been operated …..……. ..... professor N? 9. Research is conducted …..……. the use ..... chemical compounds ..... the treatment ..... cancer. 10. The development ..... the treatment came ..... 1935 …..... the discovery..... sulfonamide.

Ex. V. Match the following definitions with the terms:

1. pressure	a) any of the distinct types of material of which animals or plants are made, consisting of specialized cells and their products.
2. bulb	b) movement to and fro or around something, especially that of fluid in a closed system.
3. circulation	c) continuous physical force exerted on or against an object by something in contact with it.
4. fracture	d) a hollow flexible container with an opening through which the air can be expelled by squeezing, such as that used to fill a syringe.
5. tissue	e) the cracking or breaking of a hard object or material.
6. inadequate	f) an abnormal protuberance or localized enlargement.
7. damage	g) lacking the requisite qualities or resources to meet a task.
8. tingling	h) partial or total lack of sensation in a part of the body; a symptom of nerve damage or dysfunction.

9. swelling	i) a heavy silvery toxic univalent and bivalent metallic element; the only metal that is liquid at ordinary temperatures.
10. numbness	j) a somatic sensation as from many tiny prickles.
11. mercury	k) physical harm caused to something so that it becomes broken, unusable or less attractive.

Ex. VI. Translate the sentences into English using the active vocabulary of the text:

1. Завтра, несомненно, будет дождь.
2. Можно его навестить? Да, конечно.
3. Ему, несомненно, лучше сегодня.
4. Могу я пойти с вами? – Разумеется. (come along здесь: идти вместе (с кем-л.))
5. Они точно не мои.
6. Я обязательно попробую.
7. Ей было поручено представлять нас.
8. Что означает этот символ?
9. Никогда не пытайся внушить людям, что ты – само совершенство.
10. Я представляю молчаливое большинство.
11. Любовь изображена в виде ребёнка с цветком в руках.
12. Она представляла Францию на Олимпийских играх.
13. По этой фотографии вы можете судить, какое у меня было детство.
14. Вчера его выписали (выпустили) из больницы.
15. Нефть спустили в море.
16. Я хотел бы освободиться от обязательств по контракту.

17. Тысячи бомб были сброшены на Дрезден.
18. Комиссия обнародовала свои выводы.
19. Собака бежала рядом с хозяйкой.
20. Его книга может стоять в ряду лучших.
21. Ведите лодку вдоль причала.
22. Эти две общины мирно живут бок о бок друг с другом.
23. Перейдём к странице 5, столбец 2.
24. Заверните тюбик в кусок белой бумаги.
25. Когда в точности случилось это происшествие?
26. Нет никакой уверенности в успехе.

Ex. VII. Read the passage and retell it:

Blood and Its Functions

Blood is a thick red fluid, slightly heavier than water. In the arteries it is of a brighter red colour owing to the presence of oxygen which is carried to the tissues, in the veins it is of a darker hue. There are approximately 11 pints of blood in the body. Blood is made up of two parts – a fluid called the plasma, which represents about 55% of the total bulk, and a solid part, the corpuscles. The plasma is composed mostly of water and contains about 7% protein, salts, digested food products, and waste substances, including carbon dioxide, which are borne away from the tissues.

The corpuscles are cells and are divided into red corpuscles and white corpuscles.

The red corpuscles are minute, disc-shaped bodies. In one cubic millimeter of blood, there are about 5,000,000 red corpuscles. Hemoglobin is the coloured pigment in the red corpuscles. It possesses the power of combining with oxygen while the blood is circulating through the lungs; it then carries the oxygen

throughout the body to the tissues. The red corpuscles are, therefore, the oxygen carriers of the body. The white corpuscles or leukocytes are larger than the red cells but less numerous; only 6,000 – 8,000 in each cubic millimeter of blood.

Functions of the blood include the following:

1) it carries oxygen, food and water, salts and other substances to the tissues;

2) it carries waste products from the tissues to organs which excrete (eliminate) them,

3) it distributes heat and maintains a uniform temperature in all parts of the body;

4) it fights germ infection through some of the white corpuscles called phagocytes and also by using various antibodies which the body itself manufactures to neutralize the toxins produced by germs;

5) by its power to clot it aids the arrest of hemorrhage.

Revise your grammar:

I Conditional	**If + Present Simple, Future Simple**
II Conditional	**If + Past Simple, would/wouldn't + infinitive**
III Conditional	**If + had + past participle, would + have + past participle**

Ex. VIII. Make up a suitable continuation for the given parts of the sentences:

1. We should have solved the problems long ago if ...
2. I should have become a chemist if ...

3. We should have started this work long ago if…
4. Jack would have discussed this question at the last seminar if ...
5. He should have mentioned a greater number of works in his interview if ...
6. They would have replied to Dr. Smith's letter before if ...
7. Mary would have looked through the journal last week if ...
8. The researchers would have made the experiments if ...
9. The scientists would have finished the work long ago if ...
10. Would you have continued your work if ...
11. If we had found them…
12. If we had had the necessary equipment….
13. If we had the order from the library before it …
14. If I had found all the journals I had read….
15. If I had told him to do so….
16. If I had known what to write….
17. If we had made some additional experiments….
18. If they had had the necessary equipment...
19. If we had enough test animals….
20. If your results had been better….

Ex. IX. Translate the sentences into English using the forms of conditionals:

A.

1. Они дольше останутся в Париже, если найдут дешевый отель.
2. Мать Джона может уделить ему достаточно внимания, если он будет мыть посуду.
3. Он может писать хорошие истории, если ему это нравится.

4. Если бы Стивен взял свою камеру, он бы сделал хорошие снимки.
5. Если бы Брайан любил лошадей, он мог бы хорошо кататься.
6. Если бы Сара не ела так много вредной пищи, она могла бы быть в школьной хоккейной команде.
7. Если бы вы были старше, вы могли бы пойти на вечеринку.
8. Если бы вы внимательно выслушали, вы бы знали об этом.
9. Если бы погода была лучше, мы бы приехали на велосипеде.
10. Если бы у Алисы было больше денег, она бы поехала в Африку.

B.

1. Если бы не было так поздно, я бы пошел по магазинам.
2. Даниэль был бы дома вовремя, если бы автобус приехал вовремя.
3. Если бы вы сделали свою домашнюю работу, вы могли бы написать лучший тест.
4. Что бы вы сделали, если бы увидели грабителя?
5. Если бы Лиза встала раньше, она бы не опоздала на работу.
6. Мои родители купили бы дом, если бы он был дешевле.
7. Она была бы очень счастлива, если бы каждый друг пришёл.
8. Если пойдет дождь, я надену плащ.
9. Если я найду твой ключ, я скажу тебе.
10. Если бы они осторожно водили, они бы не врезались в другую машину.

Ex. X. Read the instructions and speak on your own experience of checking blood pressure:

Check the person's blood circulation. Press firmly over the skin beyond the fracture site. (For example, if the fracture is in the leg, press on the foot). It should first blanch white and then "pink up" in about two seconds. Other signs that circulation is inadequate include pale or blue skin, numbness or tingling, and loss of pulse. If circulation is poor, and trained personnel are not quickly available, try to realign the limb into a normal resting position. This will reduce swelling, pain, and damage to the tissues from lack of blood.

Ex. XI. Comment on the following proverbs and set expressions:

1. "Good blood always shows itself."
2. "The bonds between soldiers of a battle is stronger than family ties."
3. "The blood of the covenant is thicker that the water of the womb."
4. "Two things prolong your life: a quite heart and a loving wife."

Ex. XII. Write an independent essay on the following topics:

1. Like blood, like good, and like age make the happiest marriages.
2. It isn't over till it's over. /Do not anticipate the end of something, specifically, do not give up hope until you have actually lost or failed/.

UNIT V

VITAMINS

"Just because you're not sick doesn't mean you're healthy."
Unknown

KEY VOCABULARY:

water-soluble ['wɔ:tə:sɔljəbl] – растворимый в воде.
defence [dɪ'fen(t)s] = defense 1. защита; to speak out in defence of justice – высказываться в защиту справедливости; Syn: protection, justification, vindication.
fleeting ['fli:tɪŋ] – быстрый, мимолётный, скоротечный – fleeting impression; Syn: temporary.
controversial [kɔntrə'vɜ:ʃ(ə)l] – спорный, сомнительный; дискуссионный; controversial point - спорный вопрос, момент; Syn: questionable, disputable; Syn: disputatious.
evidence ['evɪd(ə)ns] – 1. ясность, наглядность, очевидность; in evidence – наличный; присутствующий; заметный; Syn: clearness, evidentness; 2. основание; знак, признак, симптом; факты, данные; on this evidence – в свете этого, на основании этого; from all evidence – на основании всех фактов; Syn: indication, sign, token, trace.
scurvy ['skɜ:vɪ] – 1. цинга; 2. презренный, жалкий.
coach [kəutʃ] – тренер; Syn: trainer.
unequivocal [ʌnɪ'kwɪvək(ə)l] – недвусмысленный, определённый, чёткий; ясный; the plain and unequivocal language of the laws - простой и недвусмысленный язык закона; Syn: definite.
detoxify [di:'tɔksɪfaɪ] – детоксифицировать, устранять влияние яда; a special tea that is supposed to detoxify the body –

специальный чай, который должен вывести из организма токсины.

nutritionist [nju:'trıʃ(ə)nıst] – диетолог, диетврач; Syn: dietitian.

artificial [ɑ:tı'fıʃ(ə)l] – искусственный, ненатуральный, неестественный; artificial atmosphere – кондиционированный воздух; artificial butter – маргарин; artificial year – гражданский или календарный год (в отличие от астрономического); food that contains no artificial preservatives – пища, которая не содержит искусственных консервантов.

source [sɔ:s] – источник, ключ; Sources dry up. – Источники пересыхают. Syn: spring.

protect [prə'tekt] – (protect from / against); 1. защищать; охранять, ограждать; предохранять; to protect one's interests / rights / reputation – защищать свои интересы / права / репутацию; to protect rare species from extinction – защищать / охранять редкие виды (животных, растений) от истребления; to protect metal against rust – защищать металл от ржавчины; to protect a child from violence – защищать ребёнка от насилия.

claim [kleım] – требовать; предъявлять требования; заявлять о своих правах на что-л.; Syn: demand, require.

absorption [əb'zɔ:pʃ(ə)n] – всасывание, впитывание; абсорбция, поглощение; absorption band - полоса поглощения; absorption power – способность абсорбировать; absorption factor – коэффициент поглощения; Syn: suction.

contain [kən'teın] – 1. содержать в себе, включать, иметь в своём составе; вмещать; foods that contain a high level of fat – продукты с высоким уровнем содержания жира; Syn: hold,

comprise, include, accommodate; 2. ограничивать, сдерживать; подавлять; Syn: halt, hold.

extreme [ɪks'tri:m], [eks'tri:m] – 1. самый отдалённый, крайний, предельный; Syn: last, outermost, utmost, uttermost, farthest; 2. непомерный, чрезвычайный, чрезмерный; Syn: extraordinary.

Ex. I. Read the text, translate it paying attention to the key vocabulary:

VITAMIN C

A **water-soluble** vitamin essential for the formation of collagen (a major component of skin, muscles, and bone) and the healthy functioning of tissues containing collagen. It is required for the repair of joint tissues which are often damaged during high levels of physical activity. Vitamin C acts as a stimulant for body **defense** mechanisms, and **protects** vitamin A, vitamin E, and dietary fats from oxidation (see antioxidants).

Vitamin C also plays an important role in the absorption of iron from plant foods. Mild deficiencies can cause **fleeting** joint pains, poor tooth and bone growth, poor wound healing, and an increased susceptibility to infection. The Nobel Prize winner, Linus Pauling, and others **claimed** that doses 10 to 100 times greater than normal are effective in preventing the common cold. This **claim** is still very **controversial**, but there is some **evidence** to support it. In the test-tube, vitamin C has been shown **to detoxify** histamine – a product of stress (including the common cold). It is not clear whether the vitamin has the same ability in a living person. An extreme deficiency of vitamin C causes **scurvy.**

In the UK, the Reference Nutrient Intake (RNI) is 40 mg per day for adults, but this should be increased for those under any

stress and those who are physically active. The RNI for pregnant women is 50 mg per day, and for lactating mothers is 70 mg per day. The USA recommendations are higher.

Vitamin C toxicity is unlikely, therefore many **coaches** feel free to advocate substantial supplementation for athletes. The whole topic is **controversial;** there is little **unequivocal** research to support large supplementation, and there may be some problems not yet fully reported. Most **nutritionists** recommend taking vitamin C naturally in the diet rather than as **artificial** supplements. Vegetables (especially green peppers) and citrus fruits are good **sources.** The richest source is acerola cherry juice (3390 mg of vitamin C per 100 g of juice).

Ex. II. Read the text again and answer the questions:

1. What is Vitamin C required for?
2. How does Vitamin C affect?
3. What is Vitamin C essential for?
4. What is collagen required for?
5. What can mild deficiencies cause?
6. According to the Nobel Prize winner Linus Pauling what doses of Vitamin C are effective in preventing the common cold?
7. What does an extreme deficiency of Vitamin C cause?
8. In the UK, the RNI is 40 mg per day for adults, but for whom should this be increased?
9. What mg per day is the RNI for pregnant woman?
10. What are good sources of Vitamin C?
11. What is the richest source of Vitamin C?
12. How is the taking of Vitamin C recommended by most nutritionists?

Ex. III. Find in the text above the English equivalents for the following:

Содержать в себе; тренер; источник; предъявлять требования; предохранять; недвусмысленный; всасывание; искусственный; очевидность; сомнительный; защита; растворимый в воде; мимолётный; устранять влияние яда; диетолог; чрезмерный.

Ex. IV. Fill in the gaps with prepositions:

1. By what method ..... examination is elasticity and rigidity ……. the abdomen revealed? 2. We found out that the patient suffered ..... tuberculosis. 3. A bronchoscope is the instrument used ……..... inspecting the interior ……. the bronchi. 4. Has he any pains ……. the abdomen? 5. The proper medicine has been taken ……..... relief. 6. To transfuse blood promptly was …….. utmost importance. 7. To discharge these patients was not permitted …… the head doctor. 8. Wound examination is essential ……..... the healing ……. the wound. 9. Is chest pain relieved …….. rest? 10. You'd rather read a book …….... medicine.

Ex. V. Match the following definitions with the terms:

1. scurvy	a) leaving no doubt; unambiguous.
2. fleeting	b) reaching a high or the highest degree; very great.
3. unequivocal	c) a substance that raises levels of physiological or nervous activity in the body.
4. extreme	d) a disease caused by a deficiency of Vitamin C, characterized by swollen bleeding gums and the opening of previously healed wounds,

	which particularly affected poorly nourished sailors until the end of the 18th century.
5. stimulant	e) lasting for a very short time.
6. supplementation	f) a quantity added (e.g. to make up for a deficiency).
7. susceptibility	g) the state of being susceptible; easily affected.
8. acerola	h) acid red or yellow cherry-like fruit of a tropical American shrub very rich in Vitamin C.
9. prevent	i) a person who is an expert on the relationship between food and health.
10. nutritionist	j) to stop something from happening or someone from doing something.

Ex. VI. Form derivatives from the words in brackets. Use them to fill in the blanks:

1. The wound was very ……..... (pain). 2. These drug are …..... . Use them with caution (harm). 3. You must lift the patient very …….. (care). 4. …….. handling of the patient may result in an accident (care). 5. Cancer is still a ……… disease (cure). 6. Operations are made …….... by mean of anesthesia (pain). 7. You may use this drug. It is quite …….... (harm). 8. Most diseases are …….... nowadays (cure). 9. The condition of the patient is quite …….... (hope). 10. The patient seemed quite …….... (hope).

Ex. VII. Choose the correct modal verb:

1. ……. you speak French? – Only a few words, but my Russian is pretty good.
a) can

b) could
c) would
2. ……. you help me move this table? (both answers are possible. Choose the more polite request.)
a) can
b) could
c) must
3. ..... talk already before I was two years old.
a) could
b) should
c) would
4. I ..... help you, but I don't want to.
a) can
b) could
c) would
5. ……. you open the window, please.
a) can
b) may
c) would
6. I ..... move the table. It was too heavy.
a) couldn't
b) mustn't
c) shouldn't
7. You ..... not put your feet on the cafeteria tables.
a) must not
b) do not have to
c) can
8. If you continue to practise so hard, you ……. beat me before too long!
a) can

b) could
c) will be able to
9. ……. you swim? (all *are possible. which is better?)*
a) are you able to
b) can
c) could
10. You ..... eat so much chocolate. It's not good for you.
a) don't have to
b) mustn't
c) shouldn't
11. I'm afraid I ..... play tennis tomorrow. I've got a dentist appointment.
a) can't
b) couldn't
c) would not be able to
12. You can come to the meeting if you want but you ……..
a) have to
b) don't have to
c) mustn't
13. What do you want to do? - Well, we ..... have a picnic, but it looks like rain.
a) can
b) could
c) should
14. I'm so hungry I …….. eat a horse!
a) can
b) could
c) must
15. The test starts at 10.30. You ..... be late.
a) don't have to

b) mustn't
c) can
16. Why didn't you tell me? I …..... you!
a) could help
b) could have helped
c) was able to help
17. How did you do in the test? – Ok. It …..... worse!
a) could be
b) could have been
c) might be
18. He …..... broken the classroom window. He wasn't even in school today.
a) couldn't have
b) mustn't
c) shouldn't have
19. You ..... tired. You've only just got out of bed!
a) don't have to
b) can't be
c) mustn't be
20. She ..... be very pleased with herself. She got the best grades.
a) has to
b) must
c) cannot

Ex. VIII. Read the information and speak on it:

Could Mega Doses of Vitamin C Be Harmful?

Laboratory study reveals large doses of Vitamin C may lead to damaged DNA – and increased cancer risk.

A study released in the June 2001 issue of *Science* suggests that large doses of Vitamin C produce toxins that could possibly increase cancer risk by damaging the body's DNA. Long regarded as a protective nutrient against cancer, researchers from this study demonstrated that too much of a good thing might actually cause harm. Vitamin C is a powerful antioxidant, but previous studies have failed to show that supplementation is protective. This study may begin to show why. The researchers do caution *against* thinking that Vitamin C causes cancer. What they do suggest is that mega doses of the vitamin may not be beneficial. More studies are needed to determine if Vitamin C produces this toxin and DNA damage in the body itself.

Critics point out that this study was conducted in test tubes and that nutrients often function differently in the human body. They suggest that people should not stop taking Vitamin C supplements based on the results of this single study.

While the topic of Vitamin C supplementation is controversial, there is agreement that optimal levels of this powerful antioxidant can be met through a rich and varied diet of whole foods. The message to be gained. More is not always better when it comes to supplements, and we should not overdo when taking them. The daily Recommended Dietary Allowance for Vitamin C is 75 milligrams for women and 90 milligrams for men. Smokers require an additional 25 milligrams. These levels can easily be met through a varied and balanced diet.

Even more concerning is that approximately 15 percent of children and adolescents are overweight, compared to just 4 percent a few decades ago, and another 15 percent are at risk for being overweight. Childhood obesity is a growing concern in to-

day's world. An alarming number of children are obese, and developing diseases are normally seen in adulthood. Overweight adolescents have a greatly increased risk of dying from heart disease in adulthood. Even our youngest citizens are at risk. About 10 percent of preschoolers weigh more than is healthy for them.

Weighing too much may increase your risk for developing many health problems. If your body mass index (BMI) indicates that you are overweight or obese, you may be at risk for many of obesity's health effects.

Ex. IX. Translate the sentences into English using the active vocabulary of the text:

A.

1. Лучшая защита – это нападение.
2. Я заметил мимолётный проблеск кометы.
3. Кэрол находилась в Париже с кратким визитом.
4. Я мельком увидел их, когда они проезжали мимо.
5. Реку мы видели лишь мельком.
6. На одно мимолётное мгновение Пола позволила себе позабыть о своих проблемах.
7. Очевидность нельзя спрятать.
8. Команда резко повысила свой уровень под чутким руководством очень умного тренера.
9. Его ответ был недвусмысленным: «нет». Её ответ был однозначным: «да».
10. Поскольку ни один из кандидатов не желал делать каких-либо однозначных утверждений, дебаты оказались смертельно скучными.
11. Наши продукты не содержат искусственных добавок.
12. Это был день, когда был запущен первый в мире искусственный спутник Земли.

13. Искусственные зубы часто деформируют рот.
14. Цены на продовольствие искусственно удерживаются на низком уровне.
15. Парамедики попытались сделать искусственное дыхание, но это не помогло.

B.

1. Он хотел защитить своё доброе имя.
2. Этот лес охраняется общегосударственным законом.
3. Я накрыл диван чехлом, чтобы его защитить.
4. Страховка защищает вас от затопления.
5. Она сделает всё, чтобы защитить своих детей от неприятностей.
6. Мы боролись за то, чтобы сохранить свои рабочие места.
7. Нам необходимо принять меры для самозащиты.
8. Витамин С помогает всасыванию железа из пищи.
9. Она едва сдерживала свой гнев.
10. Этот продукт может содержать орехи.
11. Книга содержит более двухсот рецептов.
12. Новый справочник содержит множество полезных адресов и телефонов.
13. Этот контейнер содержит воду.
14. Он знал, что находился в большой опасности.

Ex. X. Read the article and retell it:

A Close Shave
by Dr. John Winsor

The human skin can suffer from a number of diseases, although the face is relatively immune. Constant exposure to air and sun protect the face from a lot if infections that are due to

organisms who love dark and damp areas, such as between the toes. But for men, any diseases on the face can affect shaving.

The one face rash which is very common is acne. The complaint is far more common among youths than any other age group, especially young men. Unless a male patient has a desire to grow a beard, I advise him to continue shaving but rather sketchily, skating around the worst spots. He should use a good, unscented soap, or a medicated one.

Eczema of the face is much less common than acne. Again, keep on shaving, but avoid the worst areas as far as possible. Fortunately, eczema rarely lasts for anything like as long as acne.

Impetigo, another skin infection, seems to prefer the face to any other part of the body surface. Germs affect isolated areas of the face but do not spread out wards from the main areas. Sufferers should seek medical advice since it is very often rapidly cleared up by the appropriate antibiotic drug.

Since the majority of men do not have the time to go to the barber, and therefore do their own shaving, barber's rash is now a rarity. Even among the few who do attend hairdressing salons, the latter are now almost invariably carefully maintained and have a high standard of hygiene.

Whatever the skin condition from which the face may suffer, the patient must always keep to its own towel. Also, the razor must be thoroughly cleaned after every shave, (though actual scalding is said to blunt the edge). Very occasionally a patient who uses an electric razor gets an allergic rash due to the chrome or nickel in the razor. But it is possible to identify the metal responsible and take precautions.

Finally, use pleasantly warm water for shaving when you have any skin trouble on the face, and don't follow the shaving by after-shaving lotion until the rash is better. There are plenty of shaving products for men that are available, such as skin soothers or moisturizers, so, if you are not suffering from any infections, there is no reason why you cannot have a close shave and maintain healthy skin.

Ex. XI. Write an independent essay on the following topics:

1. Never lie to your doctor.
2. God heals, and the doctor takes the fee.

UNIT VI

ALLERGY

"A few germs never hurt anyone."
Spanish proverb
"Better safe than sorry."
Jere Whiting, Bartlett

KEY VOCABULARY:

prevention [prɪ'ven(t)ʃ(ə)n] – предотвращение, предохранение, предупреждение; primary prevention – срочные меры (по предотвращению чего-л); proverb: Prevention is better than cure. – Предупреждение лучше лечения.

susceptibility [sə,septə'bɪlətɪ] – 1. восприимчивость; 2. впечатлительность; Syn: impressionability; 3. чувствительность; обидчивость; Syn: sensitiveness, sensitivity, touchiness (susceptibilities); 4. чувства, эмоции; to offend smb.'s susceptibilities – оскорбить чьи-л. Чувства.

to dye [daɪ] – 1. красить, окрашивать; to dye one's hair – красить волосы; Syn: colour, tincture, paint, stain; 2. пропитать краской (о ткань); 3. приобрести окраску, приобрести оттенок, окраситься.

consequences ['kɔnsikwənsɪz] – последствия.

to damage ['dæmɪʤ] – повреждать, портить; наносить ущерб; Syn: harm, hurt.

devise [dɪ'vaɪz] – разрабатывать, продумывать (планы, идеи); выдумывать, изобретать; Syn: conceive, contrive, formulate, invent, think out, plot.

pollen ['pɔlən] – пыльца; allergy to pollen – аллергия на пыльцу.

protozoa [prəutə'zəuə] – от protozoan; protozoa – простейшие.
disposition [dıspə'zıʃ(ə)n] – предрасположенность, склонность.
fungus ['fʌŋgəs], (pl. fungi, funguses) – гриб; плесень; древесная губка.
alliance [ə'laıən(t)s] – союз; альянс.
tissue ['tıʃu:] – 1. ткань, материя (особенно тонкая, дорогая); 2. паутина, сеть, сплетение; Syn: cobweb, web.
cellular tissue – клетчатка, рыхлая соединительная ткань.
connective tissue – соединительная ткань.
fatty tissue – жировая ткань, mortified tissue – омертвевшая ткань.
muscular tissue – мускульная ткань.
tissue compatibility – тканевая совместимость.
tissue incompatibility – тканевая несовместимость.
kidney ['kıdnı] – почка; to transplant a kidney – пересаживать почку – artificial kidney, floating kidney.
ragweed ['rægwi:d] – амброзия полыннолистная.
maritime ['mærıtaım] – морской; maritime insurance – морское страхование; maritime animals – морские животные; Syn: sea, naval.
desensitize [di:'sensıtaız] – 1. вызывать падение чувствительности (прибора); 2. уменьшить светочувствительность, десенсибилизировать; 3. делать нечувствительным к аллергенам; 4. вылечить от невроза, снять какой-л. комплекс.
incidence ['ınsıd(ə)ns] – сфера действия, охват; степень; Syn: rate.
identify [aı'dentıfaı] – 1. (identify with) устанавливать тождество; отождествлять (что-л.) с (чем-л.); 2. устанавливать,

определять; to identify the limits – устанавливать допустимые границы; 3. совпадать, быть тождественным.

Ex. I. Read the text, translate it paying attention to the key vocabulary:

WHAT IS ALLERGY?

A worldwide rise in allergic disorders has been noted in recent years. Scientists all over the world are **devising** methods of **prevention** and treatment of these disorders.

What causes allergic disorders?

They are a result of an increased susceptibility of an organism to certain environmental factors. These factors – allergens – may be microbes**, protozoa, pollen, fungi,** chemical compounds, **dyes**, polymers, synthetics, etc.

When a harmful substance enters our organism, it responds by producing specific antibodies to attack it. With allergens this doesn't happen. The antibodies enter into an alliance with the foreign substance and form compounds that can **damage** our organs and **tissues.**

Allergic responses may take place in different organs and tissues. Allergic disorders of the **kidney** can have serious **consequences** – nephritis, disorders of the liver – hepatitis, etc. Why do substances that are harmless to one person produce an allergic reaction to another?

Individual **susceptibility** is one of the most complex questions in the study of allergy. We believe that the disposition to some allergic diseases is inherited.

How often is the incidence of allergic disorders?

Allergic disorders are particularly widespread in economically developed countries. This is related to industrialization, urbanization, the development of chemical industries, the wide use of vaccines and antibiotics. Allergic disorders are commonest in the humid, **maritime** zones of the Black and Baltic Seas, but nonexistent in the mountain areas and relatively rare in the North.

What are the measure of prevention and treatment of allergic disorders?

They are numerous. The staff of the Laboratory of Allergology at the USA Academy of Medical Sciences is studying the spread of allergic disorders in relation to climatic, geographical, occupational, economic and other peculiarities of individual areas and communities in our country. The following instance may be mentioned. Ragweed grows all over the South of our country, and its **pollen** is a strong allergen, so in that area the disease caused by **ragweed** pollen affects large group of people. In Central Asia the pollen of wormwood flowers present a similar harm. Naturally, the most important measure of preventing allergy is the identification and removal of environmental factors.

The second stage of **prevention** is to **desensitize** people. This work is highly complex. There is interest in research with skin tests to determine the organism's susceptibility to different allergens. There are cases when the patient has to change his job, profession or occupation or even to move to another area because of his susceptibility to certain allergens. At times even a kind of vaccination may be given against identified allergens, which will greatly reduce susceptibility.

Ex. II. Read the text again and answer the questions:

1. What are the causes of allergic disorders?

2. What are the means and prevention of allergic disorders?

Ex. III. Find in the text above the English equivalents for the following phrases:

Тканевая несовместимость; пыльца; плесень; клетчатка; продумывать; предрасположенность; последствия; жировая ткань; повреждать; приобрести окраску; восприимчивость; союз; пересаживать почку; уменьшить светочувствительность; морское страхование; тканевая совместимость; быть тождественным.

Ex. IV. Fill in the gaps with prepositions:

Influenza

Influenza occurs ……..... epidemics or ..... sporadic cases and is characterized ……. its typical form ……. sudden onset. There is fever lasting ..... 1……..... 7 days, accompanied ……..... excessive malaise, prostration, backache pain ……..... the limbs and muscles, sore throat, bronchitis. The causative agent is filterable virus. The source …….. infection is discharge ..... the upper respiratory track …….. infected persons. Treatment ……. influenza consists ……. rest ..... bed, sedatives, analgesics and cough mixtures which afford much comfort ……..... the patient.

Ex. V. Match the following definitions with the terms:

1. consequences	a) make less sensitive.

2. desensitize	b) a result or effect, typically one that is unwelcome or unpleasant abrupt withdrawal of drug treatment.
3. inherited	c) the state or fact of being likely or liable to be influenced or harmed by a particular thing.
4. susceptibility	d) physical harm that impairs the value, usefulness, or normal function of something.
5. damage	e) derive (a quality, characteristic, or predisposition) genetically from one's parents or ancestors.
6. malaise	f) an abrupt failure of function or complete physical exhaustion.
7. prostration	g) a drug that reduces excitability and calms a person.
8. filter	h) to have an official permission to leave an institution such as a hospital.
9. sedative	i) not having existence or being or actuality.
10. discharge	j) to have a particular illness or physical problem.
11. nonexistent	k) physical discomfort (as mild sickness or depression).
12. suffer	l) device that removes something from whatever passes through it.

Ex. VI. Make up dialogues using the text below:

Your friend wants to find out whether you ever suffer from headaches (allergy). If you do, tell him about your symptoms about the onset, the causes, the remedies you use.

e.g. When does headache (allergy) come on?
How does s(he) treat them?
What relieves them?

Get to know the meanings of the word “just”:
1. “Just” в значении «просто».
2. “Just” в значении «именно» «прямо», «как раз», «так».
3. “Just” в значении «только», «лишь», «всего лишь».
4. “Just” можно также использовать в похожем значении: «всего лишь», то есть «не более чем».
5. “Just” в значении «только что», «как раз», «вот-вот».
6. Иногда “just” используется и по отношению к будущему, со значением «вскоре после момента разговора».
7. “Just” в приказах.
8. “Just” для смягчения.
9. “Just” в значениях «где-то», «чуть больше, чем», «чуть меньше, чем».
10. “Just as” в значении «как только».
11. “Just as” в значении «такой же».

Ex. VII. Translate into English using “just” and the active vocabulary of the text:

A.
1. Это просто лучший ресторан в городе.
2. Дэн не поступил в университет: результаты его теста были просто ужасны.
3. Я просто не знаю, что тебе сказать.
4. Я знаю как раз подходящее место, чтобы отпраздновать это.
5. Эти ботинки как раз нужного размера!

6. Этот человек на фотографии выглядит прямо как дядя Сэм!
7. Значит, он опять опаздывает, да? Так я и думал.
8. Это мероприятие только для членов клуба.
9. У меня нет больших целей, я всего лишь тренируюсь для себя.
10. Никто больше об этом не знает – лишь мы двое.
11. Это стоит всего лишь 24$! Давай купим!
12. Ничего интересного не случилось. Всего лишь очередной день.
13. Тим на самом деле не хотел приходить. Все его рассказы – лишь отговорки.
14. Извините, миссис Эндрюс только что вышла! Не хотите подождать ее здесь?
15. О, привет, Дэн! Мы как раз о тебе говорили.
16. Я как раз иду в магазин. Не хочешь пойти со мной?
17. Быстро! Автобус вот-вот уйдет!
18. Просто нажмите кнопку, чтобы выйти из программы.
19. Просто следуй моим инструкциям и все будет хорошо. О том, как строить приказы, читайте в статье.
20. Не могли бы вы мне показать, где находится та комната, пожалуйста?

B.

1. Могу я здесь подождать немного?
2. Мы смогли прийти где-то перед обедом.
3. Эта вещь стоит чуть больше, чем 50$, что дешево. Я буду свободен где-то после шести.
4. Как только мы закончили приготовления, нам позвонил менеджер.

5. Как только я вошел в здание, я увидел Майка, бегущего вниз по лестнице.
6. Твой план такой же плохой, как мой.
7. Я так же зол, как ты.
8. Это просто лучший ресторан в городе.
9. Дэн не поступил в университет: результаты его теста были просто ужасны.
10. Я просто не знаю, что тебе сказать.
11. Бессмысленно рассуждать о том, что могло произойти.
12. Среди мальчиков левши встречаются чаще, чем среди девочек.
13. Наши интересы совпадают.
14. Он показал высокий уровень восприимчивости.
15. Слабая иммунная система подвержена болезням.
16. Он очень восприимчив к гипнотическим воздействиям.
17. Регулярная чистка может помочь предотвратить заражение.
18. Резиновые уплотнения установлены для предотвращения выхода газа.
19. Правительство предприняло шаги, чтобы предотвратить скандал.

Revise your Grammar:
Gerunds and Infinitives

Use the gerund (verb + ing)

1. after prepositions and phrasal verbs

2. as the subject of a sentence

3. after some verbs, e.g. enjoy, don’t mind, hate

Use the infinitive + to

after adjectives

to express a reason or purpose

after some verbs, e.g. need, learn, like

Ex. VIII. Put the verbs in brackets into the gerund or the infinitive:

1. I want _____ (finish) work early tonight. 2. I hate _____ (wait) for buses in the rain. 3. I'm going to the café _____ (meet) Anna. 4. Sam is really good at _____ (climb). 5. Thank you for ____ (be) so helpful. 6. I enjoy _____ (listen) to the radio while cooking. 7. Let's go now. I'm worried about _____ (miss) the train. 8. He refused _____ (help) me. 9. There's a lot of work _____ (do) in the new building. 10. "What's this for?" "It's for _____ (cook) the vegetables." 11. I really love _____ (play) with the children. 12. _____ (swim) is a good form of exercise. 13. I can't stand _____ (do) the washing-up. 14. We managed ____ (pass) the exam by ____ (test) each other every evening. 15. We were getting tired, so we stopped _____ (have) lunch.

Ex. IX. Read and reproduce the following:

The Circulatory System

The cardiovascular system is the system of blood circulation. Hence by the cardiovascular system is meant the heart, the arteries, the veins and the capillaries of the human body. Basically the heart is a hollow muscle which is divided into four chambers. The right heart consists of an upper chamber called the atrium and a lower chamber called the ventricle. Between

these two chambers is a one-way valve called the tricuspid valve. The left heart has two similar chambers, but the valve that separates these chambers is called the mitral valve. Although the heart is a unit, anatomically and functionally, it can be thought of as two isolated pumps – the "right heart" and the "left heart". The right heart receives blood from the veins and pumps it into the lungs by way of the lesser circulatory system. In the lungs the blood is supplied with oxygen. Then it moves into the left heart. From the left heart the well-oxygenated blood is pumped into a large artery called the aorta, which distributes it to the entire body by means of the greater circulatory system. The blood is returned to the heart by means of the veins. A continuous circulation is thus kept up. The capillaries form a close network all over the body, and gradually joining together and getting larger they become veins.

The Alimentary or Digestive System

The alimentary canal begins at the mouth and ends at the arms. It consists of the oral cavity, the gullet or esophagus, the stomach, the intestines.

The glands which pour juices of secretion into the alimentary canal are:

the salivary glands secreting saliva into the mouth where the digestion of the starchy parts of the food begins;

the gastric glands in the stomach secreting gastric juice which is acid and acts on meats;

the liver which excretes about two pints of bile a day which helps in the breaking up of fats;

the pancreas secreting pancreatic juice which acts on all classes of food continuing the action of the saliva and gastric juice;

the glands of the small intestines secreting intestinal juice which completes the digestion of the meat foods in the intestines.

In the oral cavity the food by the movements of the tongue and cheeks is turned about and chewed or crushed between the teeth, while at the same time saliva flows into the mouth and is thoroughly mixed with the food to form a bolus which can be swallowed. This is done by the tongue pushing it into the upper part of the throat (pharynx) whose muscles seize it and pass it quickly over the top of the larynx and down through the gullet into the stomach. In the stomach much of the process of digestion occurs by means of the gastric juices. From the stomach the food is passed into the upper end of the small intestine. A short distance down the duodenum, ducts open into it carrying bile produced in the liver and digestive juice secreted by the pancreas. While the food is passing down the small intestines, the dissolved nutritious part is absorbed into the blood through the capillaries on the inside of the bowels and passed into the veins, through the liver, into the general circulation for the nourishment of the body. The process of digestion is completed in the large intestine by the absorption of water. The undigested parts of the food mixed with the useless remains of the digesting fluids and some substances excreted from the system are passed out of the body. The whole mass is coloured by the bile.

Ex. X. Read the text and discuss it:

MARINE POLLUTION PREVENTION

Civilization has its sunny and cloudy sides. The vessel traffic in the World Ocean is constantly growing; as a result the risk of marine pollution is greatly increasing. The pollution of the sea

has reached a very dangerous level and presents a serious threat to sea life and to the whole mankind. Marine pollution protection has become a global problem. We cannot stop progress but we can and must unite our efforts in protecting our planet.

That's why in 1973 the International conference adopted the Convention for the Prevention of pollution of the Sea by Oil. According to it, ships should be equipped with technical facilities that prevent the possibility of discharging waters containing oil or oil products into the sea. If a ship notices an oil slick, the captain should immediately inform the authorities about it. No matter how that oil has spilled into the sea, the inspectors have to make up a violation report.

In this case it is very important for the ship to prove that they haven't discharged any oil products overboard. They must show that the bilge water passes through a separator, that it is registered in the Oil Record Book. They must also prove that they have not violated the international Convention for the Prevention of Pollution of the Sea by Oil. They should also settle the matter with another ship in the vicinity.

On board every ship, there must be a sewage treatment plant. It operates continuously during the ship's stay in a port and in areas closed to discharge of sewage. The ship must be equipped with a system to comminute and disinfect the sewage. All the sewage is collected in the sewage tank. It is allowed to discharge overboard waters from sewage system at full speed when the ship is more than 300 miles off the coast.

The crewmen should also be informed of the Regulation according to which the disposal of all kinds of plastics into the sea is prohibited.

Food wastes should be stored in special receptacles, and in the port, dry rubbish and garbage should be taken away by ash-boats.

Unfortunately, these days a threat to sea life is still growing. Fish may no longer be healthy food. Studies show that parts of the North Sea contain pesticides, oil and poisonous metals such as cadmium, some of which has found its way into the liver tissue of fish. This could affect products such as cod liver oil.

Notes on the text:

1. traffic – движение.
2. threat – угроза.
3. facilities – средства.
4. slick – пятно.
5. violation – нарушение.
6. bilge water – трюмная вода.
7. sewage – сточные воды.

Ex. XI. Comment on some of the following sayings and find their equivalents in Armenian or Russian:

1. “Before healing others, heal yourself.”
2. “All the money in the world can’t buy you back good health.”
3. “The greatest wealth is health.”
4. “Eat to live, not live to eat.”
5. “Health is not valued till sickness comes.”
6. “Disease is somatic; the suffering from it, psychic.”

UNIT VII

ATHEROSCLEROSIS

"Life would be infinitely happier if we could only be born at the age of eighty and gradually approach eighteen".
Mark Twain

KEY VOCABULARY:

vessel ['ves(ə)l] – сосуд (для жидкости); communicating vessels – сообщающиеся сосуды

metabolic [metə'bɔlık] – относящийся к обмену веществ; metabolic disease – нарушение обмена веществ; metabolic disturbance – расстройство обмена веществ; metabolic process – обменный процесс; metabolic rate – скорость обмена веществ.

strain [streın] – 1. натяжение, растяжение; Syn: pull, tension; 2. напряжение; нагрузка; переутомление; emotional / mental strain – эмоциональное, душевное напряжение; physical strain – физическое напряжение.

irritate ['ırıteıt] – 1. возмущать, раздражать, сердить; Syn: provoke, vex; 2. досаждать, докучать, надоедать; Syn: annoy, fret; 3. вызывать раздражение, воспаление; 4. раздражать; стимулировать.

futile ['fju:taıl] – бесполезный, напрасный, тщетный; Syn: useless, unavailing.

lack [læk] – недостаток, нужда; отсутствие (чего-л.); for lack of – из-за нехватки.

adversely – неблагоприятно; adversely affected – негативно сказаться; adversely affect performances – отрицательно влиять на характеристики.
muscle ['mʌsl] – мускул, мышца; pain in muscles – боль в мышцах; to contract a muscle – сокращать мускул; to flex / tense / strain a muscle – напрягать мускул; to move a muscle – двигать мускулом; to pull a muscle – натягивать мускул; to relax a muscle – расслаблять мускул; to wrench a muscle – растягивать мускул; to develop one's muscles – развивать мускулы.
moderately ['mɔd(ə)rətlı] – умеренно, сдержанно, средне.
improve [ım'pru:v] – улучшаться; совершенствоваться; поправляться; налаживаться, things are improving – дела налаживаются; to improve in health – поправляться.
harm [hɑ:m] – вред; убыток, урон, ущерб; material harm – материальный ущерб; to do more harm than good – приносить больше вреда, чем пользы; out of harm's way – в безопасности; от греха подальше; bodily harm – телесное повреждение; grievous bodily harm – тяжкие телесные повреждения; Syn: hurt, injury, damage, mischief.

Ex. I. Read the text, translate it paying attention to the key vocabulary:

Atherosclerosis and its Treatment

Atherosclerosis figures prominently among the cardiovascular diseases and is thought to be due to many causes. Atherosclerosis of the blood **vessels** is the result of the **metabolic** disorders and especially of cholesterol exchange. The disorder usually starts long before there is any external evidence of the disease. It is therefore advisable to start prophylaxis and treatment

as early as possible. Any that causes nervous **strain** encourages the development of atherosclerosis, so prophylaxis and treatment consist mainly of advertising the patient how to live. He must keep regular hours, get up, eat, work, and go to bed at exactly the same time every day. He must learn not to lose temper over trifles, to deal calmly with irritating circumstances and avoid **futile** quarrels. Adequate sleep is essential, for it lets the nerve cells rest. The Atherosclerosis patient should sleep at least 7– 8 hours and take a walk before going to bed. He should see that he does not eat or do work involving nervous strain within 1–2 hours of going to bed. But sleep is not the only way of rest. Relaxation must be active and fruitful. Exhibitions, museums, theatres, books are available to all. They enrich the patient's everyday life, broaden his interests and leave less time for negative emotions.

Lack of adequate physical activities may cause Atherosclerosis, too. Physical exercises must become part of the patient's life, though naturally, account must be taken of the patient's physical condition. Atherosclerosis sufferers should avoid smoking because it **adversely** affects the walls of the vessels and can cause spasms. Alcohol, apparently, doesn't do any direct **harm** to the vessels. But alcohol is bad for the nervous system and the cardiac **muscles.** There will be greater **damage** to the heart of the patients who are drinkers. Diet is, of course most important for atherosclerosis patients. They should eat only **moderately.** They should take small quantities not only of fats but of carbohydrates. Meals should be regular and varied with the maximum inclusion of wholesome proteins, vegetables, fruit and vegetable oil. Vitamins are most important in treating Atherosclerosis. The C vitamin-ascorbic acid **improves** cholesterol

exchange, assists in removal of cholesterol and makes the vessel walls less easy to penetrate. The P vitamin-rutin-also has this effect on vessel walls. Without doubt, the vitamin of the B group.

Ex. II. Read the text again and answer the questions:

1. What kind of disease is atherosclerosis?
2. What are the main causes of atherosclerosis?
3. What prophylaxis and treatment is necessary to prevent the disease?
4. What should avoid atherosclerosis sufferers?
5. What type of diet is vital for atherosclerosis patients?
6. What is the role of vitamins in prophylaxis and treatment of the disease?
7. What drugs are used to treat the disease?

Ex. III. Find in the text above the English equivalents for the following words and phrases:

Раздражать; растяжение; обменный процесс; неблагоприятно; улучшаться; сообщающиеся сосуды; душевное напряжение; растягивать мускул; поправляться; приносить больше вреда, чем пользы; сдержанно; бесполезный; недостаток; скорость обмена веществ.

Ex. IV. Fill in the gaps with prepositions:

1. Has he been ill ……. a long time? 2. His back has been hurting ..... some time. 3. She is having bad pain ……. her shoulder. 4. Have you ever fallen ill ……..... summer? 5. You should consult the doctor ……..... the broken arm. 6. Whom do you consult ……..... heart trouble? 7. Feel his pulse and take him

……..... the polyclinic. 8. The patient complained ..... indigestion. 9. She suffers ……. shortness ……..... breath, edema ……..... the legs. 10. Jack had difficulties ……..... swallowing and was running a temperature. 11. Sleeping tablets are used ……..... inducing sleep. 12. What are you being treated …….?

Ex. V. Translate the sentences into English paying attention to the Future forms:

A.

1. Они думали, что они не полетят самолётом.
2. Она не знала, что он будет поздно.
3. Они думали, что она приедет?
4. Он сказал, что будет работать.
5. Мы верили, что мы сделаем правильный выбор.
6. Он сказал, он встретит меня.

B.

1. Я думал, ты опоздаешь. (Future Simple in the Past)
2. Я знал, что мы будем собираться в следующую пятницу. (Future Continuous in the Past)
3. Он сказал, что дочитает книгу к тому времени, когда она мне понадобится. (Future Perfect in the Past)
4. Он сказал, что к тому времени он уже будет ехать два часа. (Future Perfect Continuous in the Past)
5. Они думали, (что) она получит эту работу?
6. Она сказала, (что) она вернется на следующей неделе?

Ex. VI. Use the required tenses instead of the infinitives in brackets:

1. When Carol _____ (call) last night, I _____ (watch) my favorite show on television.

2. I _____ (work) for this company for more than thirty years, and I intend to stay here until I retire!
3. Sharon _____ (love) to travel. She _____ (go) abroad almost every summer. Next year, she plans to go to Peru.
4. Thomas is an author. He_____ (write) mystery novels and travel memoirs. He_____ (write) since he was twenty-eight. Altogether, he _____ (write) seven novels, three collections of short stories and a book of poetry.
5. We were late because we had some car problems. By the time we _____ (get) to the train station, Susan _____ (wait) for us for more than two hours.
6. Sam _____ (try) to change a light bulb when he _____ (slip) and _____ (fell).
7. Everyday I _____ (wake) up at 6 o'clock, _____ (eat) breakfast at 7 o'clock and _____ (leave) for work at 8 o'clock. However, this morning I _____ (get) up at 6:30, _____ (skip) breakfast and _____ (leave) for work late because I _____ (forget) to set my alarm.
8. Right now, Jim _____ (read) the newspaper and Kathy _____ (make) dinner. Last night at this time, they_____ (do) the same thing. She _____ (cook) and he _____ (read) the newspaper. Tomorrow at this time, they _____ (do, also) the same thing. She _____ (prepare) dinner and he _____ (read). They are very predictable people!
9. By this time next summer, you _____ (complete) your studies and _____ (find) a job. I, on the other hand, _____ (accomplish, not) anything. I _____

(study, still) and you _____ (work) in some new high paying job.
10. The students_____ (be, usually) taught by Mrs. Monty. However, this week they_____ (teach) taught by Mr. Tanzer.
11. They _____ (not speak) to the Headmaster yet.
12. The situation _____ (become) more serious in recent years.
13. When _____ (you, see) him last?
14. She's my best friend. – "How long _____ (you, know) her?"
15. He _____ (come) here three years ago.

Ex. VII. Translate the sentences into English:

1. Очевидность нельзя спрятать.
2. Команда резко повысила свой уровень под чутким руководством очень умного тренера.
3. Источники пересыхают.
4. Витамин С помогает всасыванию железа из пищи.
5. Он знал, что находился в большой опасности.
6. Бессмысленно рассуждать о том, что могло произойти.
7. Мышцы болят.

Ex. VIII. Read the passages and retell them:

The Head

The bony framework of the head, enclosing the brain and supporting it is the skull. The front part of the head is the face. Its upper part is composed of the forehead and the temples, which are formed by the frontal bone and the temporal bones of

the brain case (cranium). The two sides of the lower face are called the cheeks. The two jaws (upper and lower) form the framework of the mouth. The lower jaw also gives shape to the chin. The oral cavity contains the tongue and the teeth, the necks of which are enveloped into gums. The teeth are set in the jaw bones. With the teeth we chew and masticate our food and with the tongue we taste it. The two margins of the mouth are the lips which we use for speaking, whistling, sucking and kissing. The organs of special sense in the face are the eyes, the nose. The eye is set in a bony socket called the orbit. It is partly covered by the eyelid, so that only a small portion of it is visible. Moreover, the eyes are protected by the eyelashes and by the eyebrows. Of the ear we can see only the outer ear (auricle) and the external passage leading to the drum. The nose which we use for smelling, breathing and sneezing has two openings called nostrils. The bony part is called the bridge of the nose. The top and the back part of the head are covered with hair.

The Cell

Histology is the study of cells and tissues. It deals with the structure and work of the cells, corpuscles and other very small but vitally important structures.

The cell is composed of protoplasm – a jelly-like substance that is neither a solid nor a liquid. It is usually colourless or slightly yellow. It is in the protoplasm that all the functions occur, and for this reason it is called the physical basis of life. The protoplasm is made up of two parts: cytoplasm which is surrounded by the cell wall and contains the nucleus. The nucleus usually contains one or more separate bodies called nucleoli.

All the tissues and organs of the body are made up of cells. A tissue is defined as a group of similar cells that do similar work. In the body there are four main types of tissue:

1) epithelium, 2) connective tissue, 3) muscular tissue, 4) nervous tissue.

The Respiratory System

Respiration or breathing is the process by which

1) oxygen obtained from fresh air is absorbed into the blood stream,

2) carbon dioxide – the gas formed by tissue action - is removed from the blood and expelled into air which is then expired.

This exchange of gases takes place in the lungs, which are the principal organs of breathing; the other organs of breathing are the nose, pharynx, trachea and bronchi.

Air, in which there is about one-fifth of oxygen enters through the nose or mouth, passes through the pharynx (throat) and larynx (voice box) into the trachea (windpipe) and thence into the bronchi and lungs. The motions of the air when it is drawn in (inspiration) and expelled (expiration), are due to dilatation and reduction in volume of the thorax. In respiration the 'thorax is raised and lowered, and its internal capacity is altered by movements of the ribs and the diaphragm. As the thoracic cavity changes in size, the lungs similarly change. As the thoracic cavity is enlarged, the lungs tend to follow the chest wall, they expand outwards. This expansion sucks air through the air passages into the lungs. As the cavity is reduced, the lungs are compressed and the air is expired.

Ex. IX. Speak on the following sayings:

1. “Sometimes I get the feeling the aspirin companies are sponsoring my headaches.”
2. “To avoid sickness eat less; to prolong life worry less.”
3. “The groundwork for all happiness is good health.”
4. “Eat right, exercise regularly, die anyway.”

Ex. X. Write an independent essay on one of the topics:

1. An imaginary ailment is worse than a disease.
2. A good laugh and a long sleep are the best cures in the doctor’s book.
3. From the bitterness of disease man learns the sweetness of health.
4. Desperate diseases must have desperate remedies. /Drastic action is called for – and justified – when you find yourself in a particularly difficult situation /.

UNIT VIII

FROM THE HISTORY OF MEDICINE

"Diseases of the soul are more dangerous
than those of the body."
English Proverb

KEY VOCABULARY:

mummy ['mʌmɪ] – 1. мумия; 2. хорошо сохранившиеся останки; 3. бесформенная масса.
ingest [ɪn'ʤest] – глотать, проглатывать; Syn: swallow, gulp.
startling ['stɑ:tlɪŋ] – поразительный, потрясающий, удивительный; Syn: striking, staggering.
serendipitous [ser(ə)n'dɪpətəs] – связанный со счастливым случаем.
undetected [ʌndɪ'tektɪd] – необнаруженный, неоткрытый.
unavailable [ʌnə'veɪləbl] – 1. отсутствующий; 2. недоступный; 3. недействительный; 4. бесполезный; Syn: unavailing, inefficacious, ineffectual.
wavelength ['weɪvleŋθ] – длина волны; to work on different wavelengths – работать на разных частотах.
tend [tend] – иметь тенденцию (к чему-л.); клониться, склоняться (к чему-л.); to tend to the same conclusion – склоняться к тому же решению.
rate [reɪt] – норма; размер; уровень; величина (в расчёте на единицу).
indelible [ɪn'deləbl] – несмываемый; нестираемый – indelible pencil; Syn: permanent, ineffaceable.

signature ['sɪgnətʃə] – подпись; autograph / manual signature – собственноручная подпись; fictitious signature – поддельная подпись.
schedule ['ʃedju:l]; ['skedʒu:l] – список, перечень, каталог; опись, реестр; Syn: list, index, catalogue, inventory: scheduled – запланированный, плановый, регулярный, предусмотренный графиком.

Ex. I. Read the text, translate it paying attention to the key vocabulary:

Natural History
by George J. Armelagos

Ancient Nubians and Egyptians had a way with antibiotics. Some twenty years ago, Debra Martin placed a bit of bone from a **mummy** under a microscope and discovered that a person who lived in Nubia (northern Sudan) during the fourth century A.D. had apparently **ingested** tetracycline, a broad-spectrum antibiotic that entered the arsenal of modern medicine only in the 1950s. Finding a pair of designer sunglasses on the mummy would hardly have been more **startling.** And the discovery was purely **serendipitous.**

Today Martin is a professor of anthropology at Hampshire College in Amherst, but at the time she was a graduate student in biological anthropology at the University of Massachusetts. As part of her training, she was visiting a research laboratory at Henry Ford Hospital in Detroit, Michigan, to learn techniques for making thin sections of bones from archaeological finds. Normally she would have relied on a standard microscope, and the tetracycline would have gone **undetected.** But because the

standard microscope was **unavailable,** another researcher suggested Martin try one that used ultraviolet light. At one specific **wavelength,** ultraviolet light causes tetracycline to fluoresce with a unique yellow-greenish color. In the lab, researchers under the direction of Harold Frost were using tetracycline to measure the **rate** of bone formation.

Tetracycline **tends** to bind with calcium and phosphorus, which make up more than 80 percent of the mineral portion of mature bone. (Patients who are taking the drug are advised not to drink milk or take antacids containing calcium, since the tetracycline will bind to the calcium and lose its antibiotic effectiveness.) Any tetracycline circulating in the body may bind with calcium that is being deposited in the bone, "labeling" (tagging) the bone with its **indelible signature.** In the laboratory study, people who were **scheduled** to have bone removed during biopsy or amputation were asked to take tetracycline at intervals before the surgery. Bone deposits formed during this period could then be identified and measured.

Ex. II. Read the text again and answer the questions:

1. Why was the discovery made by D. Martin serendipitous?
2. What did another researcher advise Martin to do?
3. How was the rate of bone formation measured?
4. What are the characteristics of tetracycline?
5. Why were the patients asked to take tetracycline before surgery?

Ex. III. Find in the text above the English equivalents for the following words and phrases:

Собственноручная подпись; плановый; несмываемый; недоступный; длина волны; уровень; поразительный; склоняться

(к чему-л.); связанный со счастливым случаем; глотать; поддельная подпись; хорошо сохранившиеся останки.

Ex. IV. Use the required tenses instead of the infinitives in brackets:

1. When Carol _____ (call) last night, I _____ (watch) my favorite show on television.
2. I _____ (work) for this company for more than thirty years, and I intend to stay here until I retire!
3. Sharon _____ (love) to travel. She _____ (go) abroad almost every summer. Next year, she plans to go to Peru.
4. Thomas is an author. He_____ (write) mystery novels and travel memoirs. He_____ (write) since he was twenty-eight. Altogether, he _____ (write) seven novels, three collections of short stories and a book of poetry.
5. We were late because we had some car problems. By the time we _____ (get) to the train station, Susan _____ (wait) for us for more than two hours.
6. Sam _____ (try) to change a light bulb when he _____(slip) and _____ (fell).
7. Everyday I _____ (wake) up at 6 o'clock, _____ (eat) breakfast at 7 o'clock and _____ (leave) for work at 8 o'clock. However, this morning I _____ (get) up at 6:30, _____ (skip) breakfast and _____ (leave) for work late because I _____ (forget) to set my alarm.
8. Right now, Jim _____ (read) the newspaper and Kathy _____ (make) dinner. Last night at this time, they _____ (do) the same thing. She _____ (cook)

and he _____ (read) the newspaper. Tomorrow at this time, they _____ (do, also) the same thing. She _____ (prepare) dinner and he _____ (read). They are very predictable people!

9. By this time next summer, you _____ (complete) your studies and _____ (find) a job. I, on the other hand, _____ (accomplish, not) anything. I _____ (study, still) and you _____ (work) in some new high paying job.

Ex. V. Match the following definitions with the terms:

1. rate	a) the number of times something happens within a particular period of time.
2. serendipitous	b) cannot be removed or erased.
3. ingest	c) a list of planned activities or events and when they are intended to happen or be done.
4. indelible	d) serve oneself to, or consume regularly.
5. schedule	e) not available or accessible or at hand.
6 unavailable	f) rock fragments and pebbles.
7. deposited	g) a distinctive characteristic by which somebody or somebody's work can be identified.
8. sediment	h) lucky in making unexpected and fortunate discoveries.
9. gravel	i) matter that has been deposited by some natural process.
10. signature	j) the phenomenon of sediment or gravel accumulating.

Ex.VI. Translate the sentences into English using the active vocabulary of the text:

1. Старые богословские догматы стали не более чем мумиями.
2. Жалуйся, не жалуйся – всё бесполезно.
3. Студенты очень его ценили.
4. Это вино признано отличным.
5. Люди работают в разном темпе.
6. Я считаю его своим другом / Я причисляю его к своим друзьям.
7. Её считали прекрасной пианисткой.
8. Почему ты считаешь, что делать эту работу ниже твоего достоинства?
9. Кажется, руководство компании ценит его очень высоко (т.е. считает его очень хорошим).
10. У нее были потрясающие голубые глаза.
11. Потрясающий новый оперный театр Сиднея является наиболее часто посещаемым местом.
12. Мой секретарь принесет документы для подписания сегодня днем.
13. Требуется официальная подпись 28 государств-членов и Европейского парламента.
14. Подписание партнерского соглашения необходимо для продолжения сделки.
15. Была выставка мумии Тутанхамона.
16. Опубликованные сегодня цифры показывают очередное падение уровня инфляции.
17. Большинство людей ходят со средней скоростью 5 километров в час.
18. При таком уровне работы ты никогда не закончишь!

Ex. VII. Make up a situation using the words and phrases given below:

To go to a party; someday ago; to overeat; to suffer from gastro-intestinal symptoms; nausea; vomiting; to consult; therapeutic; to diagnose; acute gastritis; to prescribe; a diet.

Ex. VIII. Choose the right option of the modal verbs:

1. I didn't feel very well yesterday. I ..... eat anything.
a) couldn't
b) mustn't
c) cannot
2. You..... look at me when I am talking to you.
a) could
b) should
c) would
3. I was using my pencil a minute ago. It …….. be here somewhere!
a) can
b) could
c) must
4. You really…….. be late again.
a) must not
b) don't have to be
c) would
5. If you don't start working harder, you ..... repeat the course next year.
a) have to
b) must
c) will have to

6. His parents spoil him. He's always …….. to do whatever he wants.
a) been able
b) been allowed
c) could
7. Phone her now. She …..... home by now.
a) has to be
b) must be
c) would be
8. You ..... forget your sun cream. It's going to be very hot!
a) don't have to
b) mustn't
c) needn't
9. I …….. be able to help you, but I'm not sure yet.
a) would
b) might
c) could
10. Entrance to the museum was free. We …….. pay to get in.
a) needn't
b) didn't need to
c) would
11. Already as a child Mozart …….. play the piano beautifully.
a) could
b) should
c) would
12. Which sign are you more likely to see at an airport: *Bags ……. not be left unattended.*
a) can
b) must
c) may

13) I really ..... try to get fit.
a) may
b) must
c) would
14. …….. take a photograph of you?
a) Am I allowed to
b) May I
c) Must I
15. Students …….. borrow up to 6 books at any time.
a) are allowed to
b) could
c) can
16. Whose is this bag? – I don't know, but it …..... belong to Yuta.
a) could
b) may
c) should
17. ..... I go to the bathroom, please?
a) May
b) Must
c) would
18. His excuse ……... be true, but I don't believe.
a) can
b) may
c) would
19. It's very important to ..... speak more than one language.
a) can
b) be able to
c) be to
20. I don't like …..... get up early on a Sunday.

a) being able to
b) being allowed to
c) having to

Get to know different meanings of "FOR"

"For" – для, на, за, в, к, в течение, от, ради, из-за, вместо, ибо, ввиду того, что так как, потому что, ибо, довод в пользу чего-л.

Ex. IX. Translate the sentences paying attention to different meanings of *"for":*

A.

1. Это письмо для тебя.
2. Я купил это для мамы на её день рождения.
3. Кандидат выступил с речью для гигантской толпы своих сторонников.
4. Мы собираемся пойти в кафе за пиццей. Хочешь присоединиться?
5. Не хочешь пойти погулять по старому городу?
6. Эти ботинки для бега.
7. Я взял отгул, чтобы помочь родителям с переездом.
8. Я купил эту длинную ложку для размешивания коктейлей. Для чего ты это делаешь?
9. Для чего он это сказал?
10. Я работаю здесь два года.
11. Мне бы хотелось посидеть пару минут.
12. Мы собираеся порепетировать час или два.
13. Мы собираемся репетировать через час или два.
14. Мне бы хотелось обменять рубли на евро.

B.

1. Он обменял свою машину на другую. Я купил этот билет за 60$.
2. Купите два за 50$! Сегодняшний курс рубля: 67,05 за 1$.
3. Поторапливайся. Я жду. Поторапливайся, я жду тебя. Я тебя критикую, потому что беспокоюсь!
4. Я тебя критикую, потому что беспокоюсь о тебе!
5. Эта бумага для рисования акварелью.
6. Этот конверт для мистера Брауна.
7. Я хочу уехать на Мальту на недельку.
8. Я дам тебе время, чтобы подумать.
9. Официант принес меню для гостей.
10. Ты обменял свою квартиру на этот старый коттедж?!
11. Это нож для разрезания бумаги.
12. Каждый день я тренируюсь по тридцать минут.
13. Этот тостер будет ваш всего за 99$!

Ex. X. Read and retell the following text:

Hospitals in the 17-th Century

A French hospital of the 17-th century is described as follows: “In one bed of moderate width lay four, five or six persons beside each other, the feet of one to the head of another, children beside old gray-haired men; indeed, incredible but true, men and women intermingled together. In the same bed lay individuals affected with some infectious disease beside others only slightly unwell. On the same couch, body against body, a woman groaned in the pangs of labour, a nursing infant writhed in convulsions, a typhus patient burned in the delirium of fever, a consumptive coughed his hollow cough and a victim of some disease of the skin tore with furious nails his itching skin.

The patients lacked the greatest necessities.

The most miserable food was doled out to them in insufficient quantities and at irregular intervals. Sometimes food was brought to the patients by the wealthy citizens from the city. For this purpose the door of the hospital stood open day and night. Anyone could enter, anyone brought whatever he wished, and while the sick on one day might be starved, on another day might very likely get immoderately drunk and kill themselves by overloading their stomachs. The building swarmed with vermin, and the air of a morning was so vile in the wards that the attendants only entered with a sponge saturated with vinegar held before their faces.

About 1/5 of the patients in this hospital died. Recovery from a surgical operation was a rarity. In a hospital in Lyon in 1619, accommodating 549 patients there was only one medical man whose duty it was to look after the surgical cases. The stock of surgical instruments possessed by that hospital consisted of just five which included a trephine for opening the skull and a mouth plug for keeping the jaws separated.

Ex. XI. Use the required tenses instead of the infinitives in brackets and retell the stories:

James Cook (1728–1779)

The British explorer James Cook was born in the village of Marton, Yorkshire, on 27 October, 1728. However, his family soon _____ (move) to another village, called Great Ayton, where Cook _____ (spend) most of his childhood. As a teenager James Cook _____ (develop) a fascination for the sea and _____ (travel) to Whitby where he _____ (find) employment on a coal ship. While he

_____ (serve) in the Royal Navy during the Seven Years' War (1756 – 1763), Cook _____ (have) the command of a ship. After the war _____ (end), Cook _____ (take) command of the vessel Grenville and _____ (go) to Newfoundland to survey the coasts there. While he _____ (map) the coasts of Newfoundland, he _____ (observe) a solar eclipse off the North American coast. Cook _____ (send) the details to the Royal Society, England's leading scientific organisation, and _____ (win) their attention. After Cook _____ (publish) his observations of

the solar eclipse, the RoyalSociety_____ (ask) him to lead a scientific expedition to Tahiti and _____ (put) him in command of the HMS Endeavour. From Tahiti Cookthen _____ (go on) to explore the South Pacific. He also _____ (reach) New Zealand, which only the Dutchman Abel Tasman _____ (visit) before Cook. After Cook _____ (map) New Zealand's complete coastline, he _____ (sail) to Australia's east coast. Cook _____ (name) the area New South Wales as it _____ (remind) him of the south coast of Wales in Great Britain.

My trip to the Poconos

_____ (ever –you – fly) to America? Kevin is lucky – he _____ (can) visit his cousin Amy Baxter last year. Yesterday, while Kevin _____ (read) a book, his mother _____ (come) in and gave him a letter from Amy. He read: “Hi, Kevin, I hope you_____ (not forget) me yet. _____ (you – remember) how much fun we _____

(have) last year? What _____ (do – you) since then? Well, let me tell you the chaotic story of my trip to the Poconos. I _____ (want) to spend a nice weekend with my friend Jane. She _____ (live) in Manhattan for some months now." "I´m sure we _____ (have) lots of fun," Jane said while I _____ (unpack) my things. "If the weather _____ (be) fine tomorrow, we _____ (go) on a trip to the Poconos." "I think this is a fantastic idea," I _____ (agree). "I _____ to climb the highest mountains." When we _____ (drive) along Interstate 95 the next day we _____ (notice) a red light in Jane´s mother´s car. "I think, if we _____ (want) to reach the Poconos we _____ (need) some help firs," Jane´s mother said. "I _____ (read – never) the handbook, so I _____ (not have) any idea what´s wrong. "We _____ (leave) the expressway and soon saw the sign of a car repair garage. The mechanic quickly _____ (check) the car and smiled. "Lady," he said, "I _____ (see) this problem many times before. I'm sorry, but a mechanic is not what you need. If you _____ (not fill) up the tank, you _____ (get – never) to the Poconos."

Ex. XII. Write a short essay on the following proverb:

"Laughter is the best medicine."

SUPPLEMENTARY READING

Stress Symptoms, Signs and Causes

Improving Your Ability to Handle Stress

Stress isn't always bad. In small doses, it can help you perform under pressure and motivate you to do your best. However, when you're constantly running in emergency mode, your mind and body pay the price. If you frequently find yourself, feeling frazzled and overwhelmed, it's time to take action to bring your nervous system back into balance. You can protect yourself, and improve how you think and feel by learning how to recognize the signs and symptoms of chronic stress and taking steps to reduce its harmful effects.

What is stress?

Stress is your body's way of responding to any kind of demand or threat. When you sense danger, whether it's real or imagined, the body's defenses kick into high gear in a rapid, automatic process known as the "fight-or-flight" reaction or the "stress response."

The stress response is the body's way of protecting you. When working properly, it helps you stay focused, energetic, and alert. In emergencies, stress can save your life—giving you extra strength to defend yourself, for example, or spurring you to slam on the brakes to avoid a car accident.

Stress can also help you rise to meet challenges. It's what keeps you on your toes during a presentation at work, sharpens your concentration when you're attempting the game-winning free throw, or drives you to study for an exam when you'd rather be watching TV. But beyond a certain point, stress stops being

helpful and starts causing major damage to your health, mood, productivity, relationships, and your quality of life.

Fight-or-flight response: what happens in the body?

When you feel threatened, your nervous system responds by releasing a flood of stress hormones, including adrenaline and cortisol, which rouse the body for emergency action. Your heart pounds faster, muscles tighten, blood pressure rises, breath quickens, and your senses become sharper. These physical changes increase your strength and stamina, speed up your reaction time, and enhance your focus, preparing you to either fight or flee from the danger at hand.

The effects of chronic stress

Your nervous system isn't very good at distinguishing between emotional and physical threats. If you're super stressed over an argument with a friend, a work deadline, or a mountain of bills, your body can react just as strongly as if you're facing a true life-or-death situation. And the more your emergency stress system is activated, the easier it becomes to trigger, making it harder to shut off.

If you tend to get stressed out frequently, like many of us in today's demanding world, your body may exist in a heightened state of stress most of the time. And that can lead to serious health problems. Chronic stress disrupts nearly every system in your body. It can suppress your immune system, upset your digestive and reproductive systems, increase the risk of heart attack and stroke, and speed up the aging process. It can even rewire the brain, leaving you more vulnerable to anxiety, depression, and other mental health problems.

Health problems caused or exacerbated by stress, include:

1. Depression and anxiety.
2. Pain of any kind.
3. Sleep problems.
4. Autoimmune diseases.
5. Digestive problems.
6. Skin conditions, such as eczema.
7. Heart disease.
8. Weight problems.
9. Reproductive issues.
10. Thinking and memory problems.

Signs and symptoms of stress overload

The most dangerous thing about stress is how easily it can creep up on you. You get used to it. It starts to feel familiar, even normal. You don't notice how much it's affecting you, even as it takes a heavy toll. That's why it's important to be aware of the common warning signs and symptoms of stress overload.

Cognitive symptoms:

- Memory problems.
- Inability to concentrate.
- Poor judgment.
- Seeing only the negative.
- Anxious or racing thoughts.
- Constant worrying.

Emotional symptoms:

- Depression or general unhappiness.

- Anxiety and agitation.
- Moodiness, irritability, or anger.
- Feeling overwhelmed.
- Loneliness and isolation.
- Other mental or emotional health problems.

Physical symptoms:

- Aches and pains.
- Diarrhea or constipation.
- Nausea, dizziness.
- Chest pain, rapid heart rate.
- Loss of sex drive.
- Frequent colds or flu.

Behavioral symptoms:

- Eating more or less.
- Sleeping too much or too little.
- Withdrawing from others.
- Procrastinating or neglecting responsibilities.
- Using alcohol, cigarettes, or drugs to relax.
- Nervous habits (e.g. nail biting, pacing).

Causes of stress

The situations and pressures that cause stress are known as stressors. We usually think of stressors as being negative, such as an exhausting work schedule or a rocky relationship. However, anything that puts high demands on you, can be stressful. This includes positive events such as getting married, buying a house, going to college, or receiving a promotion.

Of course, not all stress is caused by external factors. Stress can also be internal or self-generated, when you worry excessively about something that may or may not happen, or have irrational, pessimistic thoughts about life.

Finally, what causes stress depends, at least in part, on your perception of it. Something that's stressful to you may not faze someone else; they may even enjoy it. While some of us are terrified of getting up in front of people to perform or speak, for example, others live for the spotlight. Where one person thrives under pressure and performs best in the face of a tight deadline, another will shut down when work demands escalate. And while you may enjoy helping to care for your elderly parents, your siblings may find the demands of caretaking overwhelming and stressful.

Common external causes of stress include:

- Major life changes.
- Work or school.
- Relationship difficulties.
- Financial problems.
- Being too busy.
- Children and family.

Common internal causes of stress include:

- Pessimism.
- Inability to accept uncertainty.
- Rigid thinking, lack of flexibility.
- Negative self-talk.
- Unrealistic expectations / perfectionism.
- All-or-nothing attitude.

TOP 10 STRESSFUL LIFE EVENTS

According to the widely validated Holmes and Rahe Stress Scale, these are the top ten stressful life events for adults that can contribute to illness:

1. Death of a spouse.
2. Divorce.
3. Marriage separation.
4. Imprisonment.
5. Death of a close family member.
6. Injury or illness.
7. Marriage.
8. Job loss.
9. Marriage reconciliation.
10. Retirement.

What's stressful for you?

Whatever event or situation is stressing you out, there are ways of coping with the problem and regaining your balance. Some of life's most common sources of stress include:

Stress at work

While some workplace stress is normal, excessive stress can interfere with your productivity and performance, influence your physical and emotional health, and affect your relationships and home life. It can even determine the difference between success and failure on the job. Whatever your ambitions or work demands, there are steps you can take to protect yourself from the damaging effects of stress, improve your job satisfaction, and bolster your well-being in and out of the workplace.

Job loss and unemployment stress

Losing a job is one of life's most stressful experiences. It's normal to feel angry, hurt, or depressed, grieve for all that you've lost, or feel anxious about what the future holds. Job loss and unemployment involves a lot of change all at once, which can rock your sense of purpose and self-esteem. While the stress can seem overwhelming, there are many steps you can take to come out of this difficult period stronger, more resilient, and with a renewed sense of purpose.

Caregiver stress

The demands of caregiving can be overwhelming, especially if you feel that you're in over your head or have little control over the situation. If the stress of caregiving is left unchecked, it can take a toll on your health, relationships, and state of mind – eventually leading to burnout. However, there are plenty of things you can do to rein in the stress of caregiving and regain a sense of balance, joy, and hope in your life.

Grief and loss

Coping with the loss of someone or something you love is one of life's biggest stressors. Often, the pain and stress of loss can feel overwhelming. You may experience all kinds of difficult and unexpected emotions, from shock or anger to disbelief, guilt, and profound sadness. While there is no right or wrong way to grieve, there are healthy ways to cope with the pain that, in time, can ease your sadness and help you come to terms with your loss, find new meaning, and move on with your life.

How much stress is too much?

Because of the widespread damage, stress can cause, it's important to know your own limit. But just how much stress is "too much" differs from person to person. Some people seem to be able to roll with life's punches, while others tend to crumble in the face of small obstacles or frustrations. Some people even thrive on the excitement of a high-stress lifestyle.

Factors that influence your stress tolerance level include:

Your support network. A strong network of supportive friends and family members is an enormous buffer against stress. When you have people you can count on, life's pressures don't seem as overwhelming. On the flip side, the lonelier and more isolated you are, the greater your risk of succumbing to stress.

Your sense of control.

If you have confidence in yourself and your ability to influence events and persevere through challenges, it's easier to take stress in stride. On the other hand, if you believe that you have little control over your life – that you're at the mercy of your environment and circumstances. stress is more likely to knock you off course.

Your attitude and outlook.

The way you look at life and its inevitable challenges makes a huge difference in your ability to handle stress. If you're generally hopeful and optimistic, you'll be less vulnerable. Stress-hardy people tend to embrace challenges, have a stronger sense of humor, believe in a higher purpose, and accept change as an inevitable part of life.

Your ability to deal with your emotions.

If you don't know how to calm and soothe yourself when you're feeling sad, angry, or troubled, you're more likely to become stressed and agitated. Having the ability to identify and deal appropriately with your emotions can increase your tolerance to stress and help you bounce back from adversity.

Your knowledge and preparation.

The more you know about a stressful situation, including how long it will last and what to expect, the easier it is to cope. For example, if you go into surgery with a realistic picture of what to expect post-op, a painful recovery will be less stressful than if you were expecting to bounce back immediately.

IMPROVING YOUR ABILITY TO HANDLE STRESS

Get moving

Upping your activity level is one tactic you can employ right now to help relieve stress and start to feel better. Regular exercise can lift your mood and serve as a distraction from worries, allowing you to break out of the cycle of negative thoughts that feed stress. Rhythmic exercises such as walking, running, swimming, and dancing are particularly effective, especially if you exercise mindfully (focusing your attention on the physical sensations you experience as you move).

Connect to others

The simple act of talking face-to-face with another human can trigger hormones that relieve stress when you're feeling agitated or insecure. Even just a brief exchange of kind words or a friendly look from another human being can help calm and

soothe your nervous system. So, spend time with people who improve your mood and don't let your responsibilities keep you from having a social life. If you don't have any close relationships, or your relationships are the source of your stress, make it a priority to build stronger and more satisfying connections.

Engage your senses

Another fast way to relieve stress is by engaging one or more of your senses – sight, sound, taste, smell, touch, or movement. The key is to find the sensory input that works for you. Does listening to an uplifting song make you feel calm? Or smelling ground coffee? Or maybe petting an animal works quickly to make you feel centered? Everyone responds to sensory input a little differently, so experiment to find what works best for you.

Learn to relax

You can't completely eliminate stress from your life, but you can control how much it affects you. Relaxation techniques such as yoga, meditation, and deep breathing activate the body's relaxation response, a state of restfulness that is the polar opposite of the stress response. When practiced regularly, these activities can reduce your everyday stress levels and boost feelings of joy and serenity. They also increase your ability to stay calm and collected under pressure.

Eat a healthy diet

The food you eat can improve or worsen your mood and affect your ability to cope with life's stressors. Eating a diet full of processed and convenience food, refined carbohydrates, and sugary snacks can worsen symptoms of stress, while a diet rich in fresh

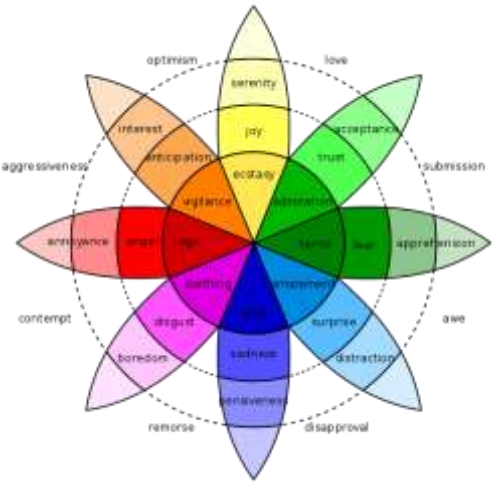
fruit and vegetables, high-quality protein, and omega –3 fatty acids, can help you better cope with life's ups and downs.

Get your rest

Feeling tired can increase stress by causing you to think irrationally. At the same time, chronic stress can disrupt your sleep. Whether you're having trouble falling asleep or staying asleep at night, there are plenty of ways to improve your sleep so you feel less stressed and more productive and emotionally balanced.

Wheel of Emotions

Robert Plutchik was a Professor Emeritus at the Albert Einstein College of Medicine and adjunct professor at the University of South Florida. His research interests include the study of emotions, the study of suicide and violence, and the study of the psychotherapy process. Plutchik created a wheel of emotions in 1980, which consisted of eight basic emotions and eight advanced emotions each composed of two basic ones.



This wheel is used to illustrate different emotions compelling and nuanced. Like colors, primary emotions can be expressed at different intensities and can mix with one another to form different emotions.

Suppressing Negative Emotional Memories

Negative emotional memories can be suppressed with practice, offering the possibility of new treatments for people suffering from a range of conditions including post-traumatic stress disorder, phobias, depression, anxiety and obsessive-compulsive syndrome.

The study measured brain activity in subjects trained to suppress memories of negative images and identified two neural mechanisms operating in the prefrontal region of the brain.

Brendan Depue said:

"We have shown in this study that individuals have the ability to suppress specific memories at a particular moment in time through repeated practice. We think we now have a grasp of the neural mechanisms at work, and hope the new findings and future research will lead to new therapeutic and pharmacological approaches to treating a variety of emotional disorders."

Subjects were asked to memorize 40 different pairs of pictures, each consisting of a "neutral" human face and a disturbing image (e.g. a car crash, a wounded soldier, a violent crime scene, an electric chair). Subjects were placed in MRI scanners and shown only the face image from each pair. They were asked to either think about, or not think about, the disturbing image previously associated with it.

Researchers found that the resulting functional brain imaging scans indicated that coordination for memory suppression

occurred in the prefrontal cortex with two specific regions, the hippocampus and amygdala appearing to work together to suppress particular posterior brain regions like the visual cortex, involved in visual recall, memory encoding and retrieval, and emotional output.

These results indicate memory suppression does occur, and, at least in non-psychiatric populations, is under the control of prefrontal regions.

The most anterior portion of the prefrontal cortex is a relatively recent human evolutionary feature and is greatly enlarged compared to great apes. Study participants were able to "exert some control over their emotional memories. By essentially shutting down specific portions of the brain, they were able to stop the retrieval process of particular memories."

The researcher speculated that "memory suppression could be a positive evolutionary trait" suggesting that a Stone Age hunter would have starved if unable to deal with traumatic memories of a close encounter with a lion while hunting for food.

"It is not clear to what extent an extremely traumatic emotional memory, like a violent battlefield incident or a crippling car accident, manifests itself in the human brain. In cases like this, a person could need thousands of repetitions of training to suppress such memories. We just don't know yet."

"The concept of repressed memories originated by psychologist Sigmund Freud more than a century ago, is extremely controversial. There is considerable debate today over whether repressed memories and suppressed memories are interchangeable terms, and even as to whether repressed memories exist at all."

"The debate over repressed memories probably won't be resolved in my lifetime. I think the important thing here is that we

have identified neural mechanisms with potential for helping the clinical community develop new therapeutic and pharmaceutical approaches for people suffering from emotional disorders."

Anxiety and Heart Attacks

Research has found that longstanding anxiety significantly increases the risk of heart attack in men, even when other common risk factors are taken into account.

Researchers said "What we're seeing is over and beyond what can be explained by blood pressure, obesity, cholesterol, age, cigarette smoking, blood sugar levels and other cardiovascular risk factors. These psychological factors are important in predicting the risk of heart disease, but anxiety is unique. Older men with sustained and pervasive anxiety appear to be at increased risk for a heart attack even after their levels of depression, anger, hostility and Type A behavior are considered."

In the current study researchers tested four measures of anxiety:

- Psychasthenia – excessive doubts, obsessive thoughts and irrational compulsions;
- Social introversion – anxiety, insecurity, and discomfort in interpersonal and social situations;
- Phobias – excessive anxieties or fears about animals, situations or objects; and
- Manifest anxiety – the tendency to experience tension and physical arousal in stressful situations.

Hostility, anger, Type A behavior, depression, and negative emotions were tested separately. Participants also completed

questionnaires about health habits such as smoking, alcohol consumption and diet. Researchers found that those who tested at the highest 15th percentile on any of the four anxiety scales, as well as on a scale combining all four, faced an increase in the risk of heart attack of approximately 30 to 40 per cent. Those with higher levels of anxiety faced an even higher risk. This held true after adjusting for standard cardiovascular risk factors, health habits, and negative psychological and personality traits. Further research is needed to compare these findings in women.

The good thing about anxiety is that it's very treatable. If someone is highly anxious-if they're suffering from panic attacks or social phobia or constant worry-we recommend therapy. Although more research is needed, we hope that by reducing anxiety, we can lower the future risk of heart attack. This is one more reason to seek help.

SURVAVALISM

Survivalism is a movement of individuals or groups (called survivalists or preppers) who are actively preparing for possible disruptions in social or political order, on scales ranging from local to international. Survivalists often have emergency medical and self-defense training, stockpile food and water, prepare for self-sufficiency, and build structures that will help them survive or "disappear" (e.g. a survival retreat or underground shelter).

Anticipated disruptions include the following:

- Clusters of natural disasters, patterns of apocalyptic planetary crises, or Earth Changes (tornadoes, hurricanes, earthquakes, blizzards, severe thunderstorms).

- A disaster caused by the activities of humankind (chemical spills, release of radioactive materials, nuclear or conventional war, oppressive governments).
- The general collapse of society caused by the shortage or unavailability of resources such as electricity, fuel, food, or water.
- Financial disruption or economic collapse (caused by monetary manipulation, hyperinflation, deflation, or depression).
- A global pandemic.
- Widespread chaos or some other unexplained apocalyptic event.

MOST IMPORTANT MEDICAL DISCOVERIES

Medicine is an ever-evolving field. New breakthroughs are being made all the time, but there are some discoveries that will always stand out as changing human thinking forever. Thanks to medicine, diseases have been eradicated, babies have been created and illnesses that used to be serious are now relatively mild. So, be grateful for living in the 21-st century as we take a look at the Top 10 Most Important Medical Discoveries.

10. Anesthetic

If you've ever visited a museum of naval history, you will inevitably have come across a display that shows how they used to do surgical procedures on board ships in the 1800s. Amputations were done on a table, with the injured man biting on a piece of wood to stop from screaming. You probably shuddered then and are probably shuddering now.

Fortunately, the late 19th century saw the discovery of anesthetia, which numbs all sensation in the patient. An early anaesthetic was cocaine, first isolated by *Karl Koller.* It was an effective numbing agent, but as we now know it is also addictive and open to abuse. Around the same time, chloroform was also being

used to numb pain (as demonstrated by John Snow during one of Queen Victoria's births), but this too had potentially lethal side-effects. Luckily, today's anesthetics are both effective and safe.

9. Birth Control

Another huge difference that occurred in the late 19-th century was the drop in birth rate as people started choosing to have smaller families. In the UK, for instance, the birth rate was 35.5 births per 1,000 people in 1870 and was down to 29 per 1,000 in 1900. This was, in part, due to better education about sex and reproduction but it was also due to better methods of birth control.
In the US, the "birth control movement" started a few years later, when a group of radicals, led by *Emma Goodman* (above), decided to start educating their fellow women about contraception to try and control the number of unwanted pregnancies. Their campaign was eventually successful and the Planned Parenthood Federation of America was formed in 1942. Birth control remains unpopular with some religious groups, but it has had a profound and undeniable social effect.

8. MMR

Another controversial one now, with the combined vaccine for measles, mumps and rubella. It was licensed in 1971, by Maurice Hilleman and immediately had a significant effect on the number of measles cases reported, with hundreds of thousands in the US during the 1960s (1966 saw 450,000) reduced to thousands by the 1980s.

The controversy occurred much later, in 1998, when Andrew Wakefield was paid by lawyers to find a way to discredit the MMR. He did this effectively, by publishing a paper claiming that there was a link between the MMR vaccine and autism. The research has since been entirely discredited, but the effects on vaccination rates was devastating, with the officially eliminated disease reoccurring in the US. Similarly, in the UK the number of measles cases had dropped to 56 in 1998 and was up to 1348 in 2008. There is also an epidemic in the UK in 2013, largely around Wales. MMR rates are now increasing again, thanks to emergency vaccination programs and it can be safely said that the MMR is a significant medical breakthrough.

7. X-Ray

A medical procedure that is now so common that we take it for granted, the X-Ray was discovered by accident. Its inventor was Wilhelm Conrad Röntgen and on 8 Nov, 1895 he discovered that his cathode ray tube could produce some unusual images. A week later, he x-rayed his wife's hand and the resulting image was close to our modern x-rays – her bones and wedding ring were clearly visible, but flesh was not. He named it "X-ray" as the x stood for "unknown", but they are occasionally known as Röntgen rays in his native Germany. He was awarded the first Nobel Prize in 1901 and his invention continues to be used in hospitals everywhere.

6. Insulin

Another breakthrough that is used on a daily basis by diabetics, insulin is the life-saving hormone that keeps our blood sugars in check. Diabetics are either missing this hormone entirely (with type 1 diabetes) or produce it but not in a way their bodies can use (type 2). It was first isolated in 1921, by scientists from the University of Toronto, who were later awarded the Nobel Prize for their discovery. The following year, a 14-year-old called *Leonard Thompson* (above) became the first human to receive artificial insulin after coming close to a diabetic coma. He rallied after his second dose (the first was found to be impure) and lived another 13 years.

It's hard to imagine, given that diabetics can now live very normal lives, but Type 1 Diabetes used to be a terminal disease. Apart from diet management, there was nothing that could be done to combat the disease. Nowadays, it still isn't curable but is manageable thanks to insulin – just as well, given that obesity rates are rising, and diabetes rates with them. Insulin could become the most useful drug in the world…

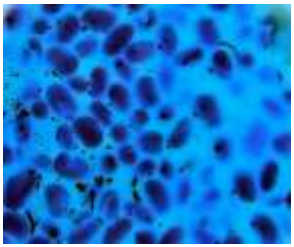
5. IVF

While birth control was a major breakthrough in limiting unwanted pregnancies, its opposite in many ways, is just as important. In-vitro fertilization is a way of creating pregnancies,

for people who have no other way of getting pregnant. The history of IVF dates back to the 1950s, but it wasn't until 1978 that the first "test-tube baby" was born. The second was born a year later in Scotland, although there were unconfirmed reports that there had been a baby born in India between the two.

As with any science that is seen to interfere with natural conception, IVF has been controversial. It is still outlawed by the *Catholic Church*, with its teaching describing babies born through IVF as a "commodity". There has also been criticism from other quarters about the multi-million dollar nature of the IVF industry and the implications of allowing couples to "design" their baby by selecting embryos based on gender etc. But for childless couples, IVF is a miracle and it should be recognized as an amazing breakthrough.

4. Germ Theory

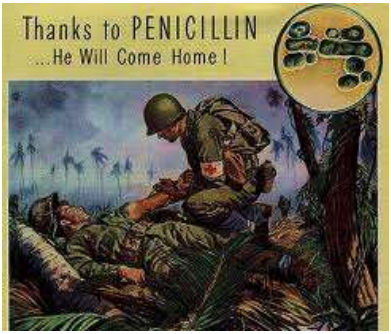


The discovery of germs was such a huge moment in the history of medicine that it completely changed the way that we think. Prior to that, patients were advised to carry around things that smelt bad, in order to ward off the "bad air" or *miasma*, particles of decaying matter that got into the air and caused diseases. The actual cause of disease – germs – were discovered by various scientists, but the breakthrough came in 1854, when John Snow

linked an outbreak of cholera to a specific water pump in Broad Street, London.

By isolating the source of the disease, he could then analyze what was in the water causing it. He tracked it down to an old cesspit, over which the pump was built and specifically a baby's nappy that contained the cholera germs. However, his work was rejected by the government of the time, as the idea of people breathing in other people's fecal matter was considered unseemly. A few years later, Louis Pasteur managed to prove germ theory in laboratory conditions and it is his name that is generally linked to the theory. The work of both men lives on, however, in much-improved sanitation and consequent lower levels of disease.

3. Penicillin



Another groundbreaking drug that has become so widely used that it seems commonplace. Penicillin was discovered by Alexander Fleming in 1928, almost entirely by accident – a petri dish left overnight showed that a mold was actively repelling the bacteria around it. Fleming developed the anti-biotic and it is now

used to treat a number of viruses and infections. A fortuitous discovery that has affected medicine in a profound way ever since.

2. Smallpox Vaccination

This is a real success story for vaccinations. Smallpox was once a horror of a disease – *killing in its millions* – but it has been entirely eradicated thanks to the vaccine. The last recorded case was in 1977, but the worldwide figures for the 20-th century still stand at around 30 million deaths. It was also notorious for killing thousands in the colonies, as colonists brought the pox with them and passed it on to the natives. The vaccine was discovered by Edward Jenner, who had learned that a milkmaid was immune to the disease because she'd been exposed to cowpox. Jenner isolated the cowpox and used them as a successful vaccine. One of the greatest achievements in medical history.

1. DNA

As amazing as all the discoveries so far have been, there is only one which unpicks the fabric of who we are – and that's DNA. It dictates which physical attributes about us, from eye color to genetic disease. It has played its part in IVF, forensics and so many other fields. As with many on our list, the discovery was the work of several people, but it was *Francis Crick* and James Watson who first produced the double-helix model and subsequently won the Nobel Prize. An amazing insight into what makes us.

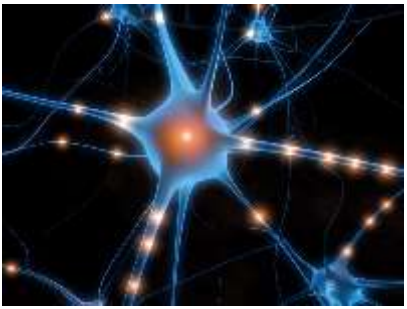
The human brain is a beautiful thing. It is responsible for all of the technological achievements that we have reached thus far. And the best part is, our brains are continually getting smarter. But to develop a better understanding of the brain, as well as a new found respect, let's cover the top 10 facts about the brain that you probably didn't know about.

FACTS ABOUT HUMAN BRAIN

10. Human Brains Consume More Energy than Any Other Part of the Body

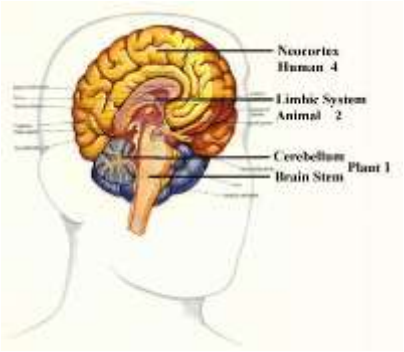
Even though your brain only makes about less than 3% of your entire body, it takes up a whopping 20% of energy to operate. What is all of this energy used for? Well, a lot of it goes towards the maintenance and production of cell-growth. The remaining energy is used to fuel electrical impulses in the body so that they work better with one another. While size is usually a factor in most cases, it isn't when it comes to the human brain.

9. The Human Brain Contains about 100 Billion Neurons



Consider this: your brain contains close to 100 billion neurons. This number is about 16 times larger than the amount of people that there are on the planet. Moreover, realize that each of these neurons can link to as many as 10,000 other ones. To put simply, this is a massive connection. The huge number of connections going on inside of your brain is what allows you to recall memories, develop ideas, and have a personality.

8. The Neo-Cortex Makes Up 75% of the Human Brain



While the brain may be relatively small compared to other parts of the body, the neo-cortex happens to be relatively large compared to the brain. In fact, the neo-cortex in the human brain is much larger than any other species of animal on the planet. This part of the brain is one reason why humans have become capable of so much. It has allowed us to transform from a primitive species into a technological one.

7. Humans Use More than 10% of Their Brains

This happens to be a rather overused and believed misconception about the human brain. To put simply, human beings use much more than 10% of their brains at any given moment. There is no evidence to suggest otherwise and even though the brain remains a mystery, scientists do have reasons to believe why this wouldn't be true. In regards to evolution, only using 10% of our brains would be a hindrance and wouldn't allow us to survive as effectively.

6. Neurons Multiply Much Quicker During Pregnancy

Did you know that neurons multiply by more than 200,000 neurons per minute in someone who is pregnant? While scientists

aren't exactly sure what causes this, it can be assumed that learning new ideas and remembering old ones should be much easier for someone who is pregnant versus someone who isn't.

5. The Brain is Mostly Water

That's right. The man brain is made up mostly of water. On the same note, this is why people often feel dizzy, light headed, or can't remember anything when they are dehydrated. They are sapping their brains of the nutrient that it requires the most.

4. The Brain Pumps Much Blood per Minute

More specifically, the human brain is capable of pumping more than 20% of the blood flow from your heart. If you had to round that off into a number that would be equal to your brain pumping about 750ml of blood every minute.

3. Your Brain Produces Enough Energy to Illuminate a Light Bulb

Despite what a lot of people may believe, the human brain is capable of many great things. One thing in particular that it is capable of is illuminating a light bulb? But how can such a small body part be capable of something so powerful? As you may or may not know, the brain is comprised mostly of electrical impulses. This is what helps us think and act the way we do. If you were to harness those electrical impulses, you would discover that your brain consumes about 25 watts of power while you are awake.

2. The Human Brain Can Think Quicker than a Computer

This is another thing that a lot of people have trouble believing. In raw data, our brains can compute 10 to the 13^{th} and 10 to the 16^{th} operations per second. This would be equal to more than one million times the people that there are on earth. In essence and in theory, the human brain is capable of solving and computing problems much quicker than a computer.

1. Reality Is Totally Subjective to the Human Brain

Our brain likes to fool us. Basically, it likes to adapt to whatever mindsets you are currently holding about the world. It will find evidence to support your view of the world, even if that evidence isn't really there. The mind does this all of the time and it is one way to ensure that we have control of our reality.

BIOINFORMATICS IN MEDICAL RESEARCH

What is Bioinformatics?

Bioinformatics has become a buzzword in the post-genomic era. However, the discipline is not new.

The term "bioinformatics" was coined by Paulien Hogeweg and Ben Hesper in 1978. In the beginning, the term was used to mean the study of informatic processes in biotic systems. Bioinformatics is basically informatics as applied to biology, that is, computer-aided analysis of biological data. There are many definitions of bioinformatics; some of these definitions make no distinction between bioinformatics and computational biology as a whole.

Here are some of the term:

Bioinformatics is conceptualizing biology in terms of molecules (in the sense of physical-chemistry) and then applying "informatics" techniques (derived from disciplines such as applied math, CS, and statistics) to understand and organize the information associated with these molecules, on a large-scale.

Bioinformatics is the development of computational methods for studying the structure, function, and evolution of genes, proteins and whole genomes; it is the development of methods for the management and analysis of biological information arising from genomics and high-throughput experiments. Therefore, for molecular biologists, bioinformatics is the discipline of computer-aided analysis of information relating to genes, genomes, and their products. In other words, for all practical purposes, bioinformatics can be regarded as **computational molecular biology**, that uses computational techniques to study the structure,

function, regulation, and interactive network of genes and proteins. The ultimate goal is to analyze and predict the structure, organization, function, regulation, and dynamics of the entire genome of an organism.

Bioinformatics, a hybrid science that links biological data with techniques for information storage, distribution, and analysis to support multiple areas of scientific research, including biomedicine. Bioinformatics is fed by **high-throughput** data-generating experiments, including genomic **sequence determinations and measurements of gene expression patterns**.

Database projects curate and annotate the data and then distribute it via the World Wide Web. Mining these data leads to scientific discoveries and to the identification of new clinical applications. In the field of medicine in particular, a number of important applications for bioinformatics have been discovered. For example, it is used to identify **correlations** between gene sequences and diseases, to predict protein structures from amino acid sequences, to aid in the design of novel drugs, and **to tailor** treatments to individual patients based on their DNA sequences (pharmacogenomics).

Notes on the text:

buzzword – ключевое слово.
high-throughput – высокопроизводительный**.**
sequence determinations – определение последовательности.
correlations – соотношение.
to tailor – специально приспосабливать.
gene expression is the process by which information from a gene is used in the synthesis of a functional gene product. These products are often proteins.

A brief history of structural bioinformatics

Structural Bioinformatics began with the first attempts to study and predict protein structures. While structure and sequences databases were small, the primary focus was the grand challenge to predict protein 3D structures from primary sequences. Methods to predict protein secondary structure or 3D structure were approached by a variety of informatics-or physics-based methods, and had mixed success until the arrival of systematic community wide assessment exercises (Critical Assessment of Structure Prediction, CASP) where double-blind assessments of predictions (i.e. where the structures were unknown to both predictors and experimentalists during the predictions). These experiments identified the strengths and weaknesses of all approaches and ultimately have led to mature methods to predict secondary structure and tertiary structure either de novo or via homology modeling techniques. Today models for virtually all proteins that are modelable are now systematically available via online databases such as ModBase and Swiss-model. Structural bioinformatics now often focuses on methods that predict function of individual proteins of known structure, rather than methods that predict structure per se. For instance, numerous methods have been developed to study protein surfaces to predict functional sites using a variety of geometrical or evolutionary criteria.

The initial genome sequencing projects produced the first large sets of genes and encoded proteins for which little information was available. Structural bioinformatics played a crucial role in identifying overall features of the genome in terms of domain distributions and combinations, a process that was greatly aided by the availability of structure classification databases.

These analyses ultimately matured and were incorporated into the protein databases used today, such as and CDD and are readily visible in primary databases such as Uniprot or Refseq.

Bioinformatics versus Computational Biology

Computational biology is an **umbrella term** that includes any subdiscipline in biology that uses computer-aided analysis, modeling, and prediction. Some examples include the modeling of **predator–prey relationships** in an ecosystem, the modeling and prediction of population and community dynamics in an ecosystem, quantitative structure–activity analysis and prediction of the biological effects of chemicals, prediction of **metabolic fate of chemicals in vivo**, and pharmacokinetic modeling of drugs and **xenobiotics**.

In contrast, bioinformatics can be regarded as computational molecular biology, as indicated above. Therefore, according to the definitions computational biology is much broader in scope and bioinformatics is a part of it. Bioinformatics, like other areas of computational biology, is essentially a multidisciplinary science because it uses techniques and concepts from a number of disciplines, such as molecular biology and biochemistry, computer science, statistics and mathematics, and informatics (information science).

Notes on the text:

umbrella term – обобщающий термин.
metabolic fate of chemicals – метаболическая судьба химических веществ.
i**n vitro** (с лат. – «в стекле») – это технология выполнения экспериментов, когда опыты проводятся «в пробирке» – вне

живого организма. В общем смысле этот термин противопоставляется термину **in vivo** – эксперимент на живом организме (на человеке или на животной модели).
predator -prey relationships – отношения хищник-жертва.
xenobiotic is a chemical which is found in an organism but which is not normally produced or expected to be present in it.

The analytical tools in bioinformatics are **computer algorithms** and statistics. Improvements in the capacity of existing tools and the development of new tools are both driven by the need for newer dimensions and greater speed of analysis, as well as the ability to handle an ever-increasing amount of data. However, the success and prediction accuracy of bioinformatic analysis ultimately depends on our knowledge of the biology of organisms. Therefore, as more data **accumulate** in the databases and more scientific information becomes available, the progress of science and its prognostic ability will require and hence dictate the development of new bioinformatic tools. Acquisition of more data and information, storage of all that information, expansion of databases, new strategies needed for analysis, and advances in computing power are all expected to facilitate the analysis of large volumes of data and discovery of new biological principles and insights from which unifying principles of life and its evolution can be **discerned**.

Notes on the text:

data accumulate – накопление данных.
unifying principles of life and its evolution can be discerned- можно различить объединяющие принципы жизни и ее эволюции.

algorithm is a set of instructions that leads to a predictable result. **Algorithms** are only as good as the instructions given, however, and the result will be incorrect if the **algorithm** is not properly defined.

Bioinformatics Technical Toolbox

Bioinformatic analysis requires data (such as sequence information), databases, and analysis tools. Databases are built from data obtained through wet laboratory experiments. Some of the original **nucleotide-** and **protein-sequence** databases were created more than 30 years ago. Subsequently, information from these original databases was **utilized** to create curated and more refined databases to meet specific research needs. With the advances in **genomics, proteomics, and metabolomics**, particularly with the development of disciplines like pharmacogenomics and toxicogenomics, the need for storage of and access to the newly created datasets has led to the development of further specialized databases. Through the collaboration of academic, corporate, and regulatory scientists, standards have been developed as to how to submit a specific type of data to the relevant databases.

The bioinformatics technical toolbox provides analysis tools (algorithms) and visualization techniques of the data generated through high-throughput experiments, such as high-throughput sequencing, **microarray analysis**, **mass spectrometry**, and other **proteomic techniques**. The analysis tools predator–prey relationships are computer based (software), and the development of newer tools is driven by various needs, such as an increased need for handling the huge body of data, faster analysis, expanded scope of the analysis, multiple simultaneous analyses,

to name a few. A few examples of software-driven analysis that have tremendously facilitated bioinformatics research are:

- Analysis of nucleotide sequences.
- Detection of single nucleotide polymorphisms (SNPs) and copy number variation (CNV)
- Understanding the sequence features and differences between coding and noncoding regions.
- Alignment of nucleotide sequences.
- Prediction of open reading frames (ORFs), restriction-enzyme cutting sites in DNA, various cis-acting regulatory DNA elements in the gene, and putative miRNA-encoding sequences in the genome.
- Gene-expression analysis.
- Designing probes and primers.
- Analysis of protein sequences.
- Alignment of amino-acid sequences.

Prediction of protein structure (including 3D structure), protein–protein interactions, post-translational modifications of proteins, hydrophilicity/hydrophobicity and potential antigenicity of proteins, and various protein domains, such as transmembrane domains

Prediction of phylogenetic relationships among proteins.

In addition, gene-expression analysis information has led to the development of systems biology tools that can perform simulation, steady-state analysis, network identification, complex behavior analysis of the system, and various other tasks.

Notes on the text:

sequence information – информация о последовательности.

original nucleotide and protein-sequence databases – оригинальные базы данных нуклеотидных и белковых последовательностей.
utilize – использовать.
to create curated and more refined databases to meet specific research needs – создавать курируемые и более усовершенствованные базы данных для удовлетворения конкретных потребностей исследований.
advances in genomics, proteomics, and metabolomics – достижения в области геномики, протеомики и метаболомики.
steady – **state analysis**, **network identification, complex behavior analysis of the system, and various other tasks** – анализ стационарного состояния, идентификация сети, комплексный анализ поведения системы и различные другие задачи.

Bioinformatics in understanding the molecular basis of cancer.

Bioinformatics is applied in understanding the molecular basis of cancer. It acknowledges the convention of organizing around the e system, and various other tasks' experimental approaches for which the bioinformatics provide support. Bioinformatics is both analytic tools and electronically represented data. Tools are essential to the understanding and interpretation of the **voluminous** and complex data generated. Data **repositories** are essential for **replication** and re-interpretation and permit cost-efficient repurposing of invaluable data. Data repositories also serve as electronic reference materials and permit definition of biologic context for future experiments.

Bioinformatics approaches in the search for natural products are a combination of molecular and chemical techniques. Important criteria of molecular approaches include phylogenetic resolution and potential to a large-scale screening. Application of comparative genome sequence analysis is essential for a better understanding of the genetic and epigenetic* components of different bacterial taxa. With the increased numbers of fully sequenced microbial genomes, including those of well-known bacterial producers of natural products, it has become clear that the genomic and metabolic capacity of these microorganisms is much higher than initially anticipated. This is due to the discovery of 'silent' or 'cryptic' **secondary metabolite gene clusters** that encode the production of additional, unidentified compounds.

Notes on the text:

voluminous and complex data – объёмные и сложные данные.
repository – хранилища.
replication – копирование.
secondary metabolite gene clusters – генные кластеры вторичного метаболита.
epigenetic – in biology, epigenetics is the study of heritable phenotype changes that do not involve alterations in the DNA sequence.

Recent Sequencing (Metagenomics) Approaches

Recent examination of massive sequencing (metagenomics) approaches to analyze the composition of bacterial communities of complex milieu including sea water, provide an abundant source of molecular sequence data for analysis. These

data are useful in comparative genome analyses to identify genes directly involved, for example, in nonribosomal peptide synthesis (peptide synthetase), **modifying enzymes**, or other genes coding the production of certain natural products. Often, the complete set of specific genes involved in the synthesis of a particular natural product is contained in a single operon. For example, as the presence of conserved sequence motifs and a modular organization of nonribosomal peptide synthetases often assembled into single bacterial **operons**, a specific sequence search algorithm can be developed to screen public database resources. This enables a detailed analysis of evolutionary, structural, and functional aspect of natural products production based on the comparison of molecular sequences, molecular modeling, and simulation. For example, the situation of genomic **colinearity** of modular *synthetase* components might also **facilitate** the identification of the molecular components of natural products production as well as the reconstruction of natural products synthesis pathways. This will permit to clarify the details of natural production systems and may allow the simulation of these pathways to explore possible strategies for the optimization or engineering of natural product production systems.

Despite the enormous flexibility of genomes, the corresponding metabolic synthesis networks follow specific inherent rules that are responsible for their rigidity. Evolutionary designed strategies are ideally suited to utilize this genomic flexibility to adapt desired phenotypes to balance the metabolic network states required for optimal performance. The identification of genes involved in the metabolic synthesis of natural products by genome sequence analysis can be complemented by the anal-

yses and modeling of natural products production. Bioinformatics tools for the construction of metabolic networks from genome sequence.

The information from the literature can be used to infer and describe natural products synthesis pathways and analyze the production machinery of bacterial producers. It is generally recognized, particularly in systems responsible for the synthesis of diverse antibiotics, that, for example, nonribosomal peptide synthesis occurs within a molecular complex composed of modules or subunits grouping peptide synthetase modules and associated enzymatic activities.

Notes on the text:

modifying enzymes – модифицирующие ферменты.
operons – /in genetics/ is a functioning unit of genomic DNA containing a cluster of genes under the control of a **single** regulatory signal or promoter.
colinearity – the phenomona that the orderings of the corresponding elements of DNA, the RNA transcribed from it, and the amino acid sequence translated from the RNA are identical.
facilitate – облегчать.

The Data of Bioinformatics

The classic data of bioinformatics include DNA sequences of genes or full genomes; amino acid sequences of proteins; and three-dimensional structures of proteins, nucleic acids and protein–nucleic acid complexes. Additional data streams include: **transcriptomics**, the pattern of RNA synthesis from DNA; proteomics, the distribution of proteins in cells; interactomics, the patterns of protein-protein and protein–nucleic acid interactions;

and metabolomics, the nature and traffic patterns of transformations of small molecules by the biochemical pathways active in cells. In each case there is interest in obtaining comprehensive, accurate data for particular cell types and in identifying patterns of variation within the data. For example, data may fluctuate depending on cell type, timing of data collection (during the cell cycle, or diurnal, seasonal, or annual variations), developmental stage, and various external conditions.

Metagenomics and **metaproteomics** extend these measurements to a comprehensive description of the organisms in an environmental sample, such as in a bucket of ocean water or in a soil sample.

Bioinformatics has been driven by the great acceleration in data-generation processes in biology. Genome sequencing methods show perhaps the most dramatic effects. In 1999 the nucleic acid sequence archives contained a total of 3.5 billion nucleotides, slightly more than the length of a single human genome; a decade later they contained more than 283 billion nucleotides, the length of about 95 human genomes. The U.S. National Institutes of Health has challenged researchers by setting a goal to reduce the cost of sequencing a human genome to $1,000; this would make DNA sequencing a more affordable and practical tool for U.S. hospitals and clinics, enabling it to become a standard component of diagnosis.

Notes on the text:

transcriptome is the set of all RNA molecules in one cell or a population of cells. It is sometimes used to refer to all RNAs, or just mRNA, depending on the particular experiment. It differs

from the exome in that it includes only those RNA molecules found in a specified cell population.

metagenomics is the study of genetic material recovered directly from environmental samples. The broad field may also be referred to as environmental genomics, ecogenomics or community genomics.

comparative metaproteomics reveals ocean-scale shifts in microbial nutrient utilization and energy transduction.

Storage and Retrieval of Data

In bioinformatics, data banks are used to store and organize data. Many of these entities collect DNA and RNA sequences from scientific papers and genome projects. Many databases are in the hands of international *consortia*. For example, an advisory committee made up of members of the European Molecular Biology Laboratory Nucleotide Sequence Database (EMBL-Bank) in the United Kingdom, the DNA Data Bank of Japan (DDBJ), and GenBank of the National Center for Biotechnology Information (NCBI) in the United States oversees the International Nucleotide Sequence Database Collaboration (INSDC). To ensure that sequence data are freely available, scientific journals require that new nucleotide sequences be deposited in a publicly accessible database as a condition for publication of an article. (Similar conditions apply to nucleic acid and protein structures). There also exist genome browsers, databases that bring together all the available genomic and molecular information about a particular species.

The major database of biological macromolecular structure is the worldwide Protein Data Bank (wwPDB), a joint effort of the Research Collaboratory for Structural Bioinformatics

(RCSB) in the United States, the Protein Data Bank Europe (PDBe) at the European Bioinformatics Institute in the United Kingdom, and the Protein Data Bank Japan at Ōsaka University. The homepages of the wwPDB partners contain links to the data files themselves, to expository and tutorial material (including news items), to facilities for deposition of new entries, and to specialized search software for retrieving structures.

Information retrieval from the data archives utilizes standard tools for identification of data items by keyword; for instance, one can type "aardvark myoglobin" into Google and retrieve the molecule's amino acid sequence. Other algorithms search data banks to detect similarities between data items. For example, a standard problem is to probe a sequence database with a gene or protein sequence of interest in order to detect entities with similar sequences.

Goals of Bioinformatic Analysis

The ultimate goal of bioinformatics is to be able to predict the biological processes in health and disease. In order to acquire such an ability, a thorough understanding of the biological processes is necessary. Therefore, the proximate goal of bioinformatics is to develop such an understanding through analysis and integration of the information obtained on **genes and proteins,** as well as to develop new tools and continuously improve the existing set of tools for **diverse** types of analyses. Bioinformatics also aims to develop tools that help in the management of and access to data and information, including improved search and **retrieval capability of genomic** data and information from various types of databases.

Some examples of common bioinformatic tools and analyses that are continuously being improved and refined are: **data capture and storage capability;** the usability of databases; data analysis; nucleic acid and protein sequence analysis and sequence annotation; structural analysis of proteins and **prediction of protein structure**, including three-dimensional (3D) structure; protein domain prediction; gene prediction; analysis of functional studies; analysis of gene and protein networks; and phylogenetic analysis.

Notes on the text:

genes and proteins – гены и белки.
diverse – разнообразный.
retrieval capability of genomic data – возможность поиска геномных данных.
data capture and storage capability – возможность сбора и хранения данных.
prediction of protein structure – предвычисление структуры белка.

Goals of Bioinformatics

The development of efficient algorithms for measuring sequence similarity is an important goal of bioinformatics. The Needleman-Wunsch algorithm, which is based on dynamic programming, guarantees finding the optimal alignment of pairs of sequences. This algorithm essentially divides a large problem (the full sequence) into a series of smaller problems (short sequence segments) and uses the solutions of the smaller problems

to construct a solution to the large problem. Similarities in sequences are scored in a matrix, and the algorithm allows for the detection of gaps in sequence alignment.

Although the Needleman-Wunsch algorithm is effective, it is too slow for probing a large sequence database. Therefore, much attention has been given to finding fast information-retrieval algorithms that can deal with the vast amounts of data in the archives. An example is the program BLAST (Basic Local Alignment Search Tool). A development of BLAST, known as position-specific iterated- (or PSI-) BLAST, makes use of patterns of conservation in related sequences and combines the high speed of BLAST with very high sensitivity to find related sequences.

Another goal of bioinformatics is the extension of experimental data by predictions. A fundamental goal of computational biology is the prediction of protein structure from an amino acid sequence. The spontaneous folding of proteins shows that this should be possible. Progress in the development of methods to predict protein folding is measured by biennial Critical Assessment of Structure Prediction (CASP) programs, which involve blind tests of structure prediction methods.

Bioinformatics is also used to predict interactions between proteins, given individual structures of the partners. This is known as the "docking problem." Protein-protein complexes show good complementarity in surface shape and polarity and are stabilized largely by weak interactions, such as burial of hydrophobic surface, hydrogen bonds, and van der Waals forces. Computer programs simulate these interactions to predict the optimal spatial relationship between binding partners. A particular

challenge, one that could have important therapeutic applications, is to design an antibody that binds with high affinity to a target protein.

Initially, much bioinformatics research has had a relatively narrow focus, concentrating on devising algorithms for analyzing particular types of data, such as gene sequences or protein structures. Now, however, the goals of bioinformatics are integrative and are aimed at figuring out how combinations of different types of data can be used to understand natural phenomena, including organisms and disease.

Bioinformatics is the application of information technology to the field of molecular biology. It entails the creation and advancement of databases, algorithms, computational and statistical techniques, and theory to solve formal and practical problems arising from the management and analysis of biological data.

The primary goal of bioinformatics is to increase the understanding of biological processes. Major research efforts in the field include sequence alignment, gene finding, genome assembly, protein structure alignment, protein structure prediction, prediction of gene expression and protein-protein interactions, and the modeling of evolution. Bioinformatics involves analyzing DNA sequences, analyzing RNA sequences, and analyzing protein sequence. SOAP and REST-based interfaces are developed for a wide variety of bioinformatics applications, allowing an application running on one computer in one part of the world to use algorithms, data, and computing resources on servers in other parts of the world. A data mining/pattern recognition system has standardized components, bringing bioinformatics and

DNA microarray analysis into a more mature field, and providing practical ways of making accurate decisions in many areas, including disease diagnosis with accompanying action plans with a known probability of success.

Bioinformatics represents an interdisciplinary and rapidly evolving area of science that applies mathematics, statistics, computer science, and biology to the understanding of living systems. Bioinformatics is driven by the advent of fast and reliable technology for sequencing nucleic acids and proteins that results in an ever-increasing volume of experimental data to be analyzed. Many of the recent developments in the field use algorithmic techniques in order to reach answers to key challenges in molecular biology research, including understanding the mechanisms of genome evolution, elucidating the structure of protein interaction networks, and determining the genetic basis for susceptibility to disease.

A major application of Bioinformatics is the analysis of the DNA and protein sequences of organisms that have been sequenced. Sequence comparison is one of the basic operations in Bioinformatics, serving as a basis for many other more complex manipulations. It provides important information for solving many key problems, such as determining the function of a newly discovered sequence, determining the evolutionary relationships among genes and proteins, and predicting the structure and function of proteins.

When a new biological sequence is discovered, its function and structure must be determined. A common approach is to compare the new sequence to known sequences belonging to biological databases, in search for similarities. We can compare a sequence to another sequence, performing a pairwise sequence

comparison, which consists of deciding whether a pair of sequences are evolutionary related, that is, whether they share a common evolutionary history. We can also compare a sequence to a profile that models a family of sequences, performing a sequence-profile comparison, which consists of deciding whether a sequence is evolutionarily related to a known evolutionary family sequence.

When we recognize a significant similarity between a new sequence and a known sequence or sequence family, we can transfer information about structure and/or function to the new sequence. We say that the sequences are homologous and that we are transferring information by homology.

Comprehensive databases of DNA and protein sequences are now established as major tools in current molecular biology research. Given the advances in sequencing technologies, the significant amount of biological sequence data produced, and the effectiveness of sequence comparison, it is logical to systematically organize and store the biological sequences to be compared. As a consequence, sequence databases have grown exponentially in the last decade.

The most accurate algorithms for solving the problems of pairwise sequence comparison and sequence-profile comparison are usually based on the dynamic programming technique. Because of the quadratic time and memory complexity of these algorithms and usually the long length of biological sequences, the task of searching large databases can lead to very lengthy execution times with huge memory requirements.

High-performance computing resources and techniques can be used to accelerate these operations. Several solutions for par-

allel sequence comparison have been proposed, targeting different high-performance platforms, such as multicore architectures, clusters, and field-programmable gate arrays (FPGAs).

Graphics processing units (GPUs) have evolved into highly parallel platforms due to their vast number of simple, data-parallel, deeply multithreaded cores. Their impressive computational power, high memory bandwidth, and comparatively low cost make them an attractive platform to solve problems based on computationally intensive algorithms. Moreover, GPUs are becoming increasingly programmable, offering the potential of significant speedups for a wide range of applications compared to general-purpose processors (CPUs).

FOOD PRESERVATION

Part I

Food preservation prevents the growth of microorganisms (such as yeasts), or other microorganisms (although some methods work by introducing benign bacteria or fungi to the food), as well as slowing the oxidation of fats that cause rancidity. Food preservation may also include processes that inhibit visual deterioration, such as the enzymatic browning reaction in apples after they are cut during food preparation.

Many processes designed to preserve food involve more than one food preservation method. Preserving fruit by turning it into jam, for example, involves boiling (to reduce the fruit's moisture content and to kill bacteria, etc.), sugaring (to prevent their regrowth) and sealing within an airtight jar (to prevent recontamination). Some traditional methods of preserving food have been shown to have a lower energy input and carbon footprint, when compared to modern methods.

Some methods of food preservation are known to create carcinogens. In 2015, the International Agency for Research on Cancer of the World Health Organization classified processed meat, i.e. meat that has undergone salting, curing, fermenting, and smoking, as "carcinogenic to humans".

Maintaining or creating nutritional value, texture and flavor is an important aspect of food preservation.

Traditional techniques

New techniques of food preservation became available to the home chef from the dawn of agriculture until the Industrial Revolution.

Curing

Bag of Prague powder#1, also known as “curing salt” or “pink salt”. It is typically a combination of salt and sodium nitrite, with the pink color added to distinguish it from ordinary salt.

The earliest form of curing was dehydration or drying, used as early as 12,000 BC. Smoking and salting techniques improve on the drying process and add antimicrobial agents that aid in preservation. Smoke deposits a number of pyrolysis products onto the food, including the phenols syringol, guaiacoland catechol. Salt accelerates the drying process using osmosis and also inhibits the growth of several common strains of bacteria. More recently nitrites have been used to cure meat, contributing a characteristic pink colour.

Cooling

Cooling preserves food by slowing down the growth and reproduction of microorganisms and the action of enzymes that causes the food to rot. The introduction of commercial and domestic refrigerators drastically improved the diets of many in the Western world by allowing food such as fresh fruit, salads and dairy products to be stored safely for longer periods, particularly during warm weather.

Before the era of mechanical refrigeration, cooling for food storage occurred in the forms of root cellars and iceboxes. Rural people often did their own ice cutting, whereas town and city dwellers often relied on the ice trade. Today, root cellaring remains popular among people who value various goals, including local food, heirloom crops, traditional home cooking techniques, family farming, frugality, self-sufficiency, organic farming, and others.

Freezing

Freezing is also one of the most commonly used processes, both commercially and domestically, for preserving a very wide range of foods, including prepared foods that would not have required freezing in their unprepared state. For example, potato waffles are stored in the freezer, but potatoes themselves require only a cool dark place to ensure many months' storage. Cold stores provide large-volume, long-term storage for strategic food stocks held in case of national emergency in many countries.

Boiling

Boiling liquid food items can kill any existing microbes. Milk and water are often boiled to kill any harmful microbes that may be present in them.

Heating

Heating to temperatures which are sufficient to kill microorganisms inside the food is a method used with perpetual stews. Milk is also boiled before storing to kill many microorganisms.

Sugaring

The earliest cultures have used sugar as a preservative, and it was commonplace to store fruit in honey. Similar to pickled foods, sugar cane was brought to Europe through the trade routes. In northern climates without sufficient sun to dry foods, preserves are made by heating the fruit with sugar. “Sugar tends to draw water from the microbes (plasmolysis). This process leaves the microbial cells dehydrated, thus killing them. In this way, the food will remain safe from microbial spoilage.” Sugar

is used to preserve fruits, either in an antimicrobial syrup with fruit such as apples, pears, peaches, apricots, and plums, or in crystallized form where the preserved material is cooked in sugar to the point of crystallization and the resultant product is then stored dry. This method is used for the skins of citrus fruit (candied peel), angelica, and ginger. Also, sugaring can be used in the production of jam and jelly.

Pickling

Pickling is a method of preserving food in an edible, antimicrobial liquid. Pickling can be broadly classified into two categories: chemical pickling and fermentation pickling.

In chemical pickling, the food is placed in an edible liquid that inhibits or kills bacteria and other microorganisms. Typical pickling agents include brine (high in salt), vinegar, alcohol, and vegetable oil. Many chemical pickling processes also involve heating or boiling so that the food being preserved becomes saturated with the pickling agent. Common chemically pickled foods include cucumbers, peppers, corned beef, herring, and eggs, as well as mixed vegetables such as piccalilli.

In fermentation pickling, bacteria in the liquid produce organic acids as preservation agents, typically by a process that produces lactic acid through the presence of lactobacillales. Fermented pickles include sauerkraut, nukazuke, kimchi, and surströmming.

Lye

Sodium hydroxide (lye) makes food too alkaline for bacterial growth. Lye will saponify fats in the food, which will change its

flavor and texture. Lutefisk uses lye in its preparation, as do some olive recipes. Modern recipes for century eggs also call for lye.

Canning

Canning involves cooking food, sealing it in sterilized cans or jars, and boiling the containers to kill or weaken any remaining bacteria as a form of sterilization. It was invented by the French confectioner Nicolas Appert. By 1806, this process was used by the French Navy to preserve meat, fruit, vegetables, and even milk. Although Appert had discovered a new way of preservation, it wasn't understood until 1864 when Louis Pasteur found the relationship between microorganisms, food spoilage, and illness.

Foods have varying degrees of natural protection against spoilage and may require that the final step occur in a pressure cooker. High-acid fruits like strawberries require no preservatives to can and only a short boiling cycle, whereas marginal vegetables such as carrots require longer boiling and addition of other acidic elements. Low-acid foods, such as vegetables and meats, require pressure canning. Food preserved by canning or bottling is at immediate risk of spoilage once the can or bottle has been opened.

Lack of quality control in the canning process may allow ingress of water or micro-organisms. Most such failures are rapidly detected as decomposition within the can causes gas production and the can will swell or burst. However, there have been examples of poor manufacture (underprocessing) and poor hygiene allowing contamination of canned food by the obligate anaerobe *Clostridium botulinum*, which produces an acute toxin within

the food, leading to severe illness or death. This organism produces no gas or obvious taste and remains undetected by taste or smell. Its toxin is denatured by cooking, however. Cooked mushrooms, handled poorly and then canned, can support the growth of *Staphylococcus aureus*, which produces a toxin that is not destroyed by canning or subsequent reheating.

Jellying

Food may be preserved by cooking in a material that solidifies to form a gel. Such materials include gelatin, agar, maize flour, and arrowroot flour. Some foods naturally form a protein gel when cooked, such as eels and elvers, and sipunculid worms, which are a delicacy in Xiamen, in the Fujian province of the People's Republic of China. Jellied eels are a delicacy in the East End of London, where they are eaten with mashed potatoes. Potted meats in aspic (a gel made from gelatin and clarified meat broth) were a common way of serving meat off-cuts in the UK until the 1950s. Many jugged meats are also jellied.

A traditional British way of preserving meat (particularly shrimp) is by setting it in a pot and sealing it with a layer of fat. Also common is potted chicken liver; jellying is one of the steps in producing traditional pâtés.

Jugging

Meat can be preserved by jugging. Jugging is the process of stewing the meat (commonly game or fish) in a covered earthenware jug or casserole. The animal to be jugged is usually cut into pieces, placed into a tightly-sealed jug with brine or gravy,

and stewed. Red wine and/or the animal's own blood is sometimes added to the cooking liquid. Jugging was a popular method of preserving meat up until the middle of the 20th century.

Burial

Burial of food can preserve it due to a variety of factors: lack of light, lack of oxygen, cool temperatures, pH level, or desiccants in the soil. Burial may be combined with other methods such as salting or fermentation. Most foods can be preserved in soil that is very dry and salty (thus a desiccant) such as sand, or soil that is frozen.

Many root vegetables are very resistant to spoilage and require no other preservation than storage in cool dark conditions, for example by burial in the ground, such as in a storage clamp. Century eggs are traditionally created by placing eggs in alkaline mud (or other alkaline substance), resulting in their “inorganic” fermentation through raised pH instead of spoiling. The fermentation preserves them and breaks down some of the complex, less flavorful proteins and fats into simpler, more flavorful ones. Cabbage was traditionally buried during Autumn in northern US farms for preservation. Some methods keep it crispy while other methods produce sauerkraut. A similar process is used in the traditional production of kimchi. Sometimes meat is buried under conditions that cause preservation. If buried on hot coals or ashes, the heat can kill pathogens, the dry ash can desiccate, and the earth can block oxygen and further contamination. If buried where the earth is very cold, the earth acts like a refrigerator.

In Orissa, India, it is practical to store rice by burying it underground. This method helps to store for three to six months during the dry season.

Butter and similar substances have been preserved as bog butter in Irish peat bogs for centuries.

Confit

Meat can be preserved by salting it, cooking it at or near 100°C in some kind of fat (such as lard or tallow), and then storing it immersed in the fat. These preparations were popular in Europe before refrigerators became ubiquitous. They are still popular in France, where they are called *confit*. The preparation will keep longer if stored in a cold cellar or buried in cold ground.

Fermentation

Some foods, such as many cheeses, wines, and beers, use specific micro-organisms that combat spoilage from other less-benign organisms. These micro-organisms keep pathogens in check by creating an environment toxic for themselves and other micro-organisms by producing acid or alcohol. Methods of fermentation include, but are not limited to, starter micro-organisms, salt, hops, controlled (usually cool) temperatures and controlled (usually low) levels of oxygen. These methods are used to create the specific controlled conditions that will support the desirable organisms that produce food fit for human consumption.

Fermentation is the microbial conversion of starch and sugars into alcohol. Not only can fermentation produce alcohol, but it can also be a valuable preservation technique. Fermentation can also make foods more nutritious and palatable. For example, drinking water in the Middle Ages was dangerous because it often contained pathogens that could spread disease. When the water is made into beer, the boiling during the brewing process kills

any bacteria in the water that could make people sick. Additionally, the water now has the nutrients from the barley and other ingredients, and the microorganisms can also produce vitamins as they ferment.
Modern industrial techniques

Pasteurization

Pasteurization is a process for preservation of liquid food. It was originally applied to combat the souring of young local wines. Today, the process is mainly applied to dairy products. In this method, milk is heated at about 70 °C (158 °F) for 15–30 seconds to kill the bacteria present in it and cooling it quickly to 10 °C (50 °F) to prevent the remaining bacteria from growing. The milk is then stored in sterilized bottles or pouches in cold places. This method was invented by Louis Pasteur, a French chemist, in 1862.

Vacuum packing

Vacuum-packing stores food in a vacuum environment, usually in an air-tight bag or bottle. The vacuum environment strips bacteria of oxygen needed for survival. Vacuum-packing is commonly used for storing nuts to reduce loss of flavor from oxidization. A major drawback to vacuum packaging, at the consumer level, is that vacuum sealing can deform contents and rob certain foods, such as cheese, of its flavor.

Artificial food additives

Preservative food additives can be *antimicrobial* – which inhibit the growth of bacteria or fungi, including mold – or *antioxidant*, such as oxygen absorbers, which inhibit the oxidation of food

constituents. Common antimicrobial preservatives include calcium propionate, sodium nitrate, sodium nitrite, sulfites (sulfur dioxide, sodium bisulfite, potassium hydrogen sulfite, etc.), and EDTA. Antioxidants include butylated hydroxyanisole (BHA) and butylated hydroxytoluene (BHT). Other preservatives include formaldehyde (usually in solution), glutaraldehyde (insecticide), ethanol, and methylchloroisothiazolinone.

Irradiation

Irradiation of food is the exposure of food to ionizing radiation. Multiple types of ionizing radiation can be used, including beta particles (high-energy electrons) and gamma rays (emitted from radioactive sources such as cobalt-60 or cesium-137). Irradiation can kill bacteria, molds, and insect pests, reduce the ripening and spoiling of fruits, and at higher doses induce sterility. The technology may be compared to pasteurization; it is sometimes called **"**cold pasteurization", as the product is not heated. Irradiation may allow lower-quality or contaminated foods to be rendered marketable.

National and international expert bodies have declared food irradiation as "wholesome"; organizations of the United Nations, such as the World Health Organization and Food and Agriculture Organization, endorse food irradiation. Consumers may have a negative view of irradiated food based on the misconception that such food is radioactive; in fact, irradiated food does not and cannot become radioactive. Activists have also opposed food irradiation for other reasons, for example, arguing that irradiation can be used to sterilize contaminated food without resolving the underlying cause of the contamination. International

legislation on whether food may be irradiated or not varies worldwide from no regulation to a full ban.

Approximately 500,000 tons of food items are irradiated per year worldwide in over 40 countries. These are mainly spices and condiments, with an increasing segment of fresh fruit irradiated for fruit fly quarantine.

Pulsed electric field electroporation

Pulsed electric field (PEF) electroporation is a method for processing cells by means of brief pulses of a strong electric field. PEF holds potential as a type of low-temperature alternative pasteurization process for sterilizing food products. In PEF processing, a substance is placed between two electrodes, then the pulsed electric field is applied. The electric field enlarges the pores of the cell membranes, which kills the cells and releases their contents. PEF for food processing is a developing technology still being researched. There have been limited industrial applications of PEF processing for the pasteurization of fruit juices. To date, several PEF treated juices are available on the market in Europe. Furthermore, for several years a juice pasteurization application in the US has used PEF. For cell disintegration purposes especially potato processors show great interest in PEF technology as an efficient alternative for their preheaters. Potato applications are already operational in the US and Canada. There are also commercial PEF potato applications in various countries in Europe, as well as in Australia, India, and China.

Modified atmosphere

Modifying atmosphere is a way to preserve food by operating on the atmosphere around it. Salad crops that are notoriously difficult to preserve are now being packaged in sealed bags with an atmosphere modified to reduce the oxygen (O_2) concentration and increase the carbon dioxide (CO_2) concentration. There is concern that, although salad vegetables retain their appearance and texture in such conditions, this method of preservation may not retain nutrients, especially vitamins. There are two methods for preserving grains with carbon dioxide. One method is placing a block of dry ice in the bottom and filling the can with the grain. Another method is purging the container from the bottom by gaseous carbon dioxide from a cylinder or bulk supply vessel. Carbon dioxide prevents insects and, depending on concentration, mold and oxidation from damaging the grain. Grain stored in this way can remain edible for approximately five years.

Nitrogen gas (N_2) at concentrations of 98% or higher is also used effectively to kill insects in the grain through hypoxia. However, carbon dioxide has an advantage in this respect, as it kills organisms through hypercarbia and hypoxia (depending on concentration), but it requires concentrations of above 35%, or so. This makes carbon dioxide preferable for fumigation in situations where a hermetic seal cannot be maintained.

Controlled Atmospheric Storage (CA): “CA storage is a non-chemical process. Oxygen levels in the sealed rooms are reduced, usually by the infusion of nitrogen gas, from the approximate 21 percent in the air we breathe to 1 percent or 2 percent. Temperatures are kept at a constant 0–2°C (32–36 °F). Humidity is maintained at 95 percent and carbon dioxide levels are also controlled. Exact conditions in the rooms are set according to the

apple variety. Researchers develop specific regimens for each variety to achieve the best quality. Computers help keep conditions constant." "Eastern Washington, where most of Washington's apples are grown, has enough warehouse storage for 181 million boxes of fruit, according to a report done in 1997 by managers for the Washington State Department of Agriculture Plant Services Division. The storage capacity study shows that 67 percent of that space – enough for 121,008,000 boxes of apples – is CA storage."

Air-tight storage of grains (sometimes called hermetic storage) relies on the respiration of grain, insects, and fungi that can modify the enclosed atmosphere sufficiently to control insect pests. This is a method of great antiquity, as well as having modern equivalents. The success of the method relies on having the correct mix of sealing, grain moisture, and temperature.

A patented process uses fuel cells to exhaust and automatically maintain the exhaustion of oxygen in a shipping container, containing, for example, fresh fish.

Nonthermal plasma

This process subjects the surface of food to a "flame" of ionized gas molecules, such as helium or nitrogen. This causes microorganisms to die off on the surface.

High-pressure food preservation

Main article: Pascalization

High-pressure food preservation or pascalization refers to the use of a food preservation technique that makes use of high pressure. "Pressed inside a vessel exerting 70,000 pounds per square inch (480 MPa) or more, food can be processed so that it retains

its fresh appearance, flavor, texture and nutrients while disabling harmful microorganisms and slowing spoilage." By 2005, the process was being used for products ranging from orange juice to guacamole to deli meats and widely sold.

Biopreservation

3D stick model of nisin. Some lactic acid bacteria manufacture nisin. It is a particularly effective preservative.

Main article: Biopreservation

Biopreservation is the use of natural or controlled microbiota or antimicrobials as a way of preserving food and extending its shelf life. Beneficial bacteria or the fermentation products produced by these bacteria are used in biopreservation to control spoilage and render pathogens inactive in food. It is a benign ecological approach which is gaining increasing attention.

Of special interest are lactic acid bacteria (LAB). Lactic acid bacteria have antagonistic properties that make them particularly useful as biopreservatives. When LABs compete for nutrients, their metabolites often include active antimicrobials such as lactic acid, acetic acid, hydrogen peroxide, and peptidebacteriocins. Some LABs produce the antimicrobial nisin, which is a particularly effective preservative.

These days, LAB bacteriocins are used as an integral part of hurdle technology. Using them in combination with other preservative techniques can effectively control spoilage bacteria and

other pathogens, and can inhibit the activities of a wide spectrum of organisms, including inherently resistant Gram-negative bacteria.

Hurdle technology

Hurdle technology is a method of ensuring that pathogens in food products can be eliminated or controlled by combining more than one approach. These approaches can be thought of as "hurdles" the pathogen has to overcome if it is to remain active in the food. The right combination of hurdles can ensure all pathogens are eliminated or rendered harmless in the final product.

Hurdle technology has been defined by Leistner (2000) as an intelligent combination of hurdles that secures the microbial safety and stability as well as the organoleptic and nutritional quality and the economic viability of food products. The organoleptic quality of the food refers to its sensory properties, that is its look, taste, smell, and texture.

Examples of hurdles in a food system are high temperature during processing, low temperature during storage, increasing the acidity, lowering the water activity or redox potential, and the presence of preservatives or biopreservatives. According to the type of pathogens and how risky they are, the intensity of the hurdles can be adjusted individually to meet consumer preferences in an economical way, without sacrificing the safety of the product.

Principal hurdles used for food preservation (after Leistner, 1995)		
Parameter	Symbol	Application
High temperature	F	Heating
Low temperature	T	Chilling, freezing
Reduced water activity	a_w	Drying, curing, conserving
Increased acidity	pH	Acid addition or formation
Reduced redox potential	E_h	Removal of oxygen or addition of ascorbate
Biopreservatives		Competitive flora such as microbial fermentation
Other preservatives		Sorbates, sulfites, nitrites

Part II

Though some foods, such as rice, wheat and other cereals can be stored for years before they deteriorate, other foods, such as fish and meat, normally deteriorate quickly. For different types of food different methods of preservation are suitable.

The traditional methods of drying, smoking, salting or pickling food were widely used long before it was known why these methods were effective. It is now known that the processes of decay are accelerated by enzymes already present in the food and by bacteria or other microorganisms which may be already present or may come from external sources. To preserve food from decay, it is necessary either to destroy the bacteria or to create an environment in which cannot multiply and enzymes

are inactivated. Bacteria can be destroyed by heat and be inactivated by dehydration. Enzymes can be inactivated by cold or by reducing the moisture content.

The moisture content of food can be reduced by drying in the sun or by other means fish suspended over smoking fire is partly dried and the smoke also has bactericidal properties. Salt and vinegar are also effective preservations, which is based on some physical principles.

Heat can be used to destroy bacteria and stop enzymic activity in food. The food is sealed in a can so that bacteria couldn't come from the external sources. The can is then heated to a temperature sufficient to sterilize the contents. The length of time and the temperature required for sterilization depend on the product and on the type of bacteria to be destroyed.

It is important that the contents of the can are heated uniformly. The exact temperature can be controlled by means and the thermo-couple inserved into a can.

Notes on the text:

1. cereals – зерновые.
2. preservation – сохранение, консервирование.
3. to store – хранить, сохранять.
4. deteriorate – портить(ся).
5. suitable – подходящий.
6. drying – вяление.
7. smoking – копчение.
8. pickling – маринование.
9. decay – гнить, разлагаться.
10. enzyme – фермент.
11. environment – среда.

12. multiply – увеличивать, размножать(ся).
13. dehydration – обезвоживание.
14. moisture – влага.
15. to suspend – подвешивать.
16. content – содержание.

DRYING OF FISH

Drying after salting is one of the oldest ways of preserving fish which gives a product a long storage life. Both mechanical and natural drying are used. Fish that is dried naturally becomes desiccated and undergoes complicated biochemical protein changes as a result of which it loses its raw flavour. It can then be eaten as it is, without cooking.

The curing of smelt and other small fish by hot drying is a widespread and commercially important method of processing. In recent years vacuum drying has been used more and more. There is drying under natural conditions. Fish dried at a temperature hot exceeding 35 C, give a tasty and valuable product. The fish are usually hund on racks in the open air in warm and dry weather, or are dried in special chambers.

The drying process consists of a gradual loss of weight moisture evaporation. At the same time, complex biochemical processes take place.

To insure uniform salting and drying the fish are first graded for size, then fed into the salting vat, natural 20 per cent brine is poured. Salting time depends on the size and temperature of the fish.

Pacific salmon cured fillets are processed only from the highest quality fresh fish. The fish are dressed by cutting the belly away from the back. The fish is then washed, and slime scrubbed away with a brush. After gutting and washing the prices are salted in vats.

After six days the fish is immersed some hours and hung on racks, they take about a mouth to dry.

Notes on the text:

1. drying – вяление.
2. desiccate – высыхать.
3. raw – сырой.
4. rack – жердь.
5. vat – чан, бак.
6. cured fillet – вяленый балык.

TENDERIZED FRESH MEATS

Enzyme tenderization of fresh meats particularly of certain beef cuts has been a long practice. A proteolytic enzyme such as papaya is usually used. The meat products are dipped in enzyme solution and then frozen. Another tenderizing process involves[3] injecting[4] an enzyme solution into the blood stream of the animal before slaughtering it.

Many frozen meats fall in the category of processed meat products. The cooking and rapid freezing of certain meat dishes is a well-established practice. Generally the precooked meat items hold up better in frozen storage if they are covered with gravy.

Canned meats are meats that are preserved by heat sterilization while enclosed in cans or glass jars. They may or may not be precooked prior to being placed in the container. If finely divided materials are to be processed and if it is desirable that they remain in this finely divided state, it is necessary that these items be precooked prior to being placed in the container. The containers are processed at 104.4 – 126.7°C for periods of time sufficient to inactivate most bacteria. This kind of treatment results

in a commercially sterile product. The shelf-life of these items is very long. Certain canned meats are produced without inducing complete sterility. These include items such as canned hams, luncheon meat. These items are generally reacted with curing ingredients and then processed to temperatures of approximately 71.1°C while in the can. Such items generally require storage at refrigeration temperatures of 4.4 – 10°C and are very stable at these temperatures, having shelf-life of approximately 2–3 years or longer.

Notes on the text:

1. cut – отруб.
2. proteolytic enzyme – протеолитический фермент.
3. to involve – включать в себя.
4. to inject – впрыскивать, вводить.
5. dish – блюдо.
6. gravy – мясной соус.
7. commercial – промышленный.
8. shelf-life – срок хранения.
9. luncheon meat – мясо (консервированное) для завтрака.

WHY FISH GO BAD

As soon as a fish dies, spoilage begins. Spoilage is a result of a whole series of complicated changes brought about in the dead fish by its own enzymes, by chemical action and by bacteria. It is necessary to understand something of the way in which these changes take place in order to make the fullest use of chilling of keeping them in check.

An important series of changes is brought about by the enzymes of the living fish which remain active after its death. They are

particularly involved in the flavour changes that take place during the first few days of storage, before bacterial spoilage has become marked.

Millions of bacteria, many of them potential spoilers, are present in the surface slime, on the gills and in the intestines of the living fish. They do no harm because the natural resistance of a healthy fish keeps them at bay. Soon after the fish dies, however, bacteria begin to invade the tissues through the gills, along blood vessels, and directly through the skin and the lining of the belly cavity.

In addition to bacterial and enzymatic changes, chemical changes involving oxygen from the air and the fat in the flesh of species such as tuna and mackerel can produce rancid odours and flavors.

Thus, spoilage is a natural process once the fish dies, but chilling can slow down this process and prolong the shelf life of fish as food.

Effect of temperature on spoilage. There are three important ways of preventing fish going bad too quickly – care, cleanliness and cooling. Care in handling is essential because unnecessary damage can provide access through cuts and wounds for the spoilage bacteria, thus hastening their effect on the flesh. Cleanliness is important in two ways: 1) the natural sources of bacteria can largely be removed soon after the fish is captured by taking out the guts and washing off the slime from the surface of the fish; 2) the chances of contamination can be kept to a minimum by ensuring the fish is always handled in a hygienic manner. But most important of all, the fish must be chilled, the speed with which bacteria grow depends on temperature. Indeed, temperature is the most important factor controlling the speed at which fish go bad. The higher the temperature, the faster the bacteria

multiply, using the flesh of the dead fish as food. When the temperature is sufficiently low, bacterial action can be stopped altogether; frozen fish stored at a very low temperature, for example –30°C, will remain wholesome for a very long time because bacteria are either killed or completely inactive at this temperature, and other forms of spoilage progress only very slowly. But, even at –10°C, some kinds of bacteria can still grow, although only a very slow rate. Therefore for long-term storage, of many weeks or months, freezing and cold storage are necessary.

It is not possible to keep unfrozen fish at a temperature low enough to stop bacterial action completely, because fish begin to freeze at about –1°C. however, it is desirable to keep the temperature of unfrozen fish as close to that level as possible in order to reduce spoilage; the easiest and best way of doing this is to use plenty of ice which, when made from clean fresh water, melts at 0°C.

At temperatures not much above that of melting ice, bacteria become much more active and fish consequently goes bad more quickly. For example, fish with a storage life of 15 days at 0°C will keep for 6 days at 5°C and only about 2 days at 15°C before becoming unacceptable.

Notes on the text:

1. complicated – сложный.
2. enzyme – энзим, фермент.
3. chilling – охлаждение.
4. involve – вовлекать.
5. intestines – кишки, кишечник.
6. invade – проникать.
7. mackerel – скумбрия.

8. prolong – продлить.
9. prevent – предотвращать.
10. access – доступ.
11. contamination – загрязнение.

CHILLED FISH

The chilling of fish is a process by which the temperature of fish is reduced close to (but not below) freezing point. It delays the biochemical and bacteriological processes in fish and consequently prolongs the storage life of fish products.

Fresh fish or fish products that have been exposed to cold until they are near freezing point are called chilled. The biochemical and bacteriological processes in them are merely delayed, and not stopped; their storage life is therefore prolonged and will last so long as spoilage has not become sufficiently far advanced to impair their value as food. The storage life of a chilled product depends mainly on the quality of the raw fish, on the method and duration of chilling, and the conditions of storage.

The freezing point for fish is between –0.6°C and –2°C, depending on the species and on the concentration of intercellular fluid. It is usually taken as –1°C. During chilling the heat transfer between the food product and the coolant is often is accompanied by weight transfer (e.g. through evaporation from the surface with air chilling); chilling must therefore be regarded as a complex process of heat and mass transfer.

The important considerations in preparing good quality chilled fish products are the biochemical and physical changes in the fish during chilling time, the temperature conditions, the chilling time, and the equipment and technology used.

Before chilling the fish are graded for species and size, their quality must conform to the technical requirements and is determined both by organoleptic signs and by physical and chemical information derived from laboratory analysis of specimens or by other means. Fish to be processed into frozen fillets or to be delivered in ice to the consumer may be live or dead, but must be absolutely fresh.

Changes occurring during chilling. During chilling important physical and biochemical changes take place in the product. The physical changes generally entail an increase in the density of tissues and in the viscosity of tissue juices and blood, and a loss in the weight due to partial evaporation of moisture from the surface desiccation during air chilling. The extent of desiccation depends on the properties of the product and coolant and on the conditions of chilling. The main properties of the product on which desiccation depends are its specific gravity, the size of the individual fish, and the type of packaging during chilling and storage.

The more water there is in the product, the more moisture will evaporate from the fish; lean fish consequently is more subject to dehydration than fatty, which contains relatively less water. The subcutaneous layer of fat offers protection against evaporation from the tissues. Products with a higher specific gravity contain more organic matter and therefore relatively less water. The evaporation surface depends on the size of the individual fish. Depending on its properties the packaging may offer complete protection against evaporation, or may impede and delay the process; but if it is hydroscopic, it will absorb moisture from the fish.

Chilling time. The chilling time of fish and other marine products depends on their properties of the coolant, and the conditions under which the process takes place (cross-section of the product, thermal efficiency, specific gravity, temperature of the coolant, type of motion and velocity of the coolant, humidity, heat transfer coefficient from product to coolant).

Fish chilling practice. The methods employed for chilling fish and other fishery products are very varied, but may be divided into two groups according to the type of coolant: a) methods of chilling in a homogeneous coolant (as when fish are chilled in cold liquid, for example), and b) methods of chilling in heterogeneous coolant (for instance in ice).

Fish are very seldom air-cooled at a temperature of –2° to – 3°C, because they chill slowly in air and deteriorate in appearance both while being chilled and during subsequent storage. The most used commercial methods of chilling are by immersion in a cold liquid, by spraying with cold brine, or by packing in crushed ice. Of these three methods the least used is brine-spraying, and the most used is chilling in crushed ice. The method of chilling in liquid is to immerse the raw fish in the cold liquid (fresh water, brine or sea water). fresh water, which freezes at 0°C, can only be used if the fish are to be lightly chilled. To chill fish thoroughly down to 0°C or –1°C, it is necessary to use either brine (for example a 2 per cent solution of sodium chloride) or sea water, both of which have a freezing point below 0°C, and can be kept at a temperature within – 3° and - 4°C throughout the chilling process. It goes without saying that, since the fish are in direct contact with the liquid during chilling, the solution must be perfectly harmless to man.

Notes on the text:

1. that have been exposed to cold until they are near freezing point – которые охлаждены почти до точки замерзания.
2. storage life – продолжительность хранения.
3. to impair their value – чтобы ухудшить их пищевые качества.
4. intercellular fluid – внутриклеточный сок.
5. heat transfer – теплообмен.
6. weight transfer – массообмен.
7. by spraying with cold brine – орошением холодным рассолом.

HANGING

The split fish have to be stretched out somehow so as to ensure thorough exposure to the smoke, and practice varies considerably from place to place. Typical methods are handing on pairs of hooks, nailed at regular intervals along a wooden "tenter" stick or threading through the "lugs" on pointed metal "speats". In the case of large "finnans", a loose hook is sometimes clipped onto the projecting backbone in order to prevent the soft flesh of the "lugs" from tearing under the weight of the fish. Fillets tend to tear if hung by hooks through the flesh. They laid over either pairs of wooden strips or a metal loop, sometimes closed at both ends. "Reds" and bloaters are "speated" through the gill and mouth with wooden or metal rods, and sprats, when hot-smoked for canning as "sardines" are threaded the eyes on thin "speats". Buckling with heads on are sometimes threaded in pairs on sticks. If smoked after beheading, they can be speated through the thickets part, or else suspended by a clip on the tail, although in this case any roe is liable to drop out of

the fish, and liquid exuding during the cooking process drips onto the fish below, leaving unsightly stains. Predrying such hotsmoked fish for a period of half an hour or so at fairly low temperature, not above about 40°C is desirable for its effect on toughening the flesh so that it is not so unduly softened as to tear during the subsequent stage of cooking at higher temperatures.

"Arbroath smokies", which are headed and hot smoked, are tied in pairs with string. Sticks can be inserted in the gut cavities to keep the fish open and thus ensure through exposure to the smoke. Large whole split fish, such as salmon, are suspended by the tail and kept flat open during smoking by means of steaks or metal skewers threaded through the flesh. Salmon fillets are suspended by a loop of twine through a hole made in the "lug" gust under the "shoulder lone". Many of those devices leave unsightly holes in the fish, and wooden tenter sticks, metal speats, etc., are difficult to keep clean. Fillets have wet, unsmoked patches where they touch the stick. Furthermore, the operation of hanging and unbanging is manually laborious, particularly with small fish. Only in Norway has any attempt been made to mechanize the threading on rods of even such tiny fish as sprat and immature herring.

Fish can be smoked satisfactorily on wire gauze trays, provided that the mean does not mark the skin or flesh excessively, and this practice is quite normal in North America, the fish hewing tilted a little so that smoke rising upward contacts both sides. With a mechanical kiln delivering horizontal flow of smoke, tray smoking seems just as convenient as hanging vertically, and more easily adaptable to mechanization.

Notes on the text:

1. hang (hung) – вешать.
2. ensure – убеждаться.
3. considerable – значительный.
4. thread – нить.
5. backbone – позвоночник, хребет.
6. back – обратно.
7. bone – кость.
8. tear – рваться.
9. loop – петля.
10. gill – жабры.
11. can – мочь.
12. suspend – подвешивать.
13. tail – хвост.
14. roe – икра, молоки.
15. stain – пятно.
16. device – прибор.
17. attempt – попытка.

ON DIET

"When one is hungry, everything tastes good."

Mediterranean Diet May Help Alzheimer's

Research from Columbia University Medical Center, New York published in *Archives of Neurology* has found that a Mediterranean diet appears to be associated with a lower risk of cognitive impairment for individuals at the stage between normal aging and dementia and between mild impairment and Alzheimer's disease.

Researchers explain that it is thought that diet may play a significant role is in the cause and prevention of Alzheimer's disease. Previous studies have shown a lower risk among those eating a Mediterranean diet "characterized by high intakes of fish, vegetables, legumes, fruits, cereals and unsaturated fatty acids, low intakes of dairy products, meat and saturated fats and moderate alcohol consumption".

In the current study, researchers calculated a score for adherence to the Mediterranean diet for 1393 participants with no cognitive problems and 482 with mild impairment when recruited between 1992 and 1999.

Over an average of 4.5 years of follow-up, 275 of the 1393 without mild cognitive impairment subsequently developed the condition. Researchers found that a Mediterranean diet was associated with lower risk: the one-third of participants with highest adherence scores had a 28 per cent reduced risk and one-third with middle adherence scores had a 17 per cent reduced risk compared with the one-third with lowest adherence scores.

Over a slightly shorter average follow-up (4.3 years), 106 of the 482 participants with mild cognitive impairment went on to develop Alzheimer's disease. Again researchers found that a Mediterranean diet also was associated with lower risk for this transition: the one-third of participants with the highest adherence scores had a 48 per cent reduced risk and those in the middle one-third had 45 per cent less risk compared with the one-third with lowest adherence scores.

Researchers suggest that a Mediterranean diet may help to improve factors associated with development of mild cognitive impairment such as cholesterol and blood sugar levels and blood vessel condition. Individual dietary components also may have an influence.

Researchers explained:

"For example, potentially beneficial effects for mild cognitive impairment or mild cognitive impairment conversion to Alzheimer's disease have been reported for alcohol, fish, polyunsaturated fatty acids (also for age-related cognitive decline) and lower levels of saturated fatty acids."

Eating more, eating right

Proper nutrition means eating more of the right foods. People with much physical work need more calories because they go through their calories very fast. But an athlete cannot indiscriminately eat more. He or she has to take in the right foods for optimum nutrition.

Eating more **carbohydrates** is good. Because carbs provide the main fuel for physically active people particularly for those who doing high intensity exercise for short periods. So they burn

most energy from carbs and that is why a diet, which comprises 65 – 70 percent carbs, is recommended for them.

But the carbs should be complex as opposed to simple carbs. Complex carbs got from whole grains and fruits, like pear, plum, apple provide a good and readily available source of energy. The right quantity of **fats** is vital. Because fats take longer to digest, they provide fuel for a long time. For moderate intensity of exercise, which last for four to six hours, an athlete uses fat as fuel first and then uses carbs. However, fats should be eaten so that the food is already digested before needed, otherwise too much of fatty food actually make them sluggish.

Proteins are necessary because athletes are needed to build muscle, for repair and growth and for energy. However proteins are not a source of primary energy. And as a fuel it can give 2% to 10% of total energy expenditure depend on intensity and type of exercise.

Proteins ought to be about 1 gram per pound of lean body weight. And it should come from complete protein sources which contain all the essential amino acids.

Vitamins and minerals should be adequate as they help in the absorption of carbs, proteins and fats and act as antioxidants.

- Vitamins B1, B2, B3 and B6, as also folic acid help maintain the all important energy levels in athletes.
- Calcium from bioavailable sources help in maintaining bone and teeth strength.
- The sodium/potassium electrolyte balance needs to be maintained for good hydration.
- Let us not forget Omega 3 fatty acids for heart health as the heart is put to the test during exercise and training.

Diet Nutrition

What is the right balance?

When we talk of the right balance, what do we mean? Nutrition for people means that there should be a fine balance of carbs, fats and proteins.

The correct balanced diet and nutrition that is a key for optimum performance and energy. It would comprise 50 to 70 percent of carbs of which at least 80 to 90 percent should be from complex carbohydrate sources. The rest can come from simple sources like sugar and fruits. Proteins must comprise 15 to 25 percent of the foods. These can come from meats, fish, eggs, dairy products, nuts, seeds and legumes.

Fats ought to form 15 to 30 percent of the diet and more of the fat should be unsaturated like canola or olive oil.

The role of supplements in proper nutrition

The role of supplements in providing proper nutrition is a bit controversial. Some doctors recommend that all nutrition should come from the right foods for athletes.

This may not always be possible and some trainers and dietitians in athletics recommend that supplements can do more good in improving performance and endurance.

Herbalife, as a nutrition sponsor of professional athletes and teams makes various products especially for athletes. Herbalife's nutrition products for athletes:

Why the nutritional needs are different?

Some people are extremely physically active. Whether playing soccer, or swimming, tennis or golf, gymnastics or competitive running and the whole range in between, active people need a lot more calories to 'fund' their physical activities.

Proper nutrition for physically active people is vital for peak physical performance and is vital for theirs body to stay strong and healthy. So that the body is not depleted of important nutrients.

Different sports have varying nutrition needs. A body builder or a boxer will need different foods and different sources of energy from a gymnast.

For example, one person will need to build muscle mass, the other has to be lean. However, both need endurance.

Proper Nutrition

Proper nutrition for people who use their body in a way differently from other people is of extreme importance. Athletes must have high fitness levels to indulge in whichever sport is their forte. Therefore, their diet must have high nutritional value and pack a punch. They also need to be adequately hydrated.

Carbohydrates. Eating more carbohydrates is good. Because carbs provide the main fuel for athletes particularly for those who doing high intensity exercise for short periods. So they burn most energy from carbs and that is why a diet, which comprises 65-70 percent carbs, is recommended for them.

But the carbs should be complex as opposed to simple carbs. Complex carbs got from whole grains and fruits, like pear, plum, apple provide a good and readily available source of energy.

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Proteins ought to be about 1 gram per pound of lean body weight. And it should come from complete protein sources which contain all the essential amino acids.

Vitamins and minerals should be adequate as they help in the absorption of carbs, proteins and fats and act as antioxidants.

1. Vitamins B1, B2, B3 and B6 as also folic acid help maintain the all important energy levels in athletes.
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and training.

FIRST AID

First aid is the help that you give someone quickly after they have hurt themselves or have had an **accident**. It can stop a person from becoming more ill. In some cases, it can even save a person's life.

Only someone who knows **first aid** well should try to **treat** an injured or sick person. Usually, you give first aid until a doctor or an ambulance arrives. Never try to give someone first aid unless you know what to do. The wrong actions can do more **harm** than good.

What should you do?

1. Check the person's airway and breathing. If necessary, call 911 and begin rescue breathing, CPR, or bleeding control.
2. Keep the person still and calm.
3. Examine the person closely for other injuries.
4. In most cases, if medical help responds quickly, allow the medical personnel to take further action.
5. If the skin is broken, it should be treated immediately to prevent infection. Don't breathe on the wound or probe it. If possible, lightly rinse the wound to remove visible dirt or other contamination, but do not vigorously scrub or flush the wound. Cover with sterile dressings.
6. If needed, immobilize the broken bone with a splint or sling. Possible splints include a rolled up newspaper or strips of wood. Immobilize the area both above and below the injured bone.
7. Apply ice packs to reduce pain and swelling.
8. Take steps to prevent shock. Lay the person flat, elevate the feet about 12 inches above the head, and cover the person with

a coat or blanket. However, DO NOT move the person if a head, neck, or back injury is suspected.

Call for help

When someone has been hurt or has had an accident, the first thing to do is get help. If you don't know the phone number of the local doctor or hospital **dial** an emergency number: for an **ambulance,** for the **fire department** and or the police.
When you call for help you should be able to give correct information. An **ambulance** needs to know where the **injured** person is **located** and what exactly has happened. In some cases, you will be given **instructions** on what to do until a doctor or **ambulance** arrives.

Immediate help

Sometimes you cannot wait until help arrives. You must begin helping a person at once, **especially** if the **victim** is **bleeding** strongly, has been **poisoned** or if breathing has stopped. Even if you wait for a short time this can be **fatal**. Here are some important **rules** for **immediate** help:

- Do not move a person who may have a broken **bone**, **internal injuries** or an injured **spine unless** you really have to.
- If the **victim** is lying down, keep the person in that position. Do not allow them to walk or stand up.
- Never give food or **liquid** to a person who may need an operation.
- If the **victim** is **unconscious,** turn the head to one side to keep the person from **choking**. But do not move the head of a person who may have a **spinal injury**.
- Never give water to a person who is **unconscious**.

- Make sure that the **victim** has an open **airway**. The nose, mouth and **throat** should be clear in order for them to **breathe**.
- Make the **victim** comfortable, but **touch** a person only if you have to.
- If **necessary,** move the **victim** away from the sun or put them into the **shade**.
- **Remain calm** and talk to the **injured** person. Explain what is being done and say that help is on its way.

Sometimes the tongue blocks the airways - Make sure that the victim can breathe.

Shock treatment

If the blood in your body does not **circulate properly** it may result in shock. Any **serious injury** or illness may lead to shock. When a person is in shock blood does not carry enough **oxygen** and food to the **brain** and other organs.

A **victim** who **suffers** from shock may look afraid, **confused**, **and weak** and be extremely **thirsty**. The skin **appears pale** and feels cold. Pulse and breathing are fast.

To **treat** shock, **place** the victim on his or her back and **raise** the legs a little. Warm the **victim** by putting **blankets** around them.

Bleeding

Strong bleeding can **cause** death in minutes. **Bleeding** from small **wounds** usually stops after a short time because the blood **clots**. But **clotting** cannot stop the **flow** of blood when a **wound** is big.

The best way to stop bleeding is to press on the **wound** itself. If possible, let the person lie down and **raise** the bleeding part of the body. Then put a sterile **handkerchief**, **cloth** or **towel** on the

wound and press it down with your hand. Do with for 10 to 20 minutes until help arrives.

Sometimes direct **pressure** cannot stop strong **bleeding**. If the **leg** or arm is hurt, you can try to stop bleeding by putting **pressure** on the **artery** that carries blood to the **injured** body part. You can place a dry, clean cloth over the wound to dress it. If the bleeding continues, apply direct pressure to the site of bleeding. DO NOT apply a tourniquet to the extremity to stop the bleeding unless it is life-threatening.

Poisoning

There are four ways in which a victim may be **poisoned**. **Poison** may be **swallowed**, **inhaled, injected** or **absorbed** through the skin. If a poison **victim** becomes **unconscious or** has **difficulty** breathing call for an **ambulance immediately**.

A person who has **swallowed** something **poisonous** may die **within minutes** if they are not **treated**. The first step is to find out what kind of **poison** the person has **swallowed.** Call a doctor or a **poison control centre immediately** and follow the instructions that you are given carefully.

If a person has **inhaled** a **poison** like **carbon monoxide** or **chlorine gas,** move him or her to fresh air at once. Open all doors and windows.

Injected **poisons** are those that come from **insect stings** or bites. If you are **stung** by a bee the **stinger remains in** the **wound. Remove** it carefully and put ice on the **sting** or **run** cold water over it. If a tick bites a person, pull out the **remaining** part carefully and slowly. Use a **glove** or something else but not your **bare** hands. Do not try to burn it off or put oil on it. If a **rash** or **flulike symptoms develop** in the following weeks contact a doctor.

Sometimes a **victim** may have an allergy towards bite or **stings**. In such a **case, either** call a doctor, an **ambulance** or take the person to the nearest hospital.
Poisons can also be **absorbed** through the skin if you get in contact with **poisonous** plants or **chemical substances**. In such a case **remove** all the clothes that someone is wearing and **flush** the skin with water for about 10 minutes.

Artificial respiration

Begin with **artificial respiration** as soon as possible if a person has stopped breathing. Two or three minutes without breathing can **cause brain damage** and six minutes can be **fatal**. The most **efficient** way is **mouth to mouth resuscitation.** Put the **victim** on their back. **Kneel** down, **press** the nose together and **place** your mouth over the mouth of the **victim.** Take a deep **breath** and blow hard enough to make the **chest rise**. Then **remove** your mouth and listen for the air to come out. Then **repeat** the **procedure**. Do this until the **victim** starts breathing again or until help has arrived.

Burns

The first aid **treatment** of burns **depends** on how **severe** the burns are. First-degree burns show a **reddening** of the skin. Second **degree** burns **damage** deeper **skin layers** and third degree burns **destroy tissue** of deeper **layers** of skin.
To **treat** a first and second degree burn put ice on it or **run** cold water over it. Then put on **sterile bandages.** A person who has third degree burns should not be **treated** at home.
When you **treat** burns never open **blisters** and do not put oil or other **greasy substances** on the burn.

Frostbite

Frostbite **occurs** when a person has been in extremely cold weather for a long time. It mostly **affects** the skin of the ears, fingers, nose or **toes**. Frostbitten skin **appears pale** or grayish blue and feels **numb**. It should be **treated gently**. Warm the **affected** area with the **heat** of your hand or cover it with clothes until you can get the **victim** indoors. **Thaw** the skin by putting it in **lukewarm** water. Never use water that is hotter than 40°C. If you get **blisters,** do not open them.

Hand fractures

Hand fractures, a frequent emergency department complaint, are the most common fractures of the body. Proper management at initial evaluation of hand injuries can prevent a significant amount of morbidity and disability. Emergency physicians, often the first to assess these fractures, must have the skills to properly evaluate and manage these injuries.

The forearm, which consists of the radius and ulna, is essentially 2 cone like structures in parallel that are connected at their proximal and distal ends by joint capsules and along their shafts by a fibrous interosseus membrane. Fractures of the forearm are classified as involving the proximal, middle, or distal shaft. Injuries to this area are intimately associated with the elbow and wrist. The upper extremity is the most commonly injured extremity; thus, it is imperative that emergency physicians are familiar with the appropriate evaluation and management.

The pediatric musculoskeletal system differs from that of adults. The relatively greater amount of cartilage and collagen reduces the tensile strength of the bone, making propagation of

fractures less likely. They are also less identifiable on radiographs. Also unique to children is the growth plate. Depending on the severity of the injury, these fractures can significantly impair further growth and functioning of the limb.

Broken bone

If more pressure is put on a bone than it can stand, it will split or break. A break of any size is called a fracture. If the broken bone punctures the skin, it is called an open fracture (compound fracture). A stress fracture is a hairline crack in the bone that develops because of repeated or prolonged forces against the bone.

Considerations

It is hard to tell a "dislocated bone" from a "broken bone". However, both are emergencies, and the basic first aid steps are the same.

Causes

The following are common causes of broken bones:

- Fall from a height.
- Motor vehicle accidents.
- Direct blow.
- Child abuse.
- Repetitive forces, such as those caused by running, can cause stress fractures of the foot, ankle, tibia, or hip.

Symptoms:

- A visibly out-of-place or misshapen limb or joint.
- Swelling, bruising, or bleeding.

- Intense pain.
- Numbness and tingling.
- Broken skin with bone protruding.
- Limited mobility or inability to move a limb.

DO NOT

- DO NOT move the person unless the broken bone is stable.
- DO NOT move a person with an injured hip, pelvis, or upper leg unless it is absolutely necessary. If you must move the person, pull the person to safety by his clothes (such as by the shoulders of a shirt, a belt, or pant-legs).
- DO NOT move a person who has a possible spine injury.
- DO NOT attempt to straighten a bone or change its position unless blood circulation appears hampered.
- DO NOT try to reposition a suspected spine injury.
- DO NOT test a bone's ability to move.

Tooth Ache Pain

I have bad teeth and I'm poor, so I often just have to 'tough it out' with tooth pain.
My remedy depends on the type of pain:
1. Wisdom tooth coming in and pushing things around or pinching gums. Whole jaw hurts with this one. What I do: Taking both aspirin and Ibuprofen to try and decrease swelling temporarily. I haven't found a solution for this type of tooth ache other than the dentist and a tooth extraction.
2. Infection under a crown. You know it's this one if you press down with a pencil on each of your fillings until one is insanely painful to press down on.

What I do: Best solution is to get your hands on some anti-biotics. On the 3rd day, you'll feel ZERO pain. The infection will come back in a couple weeks with a vengeance, and if you take anti-biotics too long after the pain was gone the first time this new infection will be anti-biotic immune.

Ice cold water held on the tooth until the water warms up will cause a great deal of pain followed by relief for a couple minutes. Being in control of the constant pain for even a few minutes somehow makes you feel better.

I also use the ice-cold water method with calcium tablets held near the tooth by my tongue. The calcium dissolves and creates a kind of paste that will trick your brain into thinking you are repairing the tooth. Tricking your brain is good.

Finally, for this type of pain I will go for a walk. Yeah, just walk it off. I tell myself that by the time I get back, the pain will be decreased. Doing things to decrease the pain tricks your brain into giving you a nice bit of endorphins and actually does decrease the pain. Keep reminding yourself the pain is temporary, or at least that the current level of it is temporary.

Why Do My Fingers Go Numb?

Finger Numbness is usually a result of damages and/or diseases to the nerves in your fingers, hands, wrists, arms and even in your neck. Damages to the nerves in your fingers may have been from an accident or trauma to the nerves in your hands. When compared to a RSI (repetitive strain injury), an accident

at work that may have crushed or broken your fingers and damaged the nerves is easier to diagnose as the root cause. Repetitive strain injuries to your fingers that can cause nerve damages are actions like typing, keyboarding, musing, handling machinery that vibrates (like a power saw, a jackhammer or rot tiller), and even text messaging on your "blackberry" phone. Inflammation of the tendons, tendon sheaths and the ligament of your fingers and thumbs can easily be treated with Far Infrared Rays. Diseases and conditions that contribute to your fingers going numb are Carpal Tunnel Syndrome, White Finger Disease, Multiple Scleroses, Diabetic Neuropathy, Peripheral Vascular Disease, Raynaud's Syndrome and Lupus.

Who Gets Finger Numbness?

Finger Numbness is very common during pregnancy. Some women experience fluid retention which can cause swelling at the joints and, at the knees and wrists. When the wrist swells, there is pressure on the Median Nerve, which can reduce circulation to the fingers. Did you know an estimated 10 million people in the United States alone suffer from Raynaud's Disease (a disorder of the blood vessels in the skin of the fingers) complain of fingertip numbness? That's incredible! Hundreds of thousands of people suffering from Carpal Tunnel Syndrome also complain of numbness in their fingers. About 1 Million people in the United States suffer from a condition called Lupus. (Lupus is an autoimmune disease that is hard to diagnose with numb fingers being only one of the symptoms). People with Multiple Sclerosis often complain about numb fingers. Some customers have regained sensitivity to the fingers by wearing Prolotex FULL FINGER Therapy Gloves on a regular basis.

How Do I Reduce Finger Numbness?

Good thing for Far Infrared! Studies have shown that Far Infrared Rays from special gloves actually help to restore sensitivity back to the dormant cells and tissues. All you have to do is wear the FIR gloves on a regular basis to get the benefits of the natural healing energy into your fingers and fingertips. Far Infrared Gloves are washable and easy to use at work, at home and even at night while you are sleeping.

First Aid Kits

It is a good idea to have a **kit** with **first aid supplies** at home or in your car when you travel. It should include **bandages**, **tissue**, something to write on, a **flashlight**, **scissors**, **safety pins**, a spray or a **lotion** that kills **germs**. Always have a blanket ready to cover a person.

Glossary:

absorb = take in.
accident = a situation in which a person is hurt.
affect = influence, change.
airway = the passage in your throat that you breathe through.
ambulance = special car that takes a person to a hospital.
appear = seem, look as if.
artery = one of the passages that carries blood from your heart to the rest of your body.
artificial respiration = the way of making someone breathe again by blowing air into their mouth.
bandage = a narrow piece of cloth that you tie around a wound.
bare = naked.
blanket = thick cover for something.

bleed = if blood comes out of your body.
blister = a swelling of you skin that has liquid in it.
bone = a hard part of your body.
brain = the organ inside your head that controls how you move, think or feel.
brain damage = damage to your brain that is caused by an accident or another illness.
breath = the air that you send out of your lungs when you breathe.
breathe = to take air into your lungs and send it out again.
calm = quiet, still.
carbon monoxide = a poisonous gas that is produced when you burn something.
case = situation.
cause = lead to.
chemical substance = chemical material.
chest = the front of your body between your neck and your stomach.
chlorine gas = a greenish yellow gas that has a strong smell.
choke = if you cannot breathe because there is something in your throat and you cannot get enough air.
circulate = to travel around.
clot = to make thicker.
cloth = material that is used for making clothes.
confused = mixed up.
damage = the harm that you do to your body.
degree = the level of something.
depend on = to be affected or decided by something.
destroy = damage.
dial = call, phone.

difficulty = trouble, problem.
efficient = here: best.
either = whichever.
especially = above all, more than the rest.
fatal = deadly.
fire department = organization that works to prevent fires and stop them burning.
flashlight = a small electric light that you carry.
flow = here: the steady running of a liquid.
flulike symptoms = the signs that your body shows you when you have a cold or a flu.
flush = wash out.
gently = quietly, smoothly.
germ = a very small living thing that can make you ill.
glove = something that you wear on your hand to protect it or to keep it warm.
greasy = oily.
handkerchief = a piece of cloth that you use for drying your nose or eyes.
harm = damage.
heat = warmth, very high temperature.
immediate = at once, right now.
inhale = breath something in.
inject = to put a liquid into a someone's body with a needle.
injured = hurt.
insect sting = if an insect makes a very small hole in your skin.
instruction = information that tells you what to do.
internal injury = injuries inside your body.
kit = a box that has special things in it which you need.
kneel = go down on your knees.

leg = long part of your body that your feet are connected to.
liquid = fluid, watery material.
located = to be found.
lotion = cream, oil, gel.
lukewarm = not too hot and not too cold.
mouth-to-mouth resuscitation = a method used to make someone start breathing again by. blowing air into their mouth.
necessary = needed, basic.
numb = frozen, without any feeling.
oxygen = a gas that has no colour or smell; it is in the air and we need it to breathe.
pale = colourless.
place = put.
poison = something that can lead to death or serious illness if you eat or drink it.
poison control centre = organization that gives you information on different types of poison and what to do.
press = push down.
pressure =force, weight.
procedure = process.
properly = correctly, as it should be.
raise = lift, move up.
rash = a lot of red spots on your skin caused by an illness.
reddening = to become red.
remain = stay.
remove = take away.
rise = to go up.
rule =instruction, advice
run = here: flow.
safety pin = a metal pin that keeps things together.

scissors = a tool for cutting paper, cloth and other materials.
serious = very important.
shade = out of sunlight.
skin layers = the parts of your skin.
spinal = everything that has to do with your spine.
spine = the row of bones down the centre of your back that keeps your body upright.
sterile bandage = a completely clean piece of cloth that you put around a part of the body that is injured.
stinger = the needle-shaped part of an insect's body, with which it stings you.
substance = material.
suffer = to feel pain.
supplies = here: the necessary things you need at home.
swallow = to make something go down your throat and into your stomach.
thaw = melt.
thirsty = if you want to drink something.
throat = the passage that leads from your mouth to your lungs and stomach.
tick = a very small animal like an insect that lives under the skin of other animals and sucks their blood.
tissue = the material that forms animal or plant cells.
toe = one of the five moveable parts at the end of your foot.
touch =to put your hand or finger on something.
towel = piece of cloth that you use for drying your skin.
treat = take care of, heal.
treatment = something that is done to cure or heal someone or make them healthy again.
unconscious = you are not able to see, move or feel anything.

unless = if not.
victim = someone who suffers because of an illness or disease.
weak = tired, shaky.
within = inside.
wound = injury.

INSTRUMENTS USED IN GENERAL MEDICINE

Instrument	Uses
Bedpan	for patients who are unconscious or too weak to sit up or walk to the toilet to defecate
Cannula	to create a permanent pathway to a vein (or artery) for the purpose of repeated injections or infusion of intravenous fluids
Cardioverter / Defibrillator	to correct arrhythmias of the heart or to start up a heart that is not beating
Catheter	to drain and collect urine directly from the bladder (primary use); also to act as a makeshift oxygen tube, etc.
Dialyser	to remove toxic materials from the blood that are generally removed by the kidneys; used in case of renal failure
Electrocardiograph machine	to record the electrical activity of the heart over a period of time
Enema equipment	to passively evacuate the rectum of faeces
Endoscope	to look inside the gastrointestinal tract, used mainly in surgery or by surgical consultants

Gas cylinder	as a supply of oxygen, nitrous oxide, carbon dioxide, etc.
Gauze sponge	to absorb blood and other fluids as well as clean wounds
Surgical scissors	used for dissecting or cutting
Hypodermic needle / Syringe	for injections and aspiration of blood or fluid from the body
Infection control equipment	as in gloves, gowns, bonnets, shoe covers, face shields, goggles, and surgical masks for preventing nosocomial or healthcare-associated infection
Instrument sterilizer	to sterilize instruments in absence of an autoclave
Kidney dish	as a tray for instruments, gauze, tissue, etc.
Measuring tape	for length, height, head circumference and girth measurements
Medical halogen penlight	to see into the eye, natural orifices, etc. and to test for pupillary light reflex, etc.
Nasogastric tube	for nasogastric suction or the introduction of food or drugs into the body
Nebulizer	to produce aerosols of drugs to be administered by respiratory route
Ophthalmoscope	to look at the retina
Otoscope	to look into the external ear cavity

Oxygen mask and tubes	to deliver gases to the mouth/nostrils to assist in oxygen intake or to administer aerosolizedor gaseous drugs
Pipette or dropper	to measure out doses of liquid, specially in children
Proctoscope	to look inside the anal canal and lower part of the rectum
Reflex hammer	to test motor reflexes of the body
Sphygmomanometer	to measure the patient's blood pressure
Stethoscope	to hear sounds from movements within the body like heart beats, intestinal movement, breath sounds, etc.
Suction device	to suck up blood or secretions
Thermometer	to record body temperature
Tongue depressor	for use in oral examination
Transfusion kit	to transfuse blood and blood products
Tuning fork	to test for deafness and to categorize it
Ventilator	to assist or carry out the mechanical act of inspiration and expiration so the non-respiringpatient can do so; a common component of “life support”

Watch / Stopwatch	for recording rates like heart rate, respiratory rate, etc.; for certain hearing tests
Weighing scale	to measure weight
Crocodile Forceps	to remove foreign bodies from ear or nasal cavities

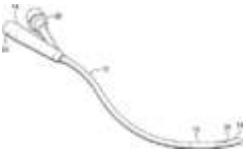
IMAGE GALLERY

Bandage

Bedpan

Blood infusion set

Cannula, intraveneous (separated)



Catheter, Foley

Defibrillator

Dialyser, hemodialysis

Enema bulb

Enema set

Gauze sponges

Endoscope

Instrument sterilizer

Face shield

Kidney dish

Gas cylinder, oxygen

Medical halogen penlight

Nasogastric tube, Levin

Nebulizer

Ophthalmoscope

Reflex hammer

Reflex hammer, queen square

Sphygmomanometer, electronic

Stethoscope

Syringe and needle

Thermometers, mercury

Tongue depressors

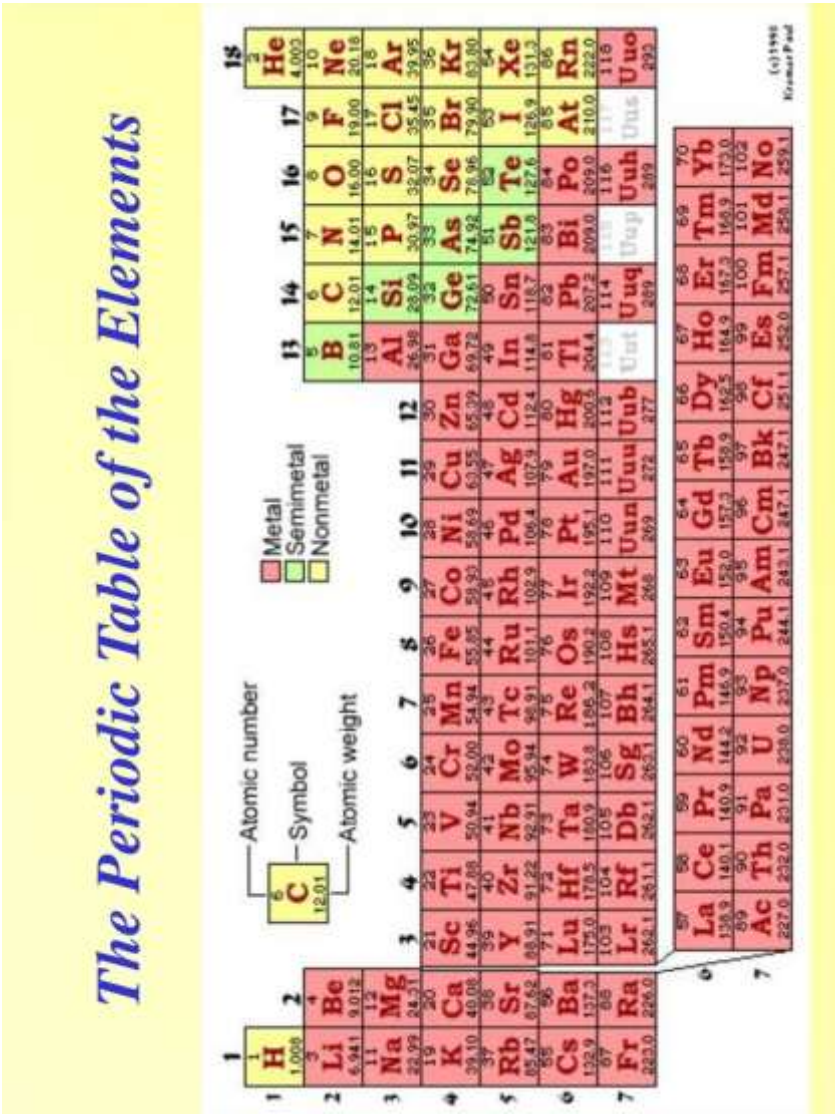
Wartenbergwheel

Tuning fork

Ventilator, high-frequency

Weighing scale

Appendices

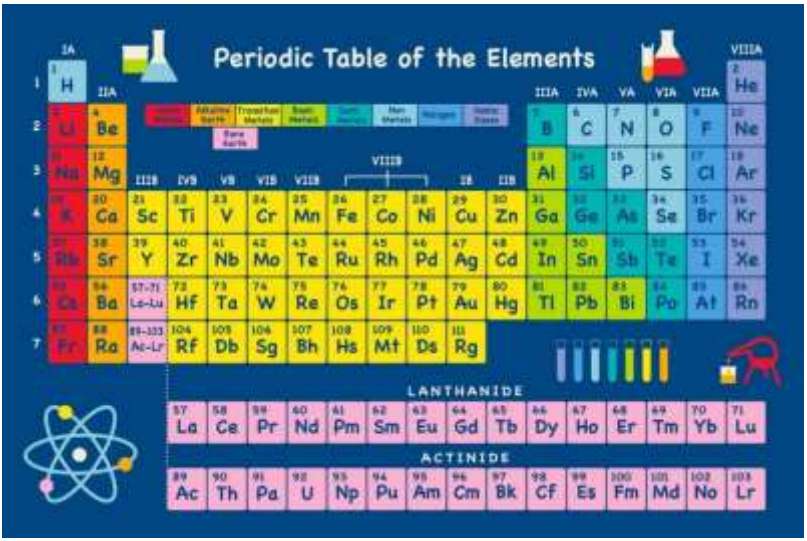

The Periodic Table of the Elements
Atomic number
Symbol
Atomic weight
Metal
Semimetal
Nonmetal

solid	*Liquid*	**THE PERIODIC TABLE**	*gas*	*synth*

Discoverer

1 H	AtomicWeight Melt|Boil(C)																2 He
3 Li	4 Be	Shell Isotopes										5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg	Orbital SpecificGravity										13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba	57 La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra	89 Ac	104 Rh	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Uun	111 Uuu	112 Uub	113 Uut	114 Uuq				

lanthanons	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	53 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
actinons	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr


Periodic Table of the Elements
LANTHANIDE
ACTINIDE

List of medical roots, suffixes and prefixes

This is a **list of roots, suffixes, and prefixes** used in medical terminology, their meanings, and their etymology. There are a few rules when using medical roots. Firstly, prefixes and suffixes, primarily in Greek, but also in Latin, have a droppable *-o-*. As a general rule, this *-o-* almost always acts as a joint-stem to connect two consonantal roots, e.g. *arthr-* + *-o-* + *logy* = *arthrology*. But generally, the *-o-* is dropped when connecting to a vowel-stem; *e.g. arthr-* + *itis* = *arthritis*, instead of *arthr-o-itis*. Secondly, medical roots generally go together according to language: Greek prefixes go with Greek suffixes and Latin prefixes with Latin suffixes. Although international scientific vocabulary is not stringent about segregating combining forms of different languages, it is advisable when coining new words not to mix different lingual roots.

Prefixes and suffixes

The following is an alphabetical list of medical prefixes and suffixes, along with their meanings, origin, and an English example.

A

Prefix or suffix	Meaning	Origin language and etymology	Example(s)
a-, an-	Denotes an absence of, without	Ancient Greek ἀ-/ἀν- (a-/an-), without, not	Apathy, Analgia
ab-	away from	Latin	Abduction
abdomin(o)-	Of or relating to the abdomen	Latin (abdōmen), abdomen, fat around the belly	Abdomen
-ac, -acal	pertaining to	Greek -ακός (-akos)	cardiac, hydrophobiac, pharmaceutical
acanth(o)-	thorn or spine	Ancient Greek ἄκανθα (akantha), thorn	acanthion, acanthocyte, acanthoma, acantholysis
acous(io)-	Of or relating to hearing	Greek ἀκουστικός (acoustikos), of or for hearing	acoumeter, acoustician
acr(o)-	extremity, topmost	Greek ἄκρον (akron), highest or farthest point	Acrocrany, acromegaly, acroosteolysis, acroposthia
-acusis	hearing	Greek ἀκουστικός (acoustikos), of or for hearing	paracusis
-ad	toward, in the direction of		dorsad
ad-	increase, adherence, motion toward, very	Latin	Adduction
aden(o)-, aden(i)-	Of or relating to a gland	Ancient Greek ἀδήν, ἀδεν- (adēn, aden-), an acorn; a gland	Adenocarcinoma, adenology, adenotome, adenotyphus
adip(o)-	Of or relating to fat or fatty tissue	Latin (adeps, adip-), fat	Adipocyte
adren(o)-	Of or relating to adrenal glands	Latin	adrenal artery
-aemia (BrE)	blood condition	Greek ἀναιμία, without blood	Anaemia
aer(o)-	air, gas	Greek ἀήρ, ἀέρος	Aerosinusitis
aesthesio- (BrE)	sensation	Greek αἴσθησις	Anesthesia
-al	pertaining to	Latin -alis	abdominal
alb-	Denoting a white or pale color	Latin albus, white	Albino

Prescription Abbreviations Decoded

Ever wonder what all of those cryptic initials mean on the prescription your doctor hands you to be filled by the pharmacist? Many of the abbreviations you see are derived from Latin, which can make it even more difficult to try and make sense of them. Here is a handy guide to some of the most frequently used abbreviations for prescriptions:

a.c. = before meals
a.d. = right ear
a.m. = morning
a.s. = left ear
a.u. = each ear
aq. = water
b.i.d. = twice daily
h.i.n. = twice a night
bis = twice
BP = blood pressure
c. = with
cap. = capsule
CBC = complete blood count
cc = cubic centimeter
D = dose
deib. alt. = every other day
dieb. tert. = every third day
dil. = dilute
disc or D.C. = discontinue
disp. = dispense
div. = divide
dos. = dose
dr = dram
e.m.p. = as directed
et = and
ex aq. = in water
fl or fld = fluid
g = gram
gr. or gr = grain
gtt. = drop

h. or hr. = hour
h.s. = at bedtime
HBP = high blood pressure
HT = hypertension
IM = intramuscular
IV = intravenous
liq = liquid
m. et n. = morning and night
mg = milligram
ml = milliliter
N.R. = do not repeat
NPO = nothing by mouth
o.d. = right eye
o.l.or o.s. = left eye
oz. = ounce
p.c. = after meals
p.m. = afternoon, evening
p.o. = by mouth
p.r.n. = as needed
q = every
qd = every day
qh = every hour
qid = four times a day
qod = every other day
R = rectal
s. = without
Sig. = write on label
SOB = shortness of breath
sol. = solution
ss. = one-half

stat. = immediately
Subc or subq = subcutaneously
sum. tal. = take one each
sup. = suppository
susp. = suspension
syr. = syrup
tab. = tablet
tbsp = tablespoon
tid = three times a day
tiw = three times a week
top = topically
tsp. = teaspoon
U or u = unit
u.d. or ut dict = as directed
URI = upper respiratory infection
UTI = urinary tract infection
w/ = with
w/o = without
x = times
y.o. = year old

Valley Direct

Common abbreviation	Latin words that make up the abbreviation	The meaning on prescription
ac	ante cibum	before meals
bid	bis in die	twice a day
gtt	gutta	drop (as in 1 drop, 2 drops, and so on)
hs	hora somni	at bedtime
od *	oculus dexter	right eye
os	oculus sinister	left eye
po	per os	by mouth
pc	post cibum	after meals
prn	pro re nata	as needed
qd **	quaque die	every day, or daily
qid	quarter in die	4 times a day
tid	ter in die	3 times a day

Буква	Фонетический эквивалент	Значение	Числовое значение	Соответствующий орган человеческого тела
Альфа	**A**	скот	1	голова
Бета	**B**	демон	2	шея
Гамма	**Γ**	божественность	3	плечи
Дельта	**Δ**	четверичность	4	грудь
Эпсилон	**E**	эфир	5	диафрагма
Зета	**Z**	жертвоприношение	7	живот
Эта	**H**	радость (любовь)	8	гениталии
Тета	**Θ**	хрустальная сфера	9	бедра
Йота	**I**	предопределение	10	колени
Каппа	**K**	болезнь	20	Икры
Ламбда	**Λ**	рост	30	лодыжки
Мю	**M**	деревья	40	ноги
Ню	**N**	ведьма	50	ноги
Кси	**Ξ**	пятнадцать звезд	60	лодыжки
Омикро	**O**	солнце	70	икры
Пи	**Π**	солнечное сияние	80	колени
Ро	**P**	плодородие	100	бедра
Сигма	**Σ**	психопомп (проводни	200	гениталии
Тау	**T**	человек	300	живот
Ипсилон	**Υ**	поток	400	диафрагма
Фи	**Φ**	фаллос	500	шея
Хи	**X**	имущество	600	плечи
Пси	**Ψ**	небесный свет	700	шея
Омега	**Ω**	богатство (изобилие)	800	голова

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