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Кафедра иностранных языков

И.В. Семенчук
Я.В. Разводовская

АНГЛИЙСКИЙ ЯЗЫК. РЕФЕРИРОВАНИЕ СПЕЦИАЛЬНОГО МЕДИЦИНСКОГО ТЕКСТА

Учебно-методическое пособие

для магистрантов, аспирантов и соискателей

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Авторы:
старший преподаватель кафедры иностранных языков УО «Гродненский государственный медицинский университет»
Семенчук И.В.
зав. кафедрой иностранных языков УО «Гродненский государственный медицинский университет»
Разводовская Я.В.

Рецензент: зам. декана факультета иностранных учащихся УО «ГрГМУ»,
канд. филолог. наук Л.Н. Гущина.

Семенчук И.В.

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Учебно-методическое пособие предназначено для магистрантов, аспирантов и соискателей, изучающих общеобразовательную дисциплину «Английский язык». Цель данного пособия – развитие навыков и умений структурирования, компрессирования и смыслового развертывания информации специального медицинского текста в устной и письменной форме на английском языке.

Ответственный за выпуск: первый проректор, доцент В.В. Воробьев

Содержание

ПРЕДИСЛОВИЕ

Настоящее учебно-методическое пособие предназначено для магистрантов, аспирантов и соискателей, изучающих общеобразовательную дисциплину «Иностранный язык» (английский).

Основной целью изучения дисциплины «Иностранный язык», в соответствии с действующей типовой учебной программой, является формирование иноязычной коммуникативной компетенции специалиста-медика, позволяющей использовать иностранный язык как средство профессионального и межличностного общения.

Цель данного пособия – развитие навыков и умений структурирования, компрессирования и смыслового развертывания информации специального медицинского текста в устной и письменной форме на английском языке.

Структура и содержание пособия ориентированы на взаимосвязанное решение коммуникативных, познавательных, развивающих и воспитательных задач и формирование у обучающихся профессиональной иноязычной коммуникативной компетенции.

В пособии представлены неадаптированные тексты с заданиями по материалам современных англоязычных периодических и справочных изданий: научных журналов, монографий, профильных учебных пособий по различным областям медицины. Система заданий к текстам ориентирована на формирование у обучающихся когнитивного стиля мышления, а также направлена на осуществление коммуникативных потребностей: подготовку сообщений и докладов на профессиональные темы; написание рефератов и аннотаций, обзор специальной литературы.

К текстам для реферирования представлена система заданий двух типов: а) предтекстовые задания, имеющие целью снятие лексических и грамматических трудностей при чтении, коррекцию фонетики, первичное представление словообразовательных и грамматических моделей; б) послетекстовые задания, ориентированные на работу с содержательной структурой текста с целью обучения составлению реферативного пересказа первичного текста, а также направленные на овладение специальными синтаксическими конструкциями, устойчивыми словосочетаниями,

оборотами, средствами связи, характерными для оформления реферата.

Структурной единицей учебного пособия является урок, состоящий из двух частей: первая часть предназначена для формирования навыков реферативного пересказа специального текста и включает задания для детальной работы с лексическим и текстовым материалом. Вторая часть каждого урока предназначена для закрепления навыков реферативного пересказа и содержит задания на компрессирование, структурирование и смысловой развертывание информации специального медицинского текста.

Учебное пособие имеет ряд приложений, в которых представлены методические рекомендации по составлению письменной аннотации к реферату на английском языке, алгоритм работы с иноязычным специальным текстом с целью извлечения основной информации, а также даются практические рекомендации по составлению реферата научной статьи на английском языке.

Учебное пособие может быть использовано для работы, как под руководством преподавателя, так и для самостоятельной работы.

Учебное пособие написано заведующей кафедрой иностранных языков УО «Гродненский государственный медицинский университет» Я.В. Разводовской и старшим преподавателем кафедры И.В. Семенчук.

Lesson 1 Human skeleton

Part I

I. Learn the new words.

- auditory ossicle — слуховая косточка
- bone marrow — костный мозг
- fuse — соединяться
- gestation — беременность
- hyoid bone — подъязычная кость стремя
- leverage — система рычагов, локомоторная функция
- ligament — связка
- pockets of cartilage — хрящевые зоны
- retrieve — извлекать
- stapes bone — слуховая косточка
- storage deposit — место накопления
- supplement — дополнять
- support (to) — поддерживать
- tendon — сухожилие
- terminal disease — заболевание в терминальной стадии
- womb — матка, утроба матери

II. Practice the pronunciation of the following words.

Ligaments, cartilage, gestation, womb, sacrum, coccyx, auditory ossicles, articulate, tongue, femur, stapes, haematopoiesis, manufacture, leverage, storage.

III. Read the text.

Human skeleton

The human skeleton is made of individual or joined bones (such as the skull), supported and supplemented by a structure of ligaments, tendons, muscles, cartilage and other organs.

The skeleton is not unchanging; it changes composition over a lifespan. Early in gestation, a fetus has no hard skeleton; bones form gradually

during nine months in the womb. At birth, all bones will have formed, but a newborn baby has more bones than an adult. On average, an adult human has 206 bones (according to Gray's Anatomy, but the number can vary slightly from individual to individual), but a baby is born with approximately 270 bones. The difference comes from a number of small bones that fuse together during growth, such as the sacrum and coccyx of the vertebral column. An infant is born with pockets of cartilage between particular bones to allow further growth. The sacrum (the bone at the base of the spine) consists of five bones which are separated at birth but fuse together into a solid structure in later years. Growing is usually completed between ages 12 and 14, at which point the bones have no pockets of cartilage left to allow more growth.

Not all bones are interconnected directly. There are 6 bones, the auditory ossicles (three on each side), in the middle ear that articulate only with each other. Another bone, the hyoid bone in the neck, does not touch any other bones in the body, and is supported by muscles and ligaments; it serves as the point of attachment for the tongue.

The longest and heaviest bone in the body is the femur and the smallest is the stapes bone in the middle ear. In an adult, the skeleton comprises around 20% of the total body weight.

Function

The most obvious function of bone is to support the body. It also the site of haematopoiesis, the manufacture of blood cells, that takes place in bone marrow (which is why bone marrow cancer is very often a terminal disease). It is also necessary for protection of vital organs. Movement in vertebrates is dependent on the skeletal muscles, which are attached to the skeleton by tendons. Without the skeleton to give leverage, movement would be greatly restricted. Bone also serves as a mineral storage deposit in which nutrients can be stored and retrieved.

IV. Find pairs of synonyms.

1) not unchanging	a) to make up
2) interconnected	b) to be composed of
3) having backbone	c) to grow together
4) to consist of	d) constant
5) obvious	e) vertebrate
6) to fuse	f) evident
7) to comprise	g) joined

V. Substitute the words in bold for their synonyms.

1. Human skeleton is ***not unchanging***.
2. The ***bone at the base of the spine*** consists of five bones.
3. Not all bones are ***interconnected*** directly.
4. Human skeleton ***consists of*** about 206 bones.
5. Some bones ***fuse together*** into a solid structure in later years.
6. In an adult, the skeleton ***comprises*** 20% of the total body weight.

VI. Form the nouns from the verbs.

to store ***storage***
to protect
to move
to attach
to compose
to form
to grow
to articulate
to support

VI. Paraphrase the sentences using another part of speech for the words in bold type.

1. One of the main functions of bones is ***to store*** minerals.
2. The skeletal system is necessary for ***protection*** of vital organs.
3. The hyoid bone serves ***to attach*** the tongue.
4. The bones of the skeleton usually ***complete their growth*** between ages 12 and 14.

VII. Chose the right translation.

- *Without the skeleton to give leverage, movement would be greatly restricted.*

1. В скелете, который дает систему рычагов, движения будут сильно ограничены.
2. Без скелета, который выполняет локомоторную функцию, движения были бы сильно ограничены.
3. Вне скелета выполнять локомоторную функцию для производства движений было бы затруднительно.

VIII. Answer the questions.

1. What is the human skeleton made up of?

2. Is the composition of the skeleton constant?
3. How many bones does a newborn baby have?
4. How many bones does an adult human have?
5. How can you explain the difference in the number of bones in an infant and in an adult?
6. What allows further growth of bones in infancy?
7. Are all bones interconnected directly?
8. What are the longest and the smallest bones in the body?
9. What are the main functions of bones?

IX. Speak about the human skeleton using the following plan:

- composition of human skeleton
- the number of bones
- growth of bones
- connections between bones
- functions of bones

Part II

I. Read the text.

Because the bones making up the human skeleton are inside the body, the skeleton is called an endoskeleton. Some animals, such as the crab, have an external skeleton called an exoskeleton.

The skeletal system is a living, dynamic system, with networks of infiltrating blood vessels. Living mature bone is about 60% calcium compounds and about 40% collagen. Hence, bone is strong, hard and slightly elastic. All humans were born with over 300 bones but some bones, such as those in the skull and lower spine, fuse during growth, thereby reducing the number. Although mature bones consist largely of calcium, most bones in the skeleton of vertebrates, including humans, began as cartilage. Some animals, such as sharks retain their cartilaginous skeleton in adulthood. Cartilage is a type of connective tissue, and contains collagen and elastin fibers.

A skeleton is a framework of about 206 bones that protects the body's organs, supports the body, provides attachment points for muscles to enable body movement, functions as a storage site for minerals such as calcium and phosphorus, and produces blood cells.

Individual bones meet at areas called joints and are held in place by connective tissue. Most joints, such as the elbow, are called synovial joints, for the synovial membrane which envelopes the joint and secretes a lubricating fluid. Cartilage lines the surface of many joints and helps reduce friction between bones. The connective tissues linking the skeleton together at the joints are tendons and ligaments. Ligaments and tendons are both made up of collagen, but serve different functions. Ligaments link bones together and help prevent dislocated joints. Tendons link bone to muscle.

II. Arrange the text in the logical order of paragraphs. Give the title and subtitles.

III. Find key words in each paragraph. Retell the text in no more than 10 sentences using key words.

IV. Ask questions to each part of the text inquiring about the main things of each paragraph.

Lesson 2 Muscles

Part I

I. Learn the new words.

▪ non-striated muscle	не поперечно-полосатая мышца
▪ hollow organ	полый орган
▪ line	выстилать
▪ lumen	полость
▪ in terms of	что касается
▪ by means of	посредством
▪ spindle shaped	веретенообразный
▪ contractile protein	сократительный белок
▪ be arranged	располагаться
▪ orderly	правильный
▪ gap junction	щелевидное соединение
▪ slide	скользить
▪ crossbridge	поперечный мостик
▪ tilt	наклоняться
▪ drag	тянуть
▪ guide	руководить
▪ sarcoplasmic reticulum	саркоплазматический ретикулум
▪ calcium release	выброс кальция

II. Practice the pronunciation of the following words.

Striated, lumen, spindle shaped, fundamentally, intracellular, contractile proteins, myosin, sarcomeres, throughout, nuclei, guide, crossbridges, neighbouring, medium, 5 μm.

III. Read the text.

Smooth muscle

Smooth muscle is a type of non-striated muscle, found within the "walls" of hollow organs; such as the bladder, the uterus, and the gastrointestinal tract, and also lines the lumen of the body, such as blood vessels. Smooth

muscle is fundamentally different from skeletal muscle and cardiac muscle in terms of structure and function.

Structure. Smooth muscle is spindle shaped, and like any muscle, can contract and relax. In order to do this it contains intracellular contractile proteins called actin and myosin. While the fibers are essentially the same in smooth muscle as they are in skeletal and cardiac muscle, the way they are arranged is different. As non-striated muscle, the actin and myosin is not arranged into distinct sarcomeres that form orderly bands throughout the muscle cell. The cells themselves are generally arranged in sheets or bundles and connected by gap junctions. In relaxed state, each cell is spindle-shaped, 25-50 μm long and 5 μm wide.

The cells that compose smooth muscle have single nuclei.

Function. The contractile function of this muscle, to a large extent, determines function of the organ. For example, contractile function of vascular smooth muscle contributes to setting the level of blood pressure. Smooth muscle tissue serves to guide medium transport, such as blood, urine, sperm, bile by means of controlled contractions inducing peristaltic movements.

Contraction. Smooth muscle contraction is caused by the sliding of myosin and actin fibres over each other. It happens when heads on the myosin fibres form crossbridges with the actin fibre. These heads tilt and drag the actin fibre a small distance.

Smooth muscle cells can be stimulated to contract or relax in many different ways.

They may be directly stimulated by the autonomic nervous system ("involuntarily" control), but can also react on stimuli from neighbouring cells and on hormones(vasodilators or vasoconstrictor) within the medium that it carries.

IV. Find in each paragraph of the text 1-2 sentences which express its main idea(s). Remember that the main idea is usually expressed in the first or in the last sentence of the paragraph.

V. Reduce the sentences as much as possible to deliver only their main idea.

Sample: *Smooth muscle is fundamentally different from skeletal muscle and cardiac muscle in terms of structure and function.* – ***Smooth muscle is different from skeletal and cardiac muscles by structure and function.***

1. While the fibers are essentially the same in smooth muscle as they are in skeletal and cardiac muscle, the way they are arranged is different**.**

2. Smooth muscle tissue serves to guide medium transport, such as blood, urine, sperm, bile by means of controlled contractions inducing peristaltic movements.

3. As non-striated muscle, the actin and myosin is not arranged into distinct sarcomeres that form orderly bands throughout the muscle cell.

4. They may be directly stimulated by the autonomic nervous system ("involuntarily" control), but can also react on stimuli from neighbouring cells and on hormones (vasodilators or vasoconstrictor) within the medium that it carries.

VI. Answer the questions.

1. What issues does the text deal with?
2. Where is smooth muscle found?
3. Is smooth muscle similar to skeletal muscle and cardiac muscle by structure and function?
4. What shape does smooth muscle have?
5. What helps smooth muscle to contract?
6. How are cells of smooth muscle generally arranged?
7. Are the cells of smooth muscles mononuclear cells or multinucleated cells?
8. What is the main function of smooth muscle?
9. What is smooth muscle contraction caused by?
10. How can smooth muscle cells be stimulated to contract or relax?
11. What agents are contractions in vertebrate smooth muscle initiated by?

VII. Continue the sentences with the information from the text.

1. Smooth muscle is found within the "walls" of hollow organs such as ….
2. Smooth muscle is fundamentally different from skeletal muscle and cardiac muscle by … .
3. Smooth muscle is … shaped.
4. In order to contract it contains intracellular contractile proteins called … and … .
5. The cells of smooth muscle are arranged in sheets or bundles and connected by …. .
6. Smooth muscle tissue serves to guide …. .
7. Smooth muscle contraction is caused by the sliding of …. .

8. Smooth muscle cells may be directly stimulated by ….. .
9. Contractions in vertebrate smooth muscle are initiated by …. .

VIII. Describe location, shape, structure and function of smooth muscle taking exercise VII as a plan and using the following phrases:

- The text can be divided into … parts.
- The first part is concerned with …
- The next part describes …
- The following part emphasizes …
- The final part presents …

Part II

I. Read the text.

Skeletal muscle

Skeletal muscle is a type of striated muscle, attached to the skeleton. Skeletal muscles are used to facilitate movement, by applying force to bones and joints; via contraction. They generally contract voluntarily, although they can contract involuntarily.

Muscles have an elongated, cylindrical shape, and are multinucleated. The nuclei of these muscles are located in the peripheral aspect of the cell, just under the plasma membrane, which vacates the central part of the muscle fiber for myofibrils. This unique arrangement of the nuclei allows for higher efficiency. Skeletal muscles usually have one end (the "origin") attached to a relatively stationary bone, (such as the scapula) and the other end (the "insertion") is attached across a joint, to another bone (such as the humerus).

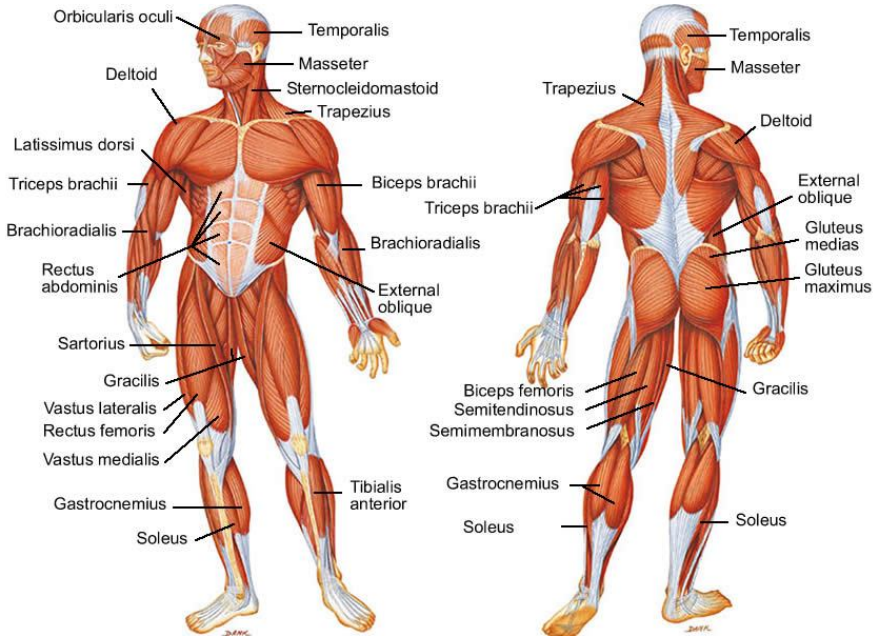
The strength of skeletal muscle is directly proportional to its cross-sectional area. The strength of a body, however, is determined by a number of biomechanical principles, including the distance between muscle insertions and joints and muscle size. Muscles are normally arranged in opposition so that as one group of muscles contract, another group "relaxes" or expands. Antagonism in the transmission of nerve impulses to the muscles means that it is impossible to stimulate the contraction of two antagonistic muscles at any one time.

Skeletal muscle cells are stimulated by acetylcholine, which is released at neuromuscular junctions by motor neurons. Each motor neuron “controls” a group of muscle cells, known as “motor units”. When more strength is required than can be obtained from a single motor unit, more units will be stimulated; this is known as "motor unit recruitment".

II. Divide the text into logical parts. Express the main idea of each part.

II. Find key words which best express the main idea of each part. Give the brief contents of each part using key words.

i.



Lesson 3 Circulation

Part I

I. Learn the new words.

- depleted — лишенный, обедненный
- distance-wise — удаленный
- distribute — распределять
- fight diseases — бороться с заболеваниями
- interstitial fluid — тканевая жидкость, интерстициальная жидкость
- network — сеть
- nutrients — питательные вещества
- target cells — мишеневидные клетки
- semilunar valve — полулунный клапан
- systemic circulation — большой круг кровообращения, системный кровоток
- pulmonary circulation — малый круг кровообращения, лёгочное кровообращение

II. Practice the pronunciation of the following words.

Nutrients, amino acids, hormone, homeostasis, oxygen, diffuse, layers, interstitial, target, circulatory, vena cava, tricuspid, semilunar, mitral, via.

III. Translate the words with the same root.

1) Circulate, circulation, circulatory; 2) oxygen, oxygen-depleted, oxygen-rich, oxygenated; 3) transport, transporting; 4) to distribute, distribution.

IV. Read the text.

The circulatory system

The circulatory system is an organ system that passes nutrients (such as amino acids, electrolytes and lymph), gases, hormones, blood cells, etc. to and from cells in the body to help fight diseases and help stabilize body temperature and pH to maintain homeostasis.

This system may be seen strictly as a blood distribution network, but some consider the circulatory system as composed of the cardiovascular system,

which distributes blood, and the lymphatic system, which distributes lymph.

Closed cardiovascular system

The cardiovascular systems of humans are closed, meaning that the blood never leaves the network of blood vessels. In contrast, oxygen and nutrients diffuse across the blood vessel layers and enters interstitial fluid, which carries oxygen and nutrients to the target cells, and carbon dioxide and wastes in the opposite direction. The other component of the circulatory system, the lymphatic system, is not closed. The heart is located in the center of the body between the two lungs. The reason that the heart beat is felt on the left side is because the left ventricle is pumping harder.

Pulmonary circulation

The Pulmonary circulation is the portion of the cardiovascular system which transports oxygen-depleted blood away from the heart, to the lungs, and returns oxygenated blood back to the heart.

Oxygen deprived blood from the vena cava enters the right atrium of the heart and flows through the tricuspid valve into the right ventricle, from which it is pumped through the pulmonary semilunar valve into the pulmonary arteries which go to the lungs. Pulmonary veins return the now oxygen-rich blood to the heart, where it enters the left atrium before flowing through the mitral valve into the left ventricle. Then, oxygen-rich blood from the left ventricle is pumped out via the aorta, and on to the rest of the body.

Systemic circulation

Systemic circulation is the portion of the cardiovascular system which transports oxygenated blood away from the heart, to the rest of the body, and returns oxygen-depleted blood back to the heart. Systemic circulation is distance-wise, much longer than pulmonary circulation, transporting blood to every part of the body.

V. Answer the questions.

1. What work does the circulatory system perform?
2. Do some scientists consider the circulatory system as composed of two different systems?
3. Why is the cardiovascular systems of humans called closed?
4. How do oxygen and nutrients enter the tissues?
5. Is the lymphatic system closed?

6. Where is the heart located?
7. Why is the heart beat felt on the left side?
8. What blood does the pulmonary (systemic) circulation transport?
9. Which circulation is distance-wise?

VI. Compare the information in pairs of sentences using the words:

In contrast в отличие от этого, напротив
However однако, с другой стороны
But но
While в то время как

1. The circulatory system may be seen strictly as an integral system. Some scientists consider the circulatory system as composed of two systems.
2. The cardiovascular system of humans is closed. The lymphatic system is not closed.
3. Blood never leaves the network of blood vessels. Oxygen and nutrients diffuse across the blood vessel layers and enter interstitial fluid.
4. The Pulmonary circulation transports oxygen-depleted blood. Systemic circulation transports oxygenated blood.
5. The Pulmonary circulation transports blood away from the heart, to the lungs. Systemic circulation transports blood away from the heart, to the rest of the body.
6. Systemic circulation is distance-wise. Pulmonary circulation is much shorter.

VII. Divide the extended sentence into two separate sentences.

The circulatory system is an organ system that passes nutrients (such as amino acids, electrolytes and lymph), gases, hormones, blood cells, etc. to and from cells in the body to help fight diseases and help stabilize body temperature and pH to maintain homeostasis.

VIII. Formulate the main idea of the text using one of the following sentences:

1. The text is about …
2. The text deals with …
3. The text also touches upon …
4. The purpose of the text is to give the idea of …

IX. Describe the circulatory system using the following plan.

1. Function and structure
2. Closed cardiovascular system
3. Pulmonary circulation
4. Systemic circulation

Part II

I. Read the text.

These are the "exchange vessels", allowing passage of substances between blood and the fluids outside them which surround the body cells. They consist of a single layer of endothelial cells, with microscopic spaces between adjacent cells which allow the solutes of the blood, including salts, glucose, and dissolved oxygen, to pass into the tissues, and products of tissue metabolism, including carbon dioxide, to pass into the blood. The number of capillaries is so vast that even though they are microscopic their overall resistance to blood flow is low and blood passes through them slowly. The high density of capillaries means the distance for diffusion by the nutrients and gases is small. The more active tissues tend to have a denser supply of capillaries.

Capillaries are formed as a complex system of branching blood vessels between arterioles and venules (microscopic veins). Those near the arteries are at a higher pressure than those near veins. The gaps between endothelial cells are small enough to be almost impermeable to the protein molecules present in the blood, causing the capillary bed to function as a semipermeable membrane. These molecules exert an osmotic force which tends to draw fluid from the tissue spaces into the capillary. This is opposed by the hydrostatic pressure forcing fluid out. A dynamic equilibrium is established, such that at the higher pressure capillaries fluid leaves the circulation, and at the lower pressure ones it is drawn back in. An additional system of vessels, the lymphatics, are fine tubes which provide an alternative route for tissue fluid, via the lymph nodes and back to the circulation. Disturbance of the balance of the fluid exchange at capillaries can lead to oedema, which is swelling caused by excess tissue fluid.

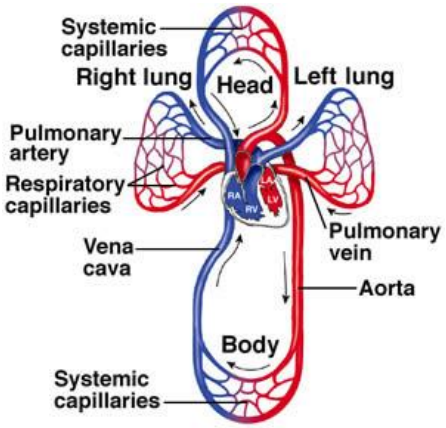
Blood returns from the tissues to the heart along veins. Larger veins possess valves which ensure that blood travels in the correct direction and prevents the development of undue back pressure. Sometimes the valves

may cease to function, causing veins to distend abnormally and permanently. This is the cause of varicose veins.
Veins have another important role in addition to being conduits. Approximately 70% of the entire blood volume is contained within the veins, and these are very distensible. This means that they can readily accommodate quite large changes in their volume, either as a result of a change in the total quantity of blood in the circulation (haemorrhage or transfusion), or because of changes in blood distribution (leg veins distend on standing up, for example). The reason that veins can change their volume with little change in pressure is partly because they collapse when empty, which applies to veins above heart level. When filled, the elastic tissue in their walls is readily distensible, although expansion is eventually limited by the relatively indistensible fibrous tissue (collagen).

II. Divide the text into two logical parts. Express the main idea of each part.

III. Give the title and subtitles.

IV. Find key words in each part and retell the text using them.



Lesson 4 Respiration

Part I

I. Learn the new words.

- ability — способность
- air-blood barrier — альвеолярно-капиллярный барьер
- consume — потреблять
- delivery — доставка
- exchange — обмен
- inferior vena cava — полая нижняя вена
- line — выстилать
- link — связующее звено
- oxygen-deficient — бедный кислородом
- reach — достигать, доходить
- release — выделять
- superior vena cava — верхняя полая вена
- transfer — перенос

II. Practice the pronunciation of the following words.

Carbon dioxide, alveoli, barrier, micron, capillaries, superior vena cava, inferior vena cava, essential, transfer, diffusion, perfusion, atmosphere.

III. Read the text.

Exchanging oxygen and carbon dioxide

The primary function of the respiratory system is to exchange oxygen and carbon dioxide. Inhaled oxygen enters the lungs and reaches the alveoli. The layers of cells lining the alveoli and the surrounding capillaries are each only one cell thick and are in very close contact with each other. This barrier between air and blood averages about 1 micron ($^{1}/_{10,000}$ of a centimeter) in thickness. Oxygen passes quickly through this air-blood barrier into the blood in the capillaries. Similarly, carbon dioxide passes from the blood into the alveoli and is then exhaled.

Oxygenated blood travels from the lungs through the pulmonary veins and into the left side of the heart, which pumps the blood to the rest of the

body. Oxygen-deficient, carbon dioxide-rich blood returns to the right side of the heart through two large veins, the superior vena cava and the inferior vena cava. Then the blood is pumped through the pulmonary artery to the lungs, where it picks up oxygen and releases carbon dioxide.
Three processes are essential for the transfer of oxygen from the outside air to the blood flowing through the lungs: ventilation, diffusion, and perfusion. Ventilation is the process by which air moves in and out of the lungs. Diffusion is the spontaneous movement of gases, without the use of any energy or effort by the body, between the gas in the alveoli and the blood in the capillaries in the lungs. Perfusion is the process by which the cardiovascular system pumps blood throughout the lungs. The body's circulation is an essential link between the atmosphere, which contains oxygen, and the cells of the body, which consume oxygen. For example, the delivery of oxygen to the muscle cells throughout the body depends not only on the lungs but also on the ability of the blood to carry oxygen and on the ability of the circulation to transport blood to muscle.

IV. Find pairs of synonyms.

1)primary	a) to give up
2)oxygenated	b) important
3)oxygen-depleted	c) main
4)essential	d) oxygen-deficient
5)pick up	e) to carry
6)to transport	f) to take up
7)to release	g) oxygen-rich

V. Substitute the words in bold for their synonyms.

1. The Pulmonary circulation transports ***oxygen-depleted*** blood away from the heart, to the lungs, and returns ***oxygenated*** blood back to the heart.
2. Ventilation, diffusion, and perfusion are ***essential*** for the transfer of oxygen from the outside air to the blood in the lungs.
3. In the lungs blood ***picks up*** oxygen and ***releases*** carbon dioxide.
4. The ***main*** respiratory surface in humans is the alveoli.
5. Almost all the oxygen (over 98%) is ***carried*** in the blood by attachment to hemoglobin.
6. Hemoglobin is the red pigment in blood that ***takes up*** oxygen in the lungs and **carries** it to the tissues.

VI. Read the text through again and note the topic dealt with in each paragraph.

Paragraph 1	Paragraph 2	Paragraph 3

VII. Write down in each column the key words (word combinations) corresponding to each paragraph of the text.

Paragraph 1	Paragraph 2	Paragraph 3
1) exchange oxygen and carbon dioxide *2)* *3)*	*1)* *2)* *3) picks up oxygen*	*1) ventilation, diffusion, and perfusion* *2)* *3)*

VIII. Answer the questions.

1. What is the primary function of the respiratory system?
2. Why does oxygen pass quickly through the air-blood barrier into the blood and carbon dioxide passes from the blood into the alveoli?
3. Where does oxygenated blood travel?
4. Where does oxygen-deficient blood travel?
5. What three processes are essential for the transfer of oxygen from the outside air to the blood flowing through the lungs?
6. Where do ventilation, diffusion, and perfusion take place?
7. What does the delivery of oxygen to the muscle cells throughout the body depend on?

IX. Using the plan from exercise VI and key words (word combinations) from exercise VII speak about the exchanging oxygen and carbon dioxide in the human body.

Part II

I. Read the text

The process of breathing

The oxygen contained in the inhaled air passes freely through these membranes, is absorbed by the blood, carried to the heart and then through the arteries and their branches to the different organs and tissues of the

body, fanning the fires of life into brighter flame all along its course and burning up the waste products and poisons that have accumulated during the vital processes of digestion, assimilation and elimination.

With every inhalation, air is sucked in through the windpipe or trachea, which terminates in two tubes called bronchi, one leading to the right lung, one to the left. The air is then distributed over the lungs through a network of minute tubes, to the air cells, which are separated by only a thin membrane from equally fine and minute blood vessels forming another network of tubes.

This explains why normal, deep, regular breathing is all-important to sustain life and as a means of cure. By proper breathing, which exercises and develops every part of the lungs, the capacity of the air cells is increased.

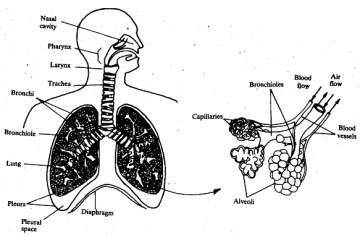
In the lungs the venous blood discharges its freight of excrementitious poisons and gases, and by coming in contact with fresh air and a new supply of oxygen, it is again transformed into bright, red arterial blood, pregnant with oxygen and ozone, the life-sustaining elements of the atmosphere.

After the blood has unloaded its supply of oxygen, it takes up the carbonic acid gas which is produced during the oxidation and combustion of waste matter and carries it to the lungs, where the poisonous gases are transferred to the air cells and expelled with the exhaled breath. This return trip of the blood to the lungs is made through another set of blood vessels, the veins, and the blood, dark with the sewage of the system, is now called venous blood.

II. Arrange the text in the logical order of paragraphs. Give the title and subtitles.

III. Find key words in each paragraph. Retell the text in no more than 10 sentences using key words.

IV. Ask questions to each part of the text inquiring about the main things of each paragraph.



Lesson 5 Digestion

Part I

I. Learn the new words.

- affect — действовать на
- carbohydrate — углевод
- contents — содержимое
- dissolve — растворяться
- empty — опорожнять
- enable — позволять
- narrowing — сужение
- proceed — протекать (о процессе)
- propel — продвигать вперёд
- swallow — глотать, глотательное движение

II. Practice the pronunciation of the following words.

Enable, propel, liquid, peristalsis, length, involuntary, proceed, junction, esophagus, ringlike, sphincter, accept, mechanical, carbohydrates, dissolve, juice, further.

III. Read the text.

Movement of food through the digestive system

The large, hollow organs of the digestive tract contain a layer of muscle that enables their walls to move. The movement of organ walls can propel food and liquid through the system and also can mix the contents within each organ. Food moves from one organ to the next through muscle action called peristalsis. Peristalsis looks like an ocean wave traveling through the muscle. The muscle of the organ contracts to create a narrowing and then propels the narrowed portion slowly down the length of the organ.

The first major muscle movement occurs when food or liquid is swallowed. Although you are able to start swallowing by choice, once the swallow begins, it becomes involuntary and proceeds under the control of the nerves.

Swallowed food is pushed into the esophagus, which connects the throat above with the stomach below. At the junction of the esophagus and stomach, there is a ringlike muscle, called the lower esophageal sphincter, closing the passage between the two organs. As food approaches the closed sphincter, the sphincter relaxes and allows the food to pass through to the stomach.

The stomach has three mechanical tasks. First, it stores the swallowed food and liquid. To do this, the muscle of the upper part of the stomach relaxes to accept large volumes of swallowed material. The second job is to mix up the food, liquid, and digestive juice produced by the stomach. The lower part of the stomach mixes these materials by its muscle action. The third task of the stomach is to empty its contents slowly into the small intestine.

Several factors affect emptying of the stomach, including the kind of food and the degree of muscle action of the emptying stomach and the small intestine. Carbohydrates, for example, spend the least amount of time in the stomach, while protein stays in the stomach longer, and fats the longest. As the food dissolves into the juices from the pancreas, liver, and intestine, the contents of the intestine are mixed and pushed forward to allow further digestion.

IV. Find pairs of synonyms.

1) to propel	a) to allow
2) to enable	b) to happen
3) liquid	c) to influence
4) to proceed	d) amount
5) volume	e) fluid
6) to affect	f) to push

V. Substitute the words in bold for their synonyms.

1. The sphincter relaxes and ***allows*** the food to pass through to the stomach.
2. The muscle of the organ ***propels*** the narrowed portion slowly down the length of the organ.
3. The first major muscle movement occurs when food or ***liquid*** is swallowed.
4. Once the swallow begins, it becomes involuntary and ***proceeds*** under the control of the nerves.
5. Several factors ***influence*** emptying of the stomach.

6. The muscle of the upper part of the stomach relaxes to accept large ***amounts*** of swallowed material.

VI. Translate into Russian.

1. The muscle of the organ contracts to create a narrowing and then propels the narrowed portion slowly down the length of the organ.
2. Although you are able to start swallowing by choice, once the swallow begins, it becomes involuntary and proceeds under the control of the nerves.

VII. Translate into English.

Основные функции желудка – хранить проглоченную пищу и жидкость, смешивать их с пищеварительным соком, а затем медленно передавать свое содержимое в тонкий кишечник.

VIII. Read the text through again and note the topic dealt with in each paragraph.

Paragraph 1	Paragraph 2	Paragraph 3	Paragraph 4	Paragraph 5
			tasks of the stomach	

IX. Write down in each column the key words (word combinations) corresponding to each paragraph of the text.

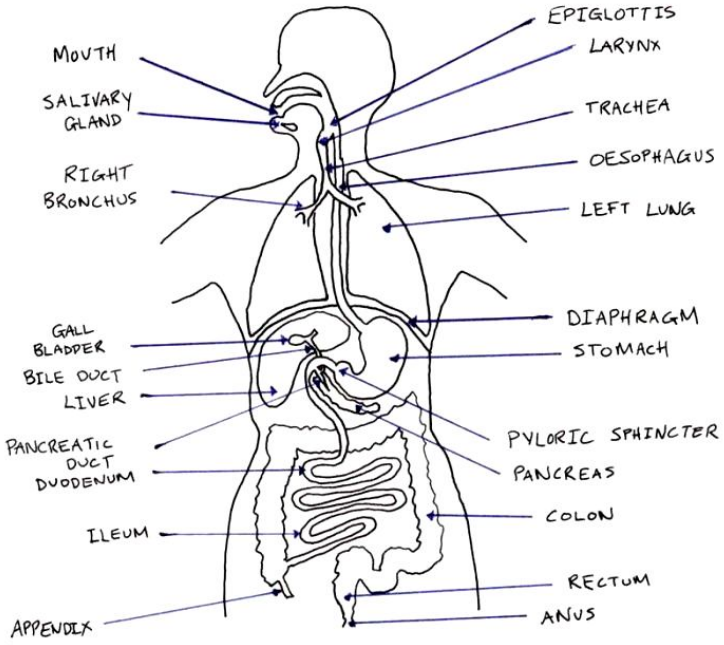
Paragraph 1	Paragraph 2	Paragraph 3	Paragraph 4	Paragraph 5
1) *2)* *3)*	*1)* *2)* *3)*	*1)* *2)* *3)*	*1) to store the swallowed food* *2)* *3)*	*1)* *2)* *3)*

X. Answer the questions.

1. What propels food and liquid through the organs of the digestive system?
2. What does peristalsis look like?
3. When does the first major muscle movement occur?
4. Where is the swallowed food pushed?
5. Where is the esophageal sphincter located?

6. What work does esophageal sphincter do?
7. What three mechanical tasks has the stomach?
8. What factors affect emptying of the stomach?
9. What classes of food spend the least (most) amount of time in the stomach?
10. When does the digestion begin?

XI. Using the plan from exercise VIII and key words (word combinations) from exercise IX speak about movement of food through the digestive tract



Part II

I. Read the text.

Digestion and absorption in the small intestine

Most fat is digested in the duodenum. There the action of bile breaks down fat droplets into smaller particles.
Absorption of nutrients occurs as a result of active and passive transport mechanisms. Water travels by osmosis following absorption of mineral salts, mainly sodium.
Absorption of nutrients into the body occurs across the villi**,** the fingerlike projections of the intestine, into the capillary network. To increase the surface area, villi also have microvilli, which are microscopic folds of the

cell membrane. Unfolded and straightened out, the villi and microvilli could cover more than 2,000 square feet, or half a basketball court. They wave to keep food molecules thoroughly mixed with digestive juices. Approximately 85 % of the nutrients in foods are absorbed through villi into the bloodstream for delivery to cells. Because the villi play such an important part in absorption, they are heavily supplied with blood capillaries. The capillaries in villi carry nutrients, by way of hepatic portal circulation, to the liver for further processing.

Once absorbed, fatty acids recombine with glycerol to form triglycerides, which then form cholesterol and proteins. Bile salts are necessary for absorption of fat-soluble vitamins and fatty acids. Lacteals are lymph capillaries within each villus that absorb fat-soluble nutrients. Due to the fat content in lacteals, their contents appear milky. The substance in lacteals is called chyle. Most digested fat is absorbed into lacteals and carried in lymph. Fats eventually reach the bloodstream by way of the thoracic and right lymphatic ducts.

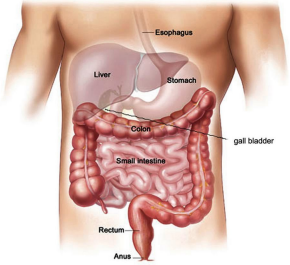
Digestion and absorption of proteins: Digestion of proteins starts in the stomach where pepsin is present.

However, the major site of digestion of dietary protein is the upper small intestine. This is effected by the pancreatic enzymes.

The proteolytic enzymes are secreted as inactive precursors, and are activated by the duodenal mucosal enzyme – enterokinase, and by trypsin. The proteolytic enzymes break down the proteins to produce small peptides of 2-6 amino acids. These small peptides are further broken down by the oligopeptidases in the brush border of intestinal epithelium. Dipeptides and tripeptides may be actively taken up as such into the epithelial cell. They are hydrolysed to free amino acids in the cell before they pass into the portal circulation.

II. Divide the text into the logical parts. Find key words in every part.

III. Using key words describe food processing in the small intestine.



Lesson 6 Urinary system

Part I

I. Learn the new words.

- affect — влиять на
- back up — двигаться назад
- consume — потреблять
- empty — опорожнять
- force — заставлять
- leaking — утечка
- message — сообщение
- ounce — унция (*28,3 г*)
- poultry — мясо птицы
- tighten — сжиматься
- quart — кварта (*англ. 1,14 л.)*
- renal tubule — почечный каналец
- rubber band — резинка
- stand still — застаиваться
- squeeze — сжимать, вытеснять
- swell — увеличиваться (в объеме, размере)
- urea — мочевина
- urinate — выделять мочу
- waste — отходы

II. Practice the pronunciation of the following words.

Urea, protein, poultry, bloodstream, glomerulus, tubule, ureters, tighten, balloon, ounce, comfortably, sphincters, tightly, rubber, urethra, message, squeezing, eliminate, quart, consume.

III. Read the text.

How does the urinary system work?

The urinary system removes a type of waste called urea from your blood. Urea is produced when foods containing protein, such as meat, poultry,

and certain vegetables, are broken down in the body. Urea is carried in the bloodstream to the kidneys.
The kidneys remove urea from the blood through tiny filtering units called nephrons. Each nephron consists of a ball formed of small blood capillaries, called a glomerulus, and a small tube called a renal tubule. Urea, together with water and other waste substances, forms the urine as it passes through the nephrons and down the renal tubules of the kidney.
From the kidneys, urine travels down two thin tubes called ureters to the bladder. Muscles in the ureter walls constantly tighten and relax to force urine downward away from the kidneys. If urine is allowed to stand still, or back up, a kidney infection can develop.
The bladder is a hollow muscular organ shaped like a balloon. The bladder stores urine until you are ready to empty it. It swells into a round shape when it is full and gets smaller when empty. If the urinary system is healthy, the bladder can hold up to 16 ounces of urine comfortably for 2 to 5 hours.
Circular muscles called sphincters help keep urine from leaking. The sphincter muscles close tightly like a rubber band around the opening of the bladder into the urethra, the tube that allows urine to pass outside the body.
Nerves in the bladder tell you when it is time to urinate, or empty your bladder. The sensation to urinate becomes stronger as the bladder continues to fill and reaches its limit. At that point, nerves from the bladder send a message to the brain that the bladder is full.
The brain signals the bladder muscles to tighten, squeezing urine out of the bladder. At the same time, the brain signals the sphincter muscles to relax. As these muscles relax, urine exits the bladder through the urethra.
Adults eliminate about a quart and a half of urine each day. The amount depends on many factors, especially the amounts of fluid and food a person consumes and how much fluid is lost through sweat and breathing. Certain types of medications can also affect the amount of urine eliminated.

IV. Translate into Russian.

1. The bladder swells into a round shape when it is full and gets smaller when empty.
2. The sphincter muscles close tightly like a rubber band around the opening of the bladder into the urethra.

3. If the urinary system is healthy, the bladder can hold up to 16 ounces of urine comfortably for 2 to 5 hours.

V. Insert the missing words.

1. Each nephron consists of a ball formed of small blood capillaries, called a …, and a small tube called a … .
2. Muscles in the ureter walls constantly … and relax to force urine downward away from the kidneys.
3. … in the bladder tell you when it is time to urinate, or empty your bladder.
4. As the sphincter muscles relax, urine … the bladder through the urethra.
5. At that point, nerves from the bladder send a … to the brain that the bladder is full.
6. Certain types of medications can also … the amount of urine eliminated.

VI. Answer the questions.

1. What waste does the urinary system remove?
2. When is urea produced?
3. How do the kidneys remove urea from the blood?
4. What substances form the urine?
5. How does the urine travel downward away from the kidneys?
6. What happens if urine is allowed to stand still or back up?
7. What function does the bladder perform?
8. What helps keep urine from leaking?
9. How does urination happen?
10. How much urine do adults eliminate each day?
11. What does the amount of urine depend on?

VII. Speak about the work of the urinary system using the following phrases:

- to remove a type of waste called urea
- to be carried in the bloodstream to the kidneys
- to form the urine
- to travel down ureters to the bladder
- to tighten and relax
- to force urine downward
- to store urine

- to help keep urine from leaking
- to allow urine to pass outside the body
- to send a message to the brain
- to exit the bladder
- to affect the amount of urine eliminated

Part II

I. Read the text.

The kidneys

The kidneys are organs that have numerous biological roles. Their primary role is to maintain the homeostatic balance of bodily fluids by filtering and secreting metabolites (such as urea) and minerals from the blood and excreting them, along with water, as urine. Because the kidneys are poised to sense plasma concentrations of ions such as sodium, potassium, hydrogen, oxygen, and compounds such as amino acids, creatinine, bicarbonate, and glucose, they are important regulators of blood pressure, glucose metabolism, and erythropoiesis (the process by which red blood cells (erythrocytes) are produced).

In humans, the kidneys are located in the posterior part of the abdominal cavity. There are two, one on each side of the spine; the right kidney sits just below the diaphragm and posterior to the liver, the left below the diaphragm and posterior to the spleen. Above each kidney is an adrenal gland (also called the *suprarenal gland*). The asymmetry within the abdominal cavity caused by the liver results in the right kidney being slightly lower than the left one while the left kidney is located slightly more medial. The bulk of water reabsorption in the vertebrate kidney takes place in the loop of Henle.

The kidneys are retroperitoneal and range from 9 to 13 cm in diameter; the left slightly larger than the right. They are approximately at the vertebral level T12 to L3. The upper parts of the kidneys are partially protected by the eleventh and twelfth ribs, and each whole kidney and adrenal gland are surrounded by two layers of fat (the perirenal and pararenal fat) and the renal fascia which help to cushion it. Congenital absence of one or both kidneys, known as unilateral (on one side) or bilateral (on both the sides) renal agenesis, can occur.

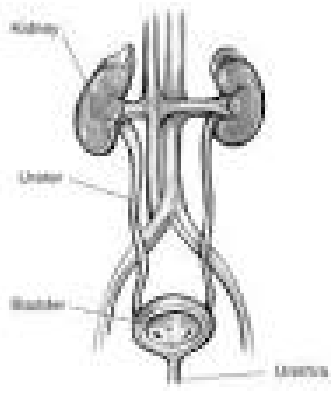
The kidneys receive unfiltered blood directly from the heart through the abdominal aorta which then branches to the left and right renal arteries.

Filtered blood then returns by the left and right renal veins to the inferior vena cava and then the heart. Renal blood flow accounts for 20-25% of the cardiac output.
The blood enters the kidney through the renal artery in the renal sinus. It branches into segmental arteries, which further divide into interlobar arteries penetrating the renal capsule and extending through the renal columns between the renal pyramids. The interlobar arteries then supply blood to the arcuate arteries that run through the boundary of the cortex and the medulla. Each arcuate artery supply a variety of additional interlobar arteries that feed into the afferent arterioles to be filtered through the nephrons. After filtration occurs the blood moves through a small network of venules that converge into interlobar veins. As with the arteriole distribution the veins follow the same pattern, the interlobar provide blood to the arcuate veins then back to the interlobar veins which come to form the renal vein exiting the kidney for transfusion for blood.
Blood filtering takes place in the (nephron), which is found in the kidney.

II. Define the main idea of the text. Try to formulate it in one sentence.

III. Divide the text into the logical parts. Give subtitles to each part.

IV.Make up a plan of the text. Try to retell the text according to your plan.



Lesson 7 Blood

Part I

I. Learn the new words.

▪ apparent	видимый, явный
▪ azurophilic granule	азурофильная гранула
▪ fungal	грибковый
▪ hence	следовательно, в результате; отсюда
▪ imply	подразумевать
▪ lack of	отсутствие
▪ life span	жизненный цикл (клетки)
▪ light microscopy	световая микроскопия
▪ membrane-bound enzymes	мембраносвязанные ферменты
▪ pale lilac	бледно-лиловый
▪ polymorphonuclear leukocytes	полиморфоядерные лейкоциты
▪ pus	гной
▪ responder	клетка-респондер
▪ stain	окрашивать
▪ transparent	прозрачный

II. Practice the pronunciation of the following words.

Major distinguishing feature, leukocytes, granule, granulocytes, cytoplasm, endocytosed, neutrophils, basophils, eosinophils, azurophilic, lysosomes, lymphocytes, monocytes, macrophages, fungal, multilobed nucleus, transparent, pale lilac.

III. Read the text.

White blood cells

There are several different types of white blood cells. They all have many things in common, but are all distinct in form and function. A major distinguishing feature of some leukocytes is the presence of granules; white blood cells are often characterized as granulocytes or agranulocytes:
Granulocytes (polymorphonuclear leukocytes): leukocytes characterised by the presence of differently staining granules in their cytoplasm when

viewed under light microscopy. These granules are membrane-bound enzymes which primarily act in the digestion of endocytosed particles. There are three types of granulocytes: neutrophils, basophils, and eosinophils, which are named according to their staining properties.
Agranulocytes (mononuclear leucocytes): leukocytes characterized by the apparent absence of granules in their cytoplasm. Although the name implies a lack of granules these cells do contain non-specific azurophilic granules, which are lysosomes. The cells include lymphocytes, monocytes, and macrophages.
Neutrophils defend against bacterial or fungal infection and other very small inflammatory processes and they are usually first responders to microbial infection; their activity and death in large numbers forms pus. They are commonly referred to as polymorphonuclear (PMN) leukocytes, although technically PMN refers to all granulocytes. They have a multilobed nucleus which may appear like multiple nuclei, hence the name polymorphonuclear leukocyte. The cytoplasm may look transparent because of fine granules that are pale lilac. Neutrophils are very active in phagocytosing bacteria and are present in large amount in the pus of wounds. These cells are not able to renew their lysosomes used in digesting microbes and die after having phagocytosed a few pathogens. They make up 60-70% of total leukocyte count. The life span of neutrophil is about 8 days.

IV. Translate the words with the same root.
1) Distinct, distinction, distinguish, distinguishing; 2) granule, granulocytes, agranulocytes; 3) nucleus, nuclei, nuclear, polymorphonuclear; 4) phagocyte, to phagocytize, phagocytosis, phagocytosing, phagocytosed; 5) to respond, responder; 6) to digest, digestion; 7) to stain, staining.

V. Choose the right word. Translate the sentences.
1. A major ***distinct/distinguishing*** feature of some leukocytes is the presence or absence of granules.
2. By ***phagocytosed/phagocytosing*** bacteria, the cells create an environment which can influence the antibacterial activity of drugs in several ways.
3. Polymorphonuclear leucocytes are short-lived cells, equipped with pre-formed lysosomes and capable of ***phagocytosing/phagocytosed*** bacteria.

4. Large numbers of these leucocytes, *having* ***phagocytosed / phagocytosing*** the microbes, are still living, and may once again enter into the tissues.
5. Granulocytes are named according to their ***stain / staining*** properties.
6. The differences in ***stain / staining*** characteristics reflect differences in the chemical composition of the granules.
7. Each of these types is distinguished by the colour that the granules ***stain / staining*** when treated with a compound dye.

VI. Chose the right translation.

1. Granulocytes are characterised by the presence of differently staining granules in their cytoplasm when viewed under light microscopy.

a) Гранулоциты характеризуются присутствием различно окрашивающих их гранул в своей цитоплазме, если их рассматривать под световым микроскопом.
b) Гранулоциты характеризуются присутствием в цитоплазме различно окрашивающихся гранул, если их рассматривать под световым микроскопом.
c) Гранулоциты характеризуют присутствие различно окрашивающихся гранул в их цитоплазме при рассмотрении в световой микроскоп.

2. These cells die after having phagocytosed a few pathogens.

a) Эти клетки погибают после фагоцитоза нескольких патогенных микроорганизмов.
b) Эти клетки погибают после фагоцитирования нескольких патогенных микроорганизмов.
c) Эти клетки умирают, совершив фагоцитоз пяти патогенных микроорганизмов.

VII. Answer the questions.

1. What is a major distinguishing feature of some leukocytes?
2. What are two major types of white blood cells?
3. What are granulocytes characterised by?
4. What function do granules in granulocytes perform?
5. What are three types of granulocytes? Why are they so classified?
6. Do agranulocytes contain any granules?
7. What are the main types of agranulocytes?
8. What is the main function of neutrophils?

9. Why are neutrophils commonly referred to as polymorphonuclear leukocytes?
10. Are neutrophils able to renew their lysosomes?
11. What is the life span of neutrophils?

VIII. Continue the sentences.

1. White blood cells are classified according to … .
2. Leukocytes are divided into two main types: … .
3. Granules of granulocytes are membrane-bound enzymes which primarily act in the digestion of … .
4. There are three types of granulocytes: … .
5. Agranulocytes contain non-specific … , which are lysosomes.
6. There are three types of agranulocytes: … .
7. Neutrophils are usually first … to microbial infection.
8. They are commonly referred to as polymorphonuclear leukocytes, bacause they have a … nucleus.
9. Neutrophils are very active in … bacteria.
10. They make up 60-70% of total leukocyte … .

IX. Speak about white blood cells using the following plan:

- Types of white blood cells
- Structure and function of granulocytes
- Structure and function of agranulocytes
- Structure and function of neutrophils

Part II

I. Read the text.

Hematocrit

Whole blood is composed of plasma (liquid), cells and platelets. If whole blood is placed into a tube and centrifuged, the cells and the plasma will separate. The erythrocytes, which are heavy, will pack into the bottom of the tube, the plasma will be at the top of the tube, and the leukocytes and platelets will form a thin layer (buffy coat) between the erythrocytes and the plasma. The hematocrit is defined as the percentage of whole blood made up of erythrocytes. This value is determined by dividing the height of the erythrocytes by the total height of the blood in the tube and multiplying by 100.

Hematocrits vary depending on sex and environmental conditions, but there is a range of values that is considered normal. Average hematocrit values are:

- males..... 40-50%
- females..... 38-45%
- athletes..... > 50%

Any activity or condition that consistently lowers oxygen levels in the blood will cause an increase in erythropoesis and a subsequent rise in the hematocrit.

Factors that will raise the hematocrit include:

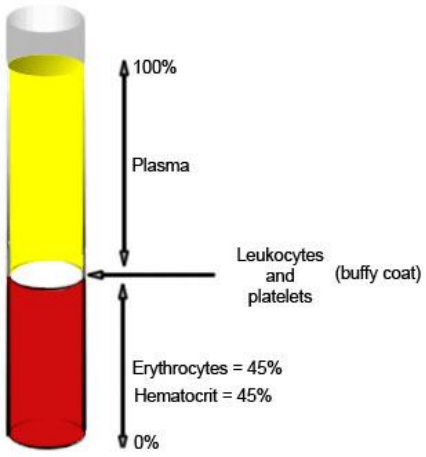
Exercise. During aerobic exercise blood oxygen levels are lowered due to rapid consumption of oxygen by active skeletal muscle. This stimulates an increase in erythropoesis, which increases hematocrit, which increases the oxygen carrying capacity of the blood. Thus regular aerobic exercise raises the hematocrit.

Living at high altitude. The air is thinner at higher altitude, therefore fewer molecules of oxygen enter the lungs with each breath. Oxygen levels in the blood are lower when breathing such thin air. A person that moves from Santa Barbara, which is at sea level, to Denver, Colorado, which has an altitude of 5000', will experience a rise in hematocrit as compensatory response to the thin air.

Injection of recombinant erythropoetin. Some endurance athletes use erythropoetin (illegally) to increase their hematocrit as a way to increase stamina.

II. Divide the text into logical parts. Define the main idea of each part.

III. Give the brief idea of hematocrit and its values.



Lesson 8 Physiology of respiration

Part I

I. Learn the new words.

▪ apneustic center	апнейстический центр
▪ automatic breathing	управляемое дыхание
▪ brainstem	мозговой ствол
▪ elastic recoil	эластическая тяга (лёгкого)
▪ enhance	усиливать
▪ fire	активизироваться
▪ input	импульс
▪ inspiratory effort	усилие на вдохе
▪ inspiratory flow	инспираторный поток
▪ motor pathway	двигательный путь
▪ panting	учащенное дыхание
▪ phrenic nerves	диафрагмальные нервы
▪ pneumotaxic centre	пневмотаксический центр
▪ pressure gradient	градиент давления
▪ rely	зависеть
▪ scalene	лестничная мышца
▪ sighing	вздох
▪ spontaneous respiration	спонтанная респирация; самостоятельное дыхание
▪ sternomastoids	грудино-сосцевидный
▪ terminate	завершать

II. Practice the pronunciation of the following words.

Automatic, gradient, spontaneous, alveoli, diaphragm, sternomastoids, scalenes, expiration, chemoreceptors, breath-holding, apneustic, pneumotaxic, neurone.

III. Guess the meaning of the words in bold type.

1. The diaphragm is a **sheet** separating the thorax from the abdomen.
2. There is a group of respiratory centers located in the **brainstem** producing automatic breathing activity.
3. **Breath-holding** is an example of voluntary control of respiration.

IV. Read the text.

Mechanism of breathing

A pressure gradient is required to generate gas flow. In spontaneous respiration inspiratory flow is achieved by creating a sub-atmospheric pressure in the alveoli by increasing the volume of the thoracic cavity under the action of the inspiratory muscles. During expiration the intra-alveolar pressure becomes slightly higher than atmospheric pressure and gas flow to the mouth results.

Motor pathways

The main muscle generating the negative intrathoracic pressure that produces inspiration is the diaphragm, a sheet separating the thorax from the abdomen. Innervation is from the phrenic nerves (C3-5) with contraction moving the diaphragm downwards forcing the abdominal contents down and out. Additional inspiratory efforts are produced by the external intercostal muscles (innervated by their intercostal nerves T1-12) and the accessory muscles of respiration (sternomastoids and scalenes), although the latter only become important during exercise or respiratory distress.

During quiet breathing expiration is a passive process, relying on the elastic recoil of the lung and chest wall. When ventilation is increased, such as during exercise, expiration becomes active with contraction of the muscles of the abdominal wall and the internal intercostals.

Central control

The mechanism by which respiration is controlled is complex. There is a group of respiratory centres located in the brainstem producing automatic breathing activity. This is then regulated mainly by input from chemoreceptors. Breath-holding, panting or sighing at will are examples of this voluntary control. The main respiratory centre is in the floor of the 4th ventricle, with inspiratory (dorsal) and expiratory (ventral) neurone groups. The inspiratory neurones fire automatically, but the expiratory ones are used only during forced expiration. The 2 other main centres are the apneustic centre, which enhances inspiration, and the pneumotaxic centre, which terminates inspiration by inhibition of the dorsal neurone group above.

V. Divide the sentence into two separate sentences.

1. In spontaneous respiration inspiratory flow is achieved by creating a sub-atmospheric pressure in the alveoli by increasing the volume of the thoracic cavity under the action of the inspiratory muscles.
2. Innervation is from the phrenic nerves (C3-5) with contraction moving the diaphragm downwards forcing the abdominal contents down and out.

VI. Find pairs of antonyms.

1) sub-atmospheric pressure	a) lower
2) inspiration	b) passive
3) higher	c) pressure above atmospheric
4) active	d) to terminate
5) to enhance	e) expiration

VII. Choose the right word. Translate the sentences.

1. During expiration the intra-alveolar pressure becomes slightly ***lower / higher*** **than** atmospheric pressure.
2. When the volume of the thoracic cavity increases under the action of the inspiratory muscles the pressure in the alveoli becomes ***sub-atmospheric / above atmospheric.***
3. During exercise expiration becomes ***active / passive***.
4. The apneustic centre ***terminates / enhances*** inspiration, while pneumotaxic centre ***terminates / enhances*** inspiration.

VIII. Answer the questions.

1. What is required to generate gas flow?
2. How does intra-alveolar pressure change during inspiration and expiration?
3. What is the main muscle participating in breathing?
4. What muscles are additional inspiratory efforts produced by?
5. How are these muscles innervated?
6. When are sternomastoids and scalenes involved in respiration?
7. What contributes to the passive and active expiration?
8. What mechanisms is respiration controlled by?
9. Where is the main respiratory centre located?
10. When do inspiratory and expiratory neurones fire?
11. What processes are the 2 other main respiratory centers involved in?

IX. Make up the plan of the text.

X. Retell the text using the plan from exercise IX and the following phrases:

- The text can be divided into … parts.
- The first part is concerned with …
- The next part describes …
- The following part emphasizes …
- The final part presents …

Part II

I. Read the text.

Control of respiration

Respiration is controlled by these areas of the brain that stimulate the contraction of the diaphragm and the intercostal muscles. These areas, collectively called respiratory centers, are summarized here:

The medullary inspiratory center, located in the medulla oblongata, generates rhythmic nerve impulses that stimulate contraction of the inspiratory muscles (diaphragm and external intercostal muscles). Normally, expiration occurs when these muscles relax, but when breathing is rapid, the inspiratory center facilitates expiration by stimulating the expiratory muscles (internal intercostal muscles and abdominal muscles).

The pheumotaxic area, located in the pons, inhibits the inspiratory center, limiting the contraction of the inspiratory muscles, and preventing the lungs from overinflating.

The apneustic area, also located in the pons, stimulates the inspiratory center, prolonging the contraction of inspiratory muscles.

The respiratory centers are influenced by stimuli received from the following three groups of sensory neurons:

Central chemoreceptors (nerves of the central nervous system), located in the medulla oblongata, monitor the chemistry of cerebrospinal fluid. When CO 2 from the plasma enters the cerebrospinal fluid, it forms HCO 3 – and H +, and the pH of the fluid drops (becomes more acidic). In response to the decrease in pH, the central chemoreceptors stimulate the respiratory center to increase the inspiratory rate.

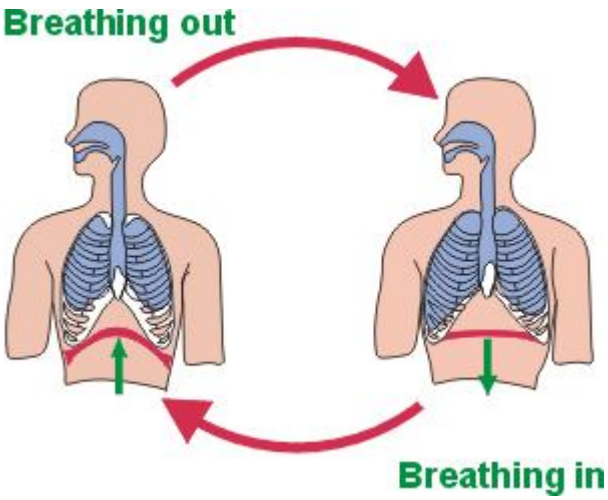
Peripheral chemoreceptors (nerves of the peripheral nervous system), located in aortic bodies in the wall of the aortic arch and in carotid bodies in the walls of the carotid arteries, monitor the chemistry of the blood. An

increase in pH or pCO 2, or a decrease in pO 2, causes these receptors to stimulate the respiratory center.
Stretch receptors in the walls of bronchi and bronchioles are activated when the lungs expand to their physical limit. These receptors signal the respiratory center to discontinue stimulation of the inspiratory muscles, allowing expiration to begin. This response is called the inflation

(Hering-Breur) reflex.

II. Divide the texts into logical parts. Find key words in each part.

III. Describe the functioning of the respiratory system using key words.



Lesson 9

Examination of digestive system

Part I

II. Learn the new words.

▪ barium meal	контрастная кашица, бариевая каша
▪ barium swallow	глотание с помощью бариевой взвеси
▪ bring out	выявлять
▪ bowel	кишечник
▪ delineate	очерчивать, определять (очертания)
▪ distend	расширять, раздуваться
▪ double contrast technique	исследование методом двойного контрастирования
▪ erect posture	вертикальная поза
▪ fast	голодание (намеренное), воздержание от пищи
▪ fetal	плодный, зародышевый, внутриутробный
▪ loop	петля
▪ fluoroscopy	рентгеноскопическое исследование
▪ plain radiograph	обзорная рентгенограмма, простая рентгенограмма
▪ radio-opaque	рентгеноконтрастный, непроницаемый для излучения
▪ vague	смазанные (симптомы)

II. Practice the pronunciation of the following words.

Tumour, calculi, gallbladder, x-ray, radio-opaque, fetal, erect posture, bowel, fast, contours, barium sulphate, delineate, vague, erosion, technique, visualize.

III. Translate the words with the same root.

1) Demonstrate, demonstrable; 2) swallow, swallowed, swallowing; 3) visualize, visualization, well visualized, visible; 4) suspect, suspected;

5) prepare, preparation; 6) distribute, distribution; 7) indicate, indication, indicated.

IV. Choose the right translation.

1. *After overnight fast the patient is made to swallow a thick freshly prepared paste of barium sulphate as rapidly as possible.*

a) Утром натощак пациент должен проглотить густую свежеприготовленную пасту сульфата бария как можно быстрее.
b) После ночного голодания пациента заставляют принять внутрь густую свежеприготовленную взвесь сульфата бария как можно быстрее.
c) После ночи пациент быстро делает глоток густой заново приготовленной пасты сульфата бария.

2. *Intestinal obstruction gives rise to the presence of multiple dilated loops with fluid levels.*

a) Кишечная закупорка дает начало присутствию множественных расширенных петель с жидкостью.
b) Непроходимость кишечника приводит к появлению множественных расширенных петель, заполненных жидкостью.
c) Непроходимость кишечника приводит к увеличению количества расширенных петель, заполненных жидкостью.

V. Read the text.

Radiological examination of the digestive system

Liver, spleen, kidneys, and tumours can be identified in a plain x-ray and their size determined. Calculi in the gallbladder, bile duct, urinary tract or pancreas, calcification of organs and radio-opaque foreign bodies and fetal part are all demonstrable in a plain radiograph.

A plain radiograph of the abdomen taken in the erect posture after proper bowel preparation may show the presence of gas under the diaphram, or gas in organs such as gallbladder, biliary tree and liver that normally do not contain gas. Intestinal obstruction gives rise to the presence of multiple dilated loops with fluid levels.

Several contrast materials have been employed to visualize different organs. *Barium swallow* is done to visualize the esophagus. After overnight fast the patient is made to swallow a thick freshly prepared paste of barium sulphate as rapidly as possible. Since most patients swallow

considerable amounts of air also simultaneously, the air distended esophagus is well visualized. The function of the esophagus and the lower sphincter can be assessed from the passage of the barium downward and the pattern of peristaltic waves.

For *barium meal* studies a large quantity of freshly suspended emulsion of barium sulphate is swallowed rapidly. The rate of transit of the barium and the contours of the stomach and intestines can be assessed by fluoroscopy or television. Pictures are taken at regular intervals to delineate the different parts. Double contrast technique using air and barium helps in bringing out even minute mucosal abnormalities. Barium meal studies for stomach and duodenum are indicated in suspected peptic ulcer, neoplasms of the stomach, mucosal erosions, obstructions and vague upper abdominal symptoms.

The intestines are visualized by taking pictures in the intestinal phase of the meal. The time taken for the passage of barium, the pattern of distribution in the intestinal lumen and morphological abnormalities can be assessed.

VI. Answer the questions.

1. What organs and pathologies can be identified in a plain x-ray?
2. What may a plain radiograph of the abdomen taken in the erect posture show?
3. What contrast materials have been employed to visualize different organs?
4. What examination is done to visualize the esophagus?
5. How is it performed?
6. How can the function of the esophagus and the lower sphincter be assessed?
7. How are barium meal studies performed?
8. What organs do barium meal studies help to visualize?
9. What helps in bringing out even minute mucosal abnormalities?
10. When are barium meal studies for stomach and duodenum indicated?
11. How are the intestines visualized?

VII. Continue the sentences to formulate the main idea of the text.

5. The text describes two main techniques used to … .
6. They include … .

VIII. Retell the text using the following phrases:

- The text describes …
- The text can be divided into … parts.
- The first part is concerned with …
- The next part emphasizes that …
- The following part presents …
- The final part describes …

Part II

I. Read the text.

The digestive process

The small intestine occupies the area of the abdomen between the diaphragm and hips, and is greatly coiled and twisted. The small intestine is lined with muscles that move the chyme toward the large intestine. The mucosa, which lines the entire small intestine, contains millions of glands that aid in the digestive and absorptive processes.

The small intestine is sub-divided by anatomists into three sections, the duodenum, the jejunum, and the ileum. The duodenum is about 1 ft (0.3 m) long and connects with the lower portion of the stomach. When fluid food reaches the duodenum it undergoes further enzymatic digestion and is subjected to pancreatic juice, intestinal juice, and bile.

The pancreas is a large gland located below the stomach that secretes pancreatic juice into the duodenum via the pancreatic duct. There are three enzymes in pancreatic juice which digest carbohydrates, lipids, and proteins. Amylase, (the enzyme found in saliva) breaks down starch into simple sugars such as maltose. The enzyme maltase in intestinal juice completes the break down of maltose into glucose.

Lipases in pancreatic juice break down fats into fatty acids and glycerol, while proteinases continue the break down of proteins into amino acids. The gall bladder, located next to the liver, secretes bile into the duodenum. While bile does not contain enzymes, it contains bile salts and other substances that help to dissolve fats, which are otherwise insoluble in water. Breaking the fat down into small globules allows the lipase enzymes a greater surface area for their action.

Chyme passing from the duodenum next reaches the jejunum of the small intestine. Here, in the jejunum, the digested breakdown products of

carbohydrates, fats, proteins, and most of the vitamins, minerals, and iron are absorbed.

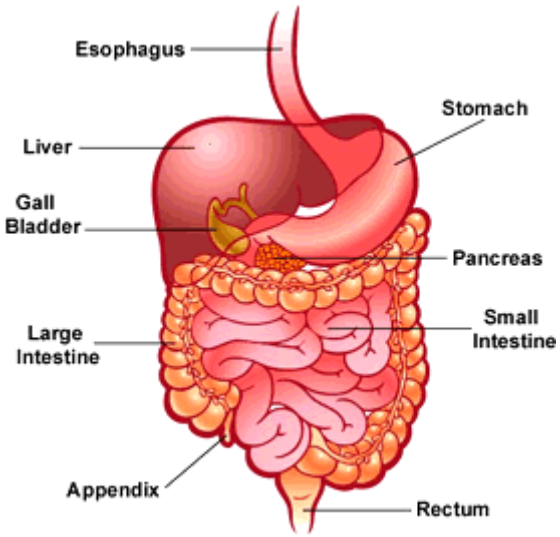
The inner lining of the small intestine is composed of up to five million tiny, finger-like projections called villi. The villi increase the rate of absorption of the nutrients into the bloodstream by extending the surface of the small intestine to about five times that of the surface area of the skin.

There are two transport systems that pick up the nutrients from the small intestine. Simple sugars, amino acids, glycerol, and some vitamins and salts are conveyed to the liver in the bloodstream. Fatty acids and vitamins are absorbed and then transported through the lymphatic system, the network of vessels that carry lymph and white blood cells throughout the body. Lymph eventually drains back into the bloodstream and circulates throughout the body.

The last section of the small intestine is the ileum. It is smaller and thinner-walled than the jejunum, and it is the preferred site for vitamin B_{12} absorption and bile acids derived from the bile juice.

II. Divide the text into logical parts. Give subtitles for each part.

III. Describe the digestive process using key words.



Lesson 10 Nutrition

Part I

I. Learn the new words.

▪ beriberi	бери-бери (авитаминоз B1)
▪ consume	потреблять
▪ fortification	обогащение пищи химическими питательными добавками
▪ gut flora	кишечная флора
▪ interfere with	препятствовать
▪ lifestyle factor	фактор образа жизни
▪ pellagra	пеллагра
▪ precursor	предшественник
▪ restrictive diet	ограничительная диета
▪ rickets	рахит
▪ scurvy	цинга
▪ store	запасать
▪ underlying disorder	первопричинное (фоновое) заболевание
▪ vitamin deficiency	дефицит витаминов, витаминная недостаточность

II. Practice the pronunciation of the following words.

Biotin, ultraviolet, precursors, beta carotene, niacin, amino acid, tryptophan, deficiency, thiamine, beriberi, pellagra, scurvy.

III. Choose the right translation.

1. *Vitamin D is synthesized in the skin with the help of the natural ultraviolet wavelength of sunlight.*

a) Витамин D синтезируется в коже под действием естественных длинных ультрафиолетовых лучей, содержащихся в солнечном свете.
b) Витамин D образуются в коже под действием ультрафиолетового света.
c) Витамин D синтезируется в коже под воздействием естественных ультрафиолетовых лучей солнечного света.

2. *People who eat a varied diet are unlikely to develop a severe primary vitamin deficiency.*

a) Люди, которые сидят на разнообразной диете, вряд ли развивают тяжелую первичную витаминную недостаточность.
b) У людей с разнообразным рационом питания низкая вероятность развития тяжелой первичной витаминной недостаточности.
c) У людей с разнообразной диетой невероятно развитие тяжелой первичной витаминной недостаточности.

IV. Translate the words with the same root.

1) Deficit, deficiency; 2) consume, consumption; 3) absorb, absorption; 4) vary, varied; 5) add, addition; 6) store, stores, stored.

V. Read the text.

Nutrition and diseases

Vitamins are essential for the normal growth and development of a multicellular organism. For the most part, vitamins are obtained with food, but a few are obtained by other means. For example, microorganisms in the intestine – commonly known as "gut flora" – produce vitamin K and biotin, while one form of vitamin D is synthesized in the skin with the help of the natural ultraviolet wavelength of sunlight. Humans can produce some vitamins from precursors they consume. Examples include vitamin A, produced from beta carotene, and niacin, from the amino acid tryptophan.

Deficiencies

Deficiencies of vitamins are classified as either primary or secondary. A primary deficiency occurs when an organism does not get enough of the vitamin in its food. A secondary deficiency may be due to an underlying disorder that prevents or limits the absorption or use of the vitamin, due to a "lifestyle factor", such as smoking, excessive alcohol consumption, or the use of medications that interfere with the absorption or use of the vitamin.

People who eat a varied diet are unlikely to develop a severe primary vitamin deficiency. In contrast, restrictive diets have the potential to cause prolonged vitamin deficits, which may result in often painful and potentially deadly diseases.

Because human bodies do not store most vitamins, humans must consume them regularly to avoid deficiency. Human bodily stores for different

vitamins vary widely; vitamins A, D, and B_{12} are stored in significant amounts in the human body, mainly in the liver, and an adult human's diet may be deficient in vitamins A and B_{12} for many months before developing a deficiency condition. Vitamin B_3 is not stored in the human body in significant amounts, so stores may only last a couple of weeks.
Well-known human vitamin deficiencies involve thiamine (beriberi), niacin (pellagra), vitamin C (scurvy) and vitamin D (rickets). In much of the developed world, such deficiencies are rare; this is due to (1) an adequate supply of food; and (2) the addition of vitamins and minerals to common foods, often called fortification.

VI. Answer the questions.

1. How are most vitamins obtained?
2. What are other means of obtaining vitamins?
3. Can humans produce some vitamins from precursors they consume?
4. How are deficiencies of vitamins classified?
5. When does a primary deficiency occur?
6. What may a secondary deficiency be due?
7. What diets may cause prolonged vitamin deficits?
8. Why must humans consume vitamins regularly?
9. What vitamins are stored in significant amounts in the human body?
10. What do well-known human vitamin deficiencies involve?
11. Why are in much of the developed world such deficiencies rare?

VII. Continue the sentences.

1. Vitamins are essential for … .
2. Vitamins are obtained with … , but … .
3. Vitamin K and biotin are produced in … .
4. Vitamin D is synthesized in … .
5. Vitamin A is produced from … .
6. Niacin is produced from … .
7. Deficiencies of vitamins are classified as … .
8. A condition when an organism does not get enough of the vitamin with food is called … .
9. A “lifestyle factor”, such as smoking, excessive alcohol consumption may cause … .
10. An adult human's diet may be deficient in vitamins A and B_{12} for many months before developing a deficiency condition because … .
11. Fortification is the addition of … .

VIII. Make up the plan of the text.

IX. Retell the text using the plan from exercise VIII and the following phrases:

- The text is called …
- The text deals with …
- The text starts with …
- According to the text …
- The text may be interesting for …

Part II

I. Read the text.

Nutrition

Nutrition is the branch of science that studies the process by which living organisms take in and use food for the maintenance of life, growth, reproduction, the functioning of organs and tissues, and the production of energy.

Diet is what a person habitually eats and drinks, so everyone is always on a diet. One of the most important and difficult tasks in nutritional medicine is to estimate accurately the habitual nutritional intake and diet of the patient. These difficulties arise because a person's diet may vary widely from day to day, food processing may greatly affect the nutrient content of foods s/he eats, and hardly anyone with a nutritional problem can accurately recall what s/he has eaten.

Dietary value is assessed by the measured energy and nutrient content of a particular diet and often in reference to dietary reference values or recommendations. Foods and diets also have many other kinds of value including political, economic, social, and cultural values. In most societies where people live above starvation level effort is put into diversifying meals and the overall diet.

Foods vary in their energy and nutrient content. Food groups are a classification of foods on the basis of the nutrient profile. Commonly used food groups are:

• high protein foods, e.g. meat, fish, eggs, dairy products, pulses/legumes;
• carbohydrate-rich foods, e.g. cereals, roots, and tubers;
• dairy foods;

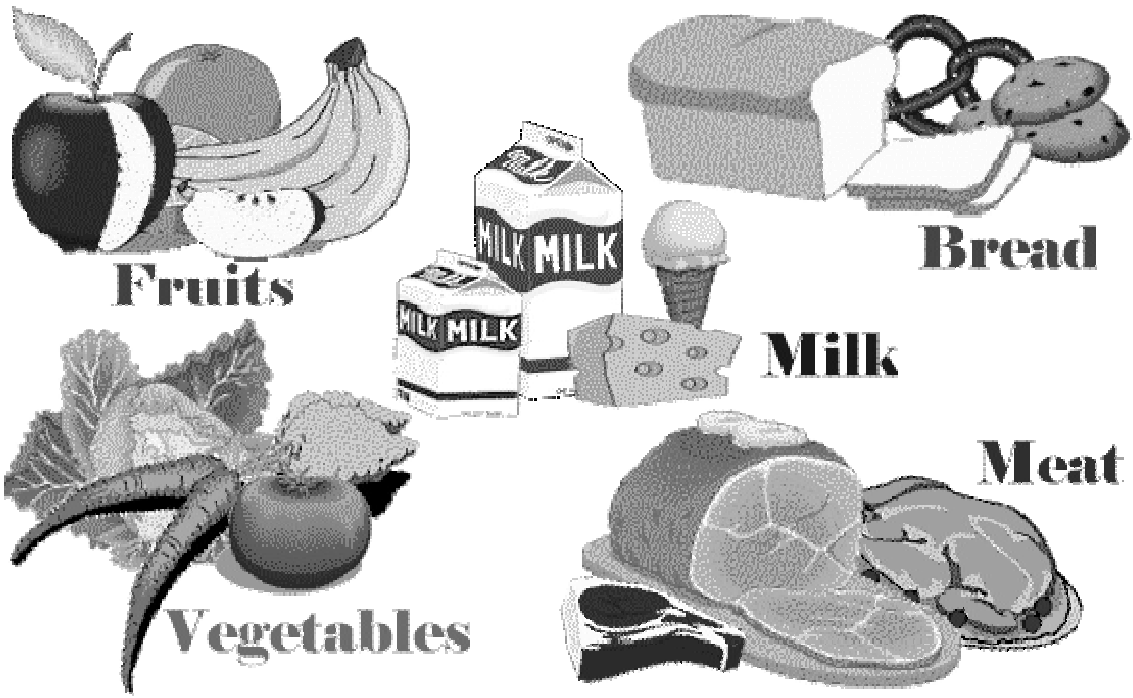
• fruit and vegetables;
• foods rich in fat or oil.

Food groups are widely used in the formulation of dietary guidelines and for nutrition education messages of various kinds, such as eat five portions of fruit and vegetables a day. While useful, such classifications are also somewhat arbitrary; some foods can be placed in more than one food group.

The gross energies of foods are measured using a ballistic bomb calorimeter, but the values used in the tables are the energy available for the body to metabolize – metabolizable energy. Metabolizable energy accounts for faecal and urinary losses. The difference between gross energy and metabolizable energy is about 5%.

II. Divide the text into logical parts. Give the appropriate subtitle to each part.

III. Find key words which best express the main idea of each part. Give the brief contents of each part using key words.



Lesson 11 Excretion

Part I

I. Learn the new words.

▪ cup-shaped	чашевидный
▪ elimination	выделение, экскреция
▪ excess	избыток
▪ Bowman's capsule	боуменова капсула
▪ nitrogenous wastes	азотистые шлаки
▪ metabolic wastes	метаболические отходы
▪ release	выделять, секретировать
▪ trace amount	незначительное количество
▪ surround	окружать
▪ wind	виться, извиваться

II. Practice the pronunciation of the following words.

Excess, homeostasis, gaseous, elimination, nitrogenous, nephron, Bowman's capsule, glomerulus, urea, protein, to wind, potassium, sodium, hydrogen, magnesium, calcium, to cleanse, sweat, pheromone.

III. Translate the words with the same root:

1) To excrete, excretory, excretion; 2) to remove, removal, removed, removing; 3) to filter, filtration, filtered; 4) nitrogen, nitrogenous; 5) to reabsorb, reabsorption; 6) to cleanse, cleansed; 7) to secrete, secretion; 8) gas, gaseous.

IV. Choose the right translation.

1. *Skin excretion by definition is passive and deals with metabolic wastes as filtered by the kidneys.*

a) Кожная экскреция согласно определению – это пассивный процесс экскреции метаболических отходов, отфильтрованных почками.

b) Кожная экскреция по определению является пассивной и имеет дело с метаболическими отходами, когда они отфильтрованы почками.

c) Кожная экскреция согласно определению это пассивный процесс и он занимается экскрецией метаболических отходов, когда они отфильтровываются почками.

2. *As the blood continues through the blood vessels, it winds around the renal tubule.*

a) Когда кровь продолжает течь по кровеносным сосудам, она проходит по кругу вокруг почечного канальца.
b) Во время своего протекания по кровеносным сосудам, кровь проходит вокруг почечного канальца.
c) Кровь протекает по кровеносным сосудам, которые окружают почечный каналец.

V. Read the text.

Excretory system

The excretory system is a system that removes excess, unnecessary or dangerous materials from an organism, so as to help maintain homeostasis within the organism and prevent damage to the body.

The kidneys are the main excretory organs. They are primarily responsible for filtering blood by removing nitrogenous wastes from metabolism, salts and other excess minerals and excess water. Within each kidney there is one million of microscopic nephrons. Filtering of the blood takes place within these areas. Each nephron contains a cluster of capillaries called a glomerulus. A cup-shaped sac called a Bowman's capsule surrounds each glomerulus. The blood that flows through the glomerulus is under great pressure. This causes glomerulus, water, glucose and urea to enter the Bowman's capsule. White blood cells, red blood cells and proteins remains in the blood. As the blood continues through the blood vessels, it winds around the renal tubule. During this time, reabsorption occurs. Glucose and chemicals, such as potassium, sodium, hydrogen, magnesium and calcium are reabsorbed into the blood. Almost all the water removed during filtration returns to the blood during the reabsorption phase. The kidneys control the amount of liquid in our bodies. The wastes in the nephron are called urine and include urea, water and inorganic salts. The cleansed blood goes into veins that carry the blood from the kidneys and back to the heart.

Skin excretion by definition is passive and deals with metabolic wastes as filtered by the kidneys. Specifically, the skin secretes a fluid waste called

sweat. Though the sweat may contain a trace amount of metabolic wastes, sweating is an active process of secretion not excretion, specifically for temperature control and pheromone release. Therefore, its role as a part of the excretory system is minimal at best.
Lungs. The lungs constantly secrete gaseous wastes from the bloodstream, such as carbon dioxide, as a regular part of respiration.

VI. Answer the questions:
- What work does the excretory system perform?
- What is its main function?
- What are the main organs of the excretory system?
- What are the kidneys responsible for?
- Where does filtering of blood take place?
- What is the structure of the nephron?
- Why do water, glucose and urea enter the Bowman's capsule?
- When does reabsorption occur?
- What chemicals are reabsorbed into the blood?
- Where does the water removed during filtration return?
- What are the wastes in the nephron called?
- Where does the cleansed blood go?
- Is skin excretion an active or passive process?
- What wastes does sweat contain?
- What is the primary function of skin excretion?
- What do the lungs secrete?

VII. Combine two sentences into one using the conjunctions which and where.
1. Within each kidney there are one million of microscopic nephrons. Filtering of the blood takes place within these areas.
2. Specifically, the skin secretes a fluid waste called sweat. The sweat may contain a trace amount of metabolic wastes.

VIII. Change Active Voice into Passive Voice.
1. The blood reabsorbs chemicals, such as potassium, sodium, hydrogen, magnesium and calcium.
2. A cup-shaped sac called a Bowman's capsule surrounds each glomerulus.

IX. Continue the sentences to formulate the main idea of the text.

1. The text describes … of the excretory system.
2. According to the text the main excretory organs are … .

X. Make up the plan of the text and retell it using the key words:

- to remove excess, unnecessary or dangerous materials from an organism
- to help maintain homeostasis
- responsible for filtering blood
- a cluster of capillaries
- under great pressure
- to remain in the blood
- to wind around the renal tubule
- to be reabsorbed into the blood
- to control the amount of liquid in our bodies
- cleansed blood
- to secrete a fluid waste called sweat
- to secrete gaseous wastes from the bloodstream

Part II

I. Read the text.

Urine production

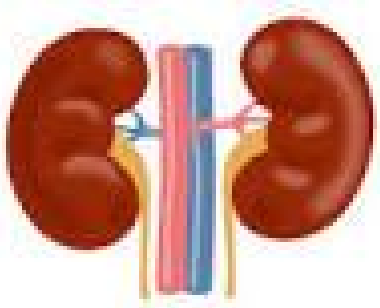
Blood enters the kidney through the renal artery. The artery divides into smaller and smaller blood vessels, called arterioles, eventually ending in the tiny capillaries of the glomerulus. The capillary walls here are quite thin, and the blood pressure within the capillaries is high. The result is that water, along with any substances that may be dissolved in it – typically salts, glucose or sugar, amino acids, and the waste products urea and uric acid – are pushed out through the thin capillary walls, where they are collected in Bowman's capsule. Larger particles in the blood, such as red blood cells and protein molecules, are too bulky to pass through the capillary walls and they remain in the bloodstream. The blood, which is now filtered, leaves the glomerulus through another arteriole, which branches into the meshlike network of blood vessels around the renal tubule. The blood then exits the kidney through the renal vein. Approximately 180 liters (about 50 gallons) of blood moves through the two kidneys every day.

Urine production begins with the substances that the blood leaves behind during its passage through the kidney – the water, salts, and other substances collected from the glomerulus in Bowman's capsule. This liquid, called glomerular filtrate, moves from Bowman's capsule through the renal tubule. As the filtrate flows through the renal tubule, the network of blood vessels surrounding the tubule reabsorbs much of the water, salt, and virtually all of the nutrients, especially glucose and amino acids, that were removed in the glomerulus. This important process, called tubular reabsorption, enables the body to selectively keep the substances it needs while ridding itself of wastes. Eventually, about 99 percent of the water, salt, and other nutrients is reabsorbed.

At the same time that the kidney reabsorbs valuable nutrients from the glomerular filtrate, it carries out an opposing task, called tubular secretion. In this process, unwanted substances from the capillaries surrounding the nephron are added to the glomerular filtrate. These substances include various charged particles called ions, including ammonium, hydrogen, and potassium ions.

Together, glomerular filtration, tubular reabsorption, and tubular secretion produce urine, which flows into collecting ducts, which guide it into the microtubules of the pyramids. The urine is then stored in the renal cavity and eventually drained into the ureters, which are long, narrow tubes leading to the bladder. From the roughly 180 liters (about 50 gallons) of blood that the kidneys filter each day, about 1.5 liters (1.3 qt) of urine are produced.

II. Make up a plan of the text. Describe the process of urine production according to the plan.



Lesson 12 Endocrine system

Part I

I. Learn the new words.

▪ diurnal rhythm	суточный ритм
▪ exhibit	показывать, проявлять
▪ extension	продолжение, расширение
▪ growth hormone inhibiting hormone	гормон, ингибирующий гормон роста
▪ growth hormone releasing hormone	гормон, высвобождающий гормон роста
▪ hormonal output	высвобождение гормонов
▪ luteinizing hormone	лютеинизирующий гормон
▪ pituitary dwarfism	гипофизарная карликовость
▪ stalk	ножка
▪ release	выделение, секреция
▪ storage	хранение
▪ subject to	подвергающийся, подверженный
▪ thyroid-stimulating hormone	тиреотропный гормон
▪ trigger	вызывать
▪ uptake	усвоение, накопление

II. Practice the pronunciation of the following words.

Pituitary, hypothalamus, adenohypophyseal, diurnal, stimuli, somatostatin, gigantism, acromegaly, hyposecretion, hypersecretion, adrenocorticotropic, glucocorticoid, luteinizing, prolactin.

III. Choose the right translation.

➢ *Most anterior pituitary hormones exhibit a diurnal rhythm of release.*

a) Большая часть гормонов передней доли гипофиза вырабатывается в дневное время.

b) Большинство гормонов передней доли гипофиза демонстрируют дневной ритм высвобождения.

c) Большинство гормонов передней доли гипофиза имеют суточный ритм высвобождения.

IV. Read the text.

Pituitary gland

The pituitary gland hangs from the base of the brain by a stalk and is enclosed by bone. It consists of a hormone-producing glandular portion (anterior pituitary) and a neural portion (posterior pituitary), which is an extension of the hypothalamus. The hypothalamus regulates the hormonal output of the anterior pituitary and synthesizes two hormones that it exports to the posterior pituitary for storage and later release.

Four of the six adenohypophyseal hormones are tropic hormones that regulate the function of other endocrine organs. Most anterior pituitary hormones exhibit a diurnal rhythm of release, which is subject to modification by stimuli influencing the hypothalamus.

Somatotropic hormone or Growth hormone (GH) is an anabolic hormone that stimulates growth of all body tissues but especially skeletal muscle and bone. It may act directly, or indirectly via insulin-like growth factors (IGFs). GH mobilizes fats, stimulates protein synthesis, and inhibits glucose uptake and metabolism. Secretion is regulated by growth hormone releasing hormone (GHRH) and growth hormone inhibiting hormone (GHIH), or somatostatin. Hypersecretion causes gigantism in children and acromegaly in adults; hyposecretion in children causes pituitary dwarfism.

Thyroid-stimulating hormone (TSH) promotes normal development and activity of the thyroid gland. Thyrotropin-releasing hormone (TRH) stimulates its release; negative feedback of thyroid hormone inhibits it.

Adrenocorticotropic hormone (ACTH) stimulates the adrenal cortex to release corticosteroids. ACTH release is triggered by corticotropin-releasing hormone (CRH) and inhibited by rising glucocorticoid levels.

The gonadotropins – follicle-stimulating hormone (FSH) and luteinizing hormone (LH) regulate the functions of the gonads in both sexes.

Prolactin (PRL) promotes milk production in humans. Its secretion is prompted by prolactin-releasing hormone (PRH) and inhibited by prolactin-inhibiting hormone (PIH).

V. Answer the questions:

1. Where is pituitary gland located?
2. What portions does it consist of?
3. What is the function of the hypothalamus?

4. Are all adenohypophyseal hormones tropic hormones?
5. What hormone stimulates growth of all body tissues but especially skeletal muscle and bone?
6. How does it work?
7. What is the secretion of somatotropic hormone regulated by?
8. What diseases do hypersecretion and hyposecretion of somatotropic hormone cause?
9. What effect does thyroid-stimulating hormone (TSH) have?
10. What hormone is its release triggered and inhibited by?
11. What hormone stimulates the adrenal cortex to release corticosteroids?
12. What hormones is its release triggered and inhibited by?
13. What do the gonadotropins regulate?
14. What does prolactin promote?

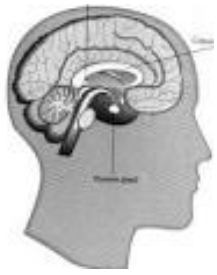
VI. What hormones trigger and inhibit the secretion of the following hormones? Fill in the table.

Hormone	**Its secretion is triggered by**	**Its secretion is inhibited by**
1. Growth hormone		
2. Thyroid-stimulating hormone		
3. Adrenocorticotropic hormone		
4. Prolactin		

VII. Continue the sentences to formulate the main idea of the text.
1. The text deals with the structure and function of … .
2. Four of the six adenohypophyseal hormones that regulate the function of other endocrine organs are … .

VIII. Make up the plan of the text.

IX. Using the plan from exercise VIII and information from exercise VI-VII speak about the pituitary gland and its hormones.



Part II

I. Read the text.

The thyroid gland is located in the anterior throat. Thyroid follicles store colloid containing thyroglobulin, a glycoprotein from which thyroid hormone is derived.

Thyroid hormone (TH) includes thyroxine (T4) and triiodothyronine (T3), which increase the rate of cellular metabolism. Consequently, oxygen use and heat production rise.

Secretion of thyroid hormone, prompted by TSH, requires reuptake of the stored colloid by the follicle cells and splitting of the hormones from the colloid for release.

Most T4 is converted to T3 (the more active form) in the target tissues. These hormones act by turning on gene transcription and protein synthesis.

Graves' disease is the most common cause of hyperthyroidism; hyposecretion causes cretinism in infants and myxedema in adults.

Calcitonin, produced by the parafollicular cells of the thyroid gland in response to rising blood calcium levels, depresses blood calcium levels by inhibiting bone matrix resorption and enhancing calcium deposit in bone.

The parathyroid glands, located on the dorsal aspect of the thyroid gland, secrete parathyroid hormone (PTH), which causes an increase in blood calcium levels by targeting bone, the intestine, and the kidneys. PTH is the antagonist of calcitonin. PTH release is triggered by falling blood calcium levels and is inhibited by rising blood calcium levels.

Hyperparathyroidism results in hypercalcaemia and all its effects and in extreme bone wasting. Hypoparathyroidism leads to hypocalcaemia, evidenced by tetany and respiratory paralysis.

The pancreas, located in the abdomen close to the stomach, is both an exocrine and an endocrine gland. Glucagon, released by alpha (α) cells when blood levels of glucose are low, stimulates the liver to release glucose to the blood.

Insulin is released by beta (β) cells when blood levels of glucose (and amino acids) are rising. It increases the rate of glucose uptake and metabolism by most body cells. Hyposecretion of insulin results in diabetes mellitus; cardinal signs are polyuria, polydipsia, and polyphagia.

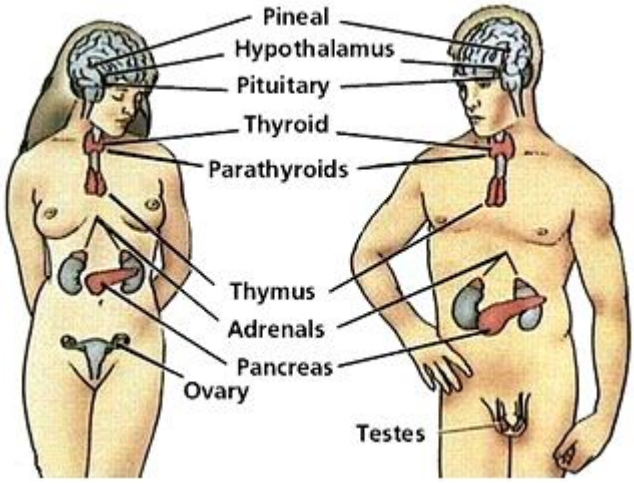
The ovaries of the female, located in the pelvic cavity, release two main hormones. Secretion of estrogens by the ovarian follicles begins at puberty under the influence of FSH. Estrogens stimulate maturation of the female

reproductive system and development of the secondary sex characteristics. Progesterone is released in response to high blood levels of LH. It works with estrogens in establishing the menstrual cycle.
The testes of the male begin to produce testosterone at puberty in response to LH. Testosterone promotes maturation of the male reproductive organs, development of secondary sex characteristics, and production of sperm by the testes.

II. Define the main idea of the text. Give the title.

III. Divide the text into logical parts. Give subtitles.

IV. Find key words in each part and retell the text using key words.



Lesson 13 Nervous system

Part I

I. Learn the new words.

▪ basal ganglion	базальное ядро (головного мозга)
▪ convention	соглашение
▪ dura mater	твердая мозговая оболочка
▪ forebrain	передний мозг
▪ innervate	иннервировать, возбудить, раздражить
▪ interior	внутренняя часть
▪ leathery	жесткий
▪ meninges	оболочка головного мозга
▪ myelinated	миелинизированный
▪ pink	розовый
▪ preserved tissue	консервированная (в формальдегиде) ткань
▪ reside	находиться
▪ tough	плотный

II. Practice the pronunciation of the following words.

Vertebrates, meninges, dura mater, myelinated, interior, tough, leathery, visceral, innervate, autonomic, sympathetic, parasympathetic, neurons.

III. Choose the right translation.

➢ *There is an anatomical convention that a cluster of neurons in the brain or spinal cord is called a nucleus.*

a) Существует анатомическое соглашение о том, что кластер нейронов в головном или спинном мозге называется ядром.
b) Среди анатомов скопление нейронов в головном или спинном мозге принято называть ядром.
c) В кругах анатомов существует единое мнение о том, что скопление нейронов в головном или спинном мозге называется ядром.

IV. Translate the words with the same root.

2. Nerve, nervous, innervate, innervation; 2) close, enclose, enclosed; 3) myelin, myelinated; 4) ganglion, ganglia; 5) layer, three-layered; 6) periphery, peripheral.

V. Read the text.

Anatomy of the nervous system

The nervous system of vertebrates (including humans) is divided into the central nervous system (CNS) and the peripheral nervous system (PNS).
The (CNS) is the major division, and consists of the brain and the spinal cord. The spinal canal contains the spinal cord, while the head contains the brain. The CNS is enclosed and protected by the meninges, a three-layered system of membranes, including a tough, leathery outer layer called the dura mater.
The peripheral nervous system (PNS) is a collective term for the nervous system structures that do not lie within the CNS. The large majority of the axon bundles called nerves are considered to belong to the PNS, even when the cell bodies of the neurons to which they belong reside within the brain or spinal cord. The PNS is divided into somatic and visceral parts. The somatic part consists of the nerves that innervate the skin, joints, and muscles. The visceral part, also known as the autonomic nervous system, contains neurons that innervate the internal organs, blood vessels, and glands. The autonomic nervous system itself consists of two parts: the sympathetic nervous system and the parasympathetic nervous system.
The vertebrate nervous system can also be divided into areas called grey matter and white matter. Grey matter (which is only grey in preserved tissue, and is better described as pink or light brown in living tissue) contains a high proportion of cell bodies of neurons. White matter is composed mainly of myelinated axons, and takes its color from the myelin. White matter includes all of the nerves, and much of the interior of the brain and spinal cord. Grey matter is found in clusters of neurons in the brain and spinal cord, and in cortical layers that line their surfaces. There is an anatomical convention that a cluster of neurons in the brain or spinal cord is called a nucleus, whereas a cluster of neurons in the periphery is called a ganglion. There are, however, a few exceptions to this rule, notably including the part of the forebrain called the basal ganglia.

VI. Answer the questions:

1. What parts is the nervous system of vertebrates divided into?
2. What parts does the central nervous system consist of?
3. Where are they located?
4. What are meninges? What is their function?
5. What does the peripheral nervous system include?
6. What parts is the PNS divided into?
7. What is the structure and function of the somatic part?
8. What is the structure and function of the visceral part?
9. What is another approach to divisions of the vertebrate nervous system?
10. What color is grey matter in living tissue?
11. What does the grey matter contain? Where is grey matter found?
12. What does the white matter include?
13. What is a cluster of neurons in the brain or spinal cord called?
14. What is a cluster of neurons in the periphery called?

VII. Continue the sentences to formulate the main idea of the text.

1. The text describes … of the nervous system.
2. According to the text the main divisions of the nervous system are …, which may be further subdivided into … .

VIII. Describe the structure and function of the central nervous system using the diagram.

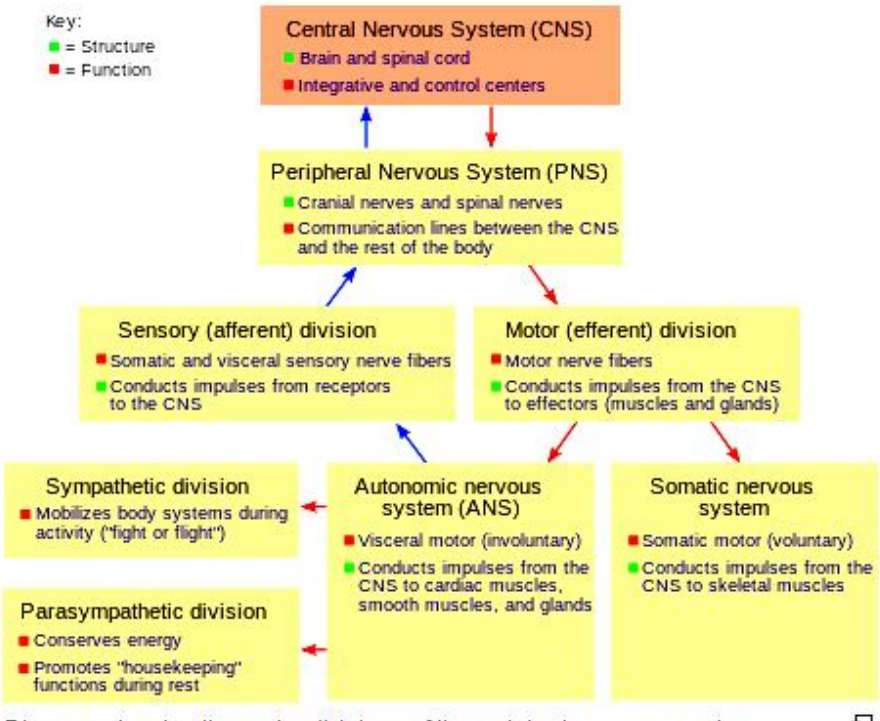


Diagram showing the major divisions of the vertebrate nervous system.

Part II

I. Read the text.

The biology of sensory pathways

Internal and external information collected from the stimulation of sensory cells is processed by the nervous system. The work of the nervous system can be split into sensory (afferent) and motor (efferent) actions. The nervous system can also be divided into voluntary responses (which we are aware of and have control over) and involuntary responses, (such as digestive processes that are controlled by the autonomic system). The nervous system processes information about the body's internal and external environments via electrical impulses from the membranes of neurons to and from the brain.

Sensory Pathways

Sense organs collect information about vision, touch, smell, hearing, taste and movement and transmit it to the brain. A sensory pathway comprises of a receptor sensory cell, nerves and the sensory areas of the brain. Impulses from sensory receptors travel to specific sensory areas in the cerebral cortex. The left side of the cerebral cortex exchanges messages with the right hand side of the body while the right side exchanges messages with the left hand side. A stimulus from the lower body is transmitted to the top of the cerebral cortex.

A sensory cell is similar in structure to a neuron. It responds to specific stimuli such as light and conducts messages to the nervous system. The sensory organs such as the eyes, ears, mouth and nose collect environmental stimuli. This information is rapidly conducted to the brain in the form of electrical and chemical messages via the peripheral and central nervous system (CNS).

The brain (which is part of the CNS) receives, stores, integrates and processes from all senses via the nervous system and directs the functions and actions of the body. The sensory and motor areas of the brain are closely situated within the cerebral cortex. In turn, the brain processes and communicates a response to effectors such as muscles and glands. Information about movement is transmitted to and from the cerebellum via the spinal cord (CNS) to the muscles, tendons regarding the positions of the limbs. Often sensors convey information to the cerebellum about

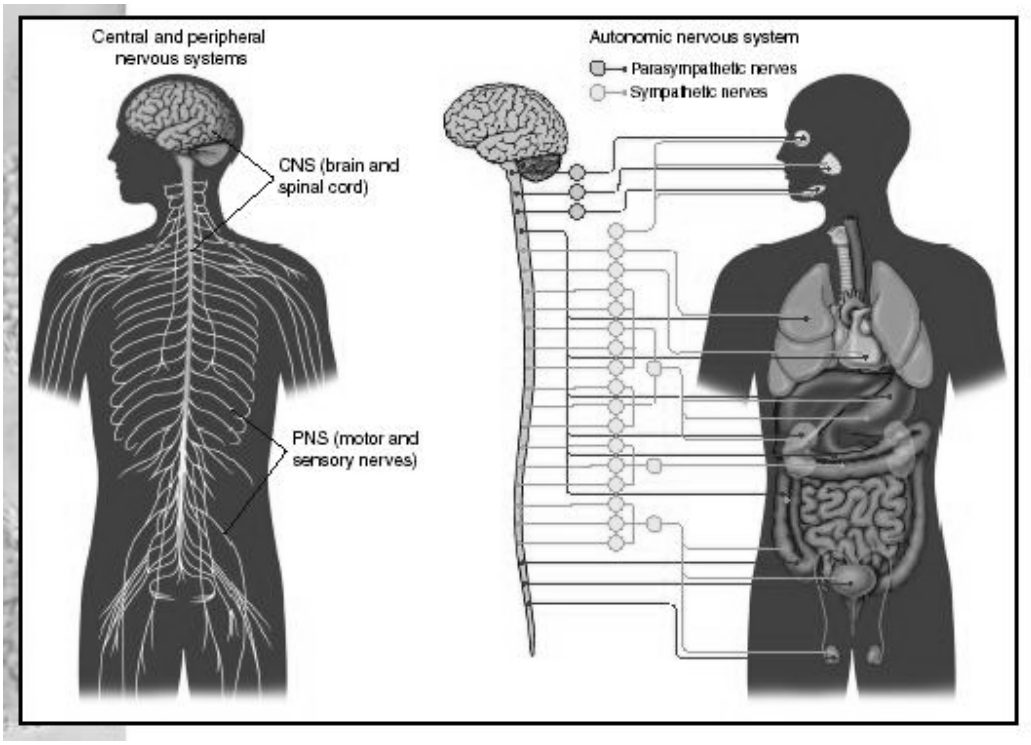
adjustment of our muscles without us being aware of this rapid transfer of information.

The Senses

We use memory to link the associations from nerves to sensory sensations from different parts of the body. For instance, consider watching a balloon being blown up. We see it stretching and becoming bigger and bigger, we can feel the surface of the balloon stretching, we can smell the material from which it is made, we can hear our hands rubbing over the balloon. Our memory of past experiences with balloons allows us to predict that sooner or later the balloon will burst without harming us and we will hear a sudden loud noise.

II. Divide the text into logical parts. Find key words in every part.

III. Retell the text using key words.



Lesson 14 Microorganisms

Part I

I. Learn the new words.

▪ aphid	тля
▪ blood-sucking insect	кровососущее насекомое
▪ contaminate	загрязнять
▪ disease-bearing organisms	переносящие болезни микроорганизмы
▪ envelope	оболочка
▪ evolve	эволюционировать
▪ faecal-oral route	фекально-оральный путь передачи инфекции
▪ host cell	клетка хозяина, клетка организма-носителя (напр. паразита)
▪ helical	спиральный
▪ icosahedral	двадцатигранный, икосаэдрический
▪ influenza virus	вирус гриппа
▪ norovirus	норовирус, “желудочный грипп“
▪ origin	происхождение
▪ replicate	реплицироваться, воспроизводиться путём клеточного деления
▪ rotavirus	ротавирус
▪ sap	сок
▪ tobacco mosaic virus	вирус табачной мозаики
▪ transmit	передаваться

II. Practice the pronunciation of the following words.

Sub-microscopic infectious agent, tobacco mosaic virus, genes, DNA, RNA, interior, molecule, icosahedral, disease-bearing, coughing, sneezing, hepatitis, faecal-oral route.

III. What do the following abbreviations stand for?

DNA, RNA, HIV.

IV. Read the text.

Viruses

A *virus* (from the Latin *virus* meaning *toxin* or *poison*) is a sub-microscopic infectious agent that is unable to grow or reproduce outside a host cell. Viruses infect all types of cellular life. The first known virus, tobacco mosaic virus, was discovered by Martinus Beijerinck in 1898, and now more than 5,000 types of virus have been described in detail, although most types of virus remain undiscovered.

Viruses consist of two or three parts: all viruses have genes made from either DNA or RNA, long molecules that carry genetic information; all have a protein coat that protects these genes; and some have an envelope of fat that surrounds them when they are outside a cell. Viruses vary in shape from simple helical and icosahedral shapes, to more complex structures. They are about 1/100th the size of bacteria. The origins of viruses are unclear: some may have evolved from plasmids – pieces of DNA that can move between cells – others may have evolved from bacteria.

Viruses spread in many ways; plant viruses are often transmitted from plant to plant by insects that feed on sap, such as aphids, while animal viruses can be carried by blood-sucking insects. These disease-bearing organisms are known as *vectors*. Influenza viruses are spread by coughing and sneezing, and others such as norovirus, are transmitted by the faecal-oral route, when they contaminate hands, food or water. Rotaviruses are often spread by direct contact with infected children. HIV is one of several viruses that are transmitted through sex.

Not all viruses cause disease, as many viruses reproduce without causing any obvious harm to the infected organism. Some viruses such as hepatitis B can cause life-long or chronic infections, and the viruses continue to replicate in the body despite the hosts' defence mechanisms. However, viral infections in animals usually cause an immune response, which can completely eliminate a virus.

V. Answer the questions:

1. What is virus?
2. When was the first known virus, tobacco mosaic virus, discovered?
3. How many types of virus have been described in detail?
4. How many parts do viruses consist of? What are they?
5. Do viruses have various shape?

6. Which are larger in size: bacteria or viruses?
7. Are the origins of viruses clear?
8. What may they have evolved from?
9. How do viruses spread?
10. Do all viruses cause disease?
11. What virus can cause life-long or chronic infections?

VI. Write down in each column the key words (word combinations) corresponding to each paragraph of the text.

Paragraph 1	Paragraph 2	Paragraph 3	Paragraph 4
1) 2) 3)	1) 2) 3)	1) 2) 3)	1) 2) 3)

VII. Make up the plan of the text.

VIII. Retell the text using the following phrases:

- The text is called …
- The text is about …
- The text may be divided into … parts.
- The first part is concerned with …
- The next part describes …
- The following part presents …
- The final part summarizes …

Part II

I. Read the text.

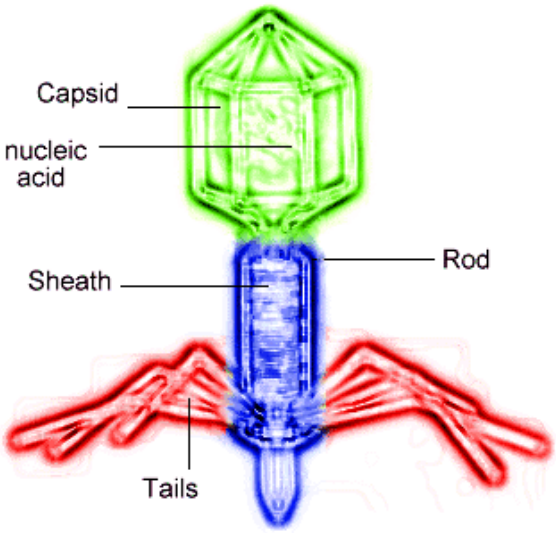
Viruses and human disease

Examples of common human diseases caused by viruses include the common cold, influenza, chickenpox and cold sores. Many serious diseases such as ebola, AIDS, avian influenza and SARS are caused by viruses. The relative ability of viruses to cause disease is described in terms of virulence. Other diseases are under investigation as to whether they too have a virus as the causative agent, such as the possible

connection between human herpes virus six (HHV6) and neurological diseases such as multiple sclerosis and chronic fatigue syndrome.
Viruses have different mechanisms by which they produce disease in an organism, which largely depends on the viral species. Mechanisms at the cellular level primarily include cell lysis, the breaking open and subsequent death of the cell. In multicellular organisms, if enough cells die the whole organism will start to suffer the effects. Although viruses cause disruption of healthy homeostasis, resulting in disease, they may exist relatively harmlessly within an organism. An example would include the ability of the herpes simplex virus, which causes cold sores, to remain in a dormant state within the human body. This is called latency and is a characteristic of the herpes viruses including Epstein-Barr virus, which causes glandular fever, and varicella zoster virus, which causes chickenpox and shingles. Most people have been infected with at least one of these types of herpes virus. However, these latent viruses might sometimes be beneficial, as the presence of the virus can increase immunity against bacterial pathogens, such as *Yersinia pestis*. Some viruses can cause life-long or chronic infections, where the viruses continue to replicate in the body despite the host's defence mechanisms.
This is common in hepatitis B virus and hepatitis C virus infections. People chronically infected are known as carriers, as they serve as reservoirs of infectious virus. In populations with a high proportion of carriers, the disease is said to be endemic.

II. Divide the text into the logical parts.

III. Find key words and retell the text using them.



Lesson 15 Diseases of bones

Part I

I. Learn the new words.

▪ angulation	ангуляция, угловое искривление
▪ brittle	хрупкий, ломкий
▪ communicate	контактировать
▪ compound fracture	осложнённый перелом
▪ compression fracture	компрессионный перелом
▪ contamination	инфицирование
▪ continuity of the bone	целостность кости
▪ crack	трещина
▪ displacement	смещение
▪ expose	подвергать (действию)
▪ gap	отверстие, щель
▪ high force impact	значительное силовое воздействие
▪ manipulation	ручное вправление
▪ osseous tissue	костная ткань
▪ osteogenesis imperfecta	несовершенный остеогенез
▪ pathologic fracture	патологический перелом
▪ reduction	репозиция, восстановление нормального положения
▪ susceptible to	чувствительный к
▪ trivial injury	легкое повреждение
▪ traverse	поперечный

II. Practice the pronunciation of the following words.

Fracture, break, continuity, trivial injury, osteoporosis, osteogenesis imperfecta, orthopedic, hematoma, angulation, manipulation, brittle, susceptible, osseous, traverse.

III. Form nouns from the given words using suffixes -tion, -ment, -ure. Translate the words.

Communicate, displace, expose, reduce, contaminate, angle, consider.

IV. Read the text.

Bone fracture

A bone fracture is a medical condition in which there is a break in the continuity of the bone. A bone fracture can be the result of high force impact or stress, or trivial injury as a result of certain medical conditions that weaken the bones, such as osteoporosis, bone cancer, or osteogenesis imperfecta, where the fracture is then properly termed a pathologic fracture.

Orthopedic

In orthopedic medicine, fractures are classified in various ways. Historically they are named after the doctor who first described the fracture conditions. However, there are more systematic classifications in place currently.

All fractures can be broadly described as:

Closed (simple) fractures are those in which the skin is intact.

Open (compound) fractures involve wounds that communicate with the fracture, or where fracture hematoma is exposed, and may thus expose bone to contamination. Open injuries carry a higher risk of infection.

Other considerations in fracture care are displacement (fracture gap) and angulation. If angulation or displacement is large, *reduction* (manipulation) of the bone may be required and, in adults, frequently requires surgical care. These injuries may take longer to heal than injuries without displacement or angulation.

Compression fractures usually occurs in the vertebrae, for example when the front portion of a vertebra in the spine collapses due to osteoporosis (a medical condition which causes bones to become brittle and susceptible to fracture, with or without trauma).

Other types of fracture are:

Complete fracture: A fracture in which bone fragments separate completely.

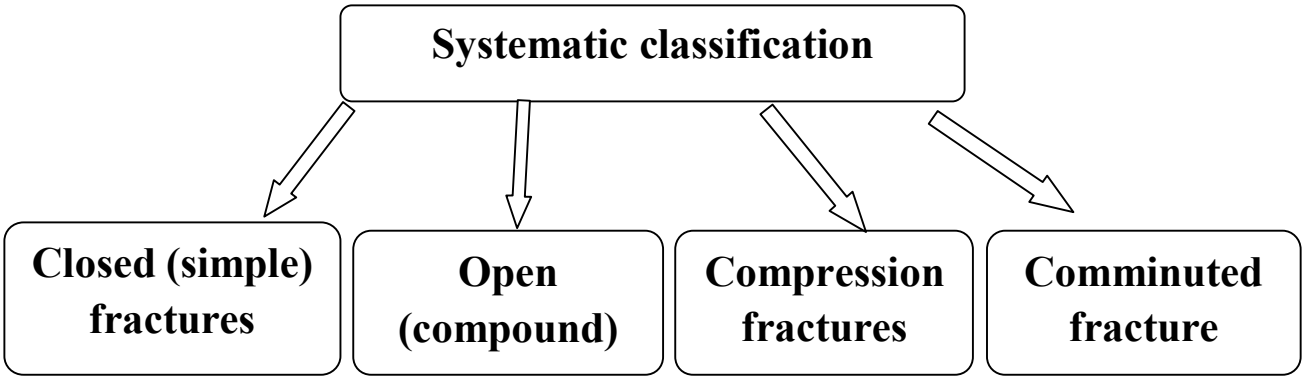
Incomplete fracture: A fracture in which the bone fragments are still partially joined. In such cases, there is a crack in the osseous tissue that does not completely traverse the width of the bone.

Comminuted fracture: A fracture in which the bone has broken into a number of pieces, etc.

V. Answer the questions.

1. What medical condition is called a bone fracture?
2. What can a bone fracture result from?
3. What is a pathologic fracture?
4. How are fractures classified in orthopedic medicine?
5. What is the difference between simple and compound fractures?
6. How are fractures with displacement and angulation treated?
7. Where do compression fractures usually occur?
8. What is the difference between complete and incomplete fracture?
9. What is a comminuted fracture?

VI. Describe main types of bone fractures using the following scheme.



Part II

I. Read the text.

Repair of bone fracture

The process of repair of bone proceeds on the same lines as in the case of the soft tissues; if we substitute osteoid and osseous matrix for collagenous fibrils, the analogy will be seen to be very close. In both kinds of tissue, the activity of the cells concerned is directed in the first place to occupying the breach of continuity, and thus an abundant new formation of cellular tissue is seen. Then follows the formation of matrix, and the gradual acquisition of the characters of the adult tissue. In a fractured bone, not only has the breach to be filled, but it is manifestly desirable that the necessary support should be given as quickly as possible, and this end is attained by the formation of a large amount of spongy bone. Once the bony

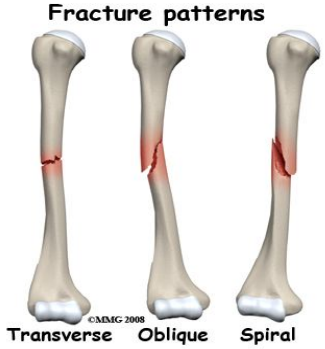
support has been supplied, there follows a process of considerable duration in which the bone formed in excess is gradually absorbed, while, at the same time, condensation of the bone forming the union occurs, and the Haversian systems with their lamellae are arranged so as best to give the necessary support according to the strain put on the bone; thus permanent union is attained.

Structural Changes. When a bone undergoes a simple fracture there is necessarily tearing of blood vessels and of the soft tissues, and a variable amount of hemorrhage occurs between the broken ends. The periosteum is usually torn through and separated from the bone to a varying extent in the neighborhood of the breach. Bleeding soon ceases and coagulation of the effused blood occurs. Soon there follows a reaction on the part of the vessels. There is exudation from them which leads to a swelling of the tissues at the site; emigration of leucocytes also occurs, these cells wandering into the blood clot and aiding its absorption. Such pneunomena are, however, of comparatively short duration and soon pass off.

The process of healing begins by proliferation of cells and new formation of blood vessels. The proliferation takes place in cells of the endosteum and of the deep layer of the periosteum, as well as in cells derived from the bone, especially from the Haversian canals which, in the region of the fracture, become somewhat widened by absorption of the bone. All these cells possess osteogenic function, that is, are osteoblasts. The new blood vessels accompanied by the cells grow out from the pre-existing blood vessels and make their way into the clot, which gradually becomes replaced by a cellular and vascular tissue. Where it is in contact with the fracture a certain amount of resorption of bone occurs.

IV. Divide the text into the logical parts.

V. Find key words and retell the text using them.



Lesson 16 Diseases of cardiovascular system

Part I

I. Learn the new words.

- anxiety — тревога
- arbitrarily — произвольно
- authorities — специаслисты
- concomitant disease — сопутствующее заболевание
- consistent readings — устойчивые показания
- inheritance — наследственность
- intake — прием
- morbidity — заболеваемость
- mortality — смертность
- nevertheless — однако, тем не менее
- occasion — случай
- review — наблюдение
- settle — понижаться
- steeply — сильно
- transient — транзиторный
- underlying — лежащий в основе, основной
- unfamiliar surroundings — незнакомое окружение

II. Practice the pronunciation of the following words.

Hypertension, arbitrarily, anxiety, unfamiliar, subsequently, multifactorial, measurements, pathogenesis, authorities.

III. Practice the pronunciation of the blood pressure readings:

140/90, 160/95.

IV. Choose the right translation of the sentences with complex subject.

1. *Such patients are said to have essential hypertension.*
   a) Такие пациенты говорят, что у них эссенциальная гипертензия.
   b) Так, у пациентов, как говорится, эссенциальная гипертензия.
   c) Говорят, что у таких пациентов эссенциальная гипертензия.

2. *Inheritance is thought to be multifactorial.*
    a) Полагают, что наследственность зависит от множества факторов.
    b) Считают, что наследственность является многофакторной.
    c) Наследственность предположительно мультифакторная.

V. Read the text.

Systemic hypertension

Hypertension is defined arbitrarily at levels above generally accepted "normals", for example 140/90 at the age of 20, 160/95 at the age of 50. According to these criteria, about 15% of the population can be regarded as hypertensive. However, the morbidity and mortality risks rise continuously across the range of pressures, although more steeply at higher pressures.

The risks associated with a particular blood pressure are dependent upon the combination of risk factors in the specific individual. These include the risks associated with age (risk increases with age), gender (males more than females), ethnic origin (blacks more than whites), diet (high salt), smoking and concomitant disease (e. g. coronary artery disease).

Exercise, anxiety, discomfort and unfamiliar surroundings can all lead to a transient rise in blood pressure, and measurements should be repeated when the patient is resting and relaxed until consistent readings are obtained (ideally on 3 separate occasions). Patients who have an isolated recording of high blood pressure, which subsequently settles, may nevertheless be at increased risk and should be kept under review.

In more than 95% of cases a specific underlying cause of hypertension is not found. Such patients are said to have essential hypertension. In 70% of those with essential hypertension another member of the family is affected and inheritance is thought to be multifactorial. Essential hypertension is especially frequent in some ethnic groups, particularly American Blacks and Japanese, and is commoner in countries where there is a high salt intake.

The pathogenesis of essential hypertension is not clearly understood. However, it is known that the underlying defect is an increase in peripheral vascular resistance. Some authorities believe that this is due to an increase

in sympathetic nervous activity while others believe that there is a fundamental defect in the vascular smooth muscle.

VI. Answer the questions:

1. How is hypertension defined?
2. What is the prevalence of hypertension?
3. What are risk factors of hypertension?
4. What factors can lead to a transient rise in blood pressure?
5. How should blood pressure measurements be obtained?
6. Are patients who have an isolated recording of high blood pressure at increased risk of developing hypertension?
7. What do we call a disease when a specific underlying cause of hypertension is not found?
8. Is essential hypertension a hereditary disease?
9. What population suffers from hypertension more often?
10. What is essential hypertension caused by?

VII. Translate into English.

1. Показатели повышенного кровяного давления для каждого возраста различны.
2. Считают, что 15% населения США гипертоники.
3. Факторы риска включают в себя увеличение возраста, мужской пол, высокое потребление соли, курение и другие.
4. Незнакомая обстановка, тревога, физическая нагрузка могут привести к транзиторному повышению кровяного давления.
5. В идеале измерять кровяное давление нужно три раза, пока не будут получены устойчивые показатели.
6. Патогенез эссенциальной гипертензии не до конца изучен.

VIII. Continue the sentences:

1. The text describes … .
2. The text may be divided into … logical parts.
3. The text may be of interest for … .

IX. Make up the plan of the text and speak about systemic hypertension in accordance with the plan.

Part II

I. Read the text.

Hypertensive heart disease

Uncontrolled and prolonged elevation of blood pressure (BP) can lead to a variety of changes in the myocardial structure, coronary vasculature, and conduction system of the heart. These changes can lead to the development of left ventricular hypertrophy (LVH), coronary artery disease, various conduction system diseases, and systolic and diastolic dysfunction of the myocardium, which manifest clinically as angina or myocardial infarction, cardiac arrhythmias (especially atrial fibrillation), and congestive heart failure (CHF). Thus, hypertensive heart disease is a term applied generally to heart diseases, such as LVH, coronary artery disease, cardiac arrhythmias, and CHF, caused by direct or indirect effects of elevated BP. Although these diseases generally develop in response to chronically elevated BP, marked and acute elevation of BP can also lead to accentuation of an underlying predisposition to any of the symptoms traditionally associated with chronic hypertension.

The pathophysiology of hypertensive heart disease is a complex interplay of various hemodynamic, structural, neuroendocrine, cellular, and molecular factors. On one hand, these factors play integral roles in the development of hypertension and its complications; on the other hand, elevated BP itself can modulate these factors. Elevated BP leads to adverse changes in cardiac structure and function in 2 ways: directly by increased afterload and indirectly by associated neurohormonal and vascular changes. Elevated 24-hour ambulatory BP and nocturnal BP have been demonstrated to be more closely related to various cardiac pathologies, especially in African Americans. The pathophysiologies of the various cardiac effects of hypertension differ and are described in this section.

Left ventricular hypertrophy

LVH, defined as an increase in the mass of the left ventricle (LV), is caused by the response of myocytes to various stimuli accompanying elevated BP. Myocyte hypertrophy can occur as a compensatory response to increased afterload. Mechanical and neurohormonal stimuli accompanying hypertension can lead to activation of myocardial cell growth, gene expression, and, thus, LVH. In addition, activation of the renin-angiotensin system, through the action of angiotensin II on angiotensin I receptors, leads to growth of interstitium and cell matrix

components. Thus, the development of LVH is characterized by myocyte hypertrophy and by an imbalance between the myocytes and the interstitium of the myocardial skeletal structure.

II. Divide the text into logical parts. Give subtitles.

III. Find key words in every part and retell the text using key words.

Lesson 17 Diseases of respiratory system

Part I

I. Learn the new words.

- account for — объяснять, составлять
- catarrhal syndrome — катаральный синдром
- cellular immune defenses — иммунная защита, клеточная иммунная защита
- ciliated cells — реснитчатые клетки
- droplet — капля
- encounter — сталкиваться
- engulf — поглощать
- gateways — ворота
- inoculation — заражение, внедрение
- impinge — сталкиваться
- life-threatening — опасный для жизни
- recruit — привлекать
- self-limited — самокупирующийся
- transfer — перенесение, передача
- trap — захватывать

II. Practice the pronunciation of the following words.

Rhinitis, pharyngitis, sinusitis, epiglottitis, laryngitis, tracheitis, invasion, inoculation, impinge, adenoids, macrophages, monocytes, neutrophils, eosinophils.

III. Translate the words with the same root.

1) catarrh, catarrhal; 2) to invade, invader; 3) respond, response; 4) threaten, life-threatening; 5) secrete, secretion; 6) expose, exposure.

IV. Choose the right translation.

➢ *Patients with bacterial infections may present in similar fashion.*

1) Больные бактериальными инфекциями могут быть представлены в одинаковой манере.

2) Пациенты с бактериальными инфекциями могут иметь схожую картину заболевания.
3) Пациенты с бактериальными инфекциями могут иметь аналогичный механизм развития заболевания.

V. Read the text.

Upper respiratory tract infection

Upper respiratory tract infections (URIs) range from the common cold – typically a mild, self-limited, catarrhal syndrome of the nasopharynx – to life-threatening illnesses such as epiglottitis. Viruses account for most URIs.

The upper respiratory tract includes the sinuses, nasal passages, pharynx, and larynx, which serve as gateways to the trachea, bronchi, and pulmonary alveolar spaces. Rhinitis, pharyngitis, sinusitis, epiglottitis, laryngitis, and tracheitis are specific manifestations of URIs.

Pathophysiology

URIs involve direct invasion of the mucosa lining the upper airway. Person-to-person spread of viruses accounts for most URIs. Patients with bacterial infections may present in similar fashion, or they may present with a superinfection of a viral URI. Inoculation by bacteria or viruses begins when secretions are transferred by touching a hand exposed to pathogens to the nose or mouth or by directly inhaling respiratory droplets from an infected person who is coughing or sneezing.

After inoculation, viruses and bacteria encounter several barriers, including physical, mechanical, humoral, and cellular immune defenses. Hair lining the nose filters and traps some pathogens. Mucus coats much of the upper respiratory tract, trapping potential invaders. The angle resulting from the junction of the posterior nose to the pharynx causes large particles to impinge on the back of the throat. Ciliated cells lower in the respiratory tract trap and transport pathogens up to the pharynx, where they are then swallowed into the stomach.

Adenoids and tonsils contain immune cells that respond to pathogens. Humoral immunity (immunoglobulin A) and cellular immunity act to reduce infections throughout the entire respiratory tract. Resident and recruited macrophages, monocytes, neutrophils, and eosinophils coordinate to engulf and invaders.

VI. Answer the questions:

1. Are upper respiratory tract infections life-threatening illnesses?
2. Do viruses account for most URIs?
3. What are specific manifestations of URIs?
4. How do most viruses spread?
5. How does inoculation by bacteria or viruses begin?
6. What barriers do viruses and bacteria encounter after inoculation?
7. What structures contain immune cells that respond to pathogens?
8. What cells engulf and destroy invaders?

VII. Continue the sentences.

1. Upper respiratory tract infections (URIs) range from … to … .
2. The upper respiratory tract includes … .
3. Specific manifestations of URIs are … .
4. URIs involve direct invasion of … .
5. Most URIs are caused by … .
6. Respiratory secretions are transferred by … .
7. Hair lining the nose filters and … .
8. Ciliated cells lower in the respiratory tract trap an … .
9. Humoral immunity and … act to reduce infections throughout the entire respiratory tract.

VIII. Describe the structure of the upper respiratory tract, manifestations and pathophysiology of URIs in no more than 15 sentences.

Part II

I. Read the text.

Pneumonia in children

Description. Pneumonia is a lung infection that can be caused by different types of germs, including bacteria, viruses, fungi, and parasites. Although different types of pneumonia tend to affect children in different age groups, pneumonia is most commonly caused by viruses. Some viruses that cause pneumonia are adenoviruses, rhinovirus, influenza virus (flu), respiratory syncytial virus (RSV), and parainfluenza virus (the virus that causes croup).

Incubation. The incubation period for pneumonia varies, depending on the type of virus or bacteria causing the infection. Some common incubation periods are: respiratory syncytial virus, 4 to 6 days; influenza, 18 to 72 hours.

Symptoms of pneumonia vary, depending on the age of the child and the cause of the pneumonia. Some common symptoms include: fever, chills, unusually rapid breathing, breathing with grunting or wheezing sounds, labored breathing that makes a child's rib muscles retract (when muscles under the rib cage or between ribs draw inward with each breath), vomiting, chest pain, abdominal pain, decreased activity, loss of appetite (in older children) or poor feeding (in infants) in extreme cases, bluish or gray color of the lips and fingernails.

Sometimes a child's only symptom is rapid breathing. Sometimes when the pneumonia is in the lower part of the lungs near the abdomen, there may be no breathing problems at all, but there may be fever and abdominal pain or vomiting.

When pneumonia is caused by bacteria, an infected child usually becomes sick relatively quickly and experiences the sudden onset of high fever and unusually rapid breathing. When pneumonia is caused by viruses, symptoms tend to appear more gradually and are often less severe than in bacterial pneumonia. Wheezing may be more common in viral pneumonia.

Some types of pneumonia cause symptoms that give important clues about which germ is causing the illness. For example, in older children and adolescents, pneumonia due to *Mycoplasma* (also called walking pneumonia) is notorious for causing a sore throat and headache in addition to the usual symptoms of pneumonia.

In infants, pneumonia due to chlamydia may cause conjunctivitis (pinkeye) with only mild illness and no fever. When pneumonia is due to whooping cough (pertussis), the child may have long coughing spells, turn blue from lack of air, or make a classic “whoop” sound when trying to take a breath.

II. Divide the text into logical parts. Give subtitles.

III. Find key words in every part and retell the text using key words.

Lesson 18 Diseases of digestive system

Part I

I. Learn the new words.

▪ antacid	нейтрализующее кислоту средство
▪ bismuth compound	соединение висмута
▪ cautery	прижигание, каутеризация
▪ clear organisms	устранять микроорганизмы
▪ heal	заживать
▪ highly selective vagotomy	селективная высокая ваготомия
▪ H2 antagonist	блокатор Н2-гистаминовых рецепторов, Н2-блокатор
▪ non-steroidal anti-inflammatory drugs	нестероидные противовоспалительные препараты
▪ obsolete	устаревший
▪ peptic ulcer	пептическая язва, язвенная болезнь желудка и 12-перстной кишки
▪ perforated ulcer	прободная язва
▪ proton pump inhibitor	блокатор протонного насоса
▪ recurrence	рецидив
▪ relief	облегчение
▪ side-effect	побочное действие
▪ widespread	широко распространённый

II. Practice the pronunciation of the following words.

Helicobacter pylori, non-steroidal anti-inflammatory drugs, antacids, H2 antagonists, prostaglandin analogue, bismuth, Ampicillin, Amoxicillin, Metronidazole, Pantoprazole, vagotomy.

III. Translate the words with the same root.

1) Ulcer, ulcer-like; 2) clear, clearance; 3) inflame, inflammation, anti-inflammatories; 4) complicate, complicated, uncomplicated; 5) perforate, perforation, perforated; 6) bleed, bleeding.

IV. Read the text.

Treatment of peptic ulcers

Peptic ulcers are present in around 4% of the population. About 10% of people develop a peptic ulcer at some point in their life. Peptic ulcer disease (PUD), also known as a peptic ulcer or stomach ulcer, is a break in the lining of the stomach, first part of the small intestine, or occasionally the lower esophagus. An ulcer in the stomach is known as a gastric ulcer while that in the first part of the intestines is known as a duodenal ulcer. Common causes include the bacteria, Helicobacter pylori and non-steroidal anti-inflammatory drugs (NSAIDs).

Younger patients with ulcer-like symptoms are often treated with antacids or H2 antagonists before esophagogastroduodenoscopy (EGD) is undertaken. Bismuth compounds may actually reduce or even clear organisms.

Patients who are taking nonsteroidal anti-inflammatories (NSAIDs) may also be prescribed a prostaglandin analogue (Misoprostol) in order to help prevent peptic ulcers, which may be a side-effect of the NSAIDs.

When H. pylori infection is present, the most effective treatments are combinations of 2 antibiotics (e.g. Ampicillin, Amoxicillin, Metronidazole) and 1 proton pump inhibitor (PPI). An effective combination would be Amoxicillin + Metronidazole + Pantoprazole (a PPI). In the absence of H. pylori, long-term higher dose PPIs are often used.

Treatment of Helicobacter usually leads to clearing of infection, relief of symptoms and eventual healing of ulcers. Recurrence of infection can occur and retreatment may be required, if necessary with other antibiotics. Since the widespread use of PPI's in the 1990s, surgical procedures (like "highly selective vagotomy") for uncomplicated peptic ulcers became obsolete.

Perforated peptic ulcer is a surgical emergency and requires surgical repair of the perforation. Most bleeding ulcers require endoscopy urgently to stop bleeding with cautery or injection.

V. Answer the questions:

1. What is the prevalence of peptic ulcer disease?
2. Where does it occur?
3. What is peptic ulcer caused by?

4. How are younger patients with ulcer-like symptoms often treated?
5. Why is Misoprostol often prescribed to people who are taking nonsteroidal anti-inflammatories?
6. What are the most effective treatments when H. pylori infection is present?
7. In what cases may retreatment be required?
8. When is surgical treatment of peptic ulcer necessary?
9. How is bleeding stopped?

VI. Arrange the points of the text plan in the correct order.
1. Causes of peptic ulcer
2. Prevalence of peptic ulcer
3. Surgical treatment
4. Treatment of perforated peptic ulcer
5. Definition of peptic ulcer
6. Treatment of younger patients
7. Treatment of H. pylori infection

VII. Retell the text using the plan from exercise VI.

Part II

I. Read the text.

Gastrointestinal bleeding

The localization of the specific bleeding site in patients presenting with acute GI bleeding remains a serious clinical problem. Acute gastrointestinal bleeding (GIB) can be divided into bleeding in the upper (proximal to the ligament of Treitz) or lower tract. If acute upper GIB is a possibility, lavage with a nasogastric tube should identify acute or subacute bleeding. Endoscopy will localize 80–97 % cases of acute upper bleeding; of these 75 % will resolve spontaneously or with conservative medical therapy and 10 % will require surgery. Because of the length and tortuosity of the colon and contamination of fecal matter and blood, endoscopy is not that successful in lower GIB cases. Peptic ulcers are the most common cause of upper GIB; other causes include gastritis, esophageal varices, Mallory-Weiss tear, esophagitis with or without hiatal hernia, and carcinoma. The three leading causes of lower GIB are

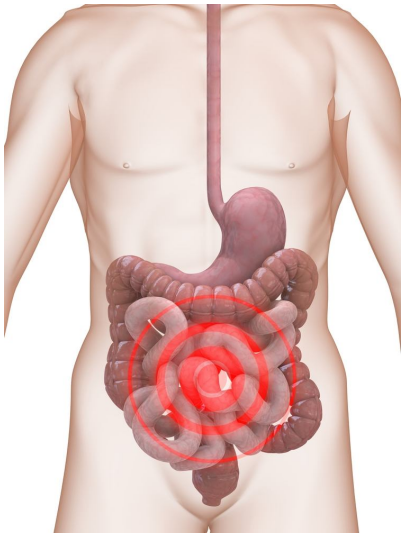
diverticular disease, angiodysplasia, and colorectal cancer. Other causes include inflammatory bowel disease, ischemic colitis, infectious colitis, and anorectal disease. This bleeding usually resolves spontaneously in 80 % of cases and rebleeds in 25 %. Angiodysplasias account for 20 % of significant lower GIB and tend to rebleed.

Meckel's diverticulum is a vestige of the omphalomesenteric duct that is present in about 2 % of the population with two thirds younger than 2 years. It is an outpouch usually found on the antimesenteric border of the ileum, 50–80 cm proximal to the ileocecal valve. Ectopic gastric mucosa is present in about 30 % of cases. Nearly all diverticula responsible for rectal bleeding contain ectopic gastric mucosa. Bleeding, which is usually massive and painless, may result from ileal mucosal ulceration due to acid secretion.

Patients with lower GIB should be stabilized and supported while diagnostic studies are performed. Scintigraphy has emerged as the imaging modality of first choice for localizing bleeding sites in the lower gastrointestinal tract. It is more sensitive for slow or intermittent bleeding, which is a common occurrence. If the scan is positive, arteriography can be employed to deliver vasopressin or embolic agents selectively into the bleeding artery.

II. Divide the text into logical parts. Give subtitles.

III. Find key words in every part and retell the text using key words.



Lesson 19 Diseases of kidneys

Part I

I. Learn the new words.

- calculi — конкременты, камни
- climb — расти, подниматься
- dehydration — обезвоживание
- flank — бок
- fluid replacement — инфузионная терапия
- groin — пах
- gout — подагра
- inherited condition — наследственная болезнь
- oxalate — оксалат
- strenuous exercise — интенсивная физическая нагрузка
- struvite — смешанный почечный камень
- uric acid — мочевая кислота

II. Practice the pronunciation of the following words.

Crystalline, calculi, nephrolithiasis, urolithiasis, calcium, oxalate, phosphate, cystine, strenuous, struvite, hypercalciuria, hyperparathyroidism, cystinuria, hyperoxaluria.

III. Choose the right translation.

➢ *Men are especially likely to develop kidney stones*.

a) Мужчины особенно предрасположены к образованию почечных камней.
b) Вероятно, у мужчин особенно развиваются почечные камни.
c) Камням особенно нравится образовываться у мужчин.

IV. Read the text.

Kidney stones

A kidney stone is a hard, crystalline mineral material formed within the kidney or urinary tract. Kidney stones are a common cause of blood in the urine and often severe pain in the abdomen, flank, or groin. Kidney stones

are sometimes called renal calculi. One in every 20 people develops a kidney stone at some point in their life.
The condition of having kidney stones is termed nephrolithiasis. Having stones at any location in the urinary tract is referred to as urolithiasis.
Kidney stones form when there is a decrease in urine volume and/or an excess of stone-forming substances in the urine. The most common type of kidney stone contains calcium in combination with either oxalate or phosphate. Other chemical compounds that can form stones in the urinary tract include uric acid and the amino acid cystine.
Dehydration from reduced fluid intake or strenuous exercise without adequate fluid replacement increases the risk of kidney stones. Obstruction to the flow of urine can also lead to stone formation. Kidney stones can also result from infection in the urinary tract; these are known as struvite or infection stones.
Men are especially likely to develop kidney stones. The prevalence of kidney stones begins to rise when men reach their 40s, and it continues to climb into their 70s. People who have already had more than one kidney stone are prone to develop more stones. A family history of kidney stones is also a risk factor for developing kidney stones.
A number of different medical conditions can lead to an increased risk for developing kidney stones:
Gout results in an increased amount of uric acid in the urine and can lead to the formation of uric acid stones.
Hypercalciuria (high calcium in the urine), another inherited condition, causes stones in more than half of cases.
Other conditions associated with an increased risk of kidney stones include hyperparathyroidism, kidney diseases such as renal tubular acidosis, and some inherited metabolic conditions including cystinuria and hyperoxaluria.

V. Answer the questions:

1. What is a kidney stone?
2. What is the prevalence of kidney stones?
3. What is the difference between nephrolithiasis and urolithiasis?
4. When do kidney stones form?
5. What minerals do kidney stones contain?
6. What are risk factors for stone formation?
7. What medical conditions can lead to an increased risk for developing kidney stones?

VI. Give your opinion of the text using some of the following phrases:

- I find the information (data) presented in the text …
- The information (data) presented in the text is … (valuable, contradictory).
- The text carries (has, contains) (much) fresh information about…
- The text may be interesting for …

VII. Retell the text using exercise V as a plan.

Part II

I. Read the text.

Kidney

The kidneys control the internal environment of the body; excreting waste products of metabolism, regulating fluids and electrolytes, as well as secreting numerous hormones. The normal function of the kidneys is key to the health and well being of the body. The kidneys are paired organs that are situated at the bottom and slightly below the rib cage in the back. Each is approximately 12 cm in length and 5–7 cm in width with the right kidney being slightly lower in position. Normally, the kidney is supplied by a single renal artery. Each kidney contains about 1.2 million nephrons – working unit of the kidney. Each nephron has a glomerulus, a tangle of capillaries, small blood vessels, supplied by two arterioles that can be likened to a colander and a series of tubules. The excretion of waste begins by filtering the blood in the glomerulus and modifying this as it passes through the tubules. The glomerulus is an effective filter and limits the excretion of protein to less than 150 mg/day.

One of the earliest signs of diabetic kidney disease, as well as that of other kidney diseases, is the finding of increased protein in the urine. This selectivity to what gets filtered helps to maintain normal oncotic or protein pressure and prevent the loss of critical proteins such as immunoglobulins, antibodies, and proteins involved in clotting. It is in the tubules that the urine is modified by secretion and reabsorption of electrolytes and water. Each day the kidney filters up to 180 l of plasma but typically excretes less than 2 l of urine.

Patients with renal disease are frequently asymptomatic and are identified on routine testing of urine and blood. Blood urea nitrogen (BUN) and creatinine are the two most common blood tests that are used to assess

kidney function. Both BUN and creatinine levels vary inversely with the level of kidney function, the lower the kidney function the higher these laboratory values. BUN can change independent of a change in renal function. Many things (e.g., dietary protein intake, fluid or hydration levels, bleeding in the gastrointestinal tract, and medications) can affect the BUN, so measurement of creatinine is more useful.

II. Divide the text into logical parts. Give subtitles.

III. Find key words in every part and retell the text using key words.

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ПРИЛОЖЕНИЕ А

План-схема реферирования специального текста

План пересказа	Полезные выражения
1. Title	➢ The title of the text is … ➢ The text is called …
2. General topic/ main idea / purpose	➢ The text is about … ➢ The text deals with … ➢ The text is devoted to the problem of … ➢ The text touches upon … ➢ The purpose of the text is to give the idea of … ➢ The aim of the article is to provide some information on …
3. The contents	➢ The text can be divided into several parts. ➢ The text starts with … ➢ According to the text … ➢ The first part is concerned with … ➢ The next part describes … ➢ The following part analyzes/ emphasizes/ compares/ presents / characterizes / discusses / reports … ➢ The final part summarizes … ➢ In conclusion … ➢ The author comes to the conclusion that … ➢ According to the text the problem of … is very …
4. Your opinion of the text	➢ I find the information (data) presented in the text … ➢ The information (data) presented in the text is … (valuable, contradictory). ➢ The text carries (has, contains) (much) fresh information about… ➢ The text may be interesting for …

ПРИЛОЖЕНИЕ Б

Методические рекомендации по написанию аннотации к реферату для сдачи кандидатского экзамена по общеобразовательной дисциплине «Иностранный язык»

Структура, содержание и особенности аннотации

В аннотации к реферату раскрываются **актуальность** и **новизна** проведенной работы, обозначаются ее тематика и основные тезисы. Этот объем информации нужно изложить максимально кратко, в пределах **до 1500 п. зн. с пробелами.**

Аннотация, как правило, состоит из **трех частей:**

- вводной, в которой сообщаются все необходимые выходные данные первоисточника;
- описательной (текст аннотации) в которой сообщается тема, цель, актуальность работы;
- заключительной, в которой приводятся отдельные особенности изложения содержания первоисточника (кратко или подробно, уделяется особое внимание и т.д.).

При составлении аннотации следует избегать избыточности информации, в частности ее повторения, лишних фраз, вводных слов и предложений, сложных придаточных предложений.

Логичность изложения материала в тексте аннотации вызывает широкое употребление пассивных конструкций, безличных предложений с инфинитивом и предикативными наречиями на «-о», с безличными глаголами или с личными в значении безличных.

В следующем абзаце подробнее остановитесь на эмпирическом и теоретическом материале, изученном в ходе подготовки реферата. Остановитесь на основных рассмотренных концепциях, назовите их положительные и отрицательные стороны. Кратко изложите выводы, к которым вы пришли в результате проведенной работы.

Сформулируйте практическую значимость реферата. Напишите, в каких сферах и целях можно будет использовать полученные сведения.

Примерный список фраз для оформления аннотации

Аннотация

1) *Данный / настоящий реферат ... посвящен (вопросам) ...*
2) *В реферате ... рассматривается / представлены / дается характеристика / описывается / приводится ...*
3) *В реферате ... доказывается / подтверждается важность ...*
4) *Основными источниками литературных данных явились ...*
5) *Настоящий реферат имеет цель представить ...*
6) *Целью реферата является ...*
7) *В реферате приводится обзор ...*
8) *В реферате дается критический / сравнительный анализ ...*
9) *Основными задачами реферата являлись ...*
10) *Актуальность вопросов, рассматриваемых в реферате, обусловлена ...*
11) *Проблема ... является в настоящее время актуальной, поскольку ...*
12) *Полученные данные могут быть использованы ...*
13) *Полученные данные определяют круг вопросов ...*

Abstract

1) *The present library-research paper / review ... is dedicated to ...*
2) *The paper ... describes / presents / gives characteristics to ...*
3) *The review states the importance of .../ proves...*
4) *The main sources of literature data were ...*
5) *The present library-research paper/review is aimed to present ...*
6) *The purpose / aim / objective of the paper is ...*
7) *The paper presents the literature data review on ...*
8) *The paper gives the critical review of ... / the comparative analysis of ...*
9) *The main tasks of the paper were ...*
10) *The topicality of the issues reviewed / discussed is determined by...*
11) *The problem of ... is topical at present because ... / due to ...*
12) *The obtained data can be used / applied in / for ...*
13) *The obtained data establish the range / spectrum of issues ...*

Анатацыя

1) *Дадзены / сапраўдны рэферат ... прысвечаны (пытанням) ...*
2) *У рэфераце ... разглядаецца / прадстаўлены / даецца характарыстыка / апісваецца / прыводзіцца ...*
3) *У рэфераце ... даказваецца / пацвярджаецца важнасць ...*
4) *Асноўнымі крыніцамі літаратурных дадзеных з'явіліся ....*
5) *Сапраўдны рэферат мае мэтай прадставіць ...*
6) *Мэтай рэферата з'яўляецца ...*
7) *У рэфераце прыводзіцца агляд ...*
8) *У рэфераце даецца крытычны / параўнальны аналіз ...*
9) *Асноўнымі задачамі рэферата з'яўляліся ...*
10) *Актуальнасць пытанняў, якія разглядаюцца ў рэфераце абумоўлена ...*
11) *Праблема ... з'яўляецца ў цяперашні час актуальнай, паколькі ...*
12) *Атрыманыя дадзеныя могуць быць выкарыстаны ...*
13) *Атрыманыя дадзеныя вызначаюць кола пытанняў ...*

ПРИЛОЖЕНИЕ В

Образцы речевых клише для написания

а) аннотации

- The article deals with …
- The paper is concerned with …
- It is known that …
- It is reported that …
- The text gives valuable information on …
- … is/are noted, examined, discussed in detail, stressed, reported, considered.
- Much attention is given to …
- The main idea of the article is …
- It gives a detailed analysis of …
- It is stressed that …
- The following conclusions are drawn …
- The article is of great help to …
- The article is of interest to …

б) реферата научной статьи

- The paper is devoted to … (is concerned with …)
- The paper deals with …
- The investigation (research) is carried out …
- The experiment (analysis) is made …
- The measurements (calculations) are made …
- The research includes (covers, consists of) …
- The data (the results of …) are presented (given, analyzed, compared with, collected)
- The results agree well with the theory …
- The results proved to be interesting (reliable) …
- The new theory (technique) is developed (worked out, proposed, suggested, advanced) …
- The method (theory) is based on …
- This method is now generally accepted …
- The purpose of the experiment is to show …

- The purpose of the research is to prove (test, develop, summarize, find) …
- Special attention is paid (given) to …
- A brief account is given to …
- The author refers to …
- Reference is made to …
- The author gives a review of …
- There are several solutions of the problem …
- It is expected that …
- It is demonstrated (reported, known) that …
- It is likely (certain, sure) …
- It is possible to obtain …
- It is important to verify …
- It is necessary to introduce …
- It should be remembered (noted, mentioned) …

ПРИЛОЖЕНИЕ Г

Дополнительные тексты для реферирования

Abdominal muscle

It is any of the muscles of the anterolateral walls of the abdominal cavity, composed of three flat muscular sheets, from without inward: external oblique, internal oblique and transverse abdominis, supplemented in front on each side of the midline by rectus abdominis.

The first three muscle layers extend between the vertebral column behind the lower ribs above and the iliac crest and pubis of the hip bone below. Their fibres all merge toward the midline, where they surround the rectus abdominis in a sheath before they meet the fibres from the opposite side at the linea alba. Strength is developed in these rather thin walls by the crisscrossing of fibres. Thus, the fibres of the external oblique are directed downward and forward, those of the internal oblique upward and forward, and those of the transverse horizontally forward.

Around the rectus abdominis, which extends from the pubis upward to the ribs, the above muscles are all fibrous. In the region of the groin, between the pubic bone and the anterior superior iliac spine, a specialized arrangement of these fibres permits the formation of the inguinal canal, a passage through the muscular layers. This develops at birth as the testes descend out of the abdominal cavity through its wall into the scrotum. In the female this is replaced by a fibrous cord from the uterus. This gap is a potentially weak area where inguinal hernias can occur.

The muscles of the abdominal walls perform a variety of functions. They provide a tonic, elastic muscular support for the viscera and, by their recoil, pull down the rib cage in expiration. They contract against blows to form a rigid protective wall for the viscera. When the glottis is closed and the thorax and pelvis are fixed, these muscles take part in the expulsive efforts of urination, defecation, childbirth, vomiting and coughing.

When the pelvis is fixed, they initiate the movement of bending the trunk forward. Thereafter, gravity comes into play, the abdominal muscles relax, and the muscles of the back then take on the strain. Conversely, the abdominal muscles come into play in preventing hyperextension.

Human abdomen

The human abdomen (the word “abdomen” comes from the Latin “abdodere”, to hide; the idea was that whatever was eaten was hidden in the abdomen) is the part of the body between the pelvis and the thorax. Anatomically, the abdomen stretches from the thorax at the thoracic diaphragm to the pelvis at the pelvic brim. The pelvic brim stretches from the lumbosacral angle to the pubic symphysis and is the edge of the pelvic inlet. The space above this inlet and under the thoracic diaphragm is termed the abdominal cavity. The abdominal cavity is the body cavity of the human body that holds the bulk of the viscera and which is located below the thoracic cavity, and above the pelvic cavity. It is the part of the abdominopelvic cavity. The abdominal cavity is lined with a protective membrane termed the peritoneum. The kidneys are located in the abdominal cavity behind the peritoneum, in the retroperitoneum. The viscera are also covered, in the front, with a layer of peritoneum called the greater omentum. The boundary of the abdominal cavity is the abdominal wall in the front and the peritoneal surface at the rear.

The abdomen contains most of the tube like organs of the digestive tract, as well as several solid organs. Hollow abdominal organs include the stomach, the small intestine and the colon with its attached appendix. Organs such as the liver, its attached gallbladder and the pancreas function in close association with the digestive tract and communicate with it via ducts. The spleen, kidneys and adrenal glands also lie within the abdomen, along with many blood vessels including the aorta and inferior vena cava.

Anatomists may consider the urinary bladder, uterus, fallopian tubes and ovaries as either abdominal organs or as pelvic organs. Also, the abdomen contains an extensive membrane called the peritoneum.

A fold of peritoneum may completely cover certain organs, whereas it may cover only one side of organs that usually lie closer to the abdominal wall. Anatomists call the latter type of organs *retroperitoneal.*

Functionally, the human abdomen is where most of the alimentary tract is placed and so most of the absorption and digestion of food occurs here. The alimentary tract in the abdomen consists of the lower esophagus, the stomach, the duodenum, the jejunum, the ileum, the cecum and the appendix, the ascending, transverse and descending colons, the sigmoid colon and the rectum.

Blood vessels

Tubular channels for blood transport, of which there are three principal types: arteries, capillaries, and veins. Only the larger arteries and veins in the body bear distinct names. Arteries carry blood away from the heart through a system of successively smaller vessels. Capillaries are the smallest but most extensive blood vessels, forming a network everywhere in the body tissues. Veins carry blood from the capillary beds back to the heart through increasingly larger vessels. In certain locations blood vessels are modified for particular functions, as the sinusoids of the liver and the spleen and the choroid plexuses of the brain ventricles.

Blood vessels are the system of branching and converging tubes which convey blood from the heart to all the various parts of the body and back again, and from the heart to the lungs and back. The size of blood vessels varies enormously, from a diameter of about 25 mm (1 inch) in the aorta to only 8 μm in the capillaries. This is a 3000-fold range.

The thickness of blood vessel walls also varies enormously, being largest in the large arteries, much less in veins of comparable diameter, and only a single cell thick in the capillaries. Despite the range of sizes the components of the blood vessel walls have a common pattern. All vessels are lined with a single layer of flattened cells called the endothelium. Except for capillaries, all vessels also contain elastic fibres, stiff collagen fibres (similar structure to muscle tendons), and smooth muscle fibres which can constrict or dilate in response to chemical and nervous stimuli. The relative proportions of these components vary in different blood vessels in accordance with their functions.

The aorta and its main branches are called elastic arteries. Although they also possess fibrous collagen tissue and smooth muscle, about half of their structure is composed of elastic fibres. These give large arteries a characteristic pale yellow colour. Their wide bore means that they offer little resistance to blood flow, so there is little pressure drop throughout the system of major arteries. The physiological significance of the elastic fibres is that they allow the vessels to expand when blood is ejected intermittently into them from the heart and to constrict again as blood flows out of them into the smaller vessels. The combination of a distensible large vessel and a downstream resistance (arterioles) transforms an intermittent cardiac ejection into a continuous capillary flow.

The nervous system

The nervous system is an organ system containing a network of specialized cells called neurons that coordinate the actions of an animal and transmit signals between different parts of its body. In most animals the nervous system consists of two parts, central and peripheral. The central nervous system of vertebrates contains the brain, spinal cord, and retina. The peripheral nervous system consists of sensory neurons, clusters of neurons called ganglia, and nerves connecting them to each other and to the central nervous system. These regions are all interconnected by means of complex neural pathways. The enteric nervous system, a subsystem of the peripheral nervous system, has the capacity, even when severed from the rest of the nervous system through its primary connection by the vagus nerve, to function independently in controlling the gastrointestinal system.
Neurons send signals to other cells as electrochemical waves travelling along thin fibers called axons, which cause chemicals called neurotransmitters to be released at junctions called synapses. A cell that receives a synaptic signal may be excited, inhibited, or otherwise modulated. Sensory neurons are activated by physical stimuli impinging on them, and send signals that inform the central nervous system of the state of the body and the external environment. Motor neurons, situated either in the central nervous system or in peripheral ganglia, connect the nervous system to muscles or other effector organs. Central neurons, which in vertebrates greatly outnumber the other types, make all of their input and output connections with other neurons. The interactions of all these types of neurons form neural circuits that generate an organism's perception of the world and determine its behavior. Along with neurons, the nervous system contains other specialized cells called glial cells (or simply glia), which provide structural and metabolic support.
Sponges have no nervous system, although they have homologs of many genes that play crucial roles in nervous system function, and are capable of several whole-body responses, including a primitive form of locomotion. Placozoans and mesozoans – other simple animals that are not classified as part of the subkingdom Eumetazoa – also have no nervous system. In Radiata (radially symmetric animals such as jellyfish) the nervous system consists of a simple nerve net. Bilateria, which include the great majority of vertebrates and invertebrates, all have a nervous system containing a brain, one central cord (or two running in parallel), and peripheral nerves.

The size of the bilaterian nervous system ranges from a few hundred cells in the simplest worms, to on the order of 100 billion cells in humans.

Functions of the kidneys

A primary function of kidneys is the removal of poisonous wastes from the blood. Chief among these wastes are the nitrogen-containing compounds urea and uric acid, which result from the breakdown of proteins and nucleic acids. Life-threatening illnesses occur when too many of these waste products accumulate in the bloodstream. Fortunately, a healthy kidney can easily rid the body of these substances.

In addition to cleaning the blood, the kidneys perform several other essential functions. One such activity is regulation of the amount of water contained in the blood. This process is influenced by antidiuretic hormone (ADH), also called vasopressin, which is produced in the hypothalamus (a part of the brain that regulates many internal functions) and stored in the nearby pituitary gland. Receptors in the brain monitor the blood's water concentration. When the amount of salt and other substances in the blood becomes too high, the pituitary gland releases ADH into the bloodstream. When it enters the kidney, ADH makes the walls of the renal tubules and collecting ducts more permeable to water, so that more water is reabsorbed into the bloodstream.

The hormone aldosterone, produced by the adrenal glands, interacts with the kidneys to regulate the blood's sodium and potassium content. High amounts of aldosterone cause the nephrons to reabsorb more sodium ions, more water, and fewer potassium ions; low levels of aldosterone have the reverse effect. The kidney's responses to aldosterone help keep the blood's salt levels within the narrow range that is best for crucial physiological activities.

Aldosterone also helps regulate blood pressure. When blood pressure starts to fall, the kidney releases an enzyme (a specialized protein) called renin, which converts a blood protein into the hormone angiotensin

This hormone causes blood vessels to constrict, resulting in a rise in blood pressure. Angiotensin then induces the adrenal glands to release aldosterone, which promotes sodium and water to be reabsorbed, further increasing blood volume and blood pressure. The kidney also adjusts the body's acid-base balance.

It helps to prevent such blood disorders as acidosis and alkalosis, both of which impair the functioning of the central nervous system.If the blood is

too acidic, meaning that there is an excess of hydrogen ions, the kidney moves these ions to the urine through the process of tubular secretion. An additional function of the kidney is the processing of vitamin D; the kidney converts this vitamin to an active form that stimulates bone development.
Several hormones are produced in the kidney. One of these, erythropoietin, influences the production of red blood cells in the bone marrow. When the kidney detects that the number of red blood cells in the body is declining, it secretes erythropoietin. This hormone travels in the bloodstream to the bone marrow, stimulating the production and release of more red cells.

Glial cells

Glial cells are non-neuronal cells that provide support and nutrition, maintain homeostasis, form myelin, and participate in signal transmission in the nervous system. In the total human brain, the number of glia is estimated to be roughly the same as neurons.
Glial cells provide support and protection for neurons. The four main functions of glial cells are to surround neurons and hold them in place, to supply nutrients and oxygen to neurons, to insulate one neuron from another, and to destroy pathogens and remove dead neurons.
A less anatomical but much more functional way of dividing the human nervous system is classification according to the role that the different neural pathways play, regardless of whether or not they cross through the CNS/PNS:
The somatic nervous system is responsible for coordinating voluntary body movements (i.e. activities that are under conscious control).
The autonomic nervous system is responsible for coordinating involuntary functions, such as breathing and digestion.
In turn, these divisions of the nervous system can be further divided according to the direction in which they conduct nerve impulses:

- Afferent system by sensory neurons, which carries impulses from a somatic receptor to the CNS
- Efferent system by motor neurons, which carries impulses from the CNS to an effector.
- Relay system by interneurons (also called "relay neurons"), which transmit impulses between the sensory and motor neurons (both in the CNS and PNS).

The junction between two neurons is called a synapse. There is a very narrow gap (about 20 nm in width) between the neurons called the

synaptic cleft. This is where an action potential (the "message" being carried by the neurons, also known as the nerve impulse) is transmitted from one neuron to the next.
This is achieved by relaying the message across the synaptic cleft using neurotransmitters, which diffuse across the gap. The neurotransmitters then bind to receptor sites on the neighboring (postsynaptic) neuron, which in turn produces its own electrical/nerve impulse. This impulse is sent to the next synapse, and the cycle repeats itself.
Nerve impulses are a change in ion balance between the inside and outside of a neuron. Because the nervous system uses a combination of electrical and chemical signals, it is incredibly fast. Although the chemical aspect of signaling is much slower than the electrical aspect, a nerve impulse is still fast enough for the reaction time to be negligible in day to day situations. Speed is a necessary characteristic in order for an organism to quickly identify the presence of danger, and thus avoid injury/death. For example, a hand touching a hot stove. If the nervous system was only comprised of chemical signals, the nervous system would not be able to signal the arm to move fast enough to escape dangerous burns. Thus, the speed of the nervous system is evolutionarily valuable, and is in fact a necessity for life.

Hypertension

Hypertension is one of the most common worldwide diseases afflicting humans. Because of the associated morbidity and mortality and the cost to society, hypertension is an important public health challenge. Over the past several decades, extensive research, widespread patient education, and a concerted effort on the part of health care professionals have led to decreased mortality and morbidity rates from the multiple organ damage arising from years of untreated hypertension. Hypertension is the most important modifiable risk factor for coronary heart disease, stroke, congestive heart failure, end-stage renal disease, and peripheral vascular disease. Therefore, health care professionals must not only identify and treat patients with hypertension but also promote a healthy lifestyle and preventive strategies to decrease the prevalence of hypertension in the general population.
Defining abnormally high blood pressure is extremely difficult and arbitrary. Furthermore, the relationship between systemic arterial pressure and morbidity appears to be quantitative rather than qualitative. A level for high blood pressure must be agreed upon in clinical practice for screening

patients with hypertension and for instituting diagnostic evaluation and initiating therapy. Because the risk to an individual patient may correlate with the severity of hypertension, a classification system is essential for making decisions about aggressiveness of treatment or therapeutic interventions.

The classification of blood pressure for adults aged 18 years or older is as follows:

– Normal- Systolic lower than 120, diastolic lower than 80
– Prehypertension - Systolic 120-139, diastolic 80-99
– Stage 1 - Systolic 140-159 or diastolic 90-99

Stage 2 - Systolic equal to or more than 160 or diastolic equal to or more than 100.

Pathophysiology: Arterial blood pressure is a product of cardiac output and systemic vascular resistance. Therefore, determinants of blood pressure include factors that affect both cardiac output and arteriolar vascular physiology. There is potential relevance of blood viscosity, vascular wall sheer conditions (rate and stress), and blood flow velocity (mean and pulsatile components) on vascular and endothelial function regulating blood pressure in humans. Furthermore, changes in vascular wall thickness affect the amplification of peripheral vascular resistance in hypertensive patients and result in reflection of waves back to the aorta, increasing systolic blood pressure.

Tonsillitis

Tonsillitis is an inflammation of the tonsils, the fleshy clusters of tissue on both sides of the back of the throat that fight off germs that enter the body through the mouth. The tonsils become enlarged and red, and can be coated with a yellow, gray, or white substance. An affected child typically has a sore throat, fever, swollen glands in the neck, and trouble swallowing.

Treating Tonsillitis. How doctors treat tonsillitis depends on whether it was caused by a virus or by group A *streptococci* bacteria. Doctors often can tell the difference just by looking at the tonsils, and can detect strep bacteria with a rapid strep test or a throat culture.

If your child's tonsillitis is caused by a virus, the body will fight off the infection on its own. If it's caused by strep bacteria, the doctor probably will prescribe an antibiotic. If so, make sure that your child completes the

full course of treatment to prevent the development of any complications. If your child gets frequent bouts of tonsillitis (more than 5 to 7 times during a 12-month period) or repeat infections over several years, the doctor may consider a tonsillectomy to remove the tonsils.

Caring for a child with tonsillitis. A child with tonsillitis needs plenty of nourishment and rest. If your child finds swallowing so painful that eating is difficult, try serving liquids and soft foods, like nutritious soups, milkshakes, smoothies, popsicles, or ice cream. Make sure that your child drinks lots of fluids and gets plenty of rest, and take his or her temperature regularly. Use a nonprescription pain reliever, such as acetaminophen or ibuprofen, for throat pain.

All forms of tonsillitis are contagious. Tonsillitis usually spreads from person to person by contact with the throat or nasal fluids of someone who is already infected.

Be sure to keep your sick child's drinking glasses and eating utensils separate, and wash them in hot, soapy water. All family members should wash their hands frequently. After a bout of tonsillitis that's caused by the strep bacteria, throw out your child's toothbrush and replace it with a new one.

Preventing Tonsillitis

To prevent tonsillitis, avoid letting your child near anyone who already has tonsillitis or a sore throat. Make sure to practice good hand-washing habits, and teach your child to do the same. If you are concerned that your child has the symptoms of tonsillitis, or has been exposed to someone who has been infected, talk with your child's doctor.

Tuberculosis

Tuberculosis (TB) is a disease caused by the bacteria *Mycobacterium tuberculosis*. It mainly infects the lungs, although it can affect other organs as well. When someone with untreated TB coughs or sneezes, the air is filled with droplets containing the bacteria. Inhaling these infected droplets is the usual way a person gets TB.

Signs and Symptoms. In older infants and children, *primary pulmonary tuberculosis* (the first infection with the tuberculosis bacteria) usually produces no signs or symptoms, and a chest X-ray shows no signs of infection. Rarely, there may be enlargement of the lymph nodes and possibly some coughing.

In most cases, only a *tuberculin skin test* (used to figure out if someone has been infected by the tuberculosis bacteria) is positive, indicating that the child has been infected. Children with a positive tuberculin test, even if they show no disease, will usually need to receive medication.
This primary infection usually resolves on its own as a child develops immunity over a 6- to 10-week period. But in some cases, it can spread all over the lungs (called *progressive tuberculosis*) or to other organs. This causes signs and symptoms such as fever, weight loss, fatigue, loss of appetite, and cough.
Another type of infection is called *reactivation tuberculosis*. Here, the primary infection has resolved, but the bacteria are dormant, or hibernating. When conditions become favorable (for instance, a lowered immunity), the bacteria become active. Tuberculosis in older children may be of this type. The most prominent symptom is a persistent fever, with sweating during the night. Fatigue and weight loss may follow. If cavities form in the lungs, the person may experience coughing and the production of saliva, mucus, or phlegm that may contain blood.
Prevention. The prevention of TB depends on: avoiding contact with those who have the active disease, using medications as a preventive measure in high-risk cases, and maintaining good living standards. New cases and potentially contagious patients are identified through proper use and interpretation of the tuberculin skin test.
Contagiousness. Tuberculosis is contagious when it's airborne and can be inhaled by others. In general, children are not considered contagious, and usually get the infection from infected adults. The incubation period varies from weeks to years.

Hyperthyroidism

Hyperthyroidism (or “overactive thyroid gland”) is the clinical syndrome caused by an excess of circulating free thyroxine (T4) or free triiodothyronine (T3), or both.
Causes
Major causes in humans are:

- Graves' disease
- Toxic thyroid adenoma
- Toxic multinodular goitre

Other causes of hyperthyroxinemia (high blood levels of thyroid hormones) are not to be confused with true hyperthyroidism and include

subacute and other forms of thyroiditis (inflammation). Thyrotoxicosis can occur in both hyperthyroidism and thyroiditis. When it causes acutely increased metabolism, it is sometimes called “thyroid storm”.

Diagnosis

A diagnosis is suspected through blood tests, by measuring the level of thyroid-stimulating hormone (TSH) in the blood. If TSH is low, there is likely to be increased production of T4 and/or T3. Measuring specific antibodies, such as anti-TSH-receptor antibodies in Graves' disease, may contribute to the diagnosis. In all patients with hyperthyroxinemia, scintigraphy is required in order to distinguish true hyperthyroidism from thyroiditis.

Treatment

The major and generally accepted modalities for treatment of hyperthyroidism in humans are:

Surgery (to remove the whole thyroid or a part of it) is not extensively used because most common forms of hyperthyroidism are quite effectively treated by the radioactive iodine method. However, some Graves' disease patients who cannot tolerate medicines for one reason or another or patients who refuse radioiodine opt for surgical intervention. Also, some surgeons believe that radioiodine treatment is unsafe in patients with unusually large gland, or those whose eyes have begun to bulge from their sockets, claiming that the massive dose of iodine needed will only exacerbate the patient's symptoms. The procedure is quite safe.

In Radioiodine (treatment) therapy, radioactive iodine is given orally (either by pill or liquid) on a one-time basis to destroy the function of a hyperactive gland. The iodine given for ablative treatment is different from the iodine used in a scan. Radioactive iodine is given after a routine iodine scan, and uptake of the iodine is determined to confirm hyperthyroidism. The radioactive iodine is picked up by the active cells in the thyroid and destroys them.

Atrophic gastritis

Atrophic gastritis is a process of chronic inflammation of the stomach mucosa, leading to loss of gastric glandular cells and their eventual replacement by intestinal and fibrous tissues. As a result, the stomach's secretion of essential substances such as hydrochloric acid, pepsin, and intrinsic factor is impaired, leading to digestive problems, vitamin B12

deficiency, and megaloblastic anemia. It can be caused by persistent infection with *Helicobacter pylori*, or can be autoimmune in origin.
Autoimmune Metaplastic Atrophic Gastritis (AMAG) is an inherited form of atrophic gastritis characterized by an immune response directed toward parietal cells and intrinsic factor. The presence of serum antibodies to parietal cells and to intrinsic factor are characteristic findings. The autoimmune response subsequently leads to the destruction of parietal cell mass which then results in profound hypochlorhydria (and elevated gastrin levels). The inadequate production of intrinsic factor also leads to vitamin B12 malabsorption and pernicious anemia. AMAG is typically confined to the gastric body and fundus

Hypochlorhydria induces G Cell (Gastrin producing) hyperplasia which leads to hypergastrinemia. Gastrin exerts a trophic effect on enterochromaffin-like cells (ECL cells are responsible for histamine secretion) and is hypothesized to be one mechanism to explain the malignant transformation of ECL cells into carcinoid tumors in AMAG.

Patients with AMAG and pernicious anemia are also at increased risk for the development of gastric adenocarcinoma. The optimal endoscopic surveillance strategy is not known but all nodules and polyps should be removed in these patients. Patients with EMAG are also at increased risk of gastric carcinoma.

Environmental metaplastic atrophic gastritis (EMAG) is due to environmental factors, such as diet and H. pylori infection. EMAG is typically confined to the antrum. Recent research has shown that AMAG is a result of the immune systeam attacking the parietal cells, the attack is being triggered by H pylori through a mechanism called molecular mimicary.

Patients with EMAG are also at increased risk of gastric carcinoma.

Pathophysiology of peptic ulcers

Tobacco smoking, blood group, spices and other factors that were suspected to cause ulcers until late in the 20th century, are actually of relatively minor importance in the development of peptic ulcers.
A major causative factor (75% of gastric and 90% of duodenal ulcers) is chronic inflammation due to Helicobacter pylori, which appears spiral, but is not a spirochaete, rather a bacillus, that colonizes (i.e. settles there after entering the body) the antral mucosa. The immune system is unable to

clear the infection, despite the appearance of antibodies. Thus, the bacterium can cause a chronic active gastritis (type B gastritis), resulting in a defect in the regulation of gastrin production by that part of the stomach, and gastrin secretion is increased. Gastrin, in turn, stimulates the production of gastric acid by parietal cells. The acid erodes the mucosa and causes the ulcer.

Another major cause is the use of NSAIDs. The gastric mucosa protects itself from gastric acid with a layer of mucous, the secretion of which is stimulated by certain prostaglandins. NSAIDs block the function of cyclooxygenase 1 (cox-1), which is essential for the production of these prostaglandins. Newer NSAIDs only inhibit cox-2, which is less essential in the gastric mucosa, and roughly halve the risk of NSAID-related gastric ulceration.

Glucocorticoids lead to atrophy of all epithelial tissues. Their role in ulcerogenesis is relatively small.

Stress in the psychological sense has not been proven to influence the development of peptic ulcers. Burns and head trauma, however, can lead to "stress ulcers", and it is reported in many patients who are on mechanical ventilation.

Smoking leads to atherosclerosis and vascular spasms, causing vascular insufficiency and promoting the development of ulcers through ischemia.

Diagnosis

An esophagogastroduodenoscopy (EGD), a form of endoscopy, also known as a gastroscopy, is carried out on patients in whom a peptic ulcer is suspected. By direct visual identification, the location and severity of an ulcer can be described. Moreover, if no ulcer is present, EGD can often provide an alternative diagnosis.

The diagnosis of Helicobacter pylori can be by:

- Biopsy during EGD;
- Breath testing (does not require EGD);
- Direct culture from an EGD biopsy specimen;
- Direct detection of urease activity in a biopsy specimen;
- Measurement of antibody levels in blood (does not require EGD).

It is still somewhat controversial whether a positive antibody without EGD is enough to warrant eradication therapy.

Cholecystitis

Cholecystitis is defined as inflammation of the gallbladder that occurs most commonly because of an obstruction of the cystic duct from cholelithiasis. Ninety percent of cases involve stones in the cystic duct (i.e., calculous cholecystitis), with the other 10% representing acalculous cholecystitis. Bacterial proliferation may be a result of cholecystitis and not the precipitating factor. Risk factors for cholecystitis mirror those for cholelithiasis and include increasing age, female sex, certain ethnic groups, obesity or rapid weight loss, drugs, and pregnancy.

Acalculous cholecystitis is related to conditions associated with biliary stasis, including debilitation, major surgery, severe trauma, sepsis, long-term total parenteral nutrition), and prolonged fasting. Other causes of acalculous cholecystitis include cardiac events; sickle cell disease; *Salmonella* infections; diabetes mellitus; and microsporidiosis infections in patients with AIDS.

Pathophysiology: Acute calculous cholecystitis is caused by obstruction of the cystic duct, leading to distention of the gallbladder. As the gallbladder becomes distended, blood flow and lymphatic drainage are compromised, leading to mucosal ischemia and necrosis. A study by Cullen demonstrated the ability of endotoxin to cause necrosis, hemorrhage, areas of fibrin deposition, and extensive mucosal loss, consistent with an acute ischemic insult. Endotoxin also abolished the contractile response to cholecystokinin (CCK), leading to gallbladder stasis.

The exact mechanism of acalculous cholecystitis is unclear. Injury may be the result of retained concentrated bile. In the presence of prolonged fasting, the gallbladder never receives a CCK stimulus to empty; thus, the concentrated bile remains stagnant in the lumen.

Age: The incidence of cholecystitis increases with age. The physiologic explanation for the increasing incidence of gallstone disease in the elderly population is unclear. The increased incidence in elderly men has been linked to changing androgen-to-estrogen ratios.

History: The most common presenting symptom of acute cholecystitis is upper abdominal pain, often radiating to the tip of the right scapula.

Most patients with acute cholecystitis describe a history of biliary pain. Some patients may have documented gallstones. Acalculous biliary colic also occurs, most commonly in young-to-middle-aged females. The presentation is almost identical to calculous biliary colic with the

exception of reference range laboratory values and no findings of cholelithiasis on ultrasound.

Frequently, the pain begins in the epigastric region and then localizes to the right upper quadrant (RUQ). Although the pain may initially be described as colicky, it becomes constant in virtually all cases.

Signs of peritoneal irritation may be present, and, in some patients, the pain may radiate to the right shoulder or scapula.

Nausea and vomiting are generally present, and patients may report fever.

Bennett fractures

Medical therapy: Closed reduction and thumb spica cast immobilization are effective in the treatment of Bennett fractures if the reduction can be maintained. The closed reduction technique consists of thumb traction combined with metacarpal extension, pronation, and abduction. Direct downward pressure is applied to the dorsal radial metacarpal base. The strong pull of the APL frequently leads to displacement, necessitating open reduction and internal fixation or closed reduction with percutaneous pinning. More than 1 mm of articular incongruity or persistent CMC joint subluxation after closed reduction indicates the need for surgical treatment.

Surgical therapy: Generally, closed reduction utilizing the technique described above followed by percutaneous K-wire fixation is successful. Two 0.045-inch K-wires are drilled through the dorsal radial thumb metacarpal base into the reduced volar ulnar fragment. If the fragment is very small, reduction may be maintained by placing the K-wire from the thumb metacarpal into the trapezium or the index metacarpal. Maintaining thumb abduction is essential to preserving the first web space.

If adequate reduction cannot be achieved utilizing this percutaneous technique, open reduction and internal fixation is performed. An L-shaped incision is made over the subcutaneous border of the thumb metacarpal. The incision is carried down radially to allow for subperiosteal reflection of the thenar musculature and direct visualization of the joint. Towel-clip forceps are extremely valuable in obtaining and temporarily maintaining reduction. Fixation is achieved using either K-wires or mini screws (2.0 mm).

Follow-up care: A well-molded thumb spica cast is utilized for 2-6 weeks depending on the stability obtained at surgery.

Once the cast is discontinued, a thermoplastic splint is fabricated and a protected mobilization program is initiated until fracture healing is complete.

Displaced intra-articular fractures predispose the patient to arthritis and loss of motion within the affected joints. Unfortunately, even after restoration of articular congruity, some patients develop posttraumatic arthritis secondary to the osteocartilaginous injury sustained as a result of the initial trauma.

Loss of motion also occurs following prolonged immobilization. Rigid fixation enables patients to initiate movement sooner postoperatively, minimizing this problem.

Other potential postoperative complications include loss of reduction with recurrent joint subluxation and instability, infection, and sensory nerve injury.

The prognosis for Bennett fractures is most closely related to the amount of energy associated with the original injury. High-energy injuries produce comminution, articular surface damage, and extensive soft tissue injury, leading to a poor outcome. With anatomic restoration of the joint surface and reestablishment of stability, the outcome is routinely good, especially in low-energy injuries with simple fracture patterns and limited soft tissue involvement.

Renal trauma

Renal trauma may manifest in a dramatic fashion for both the patient and the clinician. The incidence of renal trauma somewhat depends on the patient population being considered. Renal trauma accounts for approximately 3% of all trauma admissions and as many as 10% of patients who sustain abdominal trauma. Also, renal trauma may occur in settings other than those thought of as a classic trauma setting. The approach to renal injuries has changed over time, requiring diligent attention to recent literature. Namely, the tolerance for nonoperative or expectant management has increased, even in the most seriously injured kidneys, replacing the past tendency toward aggressive renorrhaphy.

Problem: Most renal trauma occurs as a result of blunt trauma. Renal injuries may be generally divided into 3 groups: renal laceration, renal contusion, and renal vascular injury. All subsets of renal trauma require a high index of clinical awareness and prompt evaluation and management.

Frequency: The frequency of renal injury somewhat depends on the patient population being considered. Renal trauma accounts for approximately 3% of all trauma admissions and as many as 10% of patients who sustain abdominal trauma.
Etiology: The mechanism of injury should alert the clinician to the possibility of renal trauma. The following list is not all-inclusive, but it highlights the major mechanisms that generate renal injuries:

- penetrating (e.g., gunshot wounds, stab wounds);
- blunt (e.g., pedestrian struck, motor vehicle crash, sports, fall);
- iatrogenic (e.g., endourologic procedures, extracorporeal shock-wave; lithotripsy, renal biopsy, percutaneous renal procedures);
- intraoperative (e.g., diagnostic peritoneal lavage);
- other (e.g., renal transplant rejection, childbirth [may cause spontaneous renal lacerations.

Clinical: The diagnosis of renal injury begins with a high index of clinical awareness. The mechanism of injury provides the framework for the clinical assessment. Particular attention should be paid to complaints of flank or abdominal pain. Urinalysis, both gross and, if necessary, microscopic, should be performed in patients who are thought to have renal trauma. Based on these initial measures, radiographic or operative investigation may follow.

Esophageal Cancer

Esophageal cancer is malignancy of the esophagus. There are various subtypes. Esophageal tumors usually lead to dysphagia, pain and other symptoms, and are diagnosed with biopsy. Small and localized tumors are treated with surgery, and advanced tumors are treated with chemotherapy, radiotherapy or combinations. Prognosis depends on the extent of the disease and other medical problems, but is fairly poor.
Treatment
The treatment is determined by the cellular type of cancer (adenocarcinoma or squamous cell carcinoma *vs* other types), the stage of the disease, the general condition of the patient and other diseases present.
If the patient cannot swallow at all, a stent may be inserted to keep the esophagus patent. A nasogastric tube may be necessary to continue feeding while treatment for the tumor is given, and some patients require a gastrostomy (feeding hole in the skin that gives direct access to the

stomach). The latter two are especially important if the patient tends to aspirate food or saliva into the airways, predisposing for aspiration pneumonia.

Tumor treatments

Surgery is possible if the disease is localised, which is the case in 20-30% of all patients. If the tumor is larger but localised, chemotherapy and/or radiotherapy may occasionally shrink the tumor to the extent that it becomes "operable"; however, this combination of treatments is still somewhat controversial in most medical circles. Esophagectomy is the removal of a segment of the esophagus; as this shortens the distance between the throat and the stomach, some other segment of the digestive tract (typically the stomach or part of the colon) is placed in the chest cavity and interposed. If the tumor is metastatic, surgical resection is not considered worthwhile, but palliative surgery may offer some benefit.

Laser therapy is the use of high-intensity light to destroy tumor cells; it affects only the treated area. This is typically done if the cancer cannot be removed by surgery. The relief of a blockage can help to reduce dysphagia and pain. Photodynamic therapy (PDT), a type of laser therapy, involves the use of drugs that are absorbed by cancer cells; when exposed to a special light, the drugs become active and destroy the cancer cells.

Chemotherapy depends on the tumor type, but tends to be cisplatin-based (or carboplatin or oxaliplatin) every three weeks with fluorouracil (5-FU) either continuously or every three weeks.

Radiotherapy is given before, during or after chemotherapy or surgery, and sometimes on its own to control symptoms. In patients with localised disease but contraindications to surgery, "radical radiotherapy" may be used with curative intent.

Prognosis of esophageal cancer is fairly poor. Even in patients who undergo surgery with curative intent, the five year survival rate is only 25%, and prognosis is poorer in those who are not fit for surgery. Early emphasis on symptom control and palliative care may improve the quality of life.

Thiamine deficiency (BERIBERI)

Thiamine deficiency or beriberi refers to the lack of thiamine pyrophosphate, the active form of the vitamin known as thiamine or vitamin B-1. Thiamine pyrophosphate acts as a coenzyme in carbohydrate

metabolism through the decarboxylation of alpha-ketoacids and in the formation of glucose by acting as a coenzyme for the transketolase in the pentose monophosphate pathway. Persons may become deficient in thiamine either by not ingesting enough vitamin B-1 through the diet or by excess use, which may occur in hyperthyroidism, pregnancy, lactation, or fever. Prolonged diarrhea may impair the body's ability to absorb vitamin B-1, and severe liver disease impairs its use.

Early disease symptoms include fatigue, irritability, poor memory, sleep disturbances, chest pain, anorexia, abdominal pain, and constipation. Depending on the activity and diet of the individual with beriberi, the heart or the central nervous system primarily is affected.

Pathophysiology

In healthy individuals who are deprived of thiamine, thiamine stores are depleted in approximately 1 month. However, within a week of no thiamine intake, healthy people develop a resting tachycardia, weakness, and decreased deep tendon reflexes and some people develop a neuropathy.

Nervous system involvement is termed dry beriberi. This presentation usually occurs when poor caloric intake and relative physical inactivity are present. The neurologic findings can be peripheral neuropathy characterized by symmetric impairment of sensory, motor, and reflex functions of the extremities, especially in the distal aspects of the lower limbs. Associated pain, paresthesias, and/or cramps may be present.

Through histological analysis, the lesions comprise a degeneration of the myelin in the muscular sheaths without inflammation.

Another presentation of neurologic involvement is Wernicke encephalopathy, in which an orderly sequence of symptoms occurs, including vomiting, horizontal nystagmus, palsies of the eye muscles, fever, ataxia, and progressive mental impairment leading to Korsakoff syndrome. Improvement can be achieved at any stage by the addition of thiamine, unless the patient is in frank Korsakoff syndrome. Only half of patients treated at this stage recover significantly.

Wet beriberi is the term used for the cardiovascular involvement of thiamine deficiency. This form of deficiency is the result of a high caloric intake and a high level of activity without the required thiamine for carbohydrate metabolism.