АНГЛИЙСКИЙ ЯЗЫК ДЛЯ МЕДИКОВ
КОНСПЕКТ ЛЕКЦИЙ

Хит сезона

ЭКЗАМЕН
В КАРМАНЕ

Английский язык для медиков: конспект лекций

«Научная книга»

Английский язык для медиков: конспект лекций / «Научная книга»,

Представленный вашему вниманию конспект лекций предназначен для подготовки студентов медицинских вузов к сдаче экзамена. Книга включает в себя полный курс лекций по английскому языку, написана доступным языком и будет незаменимым помощником для тех, кто желает быстро подготовиться к экзамену и успешно его сдать.

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ВВОДНАЯ ЛЕКЦИЯ History of medicine

Medicine is among the most ancient of human occupations. It began as an art and gradually developed into a science over the centuries. There are 3 main stages in medicine development: Medicine of Ancient Civilizations, Medicine of Middle Ages and Modern Medicine.

Early man, like the animals, was subject to illness and death. At that time medical actions were mostly a part of ceremonial rituals. The medicine-man practiced magic to help people who were ill or had a wound. New civilizations, which developed from early tribes, began to study the human body, its anatomic composition. Magic still played an important part in treating but new practical methods were also developing. The early Indians, e. g., set fractures and practiced aromatherapy. The Chinese were pioneers of immunization and acupuncture. The contribution of the Greeks in medicine was enormous. An early leader in Greek medicine was Aesculapius. His daughters, Hygeia and Panacea gave rise to dynasties of healers (curative medicine) and hygienists (preventive medicine). The division in curative and preventive medicine is true today. The ethic principles of a physician were summarized by another Greek, Hippocrates. They are known as Hippocrates Oath.

The next stage of Medicine's development was the Middle Ages. A very important achievement of that time was the hospital. The first ones appeared in the 15-th century in Oriental countries and later in Europe. Another advance of the Middle Ages was the foundation of universities during 13-14-th centuries. Among other disciplines students could study medicine. During 18-th century new discoveries were made in chemistry, anatomy, biology, others sciences. The advances of that time were invention of the stethoscope (by Rene Laennec), vaccination for smallpox, discovery of anesthetics and development of immunology and scientific surgery.

The next century is rise of bacteriology. Important discoveries were made by Louis Pasteur and Robert Koch. The development of scientific bacteriology made possible advances in surgery: using antiseptics and control of wound infection.

Medicine in the 20-th century made enormous contribution in the basic medical sciences. These are discovery of blood groups and vitamins, invention of insulin and penicillin, practice of plastic surgery and transplantation.

New words

medicine – медицина
ancient – древний
human – человеческий
occupation – занятие
art – искусство
to develop – развивать
science – наука
century – век
civilization – цивилизация
Middle ages – Средние века
modern – современный

animal – животное
subject – предмет
illness – заболевание
death – смерть
contribution – вклад
discovery – открытие
blood – кровь

Артикли

Перед каждым нарицательным существительным должен стоять артикль. В английском языке существуют два вида артиклей: неопределенный (indefinite) *«A»,* «AN» и определенный (definite) «THE». Если слово употребляется в первый раз, используется неопределенный артикль» «A», «AN». Во второй и последующие разы употребляется определенный артикль *«THE».* Артикль не употребляется, если перед существительным стоит притяжательное или указательное местоимение, другое существительное в притяжательном падеже, количественное числительное или отрицание «ио».

Вставьте артикль, где необходимо.

1. This is… book. It s my… book.
2. Is this your… pencil? No, it is not my pencil, it is my sister's pencil.
3. I have… sister. My… sister is… engineer. My sister's… husband is… doctor.
4. I have no. handbag.
5. Is this… watch?
– No, it isn't… watch, it's… pen.
6. This… pen is good, and that… pen is bad.
7. I can see pencil on your… table, but I can see pencil on, but I can see no… paper.
8. Give me… chair, please.
9. They have… dog and two… cats.
10. I have… spoon in my… plate, but I have no… soup in it.

Answer the questions.

1. When the history of medicine began?
2. How did it begin?
3. How many the main stages are there in the history of medicine?
4. What practices medicine-men?
5. What role did magic play at those times?
6. Who began to study medicine?
7. Who were the pioneers of immunization and acupuncture?
8. Who was the early leader in Greek medicine?
9. When appeared the first hospitals?
10. What Louis Pasteur and Robert Koch discovered?

Make the sentences of your own using the new words (10 sentences).

Find the definite and indefinite articles in the text.

Find one word, which is a little bit different in meaning from others (найдите одно слово, которое немного отличается от других по смыслу):

1) a) medicine; b) theatre; c) doctor;
2) a) patient; b) lamp; c) pain;
3) a) dance; b) science; c) studying;

4) a) mushroom; b) human; c) man;
5) a) century; b) age; c) honey.

ЛЕКЦИЯ № 1. Cell

The cell is a smallest independent unit in the body containing all the essential properties of life. types of human cells can be grown in test tubes after beeing taken from the body. Cells which are functionally organized are often grouped together and operate in concert as a tissue, such as muscle tissue or nervous tissue. Various tissues may be arranged together to form a unit called organ as the kidney, liver, heart or lungs. Organs often function in groups called organ systems. Thus the esophagus, stomach, pancreas, liver and intestines constitute the digestive system.

Cells are characterized Ьуг high degree of complexity and order in both structure and function. The cell contains a number.

Of structures called cell organelles. These are responsible for carrying out the specialized biochemical reactions characterizing each. The many chemical reactions taking place in a cell require the establishment of varied chemical microenvironment.

Carefully controlled transport mechanisms along with highly effective barriers – the cell membranes – ensure that chemicals are present in the proper region of the call in appropriate concentration.

The cell membranes of a mixture of protein and lipid form its surroundings.

Membranes are an essential component of almost all cells organel-les. The membrane allows only certain molecules to pass through it.

The most visible and essential organelle in a cell is the nucleus, containing genetic material and regulating the activities of the entire cell.

The area outside of the molecules is called the cytoplasm. Cytoplasm contains a variety of organelles that have different functions.

New words

cell – клетка
independent – независимый
unit – единица
body – тело
all – все
life – жизнь
human – человеческий
together – вместе
tissue – ткань
organ systems – системы органов
to function – функционировать
to contain – содержать
membranes – мембраны
protein – протеин
nucleus – ядро
cytoplasm – цитоплазм
different – различный

Спряжение глагола to be в Present Simple.

To be – быть, находиться, являться. После следующих местоимений он меняет свою форму.

Спряжение глагола to be в Present Simple Таблица 1

I } am я	you, they, we } are ты, вы, они, мы
He, she, it } is он, она, оно	

For example.

1. I am a pupil. I am not a pupil. Am I a pupil?
2. She is a girl. She is not a girl. Is she a girl?
3. You are a good friend. You are not a good friend. Are you a good friend?

Поставьте глагол to be в правильную форму, заполнив пропуски.

1. I… a pupil.
2. My father. not a teacher, he… a scientist.
3.. your sister a teacher?
4. Mary. a painter.
5.. they at home?
6. My father. a worker.
7. She. at work.
8.. you a doctor?
9. He… a pilot.
10. We… students.
11. They… carpenters.
12… they at home?
13. they… not at home.
14. He… at work.
15… your sister a typist?
16… your brother at school?
17… your sister in the cabinet?
18. My sister… at home.
19… this your cat?
20. She… an actress.
21. This… my bag.
22. He… professor.
23. Helen… a singer.
24… you an engineer?
25. He… Russian.

Переведите на английский язык, употребляя глагол to be в Present Simple.

1. Я ученик. Я в школе.
2. Мой брат художник. Он не инженер.
3. Моя сестра на работе. Она врач.
4. Он студент, а не учитель.
5. Вы студент? – Нет, я ученик.
6. Моя сестра дома. Она больна.
7. Мы не в школе. Мы дома.
8. Мой брат ученик. Он в школе.
9. Ваша мама дома? – Нет, она на работе.

10. Ваш двоюродный брат дома? – Нет, он в школе.
11. Твоя сестра здорова сейчас? – Да, она здорова.
12. Ваша сестра учительница? – Нет, она студентка.
13. Твой папа на работе? Нет, он на даче.
14. Твоя сестра машинистка? – Да. Она машинистка.
15. Мой дедушка не ученый, он геолог.
16. Моя мама не учительница. Она врач.
17. Чья это ручка? – Это моя ручка.
18. Чья это книга? – Это ваша книга.
19. Чей это стол? – Это стол моего брата.
20. Чья это сумка? – Это сумка моей мамы.
21. Чей это карандаш? – Это карандаш моей сестры.
22. Это твоя тетрадь? – Да, это моя тетрадь.
23. Это тетрадь твоего брата? – Нет, это моя.
24. Где ваш стол? – Он посередине комнаты.
25. Где твоя ручка? – Она в моем кармане.
26. Где твоя тетрадь? – Она на столе.

Answer the questions.

1. What is the cell consists of?
2. What is a membrane?
3. Is cell the smallest independent unit of the body?
4. What can be grown in test – tubes?
5. What can various tissues form, when they are together?
6. What are the organ system consist of?
7. What are cell characterized by?
8. What are cell organelles?
9. What ate membranes?
10. What is the cytoplasm?

Make the sentences of your own using the new words (10 sentences).

Find the verb to be in the text. Explain why it is used in such a way?

Find one word, which is a little bit different in meaning from others (найдите одно слово, которое немного отличается от других по смыслу):

1) a) cell; b) body; c) flower;
2) a) life; b) plate; c) people;
3) a) test-tube; b) microscope; c) pen;
4) a) curtain; b) body; c) tissue;
5) a) spoon; b) kidney; c) liver.

ЛЕКЦИЯ № 2. Tissue

A tissue is a group of cells working together to do a special job. A histologist is one who specializes in the study of tissues. The cells, of which the tissues are made, contain from 60 to 99% water. Gases, liquids and solids dissolve in the water. Chemical reactions that are necessary for proper body function are carried on much more readily in a water solution. The water solution and other materials in which the tissues are bathed is slightly salty. This substance is called tissue fluid. It must be mentioned that an insufficiency of tissues fluid is called dehydration and an abnormal accumulation of this fluid caused a condition called edema.

Tissue classification: The 4 main groups of tissues are:

1) epithelial tissue forms elands, covers surfaces and lines cavities;

2) connective tissue holds all parts of the body in Place. This can be fat, cartilage, bone or blood. Blood sometimes is considered a sort of tissue, since it contains cells and performs many of the functions of tissues. However; the blood has many other unique characteristics;

3) nerve tissue conducts nerve impulses all over the body;

4) the muscle tissue is designed for power-producing contractions. The surface of the body and of the tubes or passages leading to the exterior and the surface of the various cavities in the body are lined by cells which are closely approximated to each other; thus have a small amount of intercellular substance. This lining cellular layer is called epithelium. An epithelial layer may be one or many cells in thickness. When it is composed of a single layer, it is called a simple epithelium; when two or more cells in thickness, it is stratified. The nature and consistency of intercellular substance, the matrix, and the amount and arrangement of fibers furnish the basis for the subdivision of connective tissue into three main groups: connective tissue proper, cartilage and bone. In connective tissue the intercellular substance is soft; in cartilage it is firm, yet flexible and elastic; in bone it is rigid due to the deposition of calcium salt in the matrix. In multicellular organisms certain cells developed to a high degree the properties of irritability and conductivity. These cells form the nervous tissues.

The nervous system of higher animals is characterized by the multiplicity of cellular forms and intercellular connections and by the complexity of its functioning. This multiplicity and complexity is the chief feature that distinguishes the nervous tissues from other tissue which are essentially of uniform structure and function.

Muscle tissue is composed of elongated cells which have the power of contracting or reducing their length. This property of contraction is ultimately a molecular phenomenon and is due to the presence of protein molecules. The following three types of muscle tissue occur in the body.

Smooth muscle tissue is found in sheet or tubes forming the walls of many hollow or tubular organs, for example the bladder, the intes tines of blood vessels. The cells forming this tissue are long spin dles with a central oval nucleus. They are usually packed together with all little connective tissue between them.

Striated muscle tissue is composed of cylindrical fibres often of great at length in which separate cells cannot be distinguished. Many small nuclei are found in the fibres lie just under the surface. Cardiac muscle resembles striated muscle in its structure, but smooth one in its action.

New words

tissue – ткань
group – группа
to work – работать
to do – делать

special – особенный, специальный
job – работа
water – вода
gas – газ
liquid – жидкость
epithelial – эпителиальный
layer – слой
muscle – мышца
to occur – встречаться
body – тело
flexible – гибкий
elastic – эластичный
nucleus – ядро
smooth – гладкий
fibre – волокно
cardiac – сердечный

Неопределенный артикль *a (an)* может употребляться только с исчисляемыми существительными, стоящими в единственном числе. Перед неисчисляемыми существительными или существительными во множественном числе неопределенный артикль опускается. Определенный артикль *the* употребляется и с исчисляемыми, и с неисчисляемыми существительными как в единственном, так и во множественном числе.

E. g. This is a book. The book is interesting (исчисляемое в единственном числе).
This is – meat. The meat is fresh (неисчисляемое).
These are – books. The books are good (множественное число).

Вставьте артикль, где необходимо.

1. This is… pen… pen is red.
2. These are pencils.. pencils are black.
3. This is… soup… soup is tasty.
4. In the morning I eat… sandwich and drink… tea.
5. She gave me… coffee and. cake.. coffee was hot and. cake was tasty.
6. Do you like… ice-cream?
7. I see… book in your… hand. Is… book interesting?
8. She bought… meat,… butter and… potatoes yesterday.
9. She also bought… cake… cake was very… tasty. We ate… cake with. tea.
10. This is… bag… bag is brown.
11. It is my sister's… bag.
12. And this is my… bag. It is… yellow.
13. This is. tree.. tree is green.
14. I can see… boys… boys are playing.
15. I have.bicycle… bicycle is black. My friend has no… bicycle.
16. Our… room is large.
17. We wrote… dictation yesterday… dictation was long.
18. She has two… daughters and one… son. Her… son is… pupil.
19. My… brother's… friend has no… dog.
20. This… pencil is broken. Give me that… pencil, please.
21. She has… ball… ball is… big.
22. I got… letter from my… friend yesterday… letter was interesting.

Answer the questions.

1. What is tissue?
2. What are the tissues made of?
3. How many per cents of water do the cells contain?
4. What is dissolved in water?
5. What reactions are necessary for proper body function?
6. What substance is called tissue fluid?
7. How many groups are in the tissue classification?
8. What is lining cellular layer called?
9. What cells form the nervous tissues?
10. Where is smooth muscle tissue found?

Make the sentences of your own using the new words (10 sentences).

Find the definite and indefinite articles in the text.

Find one word, which is a little bit different in meaning from others (найдите одно слово, которое немного отличается от других по смыслу):

1) a) tissue; b) body; c) pen;
2) a) water; b) cell; c) circle;
3) a) muscle; b) arm; c) cold;
4) a) elastic; b) smooth; c) brick;
5) a) fibre; b) cardiac; c) line.

ЛЕКЦИЯ № 3. Epidermis

The integument consists of the skin (epidermis and dermis) and associated appendages (sweat glands, sebaceous glands, hairs, and nails). Considered the largest body organ, the integument comprises approximately 16% of total body weight. It is a highly specialized organ that functions to protect the body from injury, desiccation, and infection. It also participates in sensory reception, excretion, thermoregulation, and maintenance of water balance.

Epidermis is the outermost layer of the integument. It is a stratified squamous epithelial layer of ectodermal origin.

Layers of the epidermis from deep to superficial consist of four strata. Stratum basale (stratum germinativum) is a proliferative basal layer of columnar-like cells that contain the fibrous protein keratin. Stratum spinosum is a multilaminar layer of cuboidal-like cells that are bound together by means of numerous cytoplasmic extensions and des-mosomal junctions.

Stratum granulosum consists of flat polygonal cells filled with ba-sophilic keratohyalin granules. Viewed at the electron microscopic level, these cells also contain numerous mem brane-coating granules. Stratum corneum is the superficial stratum of dead cells and consists of several to many layers of flat, anucleated, and cornified (kerati-nized) cells. In the epidermis of the palms and soles, a thin, transitional zone of flat eosinophilic or pale-staining anucleated cells may occur as the stratum lucidum. This layer is found only in regions with a thick strata corneum.

Cells of the epidermis: keratinocytes are the most numerous and are responsible for the production of the family of keratin proteins that provide the barrier function of the epidermis.

Melanocytes are derivatives of neural crest ectoderm. They are found in the dermis and are also scattered among the keratinocytes in the basal layers of the epidermis. These dendritic cells produce the pigment melanin in the form melanosomes that are transferred to kerati-nocytes.

Langerhans cells are dendritic cells but are members of the immune system and function as antigen-presenting cells. They have also been found in other parts of the body, including the oral cavity and lymph nodes.

Merkel cells are found in the basal epidermis and appear function in concert with nerve fibers that are closely associated with them. At the electron microscopic level, their cytoplasm contains numerous membrane-bound granules that resemble those of catecholamine-pro-ducing cells.

New words

epidermis – эпидермис
dermis – дерма
largest – самый большой
approximately – приблизительно
weight – вес
to protect – защищать
injury – рана
cytoplasmic – цитоплазматический
several – несколько
level – уровень
flat – плоский
palm – ладонь
thick – толстый
pigment – пигмент

melanin – меланин
nerve – нерв
closely – тесно

Запомните следующие словосочетания, в которых артикль не употребляется.
1) at – school;
2) at – home;
3) at – work.

Вставьте артикль, где необходимо.
1. I have two… sisters. My… sisters are… students.
2. We are at… home.
3. My… brother is not at… home, he is at. school.
4. My. mother is at… work. She is… doctor.
5. I am not… doctor.
6. I have no… sisters.
7. He is not… pilot.
8. I have thirty-two… teeth.
9. He has. child.
10. She has two… children. Her children are at… school.
11. Is your father at… home? – No, he is at… work.
12. Where is your… brother? – He is at… home.

Answer the questions.
1. What is epidermis?
2. What is the largest body organ?
3. How many per cents does the integument comprise of total body weight?
4. What is the main function of the integument?
5. Where it also participates in?
6. What is the outermost layer of the integument?
7. What is stratum granulosum consists of?
8. Where is the a thin, transitional zone of flat eosinophilic?
9. What keratin proteins provide?
10. What cells produce the pigment melanin?

Make the sentences of your own using the new words (10 sentences).

Find the definite and indefinite articles in the text.

Find one word, which is a little bit different in meaning from others (найдите одно слово, которое немного отличается от других по смыслу):

1) a) rain; b) epidermis; c) dermis;
2) a) weight; b) person; c) poster;
3) a) palm; b) foot; c) shoes;
4) a) brush; b) pigment; c) skin;
5) a) lash; b) wound; c) injury.

ЛЕКЦИЯ № 4. Dermis

Dermis is a connective tissue layer of mesodermal origin subjacent the epidermis and its basement membrane. The dermis-epidermal junction, especially in thick skin, is characterized by numerous papillary interdigitations of the dermal connective tissue and epidermal epithelium. This increases the surface area of attachment and brings blood vessels in closer proximity to the epidermal cells. The epidemis, like epithelia in general, is devoid of blood vessel. Histologically, der-mis consists of two identifiable regions.

Papillary layer, associated principally with the dermal papillae, is the most superficial layer. It consists of a loosely packed, irregular meshwork of collagen fibrils that contain fine blood vessels and nerve endings.

Reticular layer is the deeper dermal layer and consists of coarse collagen bundles intertwined with elastic fibers in a gel matrix. This layer is a typical dense irregular connective tissue.

HYPODERMIS: this layer of loose vascular connective tissue is infiltrated with adipocytes and corresponds to the superficial fascia of gross anatomy. However, since it contains the deepest portions of the cutaneous glands and hairs, it is also an important part of the skin. The hypodermis fastens the skin to underlying muscles and other structures.

New words

dermis – дерма
connective – соединительный
membrane – мембрана
junction – соединение
to be characterized by – характеризоваться чем-то
numerous – значительный
to increase – увеличивать
surface – поверхность
area – площадь
bring – приносить
to consists of – состоять из
to contain – содержать
collagen – коллагеновый

Если перед существительным употребляется прилагательное, оно стоит между артиклем и существительным.

E. g. This is a book. This is a good book.

Вставьте артикль, где необходимо

1. We have… large… family.
2. My granny often tells us… long… interesting… stories.
3. My… father is… engineer. He works at… factory… factory is large.
4. My… mother is… doctor. She works at… large. hospital. She is at… work now.
5. My… aunt is… teacher. She works at… school… school is good. My… aunt is not at… school now.
6. She is at… home. She is drinking… tea and eating… jam… jam is sweet.
7. I am at home, too. I am drinking… tea and eating… sandwich… sandwich is tasty.

8. My sister is at… school. She is… pupil.
9. My cousin has… big… black… cat. My cousin's… cat has two… kittens.
10… cat likes… milk… kittens like… milk, too.
11. I am… engineer.
12. My… son is… pupil.
13. He is… good… pupil.
14. This is… house.
15. This is my… pencil.
16. You have some… pen cils, but I have no… pencil. Give me… pencil, please.
17. I like your… beautiful… flower. Give me… flower, please.
18. My… mother is at… home. She is reading… interesting… book.
19. My… father is not at… home. He is at… work. He is… doctor.
20. He is… good… doctor. He works at… hospital… hospital is large.

Answer the questions.
1. What is dermis?
2. What does dermis consist of?
3. What is the dermis-epidermal junction characterized by?
4. What increases the surface area of attachment?
5. What is the epidemis devoid of?
6. What is principally associated with the dermal papillae?
7. What is reticular layer consists of?
8. What is typical dense irregular connective tissue?
9. What does epidermis consists of?
10. What contains the deepest portions of the cutaneous glands?

Make the sentences of your own using the new words (10 sentences).

Find the definite and indefinite articles in the text.

Find one word, which is a little bit different in meaning from others (найдите одно слово, которое немного отличается от других по смыслу):

1) a) skin; b) knife; c) dermis;
2) a) fire; b) membrane; c) cell;
3) a) connective; b) collagen; c) table;
4) a) nose; b) book; c) mouth;
5) a) ear; b) throat; c) skirt.

ЛЕКЦИЯ № 5. Cutaneous appendages

Cutaneous appendages are all derivatives of the epidermis.

Eccrine (merocrine) sweat glands are simple, coiled, tubular glands that are widely distributed over the body. Secretory portions are tightly coiled and consist of a single layer of columnar-like pyramidal cells. They extend deep with in the dermis or hypodermis, where they are surrounded by myoepithelial cells, which aid in the discharge of secretion by contraction.

Duct portions, composed of two cuboidal cell layers, are corkscrew-shaped and open onto the epidermal surface. The luminal diameter of the duct is less than that of the secretory coil. These glands are important in thermal regulation. When hypotonic sweat is released onto the body surface, heat is lost by water evaporation.

Control of the eccrine glands is mainly by the innervation of choli-nergic fibers.

Apocrine sweat glands are also simple, coiled, tubular glands but are much less abundant in their distribution than eccrine glands. They can be found in the axillary, areolar, and anal regions.

Secretory portions of these glands are composed of a single layer of cuboidal or columnar cells. They are larger and have a much wider luminal diameter than eccrine sweat glands. Myoepithelial cells surround the secretory cells within the basement membrane and contract to facilitate secretion.

Duct portions are similar to those of eccrine sweat glands but open onto hair follicles instead of onto the epidermal surfaces.

Functions of these glands in humans is not at all clear. In other mammals, apocrine sweat glands are widely distributed over the body and serve a variety of functions related to olfaction and behavior. Specialized apocrine glands in the ear canal (ceruminous glands) produce a secretion in conjunction with adjacent sebaceous glands to form the protective earwax (cerumen). Apocrine sweat is normally odorless when secreted but becomes noticeable due to the activity of cutaneous bacteria. Control of the apocrine glands is hormonal and via the innervation of adrenergic fibers. These glands do not begin to function until puberty.

Sebaceous glands are simple, branched holocrine acinar glands. They usually discharge their secretions onto the hair shaft within hair follicles. These glands are found in the dermis throught the skin, except on the palms and soles.

Secretory portions consist of peripherally located, flattened stem cells that resemble basal keratinocytes. Toward the center of the acini, enlarged differentiated cells are engorged with lipid. Death and fragmentation of cells nearest the duct portion result in the holocrine mechanism of secretion.

Duct portions of sebaceous glands are composed of stratified squamous epithelium that is continuous with the hair cat and epidermal surface.

Functions involve the lubrication of both hairs and cornified layers of the skin, as well as resistance to desiccation.

Control of sebaceous glands is hormonal. Enlargement of the acini occurs at puberty.

Hairs are long, filamentous projections consisting of dead keratini-zed epidermal cells. Each hair derives from an epidermal invagination called the hair follicle, which possesses a terminal hair bulb, located in the dermis or hypodermis, from which the hair shaft grows. Bundles of smooth muscle cells, called arrector pili muscles, are attached to the hair follicle at one end and the papillary dermis at the other. Contraction of these muscles raise the hairs and dimple the epidermis («goose flesh»). The follicles and associated sebaceous glands are known as pi-losebaceous units.

Nails, like hair, are a modified stratum corneum of the epidermis. They contain hard keratin that forms in a manner similar to the formation of hair. Cells continually proliferate and keratinize from the stratum basale of the nail matrix.

New words
cutaneous – кожный
appendace – покров
coiled – намотанный
tubular – трубчатый
widely – широко
to distribute – распространять
columnar-like – колоночноподобный
pyramidal – пирамидальный
surface – поверхность
duct portions – части трубочки
corkscrew-shaped – имеющий форму штопора
luminal – люминал
thermal – тепловой
innervation – иннервация
abundant – в изобилии
to facilitate – облегчать

Часто, при первом упоминании предмета, тем не менее не рекомендуется перед ним употреблять определенный артикль:
1) если упоминаемый предмет является единственным в мире:
E. g. The sun is shining brightly;
2) если этот предмет является определенным по ситуации:
E. g. Put the book on the table.

Вставьте артикль, где необходимо.
1. What's… weather like today? -… weather is fine.
2… sun is yellow.
3… sky is grey today.
4… earth is… planet.
5. We had… English lesson yesterday… teacher asked me many… questions… questions were difficult.
6. Where is your… brother? – He is at… home. He is in his… room. He is sitting at… table. He is doing his… homework… homework is difficult.
7. Our… cat is sitting on… sofa.
8. It is very dark in… room. Turn on… light, please.
9. Nick went into… bathroom, turned on… water and washed his hands.
10. This is… good… book. Take… book from… table. Put this… book into… bookcase.
11… weath er is fine today… sky is blue… sun is shining brightly in… blue… sky.
12. This is… boy… boy is… school. He is… pupil.
13. This… boy is my… brother's friend.
14. He has… cat, but he has no. dog.
15. He likes his…cat.
16. He gives. cat… milk every day.
17. Yesterday I received… letter from my… friend… letter was interesting.

18. We live in… big house. I like… house very much.
19. Are you. worker? – No, I am… student.
20. Is this… table? – Yes, this is a table.

Answer the questions.

1. What are all derivatives of the epidermis?
2. What do secretory portions consist of?
3. How much do secretory portions extend?
4. What are duct portions composed of?
5. In what regulation are glands important?
6. What is surrounded by myoepithelial cells?
7. What is the result in the holocrine mechanism of secretion?
8. What are duct portions of sebaceous glands composed of?
9. What does each hair derive from?
10. What contain hard keratin?

Make the sentences of your own using the new words (10 sentences).

Find the definite and indefinite articles in the text.

Find one word, which is a little bit different in meaning from others (найдите одно слово, которое немного отличается от других по смыслу):

1) a) cutaneous; b) skin; c) face;
2) a) cold; b) heat; c) thermal;
3) a) mouth; b) nose; c) arm;
4) a) nail; b) hair; c) skin;
5) a) neck; b) head; c) string.

ЛЕКЦИЯ № 6. Matter

Matter is anything that occupies space, possesses mass and can be perceived by our sense organs. It exists in nature in three, usually inter convertible physical states: solids, liquids and gases. For instance, ice, water and steam are respectively the solid, liquid and gaseous states of water. Things in the physical world are made up of a relatively small number of basic materials combined in various ways. The physical material of which everything that we can see or touch is made is matter. Matter exists in three different states: solid, liquid and gaseous. Human senses with the help of tools allow us to determine the properties of matter. Matter can undergo a variety of changes – physical and chemical, natural and controlled.

Chemistry and physics deal with the study of matter, its properties, changes and transformation with energy. There are two kinds of properties: physical – colour, taste, odour, density, hardness, solubility and ability to conduct electricity and heat; in solids the shape of their crystals is significant, freezing and boiling points of liquids.

Chemical properties are the changes in composition undergone by a substance when it is subjected to various conditions. The various changes may be physical and chemical. The physical properties are temporary. In a chemical change the composition of the substance is changed and new products are formed. Chemical properties are permanent.

It is useful to classify materials as solid, liquid or gas (though water, for example, exists as solid (ice), as liquid (water) and as gas (water vapour). The changes of state described by the terms solidify (freeze), liquify (melt), vapourise (evaporate) and condense are examples of physical changes. After physical change there is still the same material. Water is water whether it is solid, liquid or gas. Also, there is still the same mass of material. It is usually easy to reverse a physical change.

New words
matter – материя
anything – все
to occupy – занимать
space – пространство
to possesses – владеть, обладать
mass – масса
sense – чувство
organ – орган
steam – пар
to exist – существовать
can – мочь
to undergo – подвергать
variety – разнообрзие
change – перемена
physical – физический
chemical – химический
natural – природный
transformation – трансформация
colour – цвет
taste – вкус
odour – запах

density – плотность
hardness – твердость
solubility – растворимость
ability – возможность
to conduct – проводить
permanent – постоянный

Существует огромное количество так называемых застывших словосочетаний, в которых артикль употребляется или отсутствует традиционно. Эти словосочетания приходится заучивать наизусть.

Запомните следующие конструкции.
There is a…
Where is the…?

Запомните также следующие предложения.
The (book) is on the (table).
Но: The (book) is on a little (table).

Вставьте артикль, где необходимо.
1. Where is… soup? -… soup is in… big saucepan on… gas-cooker.
2. Where are… cut lets? -… cutlets are in… refrigerator on… lit tle plate.
3. There is no… bread on… table. Where In… bread?
4. There is… little brown coffee-table in our… room in… front of… sofa.
5. Where is… table in your… room?
6. There is… thick carpet on… floor in my mother's room.
7. Is your brother at… home? – No, he is at… work. He works at… big factory. He is… engineer.
8. My sister has many… books… books are in… big bookcase.
9… weather is fine today. Let's go and play in… yard.
10. There are many… children in… yard. They are playing with… ball.
11. Where is… cat? -… cat is on… sofa.
12. Where is… book? -… book is on… shelf.
13. Where are… flowers? -… flowers are in… beautiful vase.
14. Where is… vase? -… vase is on… little table near… window.
15. Open… win dow, please… weather is fine today.
16. I can see… sun in… sky. I can see… nice little bird… bird is sitting in… big tree… tree is green.
17. There is… little white cloud in… sky.
18. We have. large room.
19. There is… big sofa in… room and… little lamp on… wall over… sofa.
20. I like to sit on… sofa and read… good book.

Answer the questions.
1. What is matter?
2. What does matter occupy?
3. Where does matter exist?
4. What are things in the physical world made up of?
5. What states does matter exist in?

6. What can matter undergo?
7. How many kinds of properties are there?
8. Are chemical properties permanent?
9. What may the various changes be?
10. Is it easy to reverse a physical change?

Make the sentences of your own using the new words (10 sentences).

Find the definite and indefinite articles in the text.

Find one word, which is a little bit different in meaning from others (найдите одно слово, которое немного отличается от других по смыслу):

1) a) nothing; b) anything; c) everything;
2) a) sense; b) feeling; c) gas;
3) a) ring; b) odour; c) taste;
4) a) colour; b) green; c) table;
5) a) feet; b) arms; c) molecule.

ЛЕКЦИЯ № 7. Skeletal system

The components of the skeletal system are derived from mesenchy-mal elements that arise from mesoderm and neural crest. Mesenchy-mal cells differentiate into fibroblasts, chondroblasts, and osteoblasts, which produce connective tissue, cartilage, and bone tissue, respectively. Bone organs either develop directly in mesenchymal connective tissue (intramembranous ossification) or from preformed cartilage models (endochondral ossification). In general, the skeletal muscles differentiate from paraxial mesoderm. The splanch nic mesoderm gives rise to cardiac and smooth muscle.

The integument consists of the epidermis and its derivatives (glands, hairs, nails), and the underlying dermis. The epider mis is derived from ectoderm, whereas the dermis is formed from mesenchyme. Melanocytes, which may occur in both layers, originate from neural crest.

The skeletal system develops from paraxial mesoderm, which forms a column of tissue blocks, called the somites, on either side of the neural tube. Each somite becomes differentiated into a ventromedial part, the sclerotome, and a dorsolateral part, the dermomyotome. By the end of the fourth week, the sclerotome cells form embryonic connective tissue, known as mesenchyme. Mesenchyme cells migrate and differentiate to form fibroblasts, chondroblasts, or osteoblasts.

Bone organs are formed by two methods.

Flat bones are formed by a process known as intramembinous ossification, in which bones develop directly within mesenchyme.

Long bones are formed by a process known as endochondral ossification, in which mesenchymal cells give rise hyaline cartilage models that subsequently become ossified.

Skull formation. The neurocranium provides protection around the brain, and the viscerocranium forms the skeleton the face.

Neurocranium is divided into two portions:

The membranous neurocranium consists of flat bones that surround the brain as a vault. The bones appose one another at sutures and fon-tanelles, which allow overlap of bones during birth and remain membranous until adulthood. Palpation of the anterior fontanelle, where the two parietal and frontal bones meet, provides information about the progress of ossification and intracranial pressure.

The cartilaginous neurocranium (chondro-cranium) of the base of the skull is formed by fusion and ossification of number of separate cartilages along the median plate.

Viscerocranium arises primarily from the first two pharynge arches.

Appendicular system: The pectoral and pelvic girdles and the limbs comprise the appendicular system.

Except for the clavicle, most bones of the system are end chondral. The limbs begin as mesenchymal buds with an apical ectodermal ridge covering, which exerts an inductive influence over the mesen-chyme.

Bone formation occurs by ossification of hyaline cartilage models.

The process begins at the end of the embryonic period in the primary ossification centers, which are located in the shaft, or diaphysis, of the long bones. At the epiphyses, or bone extremities, ossification begins shortly after birth.

The cartilage that remains between the diaphysis and the epiphyses of a long bone is known as the epiphysial plate. It is the site of growth of long bones until they attain their final size and the epiphysial plate disappears.

Vertebral column.

During the fourth week, sclerotome cells migrate medially to surround the spinal cord and notochord. After proliferation of the caudal portion of the sclerotomes, the vertebrae are formed, each consisting of the caudal part of one sclerotome and cephalic part of the next.

While the notochord persists in the areas of the vertebral bod ies, it degenerates between them, forming the nucleus pulposus. The latter, together with surrounding circular fibers of the annulus fibrosis, forms the intervertebral disc.

New words
skeletal – скелетный
mesoderm – мезодерма
neural – нервный
crest – гребень
cartilage – хрящ
fibroblasts – фибробласты
chondroblasts – хондробласты
osteoblasts – остеобласты
paraxial – параксиальный
which – который
may – мочь, может
flat – плоский
bone – кость
to provide – снабжать
protection – защита
long – длинный

Запомните следующее застывшее словосочетание.
In front

Запомните следующие конструкции, требующие неопределенного артикля.
I have a…
He has a…
I see a…
I am a…
He is a.
She is a.
This is a.
That is a.
It is a…
There is a.

Вставьте артикль, где необходимо.
1. We have… big dog… dog is very clever.
2. My friend has… very good computer.
3. This… boy is big. He is… student.
4. There is… very big piano in. hall.
5. This is. tree and that is not… tree. It's. bush.
6. I am… boy. I am… pupil. I learn at… school.
7. My sister is at… work. She is… secretary. She works at… large office.
8. This is… very difficult question. I don't know. answer to it.
9. Do you see… little girl with… big ball in her… hands? She is… pupil of our… school.
10. There was… beautiful flower in this… vase yesterday. Where is … flower now?

Answer the questions.

1. Where the components of the skeletal system are derived from?
2. What do mesenchymal cells differentiate into?
3. What produces connective tissue, cartilage, and bone tissue?
4. What does the splanch nic mesoderm give rise?
5. What does the integument consist of?
6. What is the skeletal system developed from?
7. How many portions is neurocranium divided into?
8. What does the membranous neurocranium consist of?
9. Where does viscerocranium arise primarily?
10. During what week do sclerotome cells migrate?

Make the sentences of your own using the new words (10 sentences).

Find the definite and indefinite articles in the text.

Find one word, which is a little bit different in meaning from others (найдите одно слово, которое немного отличается от других по смыслу):

1) a) bone; b) pen; c) skeletal;
2) a) strong; b)weak; c) powerful;
3) a) water; b)rain; c)steam;
4) a) wind; b) storm; c) easy;
5) a) hot; b)sun; c) winter.

ЛЕКЦИЯ № 8. Muskular system

Skeletal (voluntary) system.

The dermomyotome further differentiates into the myotome and the dermatome.

Cells of the myotome migrate ventrally to surround the intraembry-onic coelom and the somatic mesoderm of the ventrolateral body wall. These myoblasts elongate, become spindle-shaped, and fuse to form multinucleated muscle fibers.

Myofibrils appear in the cytoplasm, and, by the third month, cross-striations appear. Individual muscle fibers increase in diameter as myofibrils multiply and become arranged in groups surrounded by mesenchyme.

Individual muscles form, as well as tendons that connect muscle to bone.

Trunk musculature: By the end of the fifth week, body-wall musculature divides into a dorsal epimere, supplied by the dorsal primary ramus of the spinal nerve, and a ventral hypomere, supplied by the ventral primary ramus.

Epimere muscles form the extensor muscles of the vertebral column, and hypomere muscles give rise to lateral and ven tral flexor musculature.

The hypomere splits into three layers. In the thorax, the three layers form the external costal, internal intercostal, and transverse thoracic muscle.

In the abdomen, the three layers form the external oblique, internal oblique, and transverse abdomii muscles. Head musculature.

The extrinsic and intrinsic muscles of the tongue are thought to be derived from occipital myotomes that migrate forward.

The extrinsic muscles of the eye may derive from preoptic myoto-mes that originally surround the prochordal plate.

The muscles of mastication, facial expression, the pharynx, and the larynx are derived from different pharyngeal arches and maintain their innervation by the nerve of the arch of origin.

Limb musculature originates in the seventh week from soma meso-derm that migrates into the limb bud. With time, the limb musculature splits into ventral flexor and dorsal extern groups.

The limb is innervated by spinal nerves, which penetrate the limb bud mesodermal condensations. Segmental branches of the spinal nerves fuse to form large dorsal a ventral nerves.

The cutaneous innervation of the limbs is also derived from spinal nerves and reflects the level at which the limbs arise.

Smooth muscle: the smooth muscle coats of the gut, trachtea, bronchi, and blood vessels of the associated mesenteries are derived from splanchnic mesoderm surrounding the gastrointestinal tract. Vessels elsewhere in the body obtain their coat from local mesenchyme.

Cardiac muscle, like smooth muscle, is derived from splanchnic mesoderm.

New words

migrate – мигрировать
ventral – брюшной
to surround – окружать
somatic – соматический
cytoplasm – цитоплазма
spindle-shaped – веретенообразный
to fuse – плавить
cross-striations – поперечные бороздчатости

to appear – появляться
extensor – разгибающая мышца
dorsal – спинной
primary – первичный
ramus – ветвь
split – раскол
extrinsic – внешний
intrinsic – внутренний
vertebral – позвоночный
arche – дуга
abdomen – живот
facial – лицевой
expression – выражение
to penetrate – проникать
segmental – сегментальный
branch – ветвь

Запомните следующие застывшие словосочетания.
In the middle
In the corner
To the right
To the left

Вставьте артикль, где необходимо.

1. There is… thick red… carpet in my… room… carpet is on… floor in… front of… sofa
2. Where is… table? – His… table is near… window.
3. I can see… fine… vase on… shelf. Is it your… vase?
4. We have no… piano in our… living-room.
5. My… uncle is… married. He has… beautiful wife. They have… son, but they have no… daughter.
6. I can see… nice… coffee-table in… middle of… room to… right of… door. It is. black and. red. I like… coffee-table.
7. Our… TV-set is on… little… table in… corner of… room.
8. There is… beautiful picture in my father's… study… picture is on… wall to… left of… window.
9. My aunt's flat is in. new house.
10. There is… living-room,… bedroom,… study,… bathroom and… kitchen in… flat.
11… bedroom is… large room with… two windows.
12… room is light as… windows are large.
13. There are… white curtains on.windows.
14. There are… two beds with. large pillows on them.
15. There are… small tables near… beds.
16. There are… lamps on them. To the left of… door there is… dressing-table with. looking – glass on it.
17. There is… low chair at the dressing – table.
18. There are… several pictures on… pale green walls.
19. There is… thick carpet on… floor.
20… carpet is dark green… room is very cosy.

Answer the questions.

1. What does the muscular system consist of?
2. What surround the intraembryonic coelom?
3. What form do myoblasts become?
4. Where myofibrils appear?
5. By what week body-wall musculature are divided?
6. What is the limb innervated by?
7. What does trunk musculature consist of?
8. Where is the cutaneous innervation of the limbs derived from?
9. Where is cardiac muscle derived from?
10. What do smooth muscles coat?

Make the sentences of your own using the new words (10 sentences).

Find the definite and indefinite articles in the text.

Find one word, which is a little bit different in meaning from others (найдите одно слово, которое немного отличается от других по смыслу):

1) a) abdomen; b) back; c) belly;
2) a) last; b) primary; c) first;
3) a) facial; b) lateral; c) appearance;
4) a) textbook; b) backbone; c) vertebral;
5) a) dark; b) night; c) day.

ЛЕКЦИЯ № 9. Skeleton

The bones of our body make up a skeleton. The skeleton forms about 18% of the weight of the human body.

The skeleton of the trunk mainly consists of spinal column made of a number of bony segments called vertebrae to which the head, the thoracic cavity and the pelvic bones are connected. The spinal column consists of 26 spinal column bones.

The human vertebrae are divided into differentiated groups. The seven most superior of them are the vertebrae called the cervical vertebrae. The first cervical vertebra is the atlas. The second vertebra is called the axis.

Inferior to the cervical vertebrae are twelve thoracic vertebrae. There is one rib connected to each thoracic vertebrae, making 12 pairs of ribs. Most of the rib pairs come together ventrally and join a flat bone called the sternum.

The first pairs or ribs are short. All seven pairs join the sternum directly and are sometimes called the «true ribs». Pairs 8, 9, 10 are «fal-se ribs». The eleventh and twelfth pairs of ribs are the «floating ribs».

Inferior to the thoracic vertebrae are five lumbar vertebrae. The lumbar vertebrae are the largest and the heaviest of the spinal column. Inferior to the lumbar vertebrae are five sacral vertebrae forming a strong bone in adults. The most inferior group of vertebrae are four small vertebrae forming together the coccyx.

The vertebral column is not made up of bone alone. It also has cartilages.

New words

skeleton – скелет
make up – составлять
weight – вес
trunk – туловище
mainly – главным образом
thoracic cavity – грудная впадина
axis – ось
spinal column – позвоночник
inferior – низший
rib – ребро
pair – пара
sacral – сакральный
coccyx – копчик
floating – плавающий
forming – формирующий
cartilage – хрящ

Если после конструкции there is (there are) стоит неисчисляе-мое существительное во множественном числе, вместо опущенного неопределенного артикля часто (не обязательно) употребляется слово «some».

Вставьте артикль, где необходимо.

1. There is… sofa in… corner of… room.

2. There are… cushions on… sofa
3. There are… books on… shelf. Give me… book, please.
4. Look into… refrigerator. What can you see on… shelves?
5. There is… butter in… butter-dish.
6. There is. sausage, but there is no… cheese.
7. There are… eggs,… apples.
8. There is… orange,… lemon, and… some jam in… little vase.
9. There is juice in this… cup. May I drink… juice?
10. There are… girls in… yard, but I can see no… boys. Where are… boys?
11… boys are playing football at… stadium.
12. I have. colour TV-set… TV-set is on… little table in… corner of… room.
13. There is… book,… pen, and… paper on my… writing-desk.
14. My… brother is… teacher. He works at… school.
15. He has… very good books. His… books are in… big bookcase.
16. There is… tea in my… glass. There is no… tea in my… friend's… glass.
17. His… glass is empty.
18. Where is… coffee-table in your… room? -… coffee-table is in… front of… sofa
19. There is… cup on… coffee-table and… newspa pers.
20. There is. coffee in… cup.

Answer the questions.
1. What do the bones of our body make up?
2. How many per cents does the skeleton form?
3. What does the skeleton of the trunk mainly consist of?
4. How many bones does the spinal column consist of?
5. What groups are the human vertebrae divided into?
6. How many groups are the most superior?
7. How is the first cervical vertebra called?
8. Are the first pairs or ribs short?
9. How is the second vertebra called?
10. What forms the coccyx?

Make the sentences of your own using the new words (10 sentences).
Find the definite and indefinite articles in the text.

ЛЕКЦИЯ № 10. Muscles

Muscles are the active part of the motor apparatus; their contraction produces various movements.

The muscles may be divided from a physiological standpoint into two classes: the voluntary muscles, which are under the control of the will, and the involuntary muscles, which are not.

All muscular tissues are controlled by the nervous system. The involuntary muscles are controlled by a specialized part of the nervous system.

When muscular tissue is examined under the microscope, it is seen to be made up of small, elongated threadlike cells, which arc called muscle fibres, and which are bound into bundles by connective tissue.

There are three varieties of muscle fibres:

1) striated muscle fibres, which occur in voluntary muscles;

2) unstriated muscles which bring about movements in the internal organs;

3) cardiac or heart fibres, which are striated like (1), but are otherwise different. Both unstriated and cardiac muscles are involuntary. All living cells can move to some degree, but this ability is highly developed in muscles. Muscle tissue comprises about 40% of human weight. Muscle consists of threads, or muscle fibers, supported by connective tissue, which act by fiber contraction: the fibers can shorten to two – thirds of their resting length. There are two types of muscles smooth and striated. Smooth, or «involuntary» muscles are found in the walls of all the hollow organs and tubes of the body, such as blood vessels and intestines. These react slowly to stimuli from the autono-mic nervous system. The striated, or «voluntary» muscles of the body mostly attach to the bones and move the skeleton. Under the microscope their fibres have a cross – striped appearance. Striated muscle is capable of fast contractions. The heart wall is made up of special type of striated muscle fibres called cardiac muscle. Muscles vary greatly in structure and function in different organs and animals: some invertebrates have only smooth muscles, while all the arthropods have only striated muscles. The body is composed of about 600 skeletal muscles. In the adult about 35-40% of the body weight is formed by the muscles. According to the basic part of the skeleton all the muscles are divided into the muscles of the trunk, head and extremities.

According to the form all the muscles are traditionally divided into three basic groups: long, short and wide muscles. Long muscles compose the free parts of the extremities. The wide muscles form the walls of the body cavities. Some short muscles, of which stapedus is the smallest muscle in the human body, form facial musculature.

Some muscles are called according to the structure of their fibres, for example radiated muscles; others according to their uses, for example extensors or according to their directions, for example, – oblique. The muscles are formed by a mass of muscle cells. The muscle fibres are connected together by connective tissue. There are many blood vessels and nerves in the muscles.

Great research work was carried out by many scientists to determine the functions of the muscles. Three basic methods of study were used: experimental work on animals, the study of the muscles on a living human body and on the cadavers. Their work helped to establish that the muscles were the active agents of motion and contraction.

New words

muscles – мышцы

active – активный

part – часть

motor apparatus – двигательный аппарат
various – различный
movement – движение
elongated – удлиненный
threadlike – нитевидный
to be bound – быть связанным
some – некоторый
degree – степень
this – этот
ability – возможность
capable – способность
scientist – ученый
basic – основной
experimental – экспериментальный
work – работа

Запомните застывшие словосочетания.
In the morning. In the evening to come home.
In the afternoon. At night to leave home for work (school).
To go to bed. to go to school at half past five.
To go to work, to go home at a quarter past five.

Вставьте артикль, где необходимо.
1. My… friend has to get up early in… morn ing because he goes to… school.
2. That's why he usually goes to… bed early in… evening.
3… weather was very bad in… morning yesterday.
4… sky was grey and it was raining.
5. But in… middle of… day… weather began to change.
6… rain stopped and… sun appeared from behind… clouds.
7. In… afternoon it was very warm.
8. I did not want to stay at… home and went into… yard.
9. There were… boys and… girls in… yard.
10. We played in… yard till late in… evening.
11. When I came… home, I drank… tea, ate… sandwich and went to… bed at once.
12. I slept very well at… night.
13. My brother is… pupil. He goes to… school. He goes to… school in… morning. He has five or six… lessons every day. In… afternoon he goes home. At… home he does his… homework.
14. In… evening he reads… books. He usually goes to… bed at… half past ten. At… night he sleeps.
15. My father goes to… work in… morning and comes… home in… evening.
16. I get up at… half past seven in… morning and go to… bed at… quater to eleven in… evening.
17. When does your mother leave… home for… work?
18. She leaves… home for… work at… quarter past eight.
19. When do you leave… home for… school?
20. I leave… home for… school at… half past… eight.

Answer the questions.
1. What are the muscles?

2. What contraction produces various movements?
3. What may the muscles be divided from?
4. What does the nervous system control?
5. What does the muscular tissue consist of?
6. How many varieties of muscle fibres are there?
7. How many per cents does muscle tissue comprise?
8. For how many groups are all the muscles traditionally divided?
9. How sometimes are muscles called?
10. What does connective tissue connect?

Make the sentences of your own using the new words (10 sentences).

Find the definite and indefinite articles in the text.

Find one word, which is a little bit different in meaning from others (найдите одно слово, которое немного отличается от других по смыслу):

1) a) work; b) job; c) rest;
2) a) class; b) student; c) sea;
3) a) home; b) house; c) garage;
4) a) lift; b) down; c) rise;
5) a) white; b) pink; c) scarlet.

ЛЕКЦИЯ № 11. Bones

Bone is the type of connective tissue that forms the body's supporting framework, the skeleton. In addition, bones act as levers for muscles and serve to protect the internal organs from injury. They always act as a storehouse for calcium and phosphorus. The bone marrow inside the bones is the body's major producer of both red and white blood cells.

Bones vary somewhat according to a person's age and sex. The bones of women are generally lighter than those of men, while children's bones are more resilient than those of adults and tend to bend rather than fracture when abnormal pressure is applied to them. Bones also respond to certain physical physiological changes. For example, bones tend to atrophy, or waste away, when muscular activity in a region is decreased, as when a limb is afflicted with a paralytic disease.

Bones are generally classified in two ways. When classified on the basis of their shape, they fall into four categories: flat bones, such as the ribs; long bones, such as the thigh bone; short bones, such as the wrist bones; and irregular bones, such as the vertebrae. When classified on the basis of how they develop, bones are divided into two groups: endochondral bones and intramembraneous bones. Endochon-dral bones, such as the long bones and the bones at the base of the skull, develop from cartilage tissue. Intramembraneous bones, such as the flat bones of the roof of the skull, are not formed from cartilage but develop under or within a connective tissue membrane. Although endochondral bones and intramembraneous bones form in different ways, they have the same structure.

The formation of bone tissue (ossification) begins early in embryo-logical development, when the embryo is two months old. The bones continue to grow during childhood and adolescence, reaching their full size when the person is about 25.

Most adult bone is composed of two types of tissue: an outer layer of compact bone and an inner layer of spongy bone. Compact bone is strong and dense. Spongy bone is light and porous and contains bone marrow. The amount of each type of tissue varies in different bones. The flat bones of the skull consist almost entirely of compact bone, with very little spongy tissue. In a long bone, such as the thigh bone, the shaft, called the diaphysis, is made up largely of compact bone. While the ends, called epyphyses, consist mostly of spongy bone. In a long bone, marrow is also present inside the shaft, in a cavity called the medullary cavity.

Surrounding every bone, except at the surface where it meets another bone, is a fibrous membrane called the periosteum. The outer layer of the periosteum consists of a network of densely packed collagen fibres and blood vessels. This layer serves for the attachment of tendons, ligaments, and muscles to the bone and is also important in bone repair.

The inner layer of the periosteum has many fibres, called fibres of Sharpey, which penetrate the bone tissue, anchoring the periosteum to the bone. The inner layer also has many bone-forming cells, or osteo-blasts, which are responsible for the bone's growth in diameter and the production of new bone tissue in cases of fracture, infection.

In addition to the periosteum, all bones have another membrane, the endosteum. It lines the marrow cavity as well as the smaller cavities within the bone. This membrane, like the inner layer of the periosteum, contains osteoblasts, and is important in the formation of new bone tissue.

Bone tissue consists largely of a hard substance called the matrix. Embedded in the matrix are the bone cells, or osteocytes. Bone matrix consists of both organic and inorganic materials. The organic portion is made up chiefly of collagen fibres. The inorganic portion of matrix constitutes about two thirds of a bone's total weight. The chief inorganic substance is calcium phosphate, which is responsible for the bone's hardness. If the calcium were removed from a bone, the bone would loose its rigidity and become flexible. If the organic portion were burned out, or calcined, the bone

would retain its shape but crumble under the slightest pressure. In the formation of intramembraneous bone, certain cells of the embryonic connective tissue congregate in the area where the bone is to form. Small blood vessels soon invade the area, and the cells, which have clustered in strands, undergo certain changes to become osteoblasts. The cells then begin secreting collagen fibers and an intercellular substance. This substance, together with the collagen fibers and the connective tissue fibers already present, is called osteoid. Osteoid is very soft and flexible, but as mineral salts are deposited it becomes hard matrix. The formation of endochondral bone is preceded by the formation of a cartilaginous structure similar in shape to the resulting bone. In a long bone, ossification begins in the area that becomes the center of the shaft. In this area, cartilage cells become osteo-blasts and start forming bone tissue in the same manner as intramem-braneous bone is formed. This process spreads toward either end of the bone, but while this is happening the cartilage cells at each end also become osteoblasts and start forming bone. The only areas where cartilage is not soon replaced by bone tissue are the regions where the shaft joins the two epiphyses. These areas, called epiphyseal plares, are responsible for the bone's continuing growth in length, As the bone grows, each epiphyseal plate forms new cartilage, which is then replaced by bone. When the epiphyseal plates stop forming cartilage, the bone stops growing. The bone's growth in diameter is due to the addition of layers of bone around the outside of the shaft. As they are formed, layers of bone on the inside of the shaft are removed. Thus, when a long bone grows in diameter, the compact bone of the shaft does not get thicker, but the marrow cavity gets larger. In all bones, the matrix is arranged in layers called lamellae. In compact bone, the lamellae are arranged concentrically around blood vessels, and the space containing each blood vessel is called a Haversian canal. The osteocytes are located between the lamellae, and the canaliculi containing their cellular extensions connect with the Haversian canals, allowing the passage of nutrients and other materials between the cells and the blood vessels. Besides the blood vessels in the Haversian canals, bone tissue contains many smaller blood vessels that extend from the periosteum and enter the bone through small openings called canals of Volkmann. These vessels lead to those in the Haversian canals. In long bones there is an additional blood supply, the nutrient artery, which represents the chief blood supply to the marrow. The structure of spongy is similar to that of compact bone. However, there are fewer Haversian canals, and the lamellae are arranged in a less regular fashion, forming spicules and strands known as trabeculae.

New words

bone – кость
in addition – в дополнение
to serve – служить
to protect – защищать
internal – внешний
calcium – кальций
phosphorus – фосфор
inside – внутри
major – главный
red – красный
white – белый
blood cells – кровяные клетки
age – возраст
sex – пол
changes – перемены
to tend – иметь тенденцию
atrophy – атрофия
spongy – губчатый

outer – внешний
tendon – сухожилие
ligament – связка
responsible – ответственный, надежный
inner – внутренний
flexible – гибкий
periosteum – надкостница
osteoblast – остеобласт (клетка, образующая кость)
rigidity – неподвижность
to retain – удерживать, сохранять
shape – движение
but – но
to crumble – крошиться
to congregate – собираться
epiphyseal – относящийся к эпифизу
shaft – ствол, тело (длинной) кости, диафиз
spicules – выросты, отростки
strand – пучок
known as – известный как

Перед названиями месяцев и дней недели артикль не употребляется.
School begins in September.
We rest on Sunday.

Запомните следующие застывшие словосочетания.
After – work
After – school
From – work
From – school

Перед порядковыми числительными употребляется определенный артикль.
Our classroom is on the second floor.
Today is the tenth of May.

Вставьте артикль, где необходимо.

Конец ознакомительного фрагмента.

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