Тема 1.1.
Современный иностранный язык/ Modern foreign language

There are a lot of ways of communication. We can impart information by gestures, emotions…But the main means of conversation is speech. You can connect with everybody you want and say what you want. But the problem appears if you don`t know the language of your partner.

1.World Languages.

There are about 6000 languages in the word. The languages spoken by 1 000 000 of people are called big word language. Millions of people speak English, Russian, Italian, French, Spanish, Chinese, German, Japanese, Hindi and others. The languages spoken by few people are called dying languages. Most of them are spoken in Asia, Australia, Africa. The experts say that 3 000 languages will disappear in the next 100 years.

Languages are dying for many reasons. To begin with, natural disasters such as earthquakes, floods or hurricanes suddenly destroy small groups of people, speaking rare languages. Moreover, the weather changes and there isn`t enough foo d for small communities. One more reason is that strangers bring new diseases. But the real problem comes from the big languages such as English, French and others which put out rare languages. Of course, we can try to safe such language but it needs lots of time and money. The Government should record and write down dying languages, then they need to train teachers and write grammar books, dictionaries and books for school.

2. Interesting Facts about English.

English will never die because it is more multicultural than any other language. For centuries it has taken words from other languages, and today`s international communication means that new words are appearing every day. In fact English contains words from more than 350 other languages! E.g. `algebra` came from Arabic, `safari` from Swahili…

If you will try to image that English is a tasty dish, the recipe will be like this:

-50 grammes-----Greek
-75 grammes-----Latin
-400 grammes-----Anglo Saxon
-150 grammes-----Norse
-300 grammes-----French
-25 grammes-----other mixed languages.

Mix all the ingredients together. Cook slowly for 1000 years.

English is the main language in 30 countries, and there are about 375 million people who speak it is as their first language. It`s also used as an official language in over 70 other countries such as Cameroon, Tanzania, India, Pakistan, Malaysia and Fiji, and is a second language for about 350 million people. One in two Europe ans can speak quite well and can have a proper conversation, and in the future even more Europeans will be able to speak it. All in all, there are about 1000 million

people who can`t speak English, but they`re learning it!
English is the top language for travel and tourism, and is used in business and science. 80% of the world`s Internet sites are in English. Teenagers use it to write even SMS. Moreover, nowadays it`s popular to make friends with people from other countries. But to have a conversation you have to know their language.
There are some interesting facts about English language. I wondered, how many words are there in English. And it turned out, that there are about 300 000 words in the Oxford English Dictionary. However, there are many scientific an d technical words that are not included in the dictionary (for example, there are over a million types of insect). But an educated English speaker only uses about 30 000 words.
What do you think, what is the most common letter in English? The letter `e` is used more than any other. Ernest Wright was very interested in this fact, and wanted to see if it was possible to communicate without using this letter at all. He wasn`t able to write very much. In the end, he wrote a 200-page novel "Gadsby" without using any words containing the letter `e`.
Unfortunately, it was not a great success, but here is a bit of it:
A glorious full moon sails across a sky without a cloud.
A crisp night air has folks turning up coat collars and
Kids hopping up and down for warmth.
Furthermore, in the Britain three types of language are allocated: conservative (it`s used in the Queen`s family and Parliament), received pronunciation (it`s language of BBC, News and other TV-programs) and advanced (it`s a language of teenagers).
2.1 Comparing English and American.
There is one problem in the English language: it is – American language. I have as ked some people what language does the Americans speak.
97% of polled people answered, that of course they speak English. But it was the wrong answer. English and American languages have a lot of difference.

American	English
Bill	Bank note
Can	Tin
Candy	Sweets
Cookie	Sweet biscuit
Drugstore	Chemist`s shop
Freeway	Motorway
Two weeks	Fortnight
Mail	Post
Movie	Film
Period	Full stop
Vacation	Holiday
Second floor	First floor
Sidewalk	Pavement
Last name	Surname

Let`s compare two weeks and fortnight. Their roots are different and there is no

familiar construction. The American variant consists of two elementary words, while the British consists of one word with two roots of different words.
In addition, there is a distinction in way of writing some words.
English American
Apologize Apologise
Center Centre
Defense Defence
Honor Honour
Traveler Traveller
So, you can see, that instead of writing word termination -our Americans write -or. It is a merit of Noe Webster who lived in 1758 –
1843. He introduced in the American variant the practice of way of writing –er instead of –re ; -or instead of –
ous. Moreover, the Americans give one name for a group of animals, for example, they nominate all predatory birds "hawks".
What is more, there is a large odds in the English and American grammar. In lieu of using Present Perfect they can use Past Simple. The Americans refuse from Perfect Tenses so sometimes you can hear phrase "Did you see…". For British there is a strict mistake because you must say "Have you seen…". Another point to be made, is that the Americans never say going to because they use the modern for m gonna to. Nowadays we never say `Shall you…?` But we say `Will you…?` Besides, in many countries, like India or Africa, there are hundreds of local dialect s (different ways of speaking the same language). These countries often use English as a common language, and each country creates its own words. As a result new variations of English are born. In West Africa for example, traffic jams are called `goslows`, clothes are called `wears`, and hairdresser`s are known as `barbing saloons`.

English is a traditional majestic language. There are a lot of secrets in it. We should try to safe all British traditions and attempt not to use American slang.

Тема 2.1.
Моя будущая профессия/ My future profession

Choosing a career is one of the most important and tough decisions people will ever make in life. According to Confucius, “Find a job you love and you will never work a day in your life.” It is absolutely true. If you are passionate about your work, you have more chances to succeed.

Well, choosing a proper career is a conscious decision of a grown-up person, and it is essential to explore job options that match your interests, skills and knowledge. It is absolutely wrong to chase your parents’ dreams. If you are not interested to work in a field they want you do, always stand your ground. It is high time for you to decide for yourself what to do for living and to find your real calling. Moreover, when you make a choice, it is also important to get appropriate education that will give you all the necessary skills, knowledge and practical awareness.

Today there are a lot of job options to choose from out there. Anyway, the choice of professions depends on people’s individual abilities and talents.

It is difficult to overestimate the role of vision in everyone's life. We get most of the information from the surrounding world through visual perception: the shape, size, distance of objects, so that we are clearly oriented in space. Almost any qualified work requires the participation of vision. Unfortunately, with the growth of digital and computer technologies, the number of eye diseases and visual impairments is increasing. In this regard, ophthalmology, today, is one of the most popular professions in the medical industry. Unfortunately, people's vision problems are increasing every year, which means that the demand for the services of an eye doctor is unlikely to decline. To date, ophthalmology, the science that studies the physiology of the organs of vision, is undergoing a period of active development. Diseases that seemed incurable a few years ago are now being successfully eliminated.

Полезные слова и словосочетания к теме с переводом

- оптика - **optician's (shop)**
- окулист, офтальмолог - **oculist** ['ɔkjəlɪst], [-kju-]
- оптометрист (специалист в определении недостатков рефракции глаз и подборе очков) - **refractionist**
- оптометрическая таблица Typical Snellen chart used for visual acuity testing - **eye-chart**
- очки - **eyeglasses** / **glasses** (разг.) / **spectacles** (преим. брит.) / **specs** ['spektəklz]
- носить очки - **to wear glasses** / **to wear spectacles**

- оправа для очков - **spectacle frame** / **spectacle rim**
- очки в золотой, роговой, стальной оправе - **gold** / **horn** / **steel-rimmed spectacles**
- солнцезащитные очки - **sun glasses**
- контактные линзы - **contact lenses**
- мягкие контактные линзы - **soft lenses**
- жесткие контактные линзы - **hard lenses**
- зрение - **eyesight** / **vision**
- слабое зрение - **weak (eye)sight**
- иметь хорошее зрение - **to have good eyes / eyesight**
- контейнер для линз - **lense container**
- раствор для линз - **lense solution**
- футляр для очков - **a box for glasses / a case for glasses**
- дальнозоркость - **long sight** / **farsightedness** / **longsightedness** / **hypermetropia**
- близорукость - **nearsightedness** (Амер.) / **shortsightedness** (Брит.) / **myopia**
- астигматизм - **astigmatism** [æ'stɪgmətɪz(ə)m]
- проверять зрение - **to examine eyes / to check vision**

Ситуативные высказывания по теме с переводом

Оптика -	**Optician's**
У вас есть рецепт?	Have you a prescription?
В нашей оптике работает врач-окулист.	There is an oculist in our shop.
Врач ведет приём ежедневно с … до … часов.	The doctor is working daily from… up to … o'clock.
Он вам выпишет рецепт.	He will show you a description.
Какое у вас зрение? (У вас хорошее зрение?)	Is your vision good?
У вас близорукость или дальнозоркость?	Are you near- or farsighted?
У меня близорукость.	I am nearsighted.
У меня астигматизм.	I have astigmatism.
Я бы хотел подобрать оправу.	I'd like to choose an eyeglass frame.
У нас как раз поступили новые оправы.	We have just got new eyeglass frames.
Мне нужно заменить стекла.	I need to change lenses.
К сожалению, у нас нет сейчас таких стёкол.	Sorry, we haven't lenses like these right now. –
Ваши очки будут готовы завтра.	Your glasses will be ready tomorrow.
Такие стёкла у нас появятся через три дня / через неделю.	Such glasses will arrive in three days / in a week.
Вам нужны стёкла с диоптриями?	Do you need eyeglasses to improve vision?

Вам нужны стёкла со светопоглощением?	Do you need sunglasses?
У вас левый глаз -1.	Your left eye has a minus one vision.
У вас правый глаз +1.	Your right eye has a plus one vision.
У вас оба глаза -2.	Your both eyes have a minus two vision.
Мы можем предложить вам контактные линзы.	We can offer you contact lenses.
Какие у вас есть линзы?	What lenses have you?
Какой они фирмы?	What company are they made by?
У нас есть мягкие линзы фирмы Baush & Lomb	We have soft lenses by Baush & Lomb
К этим линзам подойдёт этот раствор.	This solution is good for these lenses.
Я ношу мягкие линзы фирмы Johnson & Johnson.	I wear soft lenses by Johnson & Johnson.

Эта оправа вам не идет. Вам больше подойдет такая.	This case does not match you well. Try this one instead.
Примерьте вот такую оправу.	Try this frame.
Я бы хотел роговую оправу.	I'd like a horn rim.
Эта оправа дороже.	This eyeglass frame is more expensive.
Эта оправа более лёгкая.	This eyeglass frame is not as heavy.
Вам в ней будет удобнее.	You will be more comfortable with this one.
Могу порекомендовать вам другую оптику.	I can recommend you other opticians.
Возможно, вам там смогут помочь.	They may be able to help you.

Тема 2.2.
Медицинское образование в России и за рубежом /
Medical education in Russia and abroad

Duration of training

In the UK, the duration of training is 10-11 years, of which five-year or six-year undergraduate programme and five-year or more postgraduate training. In the USA, the duration of study is 4 years, but before that, the applicant must complete bachelor's degree courses. In Russia, the duration of training is the same as in the UK.

Application process

In Great Britain students generally begin medical school after secondary education. Applications for entry into medical school are made through the Universities and Colleges Admissions Service. Most of applicants have an excellent academic record in the main subjects and good General Certificate of Secondary Education results. Also applicants must sit an admission test and have an interview.
In USA students must earn a bachelor`s degree before entering the Medical School. All applicants are required to take the Medical College Admission Test. This test measures factual knowledge of the science, reading skills and ability to solve problems. In selection applicants for admission the Admission`s Committee will place emphasis on those qualities of motivation, intellect and character essential to a physician.
In Russia, students pass a unified state exam, then enter on the basis of a general competition for points and individual achievements.

Medical education
Preclinical period

In Great Britain in preclinical period for the first 3 years students study the structure and function of the healthy body and the basic mechanisms underlying disease, develop an integrated understanding of how the body works. The main areas of learning are covered by courses in biology, anatomy, physiology, histology, biochemistry and others.
In USA the first four quarters, termed Year One, include course work in basic medical sciences, behavioural sciences and introductory experiences with patients. The training is represented by courses in microbiology, neurology, clinical correlation and pharmacology. The three-quarter sequence of Year Two consists of lectures and laboratories in organ system pathology, pharmacology, and interdisciplinary courses in pathophysiology and practice tutorials in clinical medicine.

Clinical period

In Great Britain in clinical period students develop the knowledge and skills required to practise clinical medicine. Instruction is provided in medical and surgical specialities including obstetrics, gynaecology, psychiatry, neurology, orthopaedics and others. Than for three years the clinical component of medical education is centred on the involves direct experiences in the diagnosis and treatment of disease. During the last six months students study subjects of interest.

Postgraduate medical education comprises the Foundation Programme and the period when doctors undergo speciality or general practice training. It gives doctors experience in different areas of medicine.

In USA the students in Year Three and Four work to extend knowledge of medicine through full-time clinical work, participating in the care of patients in hospitals, clinics and office practice settings. The remaining clinical course is individualized, relating specifically to personal interests and career goals.

The system of medical education in Russia is very similar to the system in the UK. The preclinical and clinical periods coincide. After receiving the education of a general practitioner, a student can go to postgraduate medical education: residency or graduate school.

Modern personnel development policy is based in many countries on the joint responsibility of both the state and society, including professional medical associations. The efforts of Governments are focused on regulating, defining, meeting the real needs for health personnel, as well as supporting, directing and monitoring education and training activities. The policy is aimed at meeting the need for qualified and experienced medical personnel in accordance with the development of medical science and technology. The development of healthcare personnel is based on the principles of equal distribution and development of job opportunities. The process of managing the development of human resources is based on an understanding of the need for intersectoral cooperation, involving the population to participate in the formulation of personnel health policy and relevant plans. Personnel development includes elements of planning, training and management at different levels.

Modern problems of the development of healthcare personnel in most countries of the world, as well as in Russia, are connected, firstly, with a shortage of personnel providing primary medical care, secondly, with an excess of specialists of a narrow profile, and thirdly, with an excessive concentration of medical workers in large cities. The excess of doctors in comparison with the average medical staff and specialist doctors in comparison with general practitioners leads primarily to an increase in the cost of medical care for both patients and society as a whole.

An important mechanism for regulating the total number of medical workers is the licensing system, which differs significantly in different countries.

In the USA, licenses for the right to practice medicine are issued by the authorities of individual states. A person who has graduated from a medical faculty or medical school in the USA and has worked as an intern in a hospital for 1 year

or has passed written exams can get a license. Persons who have received medical education outside the United States must pass qualifying exams and complete the final course of study in one of the American hospitals.
Graduates of medical faculties in the UK undergo initial registration with the General Medical Administration and a one-year internship at their university, after which the final final registration is carried out. Persons with foreign diplomas (except citizens of those countries with which the UK has special agreements) must pass certification.

Тема 2.3
Этические аспекты работы медицинских специалистов./
Ethical aspects of the work of medical specialists.

Ethics is the science of morality, which is part of philosophy. At the same time, ethics is also commonly understood as a system of human behavior in relation to other people. Morality and ethics are often used as synonyms in various areas of our lives, but they are especially important in the medical profession. Therefore, in the practice of medical activity, a whole scientific section of deontology has been formed, which studies the rules of behavior of a medical worker in relation to other people and gives a number of fundamental recommendations to doctors.

The first attempts to form the basic ethical principles of the medical profession were made in antiquity. The most striking example is the so-called Hippocratic Oath. It contains nine ethical principles: respect for the mentor, colleagues and students, no harm to the patient, the principle of mercy, that is, the obligatory provision of medical care to all people without exception, the principle of the priority of the patient's interests, respect for life, a negative attitude towards abortion and euthanasia, the rejection of intimate relationship with the patient, the principle of keeping medical secrets and personal self-improvement. According to historians, this document was only edited by Hippocrates (460 - 377 BC) and appeared much earlier - in ancient Egypt. In the ancient Indian treatise on medicine «Charaka-samhita» (I millennium BC), a solemn sermon is given to medical students after graduation. It says that the doctor must take care of the patient's life, even if there is a threat to his life, that information about the patient and his relatives should not be disclosed, and the doctor himself must be neat, healthy, directing all his efforts towards the main goal - treating people.

In ancient Rome, the ideas of medical ethics were perfected by the famous Galen (130 - 200 AD), who, being a follower of Hippocrates, he sharply criticized greed and envy among doctors.

Another equally well-known physician from the East, Avicenna or Ibn Sina (980 - 1037), also created his own code of ethics. In it, Avicenna urged the doctor not only to take a responsible approach to the performance of professional duties, but also to pay great attention to communication, because the doctor’s word also heals. It is impossible to treat the patient rudely, upset him or disturb him. On the contrary, the patient should be encouraged, the reasons for fear should be eliminated, and a favorable psychological atmosphere should be created. At the same time, it is required to select an individual approach to each patient, because. human personality is unique. The healer himself must «... have the eye of a falcon (vigilance), the wisdom of a snake (caution), the heart of a lion (courage) and the hands of a girl (tenderness of mother's hands)».

On the basis of the teachings of Hippocrates, Galen and Avicenna, as well as under the influence of Christian ethics, the deontology of medieval medicine was formed. Later, European medical ethics was supplemented by the principles of humanism, justice, generated by the New Age. In Russia, during the Enlightenment, a special contribution to the development of deontology was made by such medical scientists as D.S. Samoilovich (1744 - 1805) and M.Y. Mudrov (1776 - 1831), who believed that a doctor should not only be disinterested, competent, polite and sincere, but also serve for the benefit of every compatriot. They emphasized that the medical profession is a vocation, very hard work, the purpose of which cannot be only material gain. To illustrate their arguments, scientists cited the example of nurses who voluntarily care for the sick, who show patience and mercy when working with the sick and consider the goal of their work to be moral satisfaction from helping a person.

In the Soviet Union, there was an Oath of a doctor, as a solemn promise to direct all one's strength and knowledge to improve human health, readiness to help at any time and keep medical secrets, improve one's skills and consult with colleagues.

Soviet researchers S.A. Pozdnyakov (1965), and later S.S. Gurevich and A.I. Smolnyakov (1976) identified eight basic ethical principles of the medical profession:

- humanism towards the patient;

- refusal of actions that can worsen human health;

- providing medical care to all people without exception;

- solidarity of medical workers in relation to each other, the struggle for peace;

- medical secrecy;

- participation in health protection in an indirect way, for example, the fight against environmental pollution;

- refusal to participate in human experiments;

- avoidance of actions that can bring down the honor of a medical worker in the eyes of patients, colleagues and society.

In the Russian Federation, in accordance with the Constitution of the Russian Federation, the Law on the “Basics of Protecting the Health of Citizens”, medical workers, and especially doctors, also take a solemn oath, promising to be merciful, highly moral, patient, to protect people's health in every possible way, helping

everyone without exception and discrimination. In addition, Russian doctors are obliged to keep medical secrecy, oppose euthanasia, respect their teachers and colleagues, and improve their professional knowledge and skills. The text of the oath itself is very similar to the Hippocratic oath.

Domestic theorists of medicine agree that the fundamental ethical principles of the modern medical profession are the principle of fulfillment of duties and honesty, the principle of autonomy, no harm, beneficence and justice.

The principle of fulfillment of duties and honesty is perhaps the most ancient, it lies in the fact that a medical worker, firstly, cannot refuse a person medical care under any pretext, and secondly, that the doctor's activity is not aimed at achieving material benefits, and for the benefit of the patient, the satisfaction of social needs.

At the same time, many actions of a physician cannot be driven into the framework of the law, built according to a certain pattern, therefore the doctor can and should act autonomously, that is, at his own discretion with a certain level of inner freedom that allows him to make the right decision. Only an independent, free doctor, well acquainted with deontology, can respect the patient, colleagues, provide psychological support to patients, provide the necessary information in an accessible form to the patient's relatives. Within the framework of this principle, patients and their relatives also receive more rights, for example, the right to choose their own doctor and to cooperate with him. This principle contradicts the traditional paternalistic model of the relationship «doctor – patient», in which the doctor was seen as a kind of «king and god», who completely guides the patient.

The principle of «do no harm» concerns both the choice of diagnostic method and treatment, prevention and psychological support for the patient. The doctor must ensure the safety of the patient starting from the diagnostic stage, especially when it comes to research methods such as biopsy, endoscopy, etc. After that, he must choose a treatment that would have a minimum of undesirable consequences (taking into account the patient's condition) and contribute to a speedy recovery. Throughout the entire process of treatment, medical workers are required to be patient and respectful towards the patient, to be able to calm and encourage him, to correctly present information so that the patient does not suffer from stress.

Justice in modern deontology is, first of all, ensuring access to medical services for all segments of the population, regardless of their financial situation. It's no secret that in modern Russia most medical services are paid, so doctors are also expected to perform social functions.

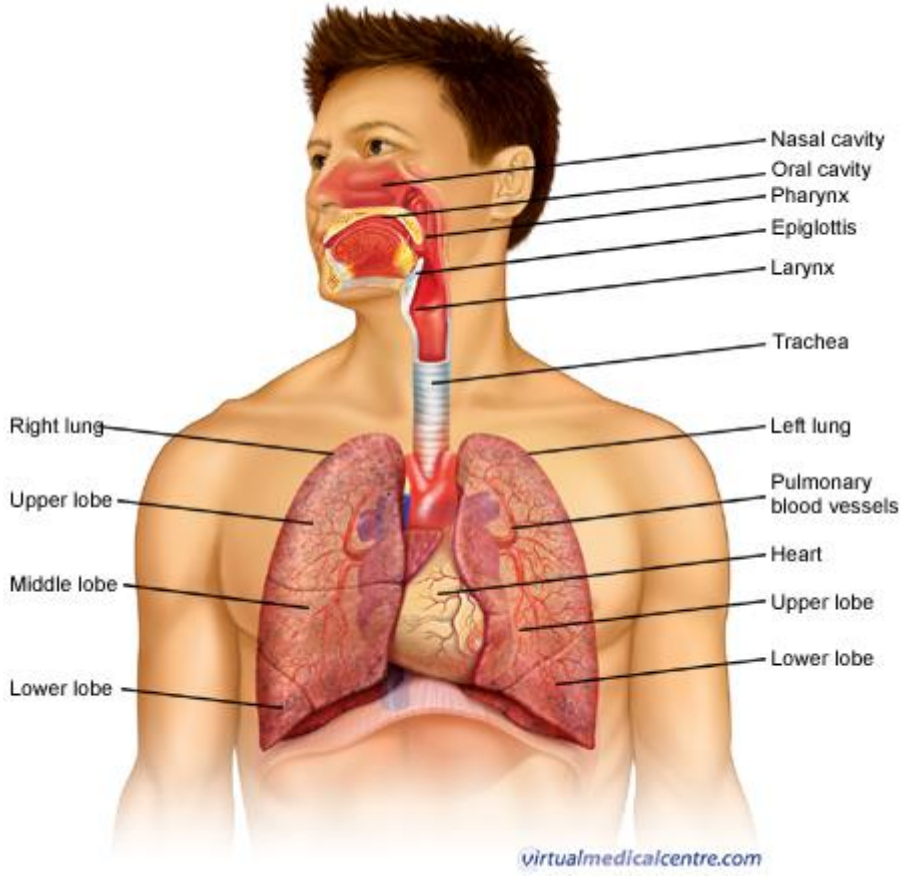
Another acute problem of our time is the ethical issues associated with euthanasia, abortion, the announcement of a fatal disease to the patient, animal experiments, and personal position during psychotherapy. And if some of them, for example, euthanasia, which is prohibited in our country, are regulated by law. That other

dilemmas - is completely in the sphere of the personal choice of the doctor.

In accordance with the Code of Medical Ethics of the Russian Federation, the main goal of the professional activity of a physician is to save lives and preserve the health of people, to reduce the suffering of terminally ill patients. At the same time, the physician is obliged to bear full responsibility for his decisions and actions. He may conduct a private paid practice, in accordance with the laws, but in making professional decisions he should not be guided by motives for material gain. The ethics committee of the Russian Medical Association monitors the ethics of workers, and especially doctors.

Тема 2.6. Строение дыхательной системы./
The structure of the respiratory system.

The respiratory system consists of all the organs involved in breathing. These include the nose, pharynx, larynx, trachea, bronchi and lungs. The respiratory system does two very important things: it brings oxygen into our bodies, which we need for our cells to live and function properly; and it helps us get rid of carbon dioxide, which is a waste product of cellular function. The nose, pharynx, larynx, trachea and bronchi all work like a system of pipes through which the air is funnelled down into our lungs. There, in very small air sacs called alveoli, oxygen is brought into the bloodstream and carbon dioxide is pushed from the blood out into the air. When something goes wrong with part of the respiratory system, such as an infection like pneumonia, it makes it harder for us to get the oxygen we need and to get rid of the waste product carbon dioxide. Common respiratory symptoms include breathlessness, cough, and chest pain.



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The Upper Airway and Trachea

When you breathe in, air enters your body through your nose or mouth. From there, it travels down your throat through the larynx (or voicebox) and into the trachea (or windpipe) before entering your lungs. All these structures act to funnel fresh air down from the outside world into your body. The upper airway is important because it must always stay open for you to be able to breathe. It also helps to moisten and warm the air before it reaches your lungs.

The Lungs

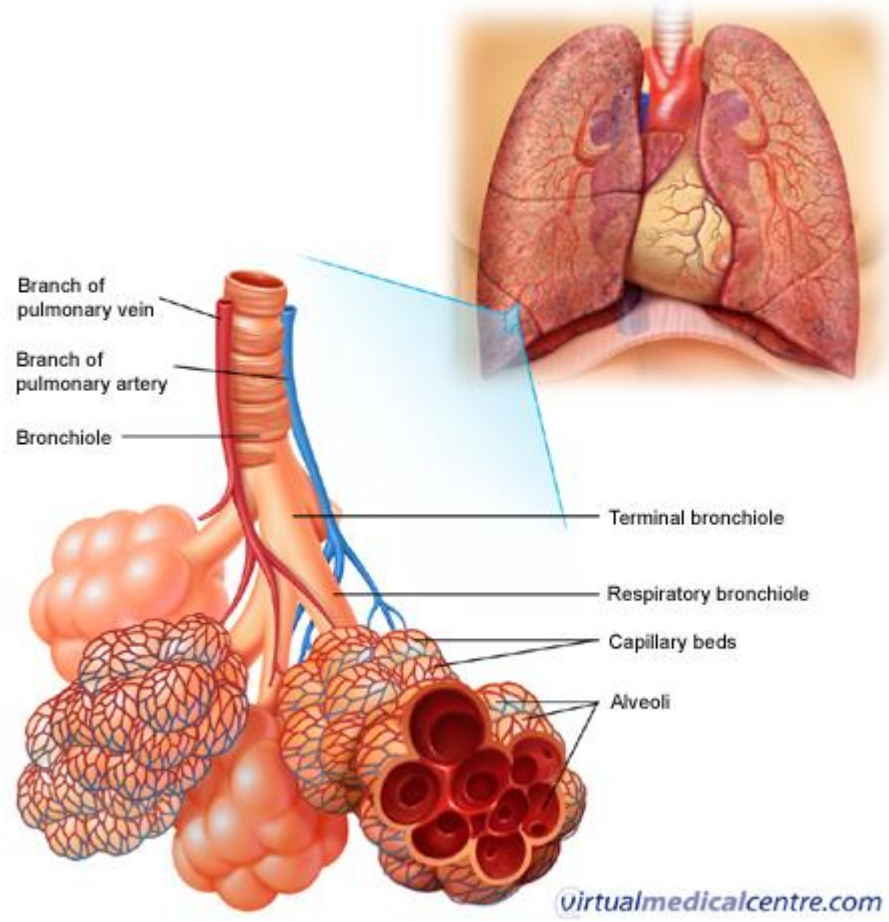
Structure

The lungs are paired, cone-shaped organs which take up most of the space in our chests, along with the heart. Their role is to take oxygen into the body, which we need for our cells to live and function properly, and to help us get rid of carbon dioxide, which is a waste product. We each have two lungs, a left lung and a right lung. These are divided up into ‘lobes’, or big sections of tissue separated by ‘fissures’ or dividers. The right lung has three lobes but the left lung has only two, because the heart takes up some of the space in the left side of our chest. The lungs can also be divided up into even smaller portions, called ‘bronchopulmonary segments’.

These are pyramidal-shaped areas which are also separated from each other by membranes. There are about 10 of them in each lung. Each segment receives its own blood supply and air supply.

How they work

Air enters your lungs through a system of pipes called the bronchi. These pipes start from the bottom of the trachea as the left and right bronchi and branch many times throughout the lungs, until they eventually form little thin-walled air sacs or bubbles, known as the alveoli. The alveoli are where the important work of gas exchange takes place between the air and your blood. Covering each alveolus is a whole network of little blood vessel called capillaries, which are very small branches of the pulmonary arteries. It is important that the air in the alveoli and the blood in the capillaries are very close together, so that oxygen and carbon dioxide can move (or diffuse) between them. So, when you breathe in, air comes down the trachea and through the bronchi into the alveoli. This fresh air has lots of oxygen in it, and some of this oxygen will travel across the walls of the alveoli into your bloodstream. Travelling in the opposite direction is carbon dioxide, which crosses from the blood in the capillaries into the air in the alveoli and is then breathed out. In this way, you bring in to your body the oxygen that you need to live, and get rid of the waste product carbon dioxide.



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Blood Supply

The lungs are very vascular organs, meaning they receive a very large blood supply. This is because the pulmonary arteries, which supply the lungs, come directly from the right side of your heart. They carry blood which is low in oxygen and high in carbon dioxide into your lungs so that the carbon dioxide can be blown off, and more oxygen can be absorbed into the bloodstream. The newly oxygen-rich blood then travels back through the paired pulmonary veins into the left side of your heart. From there, it is pumped all around your body to supply oxygen to cells and organs.

The Work of Breathing

The Pleurae

The lungs are covered by smooth membranes that we call pleurae. The pleurae have two layers, a 'visceral' layer which sticks closely to the outside surface of your lungs, and a 'parietal' layer which lines the inside of your chest wall (ribcage). The pleurae are important because they help you breathe in and out smoothly, without any friction. They also make sure that when your ribcage expands on breathing in, your lungs expand as well to fill the extra space.

The Diaphragm and Intercostal Muscles

When you breathe in (inspiration), your muscles need to work to fill your lungs with air. The diaphragm, a large, sheet-like muscle which stretches across your chest under the ribcage, does much of this work. At rest, it is shaped like a dome curving up into your chest. When you breathe in, the diaphragm contracts and

flattens out, expanding the space in your chest and drawing air into your lungs. Other muscles, including the muscles between your ribs (the intercostal muscles) also help by moving your ribcage in and out. Breathing out (expiration) does not normally require your muscles to work. This is because your lungs are very elastic, and when your muscles relax at the end of inspiration your lungs simply recoil back into their resting position, pushing the air out as they go.

The Respiratory System Through the Ages

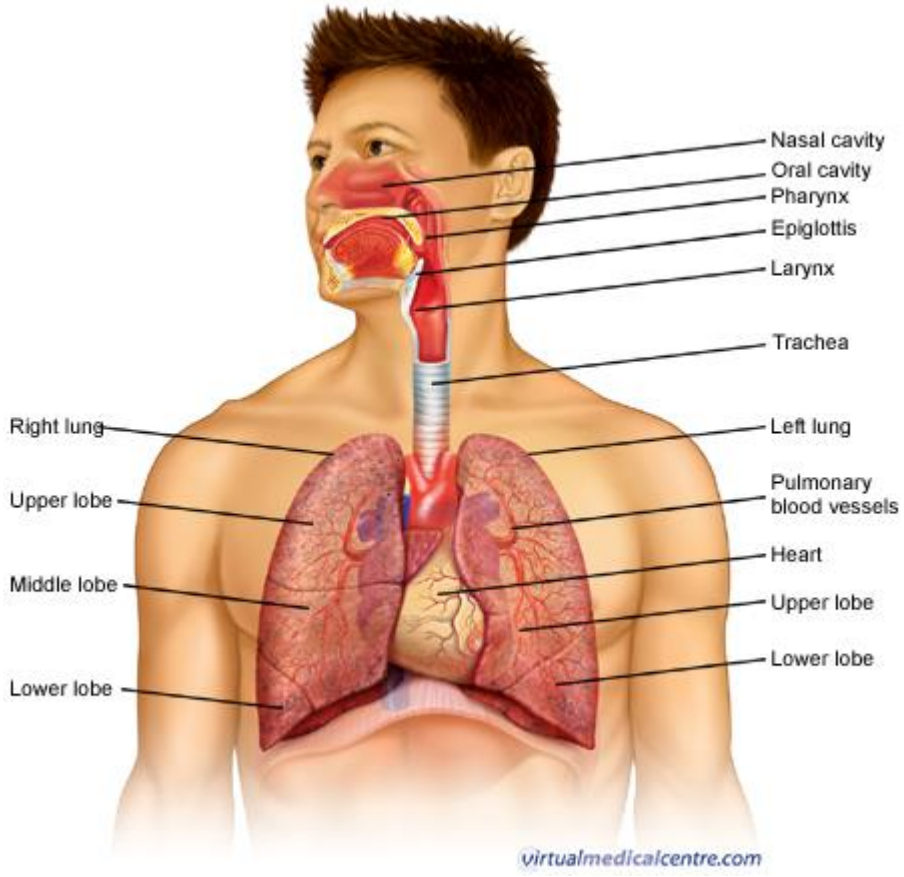
Breathing for the Premature Baby

When a baby is born, it must convert from getting all of its oxygen through the placenta to absorbing oxygen through its lungs. This is a complicated process, involving many changes in both air and blood pressures in the baby's lungs. For a baby born preterm (before 37 weeks gestation), the change is even harder. This is because the baby's lungs may not yet be mature enough to cope with the transition. The major problem with a preterm baby's lungs is a lack of something called 'surfactant'. This is a substance produced by cells in the lungs which helps keep the air sacs, or alveoli, open. Without surfactant, the pressures in the lungs change and the smaller alveoli collapse.

This reduces the area across which oxygen and carbon dioxide can be exchanged, and not enough oxygen will be taken in. Normally, a foetus will begin producing surfactant from around 28-32 weeks gestation. When a baby is born before or around this age, it may not have enough surfactant to keep its lungs open. The baby may develop something called 'Neonatal Respiratory Distress Syndrome', or NRDS. Signs of NRDS include tachypnoea (very fast breathing), grunting, and cyanosis (blueness of the lips and tongue). Sometimes NRDS can be treated by giving the baby artifically made surfactant by a tube down into the baby's lungs.

Тема 2.6. Строение дыхательной системы./
The structure of the respiratory system.

The respiratory system consists of all the organs involved in breathing. These include the nose, pharynx, larynx, trachea, bronchi and lungs. The respiratory system does two very important things: it brings oxygen into our bodies, which we need for our cells to live and function properly; and it helps us get rid of carbon dioxide, which is a waste product of cellular function. The nose, pharynx, larynx, trachea and bronchi all work like a system of pipes through which the air is funnelled down into our lungs. There, in very small air sacs called alveoli, oxygen is brought into the bloodstream and carbon dioxide is pushed from the blood out into the air. When something goes wrong with part of the respiratory system, such as an infection like pneumonia, it makes it harder for us to get the oxygen we need and to get rid of the waste product carbon dioxide. Common respiratory symptoms include breathlessness, cough, and chest pain.



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The Upper Airway and Trachea

When you breathe in, air enters your body through your nose or mouth. From there, it travels down your throat through the larynx (or voicebox) and into the trachea (or windpipe) before entering your lungs. All these structures act to funnel fresh air down from the outside world into your body. The upper airway is important because it must always stay open for you to be able to breathe. It also helps to moisten and warm the air before it reaches your lungs.

The Lungs

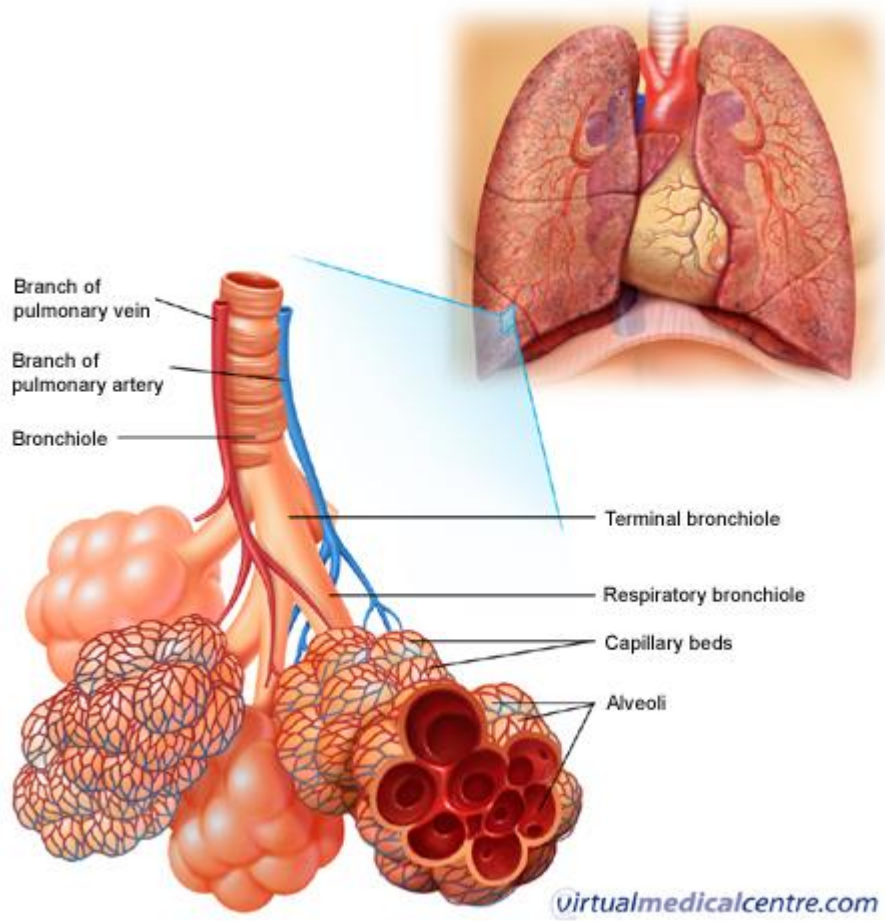
Structure

The lungs are paired, cone-shaped organs which take up most of the space in our chests, along with the heart. Their role is to take oxygen into the body, which we need for our cells to live and function properly, and to help us get rid of carbon dioxide, which is a waste product. We each have two lungs, a left lung and a right lung. These are divided up into 'lobes', or big sections of tissue separated by 'fissures' or dividers. The right lung has three lobes but the left lung has only two, because the heart takes up some of the space in the left side of our chest. The lungs can also be divided up into even smaller portions, called 'bronchopulmonary segments'.

These are pyramidal-shaped areas which are also separated from each other by membranes. There are about 10 of them in each lung. Each segment receives its own blood supply and air supply.

How they work

Air enters your lungs through a system of pipes called the bronchi. These pipes start from the bottom of the trachea as the left and right bronchi and branch many times throughout the lungs, until they eventually form little thin-walled air sacs or bubbles, known as the alveoli. The alveoli are where the important work of gas exchange takes place between the air and your blood. Covering each alveolus is a whole network of little blood vessel called capillaries, which are very small branches of the pulmonary arteries. It is important that the air in the alveoli and the blood in the capillaries are very close together, so that oxygen and carbon dioxide can move (or diffuse) between them. So, when you breathe in, air comes down the trachea and through the bronchi into the alveoli. This fresh air has lots of oxygen in it, and some of this oxygen will travel across the walls of the alveoli into your bloodstream. Travelling in the opposite direction is carbon dioxide, which crosses from the blood in the capillaries into the air in the alveoli and is then breathed out. In this way, you bring in to your body the oxygen that you need to live, and get rid of the waste product carbon dioxide.



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Blood Supply

The lungs are very vascular organs, meaning they receive a very large blood supply. This is because the pulmonary arteries, which supply the lungs, come directly from the right side of your heart. They carry blood which is low in oxygen and high in carbon dioxide into your lungs so that the carbon dioxide can be blown off, and more oxygen can be absorbed into the bloodstream. The newly oxygen-rich blood then travels back through the paired pulmonary veins into the left side

of your heart. From there, it is pumped all around your body to supply oxygen to cells and organs.

The Work of Breathing

The Pleurae

The lungs are covered by smooth membranes that we call pleurae. The pleurae have two layers, a 'visceral' layer which sticks closely to the outside surface of your lungs, and a 'parietal' layer which lines the inside of your chest wall (ribcage). The pleurae are important because they help you breathe in and out smoothly, without any friction. They also make sure that when your ribcage expands on breathing in, your lungs expand as well to fill the extra space.

The Diaphragm and Intercostal Muscles

When you breathe in (inspiration), your muscles need to work to fill your lungs with air. The diaphragm, a large, sheet-like muscle which stretches across your chest under the ribcage, does much of this work. At rest, it is shaped like a dome curving up into your chest. When you breathe in, the diaphragm contracts and flattens out, expanding the space in your chest and drawing air into your lungs. Other muscles, including the muscles between your ribs (the intercostal muscles) also help by moving your ribcage in and out. Breathing out (expiration) does not normally require your muscles to work. This is because your lungs are very elastic, and when your muscles relax at the end of inspiration your lungs simply recoil back into their resting position, pushing the air out as they go.

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Тема 2.7. Строение пищеварительной системы./

The structure of the digestive system.

The digestive system includes the oral cavity, pharynx, esophagus, stomach, small and large intestines, liver, and pancreas. The organs that make up the digestive system are located in the head, neck, chest, abdomen and pelvis.

The main function of the digestive system is the intake of food, its mechanical and chemical processing, the assimilation of nutrients and the release of undigested residues.

The process of digestion is the initial stage of metabolism. With food, a person receives energy and the substances necessary for his life. However, dietary proteins, fats and carbohydrates cannot be absorbed without pre-treatment. It is necessary that large complex water-insoluble molecular compounds turn into smaller, water-soluble and devoid of their specificity. This process occurs in the digestive tract and is called digestion, and the products formed during this are the products of digestion.

So, the digestive system includes the oral cavity, pharynx, esophagus, stomach, small and large intestines, liver, pancreas.

The oral cavity (cavitas oris) is the beginning of the digestive system. With the help of teeth, food is crushed, chewed, softened with the help of the tongue, mixed with saliva, which enters the oral cavity from the salivary glands, and then enters the pharynx.

The oral cavity is divided into two sections by means of the alveolar processes of the jaws and teeth: the vestibule of the mouth and the oral cavity proper.

The vestibule of the mouth (vestibulum oris) is a slit-like space bounded from the outside by the lips and cheeks, and from the inside by the upper and lower dental arches and gums. The vestibule of the mouth is connected with the external environment by the oral fissure, and with the oral cavity itself - by the fissure formed by the upper and lower teeth and the gap behind the large molar. The oral fissure is limited by the lips, which are musculocutaneous folds. The basis of the lips is formed by the fibers of the circular muscle of the mouth.

The oral cavity itself (cavitas oris propria) extends from the teeth to the entrance to the pharynx. From above, it is limited by the hard and soft palate, from below - by the muscles that form the diaphragm of the mouth, in front and from the sides - by the cheeks, teeth, and behind through a wide opening - by the pharynx.

The cheeks (buccae) are formed by the buccal muscles. Outside, they are covered with skin, and inside - with a mucous membrane. Gums (gingivae) are a continuation of the mucous membrane of the lips and cheeks; go to the alveolar processes of the jaws and tightly enveloping the necks of the teeth. Tongue (lingua) is a muscular organ that is involved in mixing food in the mouth, determining taste in the act of swallowing and in articulation. Teeth (denies) are located in the dental alveoli of the upper and lower jaws on the upper edge of the gums. The teeth serve as an organ for grasping, biting and grinding food, and are involved in sound production.

The glands of the mouth include large and small salivary glands, the ducts of which open into the oral cavity. Minor salivary glands are located in the thickness of the mucous membrane or in the submucosa lining the oral cavity. Depending on the location, the labial, molar, palatine and lingual glands are distinguished. From the nature of the secret they secrete, they are divided into serous, mucous and mixed. The major salivary glands are paired glands located outside the mouth.

These include the parotid, submandibular, and sublingual glands. They, like the small salivary glands, secrete a serous, mucous and mixed secret. The mixture of the secretion of all the salivary glands of the oral cavity is called saliva.

The pharynx (pharinx) is an unpaired organ located in the head and neck region, is part of the digestive and respiratory systems, is a funnel-shaped tube 12–15 cm long, suspended from the base of the skull. It is attached to the pharyngeal tubercle of the basilar part of the occipital bone, to the pyramids of the temporal bones and to the pterygoid process of the sphenoid bone; at the level of the VI-VII cervical vertebrae passes into the esophagus.

The pharynx opens into the nasal cavity (choanae) and oral cavity (pharynx). Air from the nasal cavity through the choanae or from the oral cavity through the pharynx enters the pharynx, and then into the larynx. The food mass from the oral cavity during the act of swallowing passes into the pharynx, and then into the esophagus.

The esophagus (esophagus) is a cylindrical tube 25-30 cm long that connects the pharynx to the stomach. It begins at the level of the VI cervical vertebra, passes through the chest cavity, the diaphragm and flows into the stomach to the left of the X-XI thoracic vertebra. There are three parts of the esophagus: cervical, thoracic and abdominal.

The wall of the esophagus consists of a mucous membrane, submucosa, muscular and adventitious membranes. The mucous membrane is lined with stratified squamous epithelium. The submucosa is well developed, allowing the mucosa to gather into longitudinal folds.

The stomach (ventriculus, gaster) is an enlarged part of the digestive tract, which serves as a container for food and is located between the esophagus and the duodenum. In the stomach, the anterior and posterior walls, the lesser and greater curvature, the cardial part, the fundus (vault), the body, and the pyloric (pyloric) part are distinguished. The stomach is located in the upper part of the abdominal cavity, under the diaphragm and the liver. Three-quarters of it is in the left hypochondrium, one-fourth is in the epigastric region. The inlet cardiac opening is located at the level of the bodies of the X-XI thoracic vertebrae, and the outlet opening of the pylorus is located at the right edge of the XII thoracic and I lumbar vertebrae.

The small intestine (intestinum tenue) is the longest part of the digestive tract. Here, further digestion of food takes place, the breakdown of all nutrients under the influence of intestinal juice, pancreatic juice, liver bile and absorption of products into the blood and lymphatic vessels (capillaries).

The large intestine (intestinum crassum) is a continuation of the small intestine and the final section of the digestive tract. In it, the digestion of food is completed, feces are formed and brought out through the anus.

Rectum (rectum) - the final part of the large intestine; feces accumulate in it, and then feces are removed from it. The length of the rectum averages about 15 cm, the diameter ranges from 2.5 to 7.5 cm; it is located in the pelvic cavity. Behind her are the sacrum and coccyx, in front - the prostate gland, bladder, seminal vesicles and ampullae of the vas deferens in men, the uterus and vagina - in women. The mucous membrane of the rectum contains intestinal glands (mucous and goblet) and single lymphoid nodules; forms longitudinal and transverse folds.

The liver (hepar) is the largest gland in the human body. Its mass is about 1500 g. It performs several main functions: digestive, forms protein, neutralizes hematopoietic, carries out metabolism, etc. The liver is located in the right hypochondrium and epigastric. In shape, it resembles a wedge, has an upper and lower surface.

Digestion is the first step in metabolism. For the renewal and growth of body tissues, the intake of appropriate substances with food is necessary. Food products contain proteins, fats and carbohydrates, as well as vitamins, mineral salts and water necessary for the body. However, proteins, fats and carbohydrates contained in food cannot be absorbed by its cells in their original form. In the digestive tract, not only the mechanical processing of food takes place, but also chemical breakdown under the influence of the enzymes of the digestive glands, which are located along the gastrointestinal tract.

Тема 2.8. Строение выделительной системы./
The structure of the excretory system.

The excretory function plays one of the important roles in the body. The end products of decay, formed in the process of metabolism, are a kind of slag. Their delay and accumulation can cause deep disorders in the body. Normal excretion, mainly of mineral substances, maintains the acid-base balance in the body, which ensures the functional reliability of its biological systems. The excretion of end products from the body is due to its ability to maintain a constant osmotic pressure (isooosmia) and ionic composition (isoionium) of the internal environment. The metabolic products produced in the cells enter the interstitial fluid, blood and lymph, are collected in the excretory organs (kidneys) and then excreted in the form of urine and partly with feces (bile pigments, products of the pancreas and salivary glands). To some extent, metabolic products are excreted through the skin (sweat) and respiratory organs (water vapor, carbon dioxide, volatile substances - vapors of ether and chloroform during anesthesia, etc.). Of exceptional importance for maintaining the constancy of the internal environment of the body are the excretory organs. They also remove poisons from outside (arsenic, mercury, etc.), as well as harmful substances that are transferred from the intestines with blood to the liver, where they are partially neutralized, and then excreted from the body through the kidneys. With the release of water vapor through the alveoli and skin, the body temperature does not change. Consequently, the excretory organs regulate not only metabolism, but also heat transfer. The organs of excretion also include sweat, sebaceous and mammary glands, which will be considered together with the functions of the skin.

The excretory system is a set of excretory organs involved in the removal of end products of metabolism, excess water, salts, organic compounds and toxic substances from the body.

The excretory system includes the kidneys, ureters, bladder, urethra, which provide urination. In addition, the glands of the gastrointestinal tract, skin, sebaceous and sweat glands are involved in the excretion function.

Sweating is one of the types of excretion, which consists in the release of the product of sweat glands - sweat on the surface of the skin. It is carried out in response to temperature, tactile, emotional and other influences and provides thermoregulation, maintaining the body's water-salt balance.

The excretory system is divided into urinary (kidneys) and urinary tract (renal calyces, pelvis, ureters, bladder, urinary canal).

Kidney functions: exo- and endocrine. The weight of each kidney is 150 g. During the day, the kidneys process up to 1700 liters of blood. In intensity, blood circulation exceeds all other organs by 20 times. Every 5-10 minutes in the kidneys the whole mass of blood.

1. The most important function is the removal of products that are not absorbed by the body (nitrogenous slags). The kidneys are the purgatory of the blood. Urea, uric acid, creatinine - the concentration of these substances is much higher than in the blood. Without the excretory function, there would be inevitable poisoning of the body.

2. Ensuring the homeostasis of the body and blood. It is carried out by regulating the amount of water and salts - maintaining the water-salt balance. Regulate acid-base balance, electrolyte content. The kidneys prevent the excess of the amount of water, adapt to changing conditions. Depending on the needs of the body, they can change the acidity index from 4.4 to 6.8 pH.

3. Endocrine. Synthesize renin and prostaglandins.

4. Regulation of hematopoiesis. Stimulate the formation of erythropoietin in the plasma.

5. Neutralize toxic substances in case of failure of the liver.

In violation of the kidneys, uremia, acidosis, edema, etc. occur.

Three stages. 3 paired organs are successively laid down: Pronephros pronephros. Primary kidney - mesonephros (wolf body). The final kidney is the metanephros. The source of development is the nephrotome.

The pronephros is formed from 8-10 segments of the legs corresponding to the head end of the embryo.

Then they turn into convoluted tubules that form the mesonephric duct. The pronephros exists for 40 hours and does not function.

The primary kidney is formed from 25 segments of the legs. They separate from the somite and grow up to the mesonephric duct growing down. From the other end, the afferent arterioles from the aorta grow to them and renal corpuscles are formed. By 4-5 months, the primary kidney ceases to exist.

From the 2nd month, differentiation of the permanent kidney occurs. It is formed from 2 sources: nephrogenic rudiment - a section of the mesoderm that is not divided into segments of the leg, which is located in the caudal part of the embryo. It forms nephrons.

Mesonephric duct - gives rise to the collecting ducts, papillary tubules, calyces, pelvis, ureters.

From the periphery, the kidney is covered with a connective tissue membrane (capsule). Anteriorly, by the visceral sheet of the peritoneum. Consists of 2 parts: cortex and medulla.

The medulla is divided into 8-12 pyramids, ending in papillary tubules that open into calyxes.

The cortical substance, penetrating into the medulla, forms pyramids. In turn, the medulla, penetrating into the cortical, forms rays.

The structural and functional unit is the nephron (more than 1 million). Its length is 15-150 mm, the total length is up to 150 km.

Formed by a glomerular capsule, consisting of a visceral and parietal sheet; proximal section - convoluted and straight parts; descending section of the loop; distal section - convoluted and straight parts. The distal part flows into the collecting duct, which is not included in the nephron.

There are 2 types of nephrons: cortical (80%, of which only 1% are truly cortical) and pericerebral (juxtamedullary - 20%).

Cortical nephrons - renal corpuscles and proximal sections in the cortical substance, and a loop, direct tubules - in the medulla.

The juxtamedullary nephrons are located at the border. The loop is completely in the cortex.

The cortical substance is formed by the renal corpuscles, proximal and distal sections.

The medulla is the loop and collecting ducts.

Lobes are isolated in the kidney, the number of which corresponds to the number of pyramids. The lobe is a pyramid of the medulla with adjoining cortex.