**REVI J N.**

**IN E** NDI 3D ANATOMY SOFTWARE, STUDENTS CAN STUDY THE ACTIVITY AND MOVEMENT OF INTERNAL ORGANS AS CLOSE TO REALITY AS POSSIBLE.

**Lungs**

The lung is a respiratory organ that fills both sides of the rib cage . Through the alveoli of the lungs, the oxygen in the air goes to the blood, and the carbon dioxide in the blood goes to the air. Through lung activity, the blood in the capillaries connected to the alveoli is enriched with oxygen and spreads throughout the body.

**Liver**

Liver - detoxification of the body, that is, cleansing of poisons; a metabolic organ that performs many important biological functions, such as synthesizing proteins, enzymes, and biochemicals necessary for digestion and growth.

**Kidney**

The kidney is bean-shaped; It is an organ that filters blood from mucus, bile and other harmful substances. Harmful substances and wastes contained in the blood are removed from the body through urine.

**Stomach**

Stomach - in some sources it is referred to as "stomach". The stomach is an enlarged part of the digestive system, and performs the tasks of storing, mixing, grinding, partially digesting the food consumed with the help of hydrochloric acid and gastric juice, and transferring it to the intestine.

**Intestine**

The intestine is the part of the digestive tract that comes after the stomach, where the food is completely digested, and the nutrients necessary for the functioning of the body are absorbed into the blood. Also, excess harmful substances and toxins are removed from the body through the intestine.

In the intestine there are also useful microorganisms that actively participate in the breakdown of nutrients, they are called "intestinal microflora".

**Gall bladder**

The gallbladder is a small pear-shaped organ located under the liver, on the upper right side of the abdomen, and its main function is to collect, store, and deliver bile secreted by the liver to the duodenum.

Bile contains special acids that stimulate the absorption of substances such as vitamins, amino acids and cholesterol; neutralizes the gastric juice harmful to the intestines, protects the intestines from harmful microorganisms and substances.

**Bone**

Bone is a hard supporting tissue consisting of calcium , protein and minerals, which forms the bone system - endoskeleton. Tubular bones contain bone marrow, where red and white blood cells are produced. Bone tissue, together with joints, ligaments, muscles and ligaments attached to it, forms the musculoskeletal system.

**Muscles.**

The active moving part of the human body are **muscles** , which contract and expand under the influence of nerve impulses .

The muscular system is divided into smooth, transverse and cardiac muscles. A muscle cell has a long filamentous shape. Muscles need a good blood supply to function properly. Because of this, small blood vessels, lymphatic vessels, and sensory and motor nerve tissue pass between the muscle tissues.

Smooth muscles are the muscles of internal organs, skin, blood vessels and lymphatic vessels, which move involuntarily. For example, the muscles of the stomach contract and ensure the movement of food towards the intestine.

Transverse muscles extend from the tendons and, together with ligaments and fascia, help the body move. Cross-sectional muscles are connected to bones and bone joints and move voluntarily.

The heart muscle - the myocardium performs absorption and delivery of blood .

Muscle strength depends on the number of muscle fibers - myofibrils. There are about 600 muscles in the human body, which are controlled by the central nervous system.

**The human body has the following muscles:**

**Head:**

1. **Forehead muscles**
2. **Templar muscles**
3. **Oral sphincter**
4. **Skula**
5. **Eyelid muscles**

**Neck:**

1. **Neck triangle**
2. **Trapezius muscles**
3. **Throat-larynx muscles**

**Hand:**

1. **Deltoid muscle**
2. **Biceps (biceps muscle)**
3. **Triceps**
4. **Shoulder bone**
5. **Long supinator**
6. **Short supinator**
7. **Pronator**
8. **Shoulder - forearm muscles**
9. **Elbow flexor muscle**
10. **Palm muscles (long and short)**

**Gawd:**

1. **Large pectoral muscles**
2. **Small pectoral muscles**
3. **Front tooth muscle**
4. **Abdominal flat muscles (abdominal press)**
5. **Abdominal external oblique muscles (bokovay press)**
6. **Fascia**
7. **Side muscles**

**Foot:**

1. **Adductor thigh muscle**
2. **Rectus femoris muscle**
3. **Lateral thigh muscle**
4. **Medial thigh muscle**
5. **Inner thigh muscles**
6. **Heel muscles**
7. **Muscle of the toes**
8. **Short calf muscle**
9. **Long calf muscle**
10. **Posterior calf muscle**

**Link**

[Anatomy nizhnix konechnostey (trainer59.ru)](https://trener59.ru/trenirovki-2/trenirovki/nogi/)

**Skeleton .**

All the bones in the human body together form the skeleton. The skeleton is a passive part of the movement system, supporting soft tissues and protecting internal organs.

A healthy human skeleton consists of approximately 206 bones.

The main ones are:

1. **Skull** - contains the brain and soft nervous tissue, and includes nine more bones. These are:

**The forehead** is one of the hardest parts of the human skeleton;

**The occipital bone** is the bone located behind the human head;

**Templar bone** - the part above and behind the ear;

**Cheek bone** - a bone that surrounds the lower and side parts of the eye;

**Upper and lower jaw bones** - bones that perform the functions of chewing and speaking together with muscle tissue;

and is **the nasal bone** .

1. **Cervical vertebrae** are bones consisting of 7 transverse vertebral discs, which hold the skull above and are connected to the thoracic vertebrae below.
2. **Vertebral bone** is an elongated, tube-shaped bone in the shape of the letter "s" in the Latin alphabet, which connects the upper part of the chest with the upper joint of the arm. Provides rotational movement of the hand.
3. **The scapula** is a triangular flat bone behind the ribcage. It serves as a support for the rotational movements of the shoulder and arm. An important muscle protects tendons and ligaments from external mechanical impact.
4. **Thoracic vertebrae** - consisting of 12 vertebral discs, supporting the back wall of the chest, protecting the part of the body where vital organs are located from external influences and loads. Because of this, the thoracic vertebrae are less active and thicker than other parts of the spine.
5. **Lumbar Vertebrae** - includes the vertebrae from L-1 to L-5 and extends from the end of the ribs to the tailbone. It acts as a support for movements such as holding the upper part of the body, standing, bending, lifting, and turning.
6. **Pelvis** - in some sources it is called "iliac bone" and is symmetrically paired with the spine at the point where the femur bones join the body. Behind the pelvis are the tailbone, humpback, in front of the pelvis, next to the hipbones, and at the bottom are the iliac bones.
7. **The femur** is the largest of the tubular bones and extends from the hip joint to the knee. At the junction of the hip joint is the linea aspera, which holds the muscle tissue and pulls the largest muscles in the body. It serves to keep the body upright, to walk and lift .
8. **Coccyx -** up to 16 yearsa joint bone that consists of the ankle, then 5-6 coccygeal vertebrae. A rudimentary organ that has lost its functionality, surrounded by nerve tissue and blood vessels.
9. **The kneecap is** a bone located in the knee joint, protecting the synoidal chamber from external mechanical impact, and also protecting the femur and large tibia, which are connected by ligaments in the knee, from moving to the side.
10. **The tibia is a tube-** shaped bone that connects the sole of the foot to the femur. Performs leg movements, walking, and running tasks along with small shin splints . It carries the main weight of the body and acts as a support.
11. **The small tibia is a thin tube-** like bone extending from the outside of the knee joint to the heel, parallel to the large tibia, and attaching the calf muscles. In the movement of the foot, it has a direct and indirect effect on the fact that the heel does not bend to the side more than it should. It plays an important role in maintaining the vertical balance of the body.
12. **The calcaneus is** the largest bony bone located at the bottom of the foot. It performs the functions of keeping the balance of the body, moving, squatting, and running at high speed.
13. **The bones of the toes** (phalanges) are articulated bones involved in walking, running, and balance. Each finger bone consists of three joints.
14. **The bones of the foot are** a group of bones that connect the toes, heel and shin. Together with the heel, it acts as a support.
15. **The sternum** is a long, flat bone in the center of the chest that connects the ribs to the front of the body by ligaments. It protects the heart, lungs and the most important blood vessels from external mechanical effects.
16. **Ribs are** thin hollow bones that come out of the spine, go around the chest cavity, and unite at the sternum to form a cage, protecting the important organs of the respiratory, digestive and circulatory systems. Both men and women have 12 pairs of ribs.
17. **The humerus** is a pair of tube-like bones in the upper part of the arm, extending from the spine to the elbow. Performs rotational movement and lifting tasks of the hand.
18. When it is called **" elbow".** not only the elbow joint itself, but with the humerus at the elbow; It is a long tubular bone parallel to the wrist bone, connected to the palm in the wrist joint. It serves for the twisting movement of the lower part of the hand from the elbow.
19. **The carpal bone** is a joint of two parallel bones that go from the elbow to the palm, and is a tube-like bone located on the inside of the hand, parallel to the elbow bone. Performs the functions of support, attachment, movement to any load that comes to hand.
20. **Palm bone -** finger phalangesand is a group of bones consisting of ligaments that unites the wrist joint and performs the functions of support and movement of the finger phalanges.
21. **Finger phalanges** are tube-shaped bones with three joints for each finger, which serve for bending and twisting movements of the fingers, have many nerve fibers and veins, and serve to perform small motor and complex movements.

**Lymphatic system**

The lymphatic system consists of lymph nodes, lymph vessels and bone marrow, and serves for the formation and movement of lymphocytes, the main substance of the immune system. Lymphocytes produce antibodies and immune cells that protect the human body from infection.

The lymphatic system is important in maintaining a healthy balance of fluids in the body.

**Circulatory system.**

Providing cells of internal organs, muscles and nervous tissue with oxygen and necessary substances dissolved in blood; also performs the task of removing carbon dioxide and other excess substances produced as a result of the body's activity from the cells; a system consisting of blood vessels and the heart.

**Blood vessels.**

Blood vessels are the general name of blood circulation channels throughout the body, consisting of veins, arteries and capillaries.

Blood saturated with oxygen goes to various organs of the body through arteries, and blood saturated with carbon dioxide returns from organs through veins.

The blood sent by the heart reaches the organs of the body through blood vessels and forms the cardiovascular system of the body.

**Heart**

The heart is the central organ of the circulatory system consisting of muscle tissue. By contracting and relaxing in a certain rhythm, the heart ensures that blood is transported through the veins to the various organs. The human heart is four-chambered, consisting of two chambers and two ventricles.

The circulatory system is divided into small and large circulatory system.

A small circle of blood circulation connects the heart and lungs . Venous blood saturated with carbon dioxide from the right ventricle of the heart goes to the lungs through two pulmonary veins, where it is separated into capillaries. Carbon dioxide is removed in the capillaries, and the blood is again saturated with oxygen. Oxygenated blood comes to the left side of the heart through the artery. In this way, 1 movement cycle of the small circulatory system is completed.

The large circulatory system starts from the large left ventricle of the heart. The left ventricle pumps oxygenated blood into the aorta. Oxygenated blood travels throughout the body from the aorta to the arteries.

Blood passes through the increasingly smaller and branching veins into the capillaries. The capillary transports the blood to the desired point. In the capillary, it gives the oxygen contained in the blood to the cells, saturates them with carbon dioxide, turns into venous blood and comes to the right side of the heart through the veins. In this way, 1 cycle of the large circulatory system is completed.

Venous blood passes through the heart valves from the right ventricle to the right ventricle, moves towards the lungs with the contraction of the ventricle, and begins to move along the aforementioned small blood circulation circle.

In order to maintain the vital activity of the body, blood is in constant motion within both circulations.

**Nervous system.**

ensures the movement of muscles and other organs , performs reflex actions in response to external and internal influences; A system made up of neuron cells is called a nervous system.

The nervous system is divided into central and peripheral nervous system. The human central nervous system consists of the brain and spinal cord. The peripheral nervous system includes the nerves outside the brain and spinal cord around the back and skull and the autonomic nervous system.

Nervous tissues are divided into voluntary and autonomic nervous systems depending on their excitability. Voluntary nervous tissue performs the functions of voluntary movement and perception of the external world. The autonomic nervous system supplies internal organs with nerves and performs its functional function regardless of human will.

Sensory fibers of the nervous system designed to receive information from the outside world are called receptors. They convert the received information into energy and send it to the center. This movement of energy is called momentum. The central nervous system receives the incoming impulse and sends a response to it to the necessary organs and muscles.

**The main nerves are:**

**Central nervous system:**

1. **The brain is** the organ that performs the highest psychophysical, emotional, sensory and semantic functions. The brain is composed of blood vessels, nerve fibers, neurons, synapses, dendrites, and cerebrospinal fluid.

Neurons can be conditionally divided into two groups - *afferent neurons* - sensing and feeling; efferent neurons perform motor functions. Information transmission in brain synapses is carried out using neurotransmitters.

Complex processes such as thought processes, memory, analysis of information from sensory organs, decision making, and control of internal organs are all carried out through the brain.

The brain consists of hypothalamus gland, thalamus gland, cerebral hemispheres, midbrain, pons, cerebellum, medulla oblongata, and spinal cord.

1. **The spinal cord** is a continuation of the nerve bundles from the brain, which is located in the central canal of the spine. The hindbrain begins below the 2nd lumbar vertebra and reaches the top - the brain. There is no clear boundary between the head and the spinal cord. Science considered the transition between the first cervical vertebra and the occipital bone to be the boundary between the brain and the spinal cord.

The spinal cord controls the movement of arms and legs, digestion, heartbeat, respiratory organs, diaphragm, urinary excretion, genitals, intestinal muscles, reflex function; carries the signal from the tactile sensors to the brain, conveys the signals from the brain to the organs, and at the same time performs the functions of connecting the brain to the peripheral nervous system.

The peripheral nervous system includes (no information found)

1. **Trigeminal nerve**
2. **The neck is tangled**
3. **Shoulder strap**
4. **Elbow nerve**
5. **Median nerve**
6. **Wrist nerve**
7. **Femoral nerve**
8. **Occlusive nerve**
9. **Small common nerve of the calf**
10. **Kumyk nerve**
11. **The hump is tangled**
12. **The waist is tight**
13. **Sympathetic trunks**
14. **Intercostal nerves**
15. **Spinal nerves**

The autonomic nervous system of the brain and spinal cord includes:

1. Fibers of the sympathetic nervous system
2. Sympathetic nerve nodes
3. Parasympathetic nerve fibers
4. Parasympathetic nerve nodes
5. A stray nerve
6. Stellate ganglion
7. Sunny tangle
8. Upper mesenteric node
9. Parasympathetic nodes of the gastric plexus

**Digestive system.**

external system consists of organs such as the oral cavity, larynx, esophagus, stomach (stomach), pancreas, liver, spleen, duodenum, small intestine, large intestine, and rectum. .