

Ministry of science and higher education of the Russian Federation

Medical college

Federal STATE Autonomous educational institution "Crimean V.I.

Vernadsky University "

Presentation on the: « Heart »

Performed by a student of group

13-C

Sudbina Vera

Teacher: Solokha G. V.

Heart – сердце

Organ - орган

Arteries – артерия

Atria of the ventricle – предсердия желудочка

Systole - систола

Diastole – диастола

Serous membrane – серозная оболочка

Chest cavity – грудная полость

Heart muscle – сердечная мышца

Vessels – сосуды

Coronary sulcus – венечная борозда

Interventricular furrows - межжелудочковые борозды

Circulation – циркуляция

Blood - кровь



The human heart is a cone-shaped hollow muscle organ that receives blood from the venous trunks that flow into it and pumps it to the arteries that are adjacent to the heart.

The heart cavity is divided into two Atria and two ventricles.

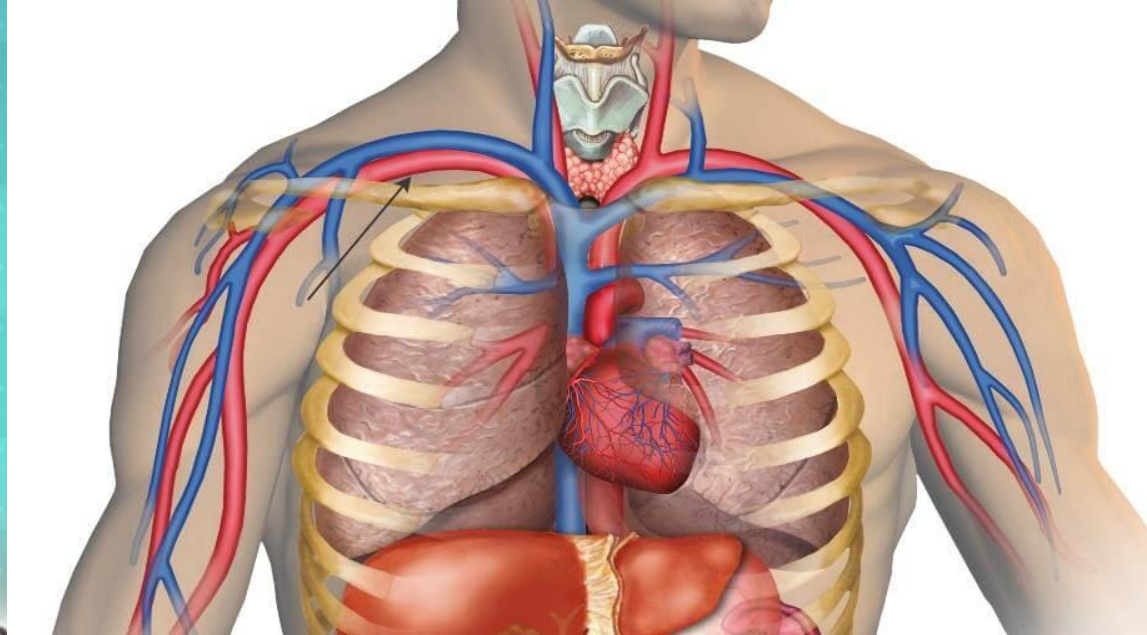
The left atrium and left ventricle together form the "arterial heart", named after the type of blood passing through it, the right ventricle and right atrium are combined into the "venous heart", named after the same principle.

The contraction of the heart is called systole, and the relaxation is called diastole



Location

The heart is located in the chest cavity. In front of it is the sternum. The organ is shifted slightly to the left in relation to the sternum. It is located at the level of the sixth and eighth thoracic vertebrae.



On all sides, the heart is surrounded by a special serous membrane. This shell is called the pericardium. It forms its own cavity called the pericardial cavity. Being in this cavity makes it easier for the organ to slip in relation to other tissues and organs.

Structure and shape

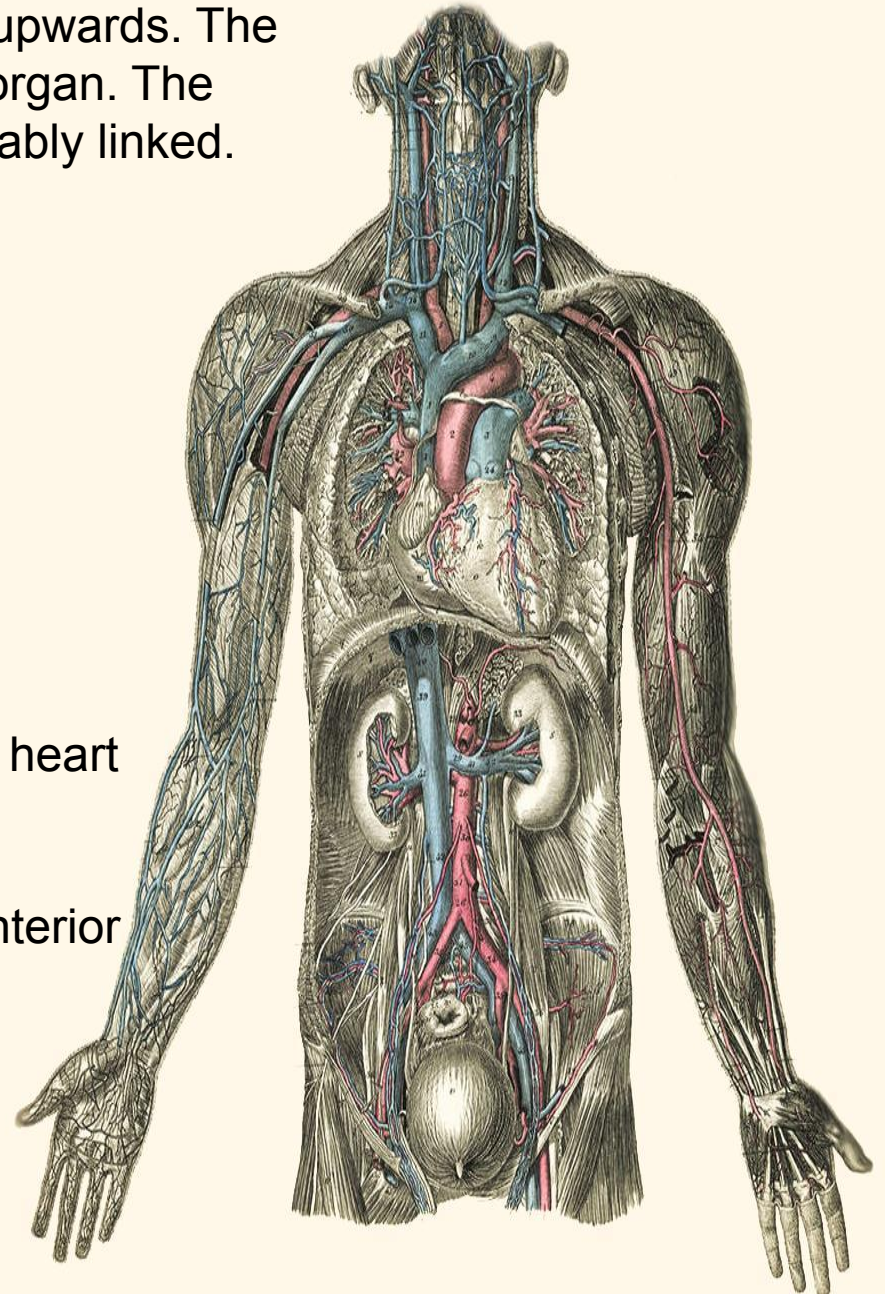
The heart muscle has the shape of a cone. The base of the organ is expanded and faces posteriorly and upwards. The main vessels are suitable for the base of the organ. The structure and function of the heart are inextricably linked.

The heart muscle has the following surfaces:

- ❖ anterior, facing the sternum;
- ❖ the lower one, facing the diaphragm;
- ❖ the side facing the lungs.

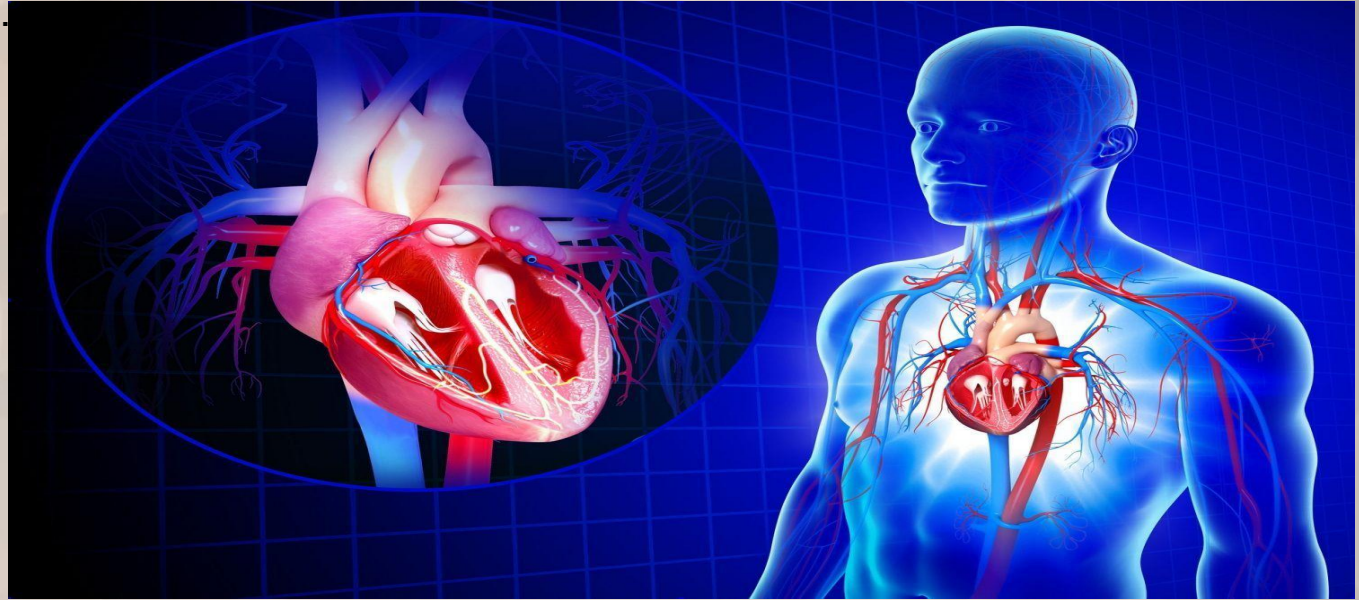
Furrows are visualized on the heart muscle, reflecting the location of its internal cavities:

- Coronal furrow. It is located at the base of the heart muscle and is located on the border of the ventricles and Atria.
- Interventricular furrows. They run along the anterior and posterior surfaces of the organ, along the border between the ventricles.



Anatomical features of the human heart

Since the normal functioning of the heart directly depends on the supply of other organs with oxygen and nutrients, it must perfectly adapt to changing environmental conditions, working in different frequency ranges.

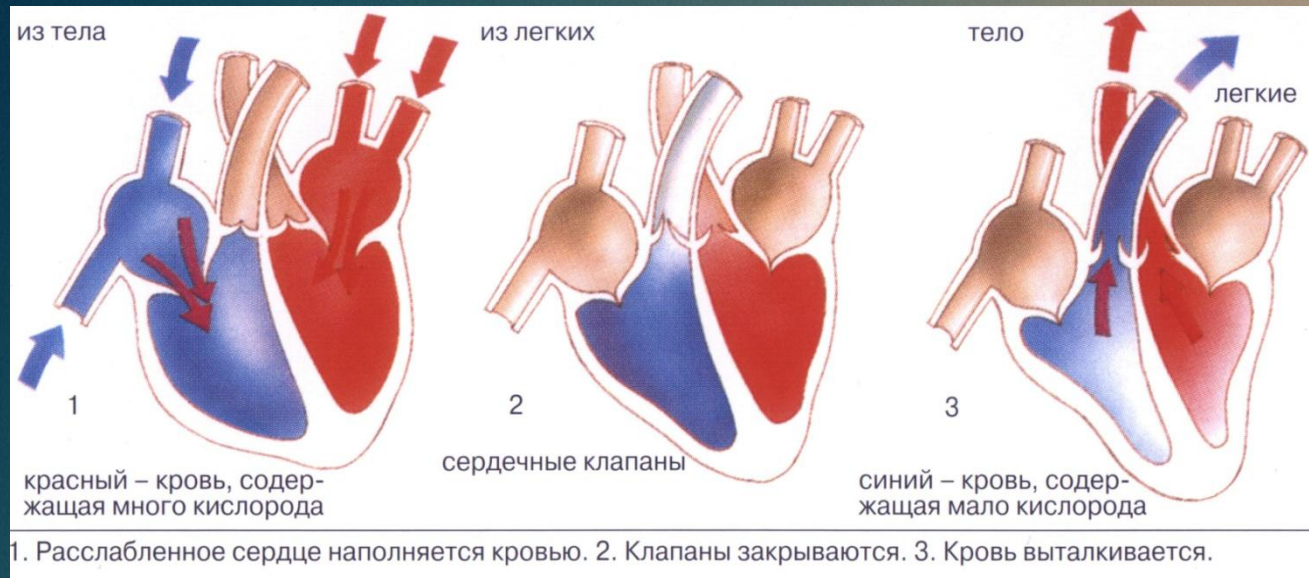


This variability is possible due to the anatomical and physiological features of the heart muscle:

- ❖ Autonomy implies complete independence from the Central nervous system. The heart contracts from impulses produced by itself, so the work of the Central nervous system does not affect the heart rate in any way.
 - ❖ Conduction consists in transmitting the formed pulse along the chain to other departments and cells of the heart.
 - ❖ Excitability implies an instant reaction to changes occurring in the body and outside it.
 - ❖ Contractility, that is, the force of contraction of the fibers, directly proportional to their length.
 - ❖ Refractoriness is a period during which the myocardial tissue is not disturbed.
- Any failure in this system can lead to a sharp and uncontrolled change in heart rate, asynchronous heart rate up to fibrillation and death.

Phases of the heart

To continuously move blood through the blood vessels, the heart must contract. Based on the stage of contraction, there are 3 phases of the cardiac cycle:



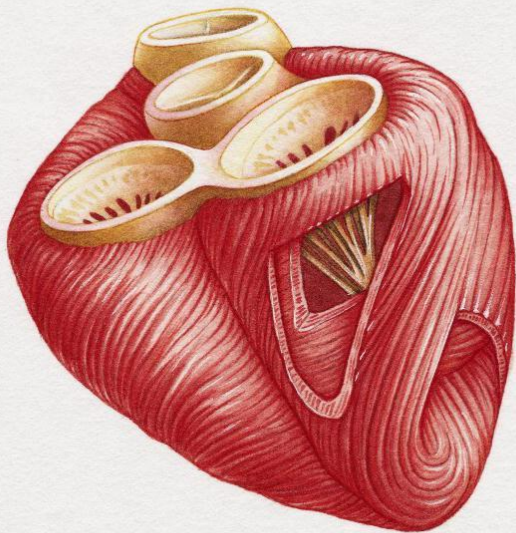
- Atrial systole, during which blood flows from the Atria to the ventricles. In order not to interfere with the current, the mitral and tricuspid valves open at this moment, and the semilunar ones, on the contrary, close.
- The systole of the ventricles move the blood on to the arteries through the semilunar valves open. In this case, the flap valves are closed.
- Diastole involves filling the Atria with venous blood through open flap valves.

Each heartbeat lasts about one second, but during active physical activity or during stress, the pulse rate increases by reducing the duration of diastole. During a full rest, sleep or meditation, the heart rate, on the contrary, slows down, diastole becomes longer, so the body is more actively cleared of metabolites.

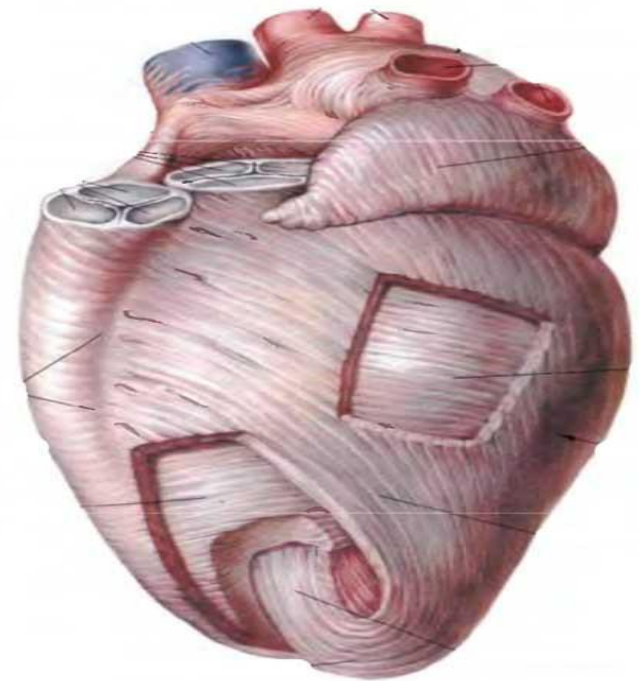
Heart muscle

The Uniqueness of the heart muscle is its ability to rhythmically automatic contractions, alternating with relaxation, which are performed continuously throughout life. The myocardium (middle muscle layer of the heart) of the Atria and ventricles is divided, which allows them to contract separately from each other.

Cardiomyocytes are muscle cells of the heart with a special structure that allows them to transmit a particularly coordinated wave of excitement.



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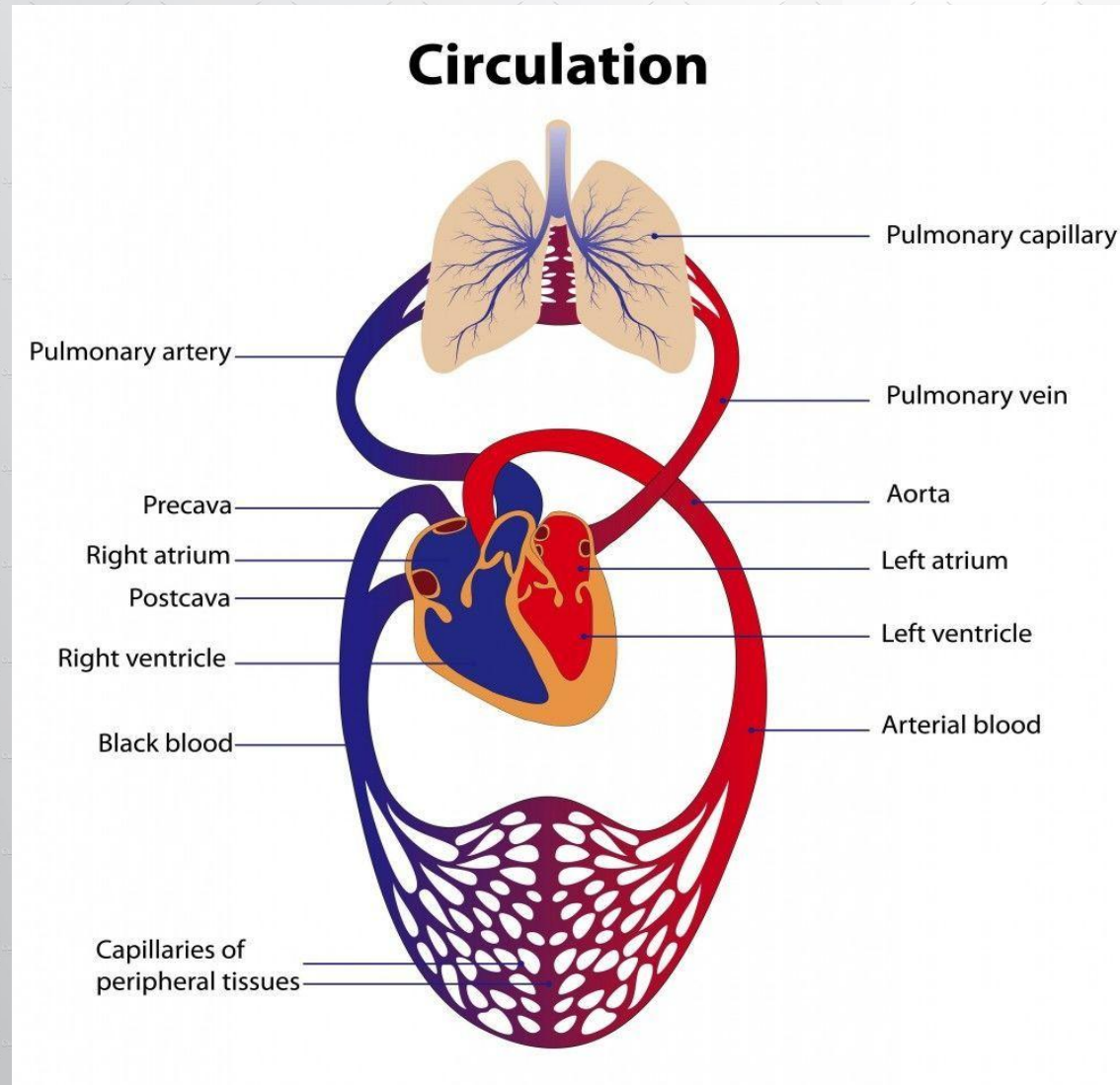
So there are two types of cardiomyocytes:

- ♦ normal working (99% of the total number of heart muscle cells) - designed to receive a signal from the rhythm driver through conducting cardiomyocytes.
- ♦ special conducting (1% of the total number of heart muscle cells) cardiomyocytes — form the conducting system. In their functions, they resemble neurons.

Circulation

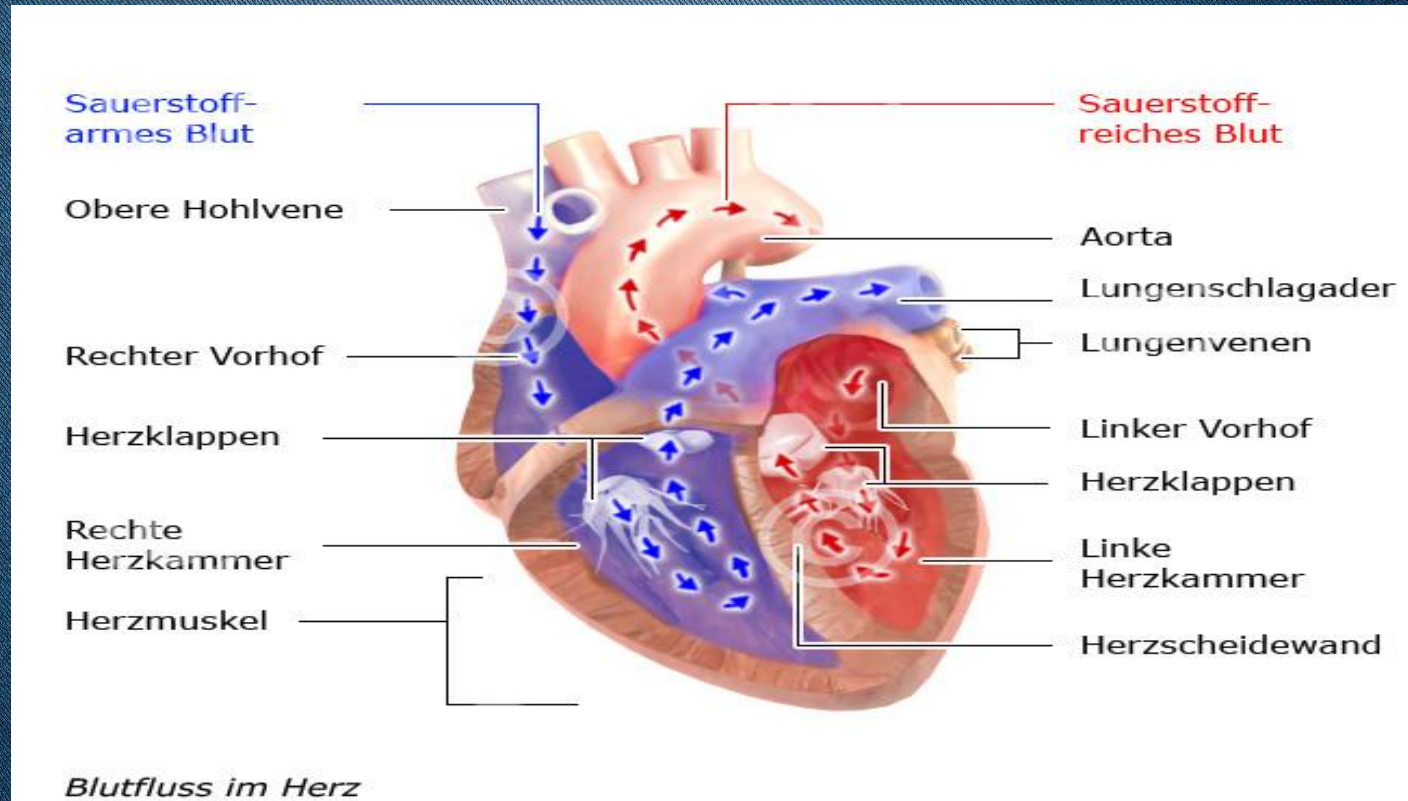
The heart conducts two circulations:

- ❖ Small-begins in the right ventricle and ends in the left atrium. This circulatory circle is responsible for normal gas exchange in the pulmonary alveoli.
- ❖ Large-the circle begins in the left ventricle and ends in the right atrium. The main role is to ensure blood flow to all internal organs.



How does the blood flow in the heart work:

- Blood from veins with a high content of carbon dioxide enters the hollow veins.
- From the mouth of the veins, it flows to the right atrium, and then to the right ventricle.
- Blood enters the pulmonary trunk and is delivered to the lungs through it. Here it is enriched with oxygen and already becomes arterial.
- Through the arteries, blood from the lungs returns to the heart – the left atrium and left ventricle.
- From the heart, blood enters the aorta (a large blood vessel), and from there it is distributed to small vessels and carried around the body.



Heart disease

It is not surprising that the number of cardiovascular diseases is increasing in the world.

The heart is a complex organ that actually rests (if you can call it rest) only in the intervals between heartbeats. Any complex and constantly working mechanism itself requires the most careful attitude and constant prevention.

Just imagine what a monstrous burden falls on the heart given our lifestyle and low-quality abundant food. Interestingly, mortality from cardiovascular diseases is also quite high in high-income countries.

The huge amounts of food consumed by the population of affluent countries and the endless pursuit of money, as well as the associated stresses, destroy our heart.

Another reason for the spread of cardiovascular diseases is hypodynamia — catastrophically low physical activity that destroys the entire body.

Or on the contrary, an illiterate passion for heavy physical exercise, often occurring against the background of heart diseases, the presence of which people do not even suspect and manage to die right during the "Wellness" classes.



Lifestyle and heart health



The full functioning of the heart directly affects the state of the entire body, so the goal of any sane person is to maintain the health of the cardiovascular system.

In order not to encounter heart pathologies, you should try to exclude or at least minimize the provoking factors:

1. excess weight;
2. Smoking, alcohol and drug use;
3. irrational diet, abuse of fat, fried, salty food;
4. high cholesterol; low-activity lifestyle;
5. super-intensive physical activity;
6. a state of constant stress, nervous exhaustion and fatigue.

Knowing a little more about the anatomy of the human heart, try to make an effort to give up destructive habits. Change your life for the better, and then your heart will work like a clock.

Thanks for your attention