



## **ANATOMY-PHYSIOLOGY AND PATHOLOGY-ANATOMY CHARACTERISTICS OF THE CARDIOVASCULAR SYSTEM**

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### **Abstract**

The cardiovascular system includes the heart and blood vessels that continuously supply the organs with blood. The movement of blood in the human body is called its blood circulation. Blood is an important component of the body, which ensures the functioning of every organ and cell in the body and connects them with each other. With the help of the cardiovascular system, all tissues and organs are supplied with oxygen, nutrients and necessary hormones, and decomposed products are removed. In the human body, blood moves continuously in two circles - large and small blood circulation. Blood moves directly through vessels - arteries, capillaries and veins. This article deals with the anatomy, physiology, pathophysiology, pathological anatomy of the cardiovascular system.

**Keywords:** Anomalies of the heart, large and small blood circulation, artery, vein, systole, diastole, Botallo tract, Turner's syndrome, coronary arteries.

### **Introduction**

Psychosomatic factors play an important role in the treatment of diseases of the cardiovascular system. In recent studies, there is reliable evidence that psychological factors influence the appearance and development of cardiovascular diseases. The duration of human life associated with heart and vascular diseases increases, and changes in lifestyle have stimulated the development of atherosclerosis and its consequences, these are: heart attack and stroke. Cardiovascular diseases are still the main killer of the world's population. According to the World Health Organization, 17.9 million people died from the disease in 2016, accounting for 31% of all deaths in the world. 85% of these deaths were due to heart attacks and stroke. And this is an urgent problem of our time, in which the development of a culture of medical communication plays an important role. The cardiovascular system was calculated- the sum of the vessels that carry out the transport of substances between tissue and blood, between the blood and the external environment. The cardiovascular system provides vital processes such as oxygen and nutrient transport to organism, transport





of metabolites formed in the exchange of carbon dioxide and substances to the lungs and subtraction organs, normal function of the immune system and thermoregulation. Knowledge of the structure and functioning of the organs of the cardiovascular system helps doctors in the treatment of many diseases.

**Anatomy of the cardiovascular system:** the heart is an organ that consists of a cavity and is made up of a muscle, located behind the collar, inside the chest in the anterior area of the chest cavity. The heart wall is made up of 3 endocardial (internal), myocardial (central) and epicardial (external) layers. The weight of an adult's heart is about 300 g. It is divided into two right and left sections, which are not connected to each other by a fence towards the neck. Above each part are the compartments (right and left), and below – the ventricles (right and left). So the heart is made up of four chambers: two compartments and two ventricles. Each compartment is connected to the ventricle on its side by a hole in the middle, which are closed by pores. On the right side is a three-tiered cap, and on the left side is a two-tiered (mitral) cap. There are also pores (semi-lunar) around the opening of the pulmonary artery and the aortic orifices, which open towards the side of the blood flow in these vessels. Since they are automatically closed under the influence of blood pressure, the blood flow opens only towards one side. Since they are automatically closed under the influence of blood pressure, the blood flow is directed only in one direction. Due to the presence of flaps, the heart works like a pump. Due to this activity, three periods are observed in the activity of the heart, which are based on the transfer of blood from one place to another: contractions of the compartments and ventricles, and at the same time a pause is observed when they empty. Its contraction is called systole, relaxation-diastole. The heart contracts about 60-90 times per minute. Alternating work and rest of the parts of the heart ensures that its muscles function without fatigue. In the human body, blood moves in two – large and small circulatory circles with continuous flow. During the period of movement within the framework of a small circulation, the blood is saturated with oxygen and purified from CO<sub>2</sub> gas. In the context of large circulation, however, the blood supplies oxygen and nutrients to all organs and from them CO<sub>2</sub> gas and residue move along arteries, capillaries and veins. Blood from the entire body is deposited in the right compartment through the upper and lower hollow veins. It is also accompanied by blood in the venous pockets, which collect venous blood from the tissues of the heart itself. And in the left compartment, four pulmonary veins are poured, which bring arterial blood from the lungs. The pulmonary artery, which carries venous blood from the right ventricle to the lungs, is an aorta that conveys arterial blood from the opening and from the left ventricle to the vessels of a large circulatory circle. [6]





Physiology of the cardiovascular system: the heart generates a constant difference in blood pressure between the arteries and veins and, while holding it, imparts blood flow. When the heart stops, the pressure between the arteries and veins quickly equalizes, and blood circulation stops. The heart valves automatically close under the influence of blood pressure, allowing blood to flow to one side. The heart of a healthy person rhythmically contracts 70 times a minute in a moderate position. In physical work, the amount of heart contraction may increase. The full cycle of cardiac activity is 0.8 s when the heart contracts 70 times. Divisions and ventricles contract successively. Contraction of the heart muscle is called systole, and relaxation is called diastole. The cycle of cardiac activity consists of three stages: the first stage – non – sectional systole (0.1 s), the second – ventricular systole (0.3 s) and the third-general pause (0.4 s). At the time of the general pause, the hips and ventricles relax. During the cardiac cycle, the vesicles contract by 0.1 S and stand in a diastolic relaxed state of 0.7 S. The ventricles contract 0.3 s, their diastole lasts 0.5 s. At an accelerated time of heart rate, the contraction of the heart cycle is due to the reduction of the total pause. The duration of bladder and ventricular systole remains the same. During the general pause, the muscles of the compartments and ventricles relax, the stratified obstructions open, and the semicircular lids are closed. The blood flows from the veins to the vesicles under the influence of pressure difference, freely flowing into the ventricle as the pores between the vesicles and ventricles are open. So during the general pause, the heart slowly fills with blood, and at the end of the pause, the ventricles become 70% full of blood. Compartment systole begins with the contraction of the annular muscles that wrap around the place of the injection of the veins that pour into the heart. This prevents the blood from returning from the compartment to the vein. In bladder systole, blood pressure in them rises to a column of 4-5 mm Mercury, and blood is directed to the ventricles only in one direction. Ventricular systole begins after the end of the ventricular systole, and at its beginning the sacs in the pelvis and ventricles close. Ventricular systole comes from two stages: the tension stage (0.05 C) and the Blood Drive stage (0.25 C). The voltage stage passes at a time when the stratified and semi-spherical caps are closed. At this time, the heart muscle is strengthened around uncompressed blood, and with an increase in muscle tension, the pressure in the ventricles increases. At a time when blood pressure in the ventricles exceeds the pressure in the arteries, the semicircular pores open and the blood rushes into the ventricles to the aorta and to the base of the lungs. The second stage of ventricular systole – the stage of pumping blood-begins. In the left ventricle, the systole pressure is equal to 120 mm of mercury column, and in the right ventricle, 25-





30 mm of mercury column. After the stage of pumping blood, diastole of the ventricles begins, and the pressure in them decreases. At a time when the pressure at the base of the aorta and lungs is higher than in the ventricles, the semicircular pores are closed. At this time, the bladder-intercarctic pores open under the blood pressure accumulated in the bladder. A general pause begins. Then the cycle of cardiac activity is returned. Heart muscle has the same excitability, permeability and contractility as skeletal muscle, but these features of the heart muscle will be specific. The heart muscle does not contract tetanically, much like skeletal muscle, but contracts slowly and works in a single order of contractions. The heart has automatism, shortening impulses appear in it. If we cut off all the nerves coming to the heart and isolate it from the body, it will contract rhythmically for a long time. Electrophysiological research has shown that cell membrane depolarization occurs in the cells of the conductive system of the heart, which rhythmically produces excitations that shorten the heart muscle. [2,3,5]

Pathological physiology of the cardiovascular system: among the diseases of the cardiovascular system, the most deadly are ischemic heart disease (which includes primarily heart attack, stenocardia, myocardial infarction). If the death event caused by diseases of the cardiovascular system is estimated at 100%, 52.5% of it is caused by heart attack stenocardia, heart attack. The pathogenesis of the vast majority of diseases of the cardiovascular system despite the large number of studies, is still due to the fact that it has not been studied from many sides to the end, as well as the cases of mortality and disability noted above. Therefore, it is important to study these types of diseases from an etiological, pathogenetic, that is, from a pathophysiological point of view, in a deep, comprehensive way, and clinically identify as early as possible, to overcome measures to prevent possible complications.

Below we bring information about the latest achievements of Medicine in the field of atherosclerosis of the crown vessels, various defects of the heart calpans, etiology and pathogenesis of heart failure and peripheral vascular diseases, which form the basis of diseases of the cardiovascular system. It is known that functionally, the heart is separated into two – large and small circulatory circles. Such a functional discrepancy provides information about the anatomical regularity of blood movement: that is, the blood moves from the umbilical vein – to the right ventricle – to the right ventricle – pulmonary artery – to the pulmonary vein – to the left ventricle – to the aorta – arteries – capillaries – venules – veins – to circulate through the umbilical vein. [4]





**Pathological anatomy of the cardiovascular system defects:** coarctation of the aorta is a defect consisting of congenital stenosis of the aorta or complete exhaustion, caused by a violation of hemodynamics. There are two main types of aortic coarctation: those found in children and those found in adults.

Found in children (preductal or infantile), Healy is defined as having significant stenosis on the proximal side of the aorta from the arterial road. In doing so, Botallo road will be open. Such a defect is equally common among both male and female genders, often continuing in combination with other developmental defects such as immaturity of the left heart chambers, atresia or stenosis of one or both mitral sacs, proximal aortic hypoplasia.

The coarctation of the aorta is defined as having aortic stenosis on the side that is found in adults, or on the side that is more distal to the postductal xyli arterial road. A smaller segment of the aorta undergoes stenosis. The Arterial road will be closed. This kind of koarctasia is more common in men, especially in Mahals with Turner syndrome. The occurrence of clinical symptoms is due to a decrease in the area of the vein below the narrowing.

**Anomalies of the coronary arteries.** Various anomalies of the coronary arteries have been described, in particular cases of multiple and unusual dislocation of the coronary arteries from the aorta. The Goho coronary arteries also exit the pulmonary pelvis. The right coronary artery is usually normal and supplies blood to the myocardium through the collaterals, at the same time the left coronary artery will have an unusual location. In this regard, the blood shunt runs from the left side, towards the right coronary artery, where the pressure is slightly lower than the left coronary artery, where the pressure is greater. As a result, dilation of the left ventricle occurs and myocardial ischemia begins. [1]

**Conclusion.** The heart and the cardiopulmonary sac that surrounds it are located in the chest between the lower breasts. The main mass of the heart is formed by the myocardium of muscle tissue and is made up of three walls. The heart consists of four chambers, with two compartments and two ventricles. The wall of the left ventricle is 2-3 times thicker than the right ventricle. Because the left ventricle of the heart has high blood pressure and is 120-80 mm.sim.ust releases blood into the aorta under pressure equal to.



## References:

1. Abdullaxo`jayeva M.S. Patologik anatomiya. II-qism // Toshkent: “Tafakkur bo`stoni” nashriyoti. 2012, 142-143 b.
2. Ahmedov A.G', Ziyamutdinova G.X. Anatomiya, fiziologiya va patologiya. O'quv uslubiy qo'llanma. Toshkent. 361 b.
3. Ahmedov N, Sodiqova Z. Normal anatomiya va fiziologiya. O'quv uslubiy qo'llanma. Toshkent, 2008.
4. Abdullayev N, Karimov H, Irisqulov B. Patologik fiziologiya. Toshkent: Yangi asr avlodi, 2008, 331 b.
5. Alaviya O.T, Qodirov Sh.Q, Qodirov A.N. Normal fiziologiya. Darslik. Toshkent, 2006.
6. Ichki kasalliklar propedevtikasi [Matn]: tibbiy-ilmiy nashr // A.G.Gadayev, M.Sh.Karimov, X.S.Axmedov. – Toshkent: Muharrir nashriyoti, 2018. 193 b.
7. Ermatov, N. D., Ganiev, A. A., Nabieva, U. P., Samigova, N. R., Khalmatova, M. A., & Alimukhamedov, D. S. (2022). The role of molecular biological and immunological markers in the diagnostics and treatment of patients with oropharyngeal cancer.
8. Искандарова, Г., Самигова, Н., & Палимбетов, А. (2021). Гигиеническая оценка воздуха рабочей зоны цементного завода с учетом её многокомпонентного состава.
9. Самигова, Н. Р. (2017). Изучение показателей теплового состояния организма работников «Махсустрэнс» в теплый период года. Молодой ученый, 1, 40.
10. Самигова, Н. Р., Мирсагатова, М. Р., & Нигматуллаева, Д. Ж. (2018). Экологические последствия урбанизации и индустриализации современности. In ДОСТИЖЕНИЯ ВУЗОВСКОЙ НАУКИ 2018 (pp. 249-252).
11. Самигова, Н. Р. (2016). Исследования влияния производственного шума на слуховой анализатор работников объединения «Махсустрэнс». Молодой учёный, 8, 20.

