HEART AND EMBRYONAL DEVELOPMENT

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ABSTRACT

This paper investigates the major points of heart and embryonal development. In this case research has been conducted both theoretically and practically at all. Finally, research has got outlines of the heart and embryonal development.

Keywords: ***heart , embryonal development, fibro-muscular, central organ, blood circulation***

HEART

The heart is a fibro-muscular, central organ of blood circulation, due to its work, blood vessels circulate continuously inside the body. The heart begins its work with the first breath of a newborn animal and ends only with its death.

The heart is a muscle bag. Right (accessible venous blood) and left (accessible arterial blood) and the atrium, which includes blood from the respective arteries; and ventricles that push blood. Between the atria and ventricles in the left and right half of the heart there are atrioventricular openings equipped with a two- and tricuspid valve, designed for the free passage of blood from the atria to the stomach and preventing the outflow of blood towards the transition. There are semilunar valves for the genital arteries.

Background of the appearance of the heart

For small organisms, there is no problem with the delivery of nutrients and removal of metabolic products from the body (diffusion rate is sufficient). However, with the increase in size, there is a need to ensure the ever-growing needs of the body in the processes of obtaining energy and food and removing the spent. As a result, primitive organisms already have the so-called. "Hearts" that provide the necessary functions. Further, as for all homologous (similar) organs, there is a decrease in the number of compartments to two (in humans, for example, two for each circle of blood circulation).

Embryonic development

The heart, like the circulatory and lymphatic systems, is a derivative of the mesoderm. The heart originates from the union of two primordia, which unite and form the heart tube, in which tissue characteristic of the heart is already represented. The endocardium is formed from the mesenchyme, and the myocardium and epicardium from the visceral leaves of the mesoderm. The primitive heart tube is divided into several parts:

Venous sinus (whose derivative is the sinus of the vena cava)

General atrium

Common ventricle

Heart bulb (lat.bulbus cordis).

Subsequently, the heart tube is wrapped as a result of its intensive growth, first S-shaped in the frontal plane, and then U-shaped in the sagittal plane, resulting in the presence of arteries in front of the venous gate of the formed heart.

For later stages, development is characterized by septation, the separation of the heart tube by septum into chambers. Separation does not occur in fish; in the case of amphibians, the wall forms only between the atria. The atrial wall (septum interatriale) consists of three components, of which the first two grow from top to bottom in the direction of the ventricles.

Primary wall

Secondary wall

False wall

Reptiles have a four-chamber heart, however, the ventricles are combined using an interventricular opening. And only in birds and mammals does a film septum develop, which closes the interventricular opening and separates the left ventricle from the right. The interventricular wall consists of two parts:

The muscle part, grows from the bottom up and divides the ventricles proper, in the region of the heart bulb there remains an opening - foramen interventriculare.

The membrane part separates the right atrium from the left ventricle, and also closes the interventricular opening.

The development of valves occurs parallel to the septation of the heart tube. The aortic valve is formed between the left ventricular arteriotic cone (conus arteriosus) and the aorta, the pulmonary vein valve between the right ventricular arterial cone and the pulmonary artery. Between the atrium and the ventricle, mitral (bicuspid) and tricuspid valves are formed. Sinus valves are formed between the atrium and the venous sinus. The left sinus valve later combines with the septum between the atria, and the right one forms the valve of the inferior vena cava and the valve of the coronary sinus.

Nervous regulation of the heart

In the cavity of the heart and in the walls of large vessels are receptors that perceive fluctuations in blood pressure. Nerve impulses coming from these receptors cause reflexes that adjust the work of the heart to the needs of the body. Impulses-commands about the restructuring of the heart come from the nerve centers of the medulla oblongata and spinal cord. Parasympathetic nerves transmit impulses that reduce the heart rate, sympathetic nerves deliver impulses that increase the frequency of contractions. Any physical activity, accompanied by the connection to the work of a large group of muscles, even a simple change in body position, requires correction of the heart and can excite a center that accelerates the activity of the heart. Painful stimuli and emotions can also change the rhythm of the heart.

HUMAN HEART

The human heart consists of four chambers - the left atrium, the right atrium, the left ventricle, the right ventricle, separated by partitions and valves. Blood from the superior and inferior vena cava enters the right atrium, passes through the tricuspid valve (it consists of three petals) into the right ventricle. Then, through the

pulmonary valve, it enters the pulmonary arteries, goes to the lungs, where there is an exchange and returns to the left atrium. Then, through the mitral or bicuspid valve (it consists of two petals), it enters the left ventricle, then passes through the aortic valve into the aorta.

Hollow enter the right atrium, pulmonary veins enter the left atrium. From the right and left ventricle exit, respectively, the pulmonary artery (pulmonary trunk) and the ascending aorta. The right ventricle and the left atrium close the pulmonary circulation, the left ventricle and the right atrium - the big circle. The heart is located in the lower part of the anterior mediastinum, most of its anterior surface is covered by the lungs. With flowing sections of the hollow and pulmonary veins, as well as the outgoing aorta and pulmonary trunk, it is covered with a chemise (pericardium). The pericardial cavity contains a small amount of serous fluid. In an adult, its volume and weight are on average 783 cm^3 and 332 g for men, 560 cm^3 and 253 g for women.

From 7,000 to 10,000 liters of blood passes through the human heart during the day, about 3,150,000 liters per year.

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