



**MORPHOFUNCTIONAL FEATURES OF THE HEART AND THEIR
SIGNIFICANCE IN THE HUMAN BODY**

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Abstract: This article scientifically analyzes the interrelationship between the morphological structure and physiological functions of the heart. The anatomical layers, chambers, valvular apparatus, and conduction system of the heart are thoroughly studied, and their roles in the circulatory system are highlighted. In addition, the main indicators of cardiac activity, its regulatory mechanisms, and its significance in maintaining vital functions of the human body are discussed.

Keywords: heart, morphofunctional features, myocardium, hemodynamics, cardiac output, blood circulation.

INTRODUCTION

The heart is the central organ of the circulatory system in the human body and performs vital functions. It plays a key role in supplying oxygen and nutrients to all tissues and organs, as well as in removing metabolic waste products.

In recent years, the increasing prevalence of cardiovascular diseases has made the study of the structure and function of the heart a pressing issue. The morphological structure and physiological activity of the heart are closely interconnected, and any disruption of this relationship can lead to various pathological conditions.

The aim of this article is to analyze the morphofunctional features of the heart on a scientific basis and to reveal their significance in the human body.

METHODS

The study is theoretical and analytical in nature, and the following methods were used:

Analysis of anatomical and physiological literature

Review of modern scientific articles

Comparative and systematic approaches

Generalization of statistical data related to cardiac activity

In addition, a morphofunctional analysis method was applied to determine the relationship between the structure and function of the heart.

RESULTS

Morphological Structure of the Heart

The heart is a muscular organ located in the middle part of the thoracic cavity, weighing approximately 250–350 grams. It consists of four chambers:

Right atrium (*atrium dextrum*)



Right ventricle (*ventriculus dexter*)

Left atrium (*atrium sinistrum*)

Left ventricle (*ventriculus sinister*)

The wall of the heart consists of three layers:

Endocardium – inner layer

Myocardium – main muscular layer

Epicardium – outer layer

The myocardium forms the main part of the heart and ensures its contractile function. The thickness of the myocardium in the left ventricle is greater than in the right ventricle, which is associated with the need to pump blood into the systemic circulation.

Valvular Apparatus of the Heart

The heart contains valves that ensure unidirectional blood flow:

Mitral (bicuspid) valve

Tricuspid valve

Aortic valve

Pulmonary valve

These valves play a crucial role in maintaining hemodynamic balance.

Cardiac Conduction System

The heart has a specialized conduction system that ensures automatic contraction:

Sinoatrial node (SA node)

Atrioventricular node (AV node)

Bundle of His

Purkinje fibers

This system ensures the rhythmic and coordinated functioning of the heart.

Physiological Functions of the Heart

The heart performs the following main functions:

Pumping blood (pump function)

Maintaining blood circulation

Regulating blood pressure

Supplying tissues with oxygen

An important indicator of cardiac activity is cardiac output:

$$Q = SV \times HR$$

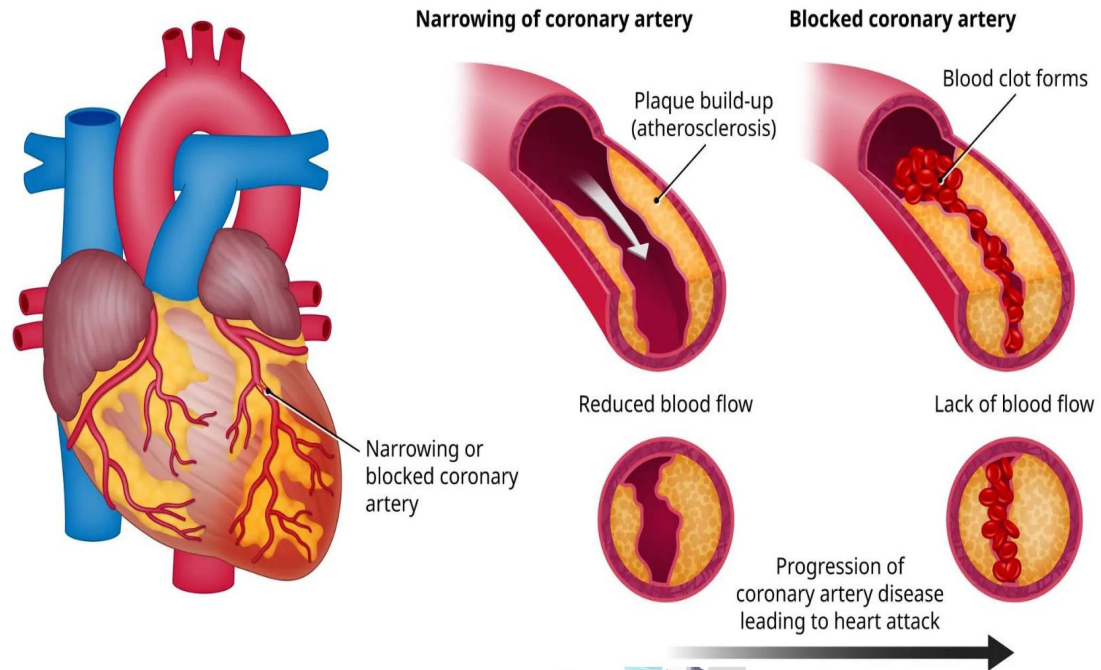
Where:

Q — cardiac output

SV — stroke volume

HR — heart rate

Myocardial Infarction



Regulation of Cardiac Activity

Cardiac activity is regulated by the following systems:

Nervous system (sympathetic and parasympathetic)

Hormonal system (adrenaline, noradrenaline)

Local metabolic factors

Sympathetic stimulation increases cardiac activity, while parasympathetic stimulation decreases it.

DISCUSSION

The obtained results indicate that the morphological structure of the heart determines its functional capabilities. For example, the thickness of the myocardium in the left ventricle is adapted to pump blood under high pressure.

The cardiac conduction system ensures its automaticity, which is essential for maintaining life. Disorders in this system can lead to arrhythmias.

Furthermore, disturbances in cardiac function can lead to the following diseases:

Heart failure

Ischemic heart disease

Arterial hypertension

Arrhythmias

In modern medicine, the in-depth study of the morphofunctional features of the heart contributes to improving the effectiveness of diagnosis and treatment.

CONCLUSION

The morphofunctional features of the heart determine its vital importance in the human body. The harmony between the structure and function of the heart ensures the effective functioning of the circulatory system.



This knowledge plays an important role in the early diagnosis, prevention, and treatment of cardiovascular diseases in medical practice.

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