



The World

The Human Heart

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Mine eye and heart are at a mortal war,
How to divide the conquest of thy sight;
Mine eye my heart thy picture's sight
would bar,
My heart mine eye the freedom of that
right.

My heart doth plead that thou in him dost
lie,

A closet never pierced with crystal eyes,
But the defendant doth that plea deny,
And says in him thy fair appearance lies.

To 'cide this title is impannelled
A quest of thoughts, all tenants to the
heart;

And by their verdict is determined
The clear eye's moiety, and the dear
heart's part:

As thus: mine eye's due is thine outward
part,

And my heart's right, thine inward love
of heart.

Shakespeare

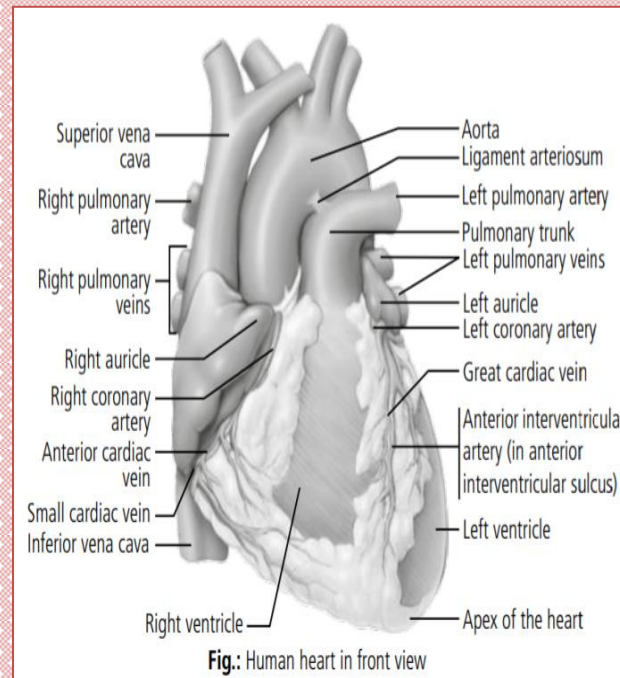


Fig.: Human heart in front view

The heart is one of the most important organs of human body. It is a muscular organ responsible for pumping blood through the blood vessels by repeated, rhythmic contractions. The term cardiac (as in cardiology) means "related to the heart" and comes from the Greek word kardia, for "heart." The heart pumps the blood, which carries all the vital materials that help in various body functions. For example, the brain requires oxygen and glucose, which, if not received continuously, will cause it to lose consciousness. Muscles need oxygen, glucose and amino acids, as well as the proper ratio of sodium, calcium and potassium salts in order to contract normally. The glands need sufficient supply of raw materials from which they manufacture the specific secretions. If the heart ever ceases to pump blood, the body begins to shut down and after a very short period of time, death occurs. All vertebrates including humans have a single heart.

External Structure

Human heart is 4 chambered, consisting of two atria and two ventricles.

The left atrium is smaller than the right atrium. Each atrium has an appendage called an auricle which increases its surface area. The superior vena cava, inferior vena cava and coronary sinus open into right atrium. The left atrium receives four openings of pulmonary veins.

Ventricles are thick walled and the left ventricle is longer and narrower than the right ventricle. Its walls are about three times thicker than the right ventricle. The pulmonary trunk arises from the right ventricle. It divides into left and right pulmonary arteries that carry deoxygenated blood to the lungs. The aorta arises from the left ventricle.

Internal Structure

The two thin walled atria are separated by interatrial septum. The right atrium receives blood from superior vena cava, inferior vena cava and coronary sinus. The superior vena cava carries blood from upper body and the inferior vena cava carries blood from the lower body region. Coronary sinus carries blood from the heart itself.

PULSE

Pulse is the alternate expansion and elastic recoil of an artery with each systole. It is the strongest in the arteries closest to the heart. Therefore, it is also called as arterial pulse. Normal pulse rate ranges from 70–90 per minute.

BLOOD PRESSURE

Blood pressure is defined as the force or pressure which the blood exerts on the walls of the artery in which it is contained. The arterial blood pressure is the result of the discharge of the blood from the left ventricle into the already full aorta. When the left ventricle contracts pushing the blood into the aorta, the pressure produced is known as systolic blood pressure (120 mmHg). When the complete diastole occurs and the heart is resting, the pressure within the blood vessels is called as the diastolic blood pressure (80 mmHg). The blood pressure is expressed as $BP = 120/80$ mmHg. The difference between the systolic and diastolic pressure is called pulse pressure. The average of blood pressure levels is called mean blood pressure. Its normal value is 40 mmHg but becomes more in case of hypertension. Pulse pressure is lower in case of kids.

Measurement of blood pressure

Both systolic and diastolic blood pressures are readily measured in human beings with the use of a device called sphygmomanometer, in terms of height in millimeters of a column of mercury. An inflatable cuff containing a pressure gauge is wrapped around the upper arm and a stethoscope is placed in a spot on the arm just below the cuff where the brachial artery lies.. The high pressure in the cuff is transmitted through the tissue of the arm and completely compresses the artery under the cuff, thereby preventing blood flow through the artery. The air in 22 MTBIOLOGY the cuff is then slowly released, causing the pressure in the cuff and on the artery to decrease.. The high-velocity blood flow is turbulent and, therefore, produces vibrations called Korotkoff's sounds that can be heard through the stethoscope. Thus, the pressure at which sounds are first heard as the cuff pressure decreases is identified as the systolic blood pressure.

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