

Topic: HUMAN PHYSIOLOGY

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Working of the heart

The heart is a pump and the events which occur in the heart during the circulation of blood are spoken of as the **cardiac cycle**. In a normal heart beat the two auricles contract simultaneously while the two ventricles relax and vice versa. The term **systole** refers to the phase of contraction. **Diastole** is the phase of relaxation. A cardiac cycle consists of the systole and diastole of both auricles and the ventricles. During the auricular diastole the right auricle receives impure blood from the superior and inferior vena cavae. The left auricle receives pure blood from the pulmonary veins. When the auricle contracts both the auriculo-ventricular valves are opened and the semilunar valves are closed. So, the blood from the right auricle passes into the right ventricle through the tricuspid valve and the pure blood from the left auricle passes into the left ventricle by means of the mitral valve. In the ventricular systole the ventricles contract and force the blood into their respective vessels. When the ventricles contract the semilunar valves are opened and the auriculo-ventricular valves are closed. The impure blood from the right ventricle passes through the pulmonary artery to the lungs for purification by opening the pulmonary semilunar valves. The pure blood from the left ventricle is taken away through the aorta to all over the body by opening the aortic semilunar valve. Thus, the blood circulates through the lungs from the right ventricle to the left auricle and through the rest of the body from the left ventricle to the right auricle. The course through the lungs is called **pulmonary** or lesser circulation, that through all other parts of the body, the **systemic** or greater circulation. The average heart beats 72 times/minute. A complete cardiac cycle requires 0.8 seconds.

Pulse

The alternate expansion and elastic recoil of an artery with each systole of the left ventricle is called the pulse. **Pulse** is strongest in the arteries which are closer to the heart. It becomes weaker as it passes over the arterial system and it disappears altogether in the capillaries. The pulse may be felt in any artery that lies near the surface of the body and over a bone or other firm tissues. The radial artery at the wrist is most commonly used. The pulse rate is the same as the heart rate and averages between 70 and 90 beats per minute in resting state. If the pulse rate is rapid it is termed as **tachycardia**. If it is slow, **bradycardia**. Each pulse beat should be of equal strength. Irregularities in strength may indicate a lack of muscle tone in the heart or arteries.

The Heart Sounds

Heart sounds provide valuable information about the heart valves. The normal heart sounds are usually described by the two syllables! 'Lubb' and 'Dub'. The first sound 'Lubb' represents the closing of the auriculo-ventricular valves. The second sound 'Dub' represents the closing of the semilunar valves. If the sounds are peculiar, they are called 'murmurs. Some murmurs are caused by the noise made by a little blood bubbling back up into an auricle because of improper closure of an auriculo-ventricular valve. Heart sounds can be easily heard by using stethoscope.