

Chapter Three : Managing the Circulatory System.

The heart is responsible for controlling and manipulating the circulatory system which consists of the following sub systems:-

- (a) **Pulmonary circulation** which entails transporting blood back from the entire body through two large veins to the right atrium of the heart and from there to the lungs via the right ventricle. From the lungs, oxygenated blood returns to the left atrium through four large pulmonary veins.
- (b) **Branching** refers to the aorta dividing into a number of main branches which further divide into smaller one until the entire body is supplied with a series of elaborately branched blood vessels. These also sub-divide further into the minute capillaries so that every square inch of the body not only receives oxygen-fresh blood but the blood is also able to furnish nutrients to the cells and remove waste matter from the tissues.
- (c) **Portal circulation** is the circulation of blood to and through the liver which carries out certain life-sustaining modifications to it before passing it on.
- (d) **Coronary circulation** which is exclusively within and for the heart itself.

The beating action of the heart consists of alternate contraction (systole) and relaxation (diastole) of the muscular walls of the auricles and ventricles. The entire cycle can be divided into three distinct periods. Firstly when the auricles contract, secondly when the ventricles contract and thirdly when both the auricles and ventricles remain at rest. With every beat the heart makes two sounds, the first being dull and protracted with ventricular systole and the second sharp and short with the sudden closure of the valves. The rate and strength of heartbeat are controlled by nerves through a series of reflexes. The sinoauricular node, a bit of specialized tissue in the right atrium, initiates heartbeat with the contraction impulse arising in the heart muscle itself. This contraction excites the auriculoventricular node, another piece of specialized tissue, which then conducts the impulses to the muscles of the ventricles. Each cardiac cycle produces an electrical potential. Pulse is the expansion and contraction of the arterial walls, near the skin undersurface, which are stretched and relaxed by blood as the heart pumps. When irregular heartbeats or disrupted heart rhythm occurs the heart is said to be undergoing a cardiac arrhythmia. This would include an uneven pulse rate. Such a condition is dangerous and the main cause of sudden death. Angina, on the other hand is a condition of chest pain or discomfort arising out of the heart and occurs whenever the heart's oxygen demand outweighs the supply. The condition arises when the arteries get narrowed and cannot convey the right volume of oxygenated blood. Blood pressure is an important diagnostic index, especially of circulatory function. High blood pressure or hypertension puts enormous strain on heart function. Low blood pressure or hypotension results from infections, wasting diseases or a hemorrhage.