The Circulatory System

The circulatory system is made up of the heart, blood vessels, and blood. The heart pumps blood through the blood vessels to the cells. The blood carries food, oxygen, and other substances cells need to function properly.

The circulatory system performs these major functions:

- supplying food, oxygen, and hormones to cells
- producing and supplying infection-fighting blood cells
- removing waste products from cells
- controlling body temperature

A healthy circulatory system is essential for life. Cells, tissues, and organs need good circulation to function well. If circulation is reduced, cells do not receive enough oxygen and nutrients. Waste products of cell metabolism are not removed. Organs become diseased.

Blood contains blood cells and plasma. Plasma is the liquid portion of the blood. It carries many substances, including blood cells, nutrients, and waste products. Analyzing these parts of blood samples can help identify illness and infection:

1. Red blood cells carry oxygen from the lungs to all parts of the body. Red blood cells are produced by bone marrow, a substance found inside hollow bones. Iron, found in bone marrow and red blood cells, is essential to blood. It gives it its red color. Red blood cells function for a short time, then die. They are filtered out of the blood by the liver and spleen. Iron in diets allows bodies to produce new red blood cells.

2. White blood cells defend the body against foreign substances, such as bacteria and viruses. When the body becomes aware of these invaders, white blood cells rush to the site of infection. They multiply rapidly. The bone marrow, spleen, and thymus gland produce white blood cells.

3. Platelets are also carried by the blood. They cause the blood to clot, preventing excess bleeding. Platelets are also produced by the bone marrow.

The heart is the pump of the circulatory system. The heart is a muscle. It is located in the middle lower chest, on the left side. The heart muscle is made up of three layers: the pericardium, the myocardium and the endocardium.

The interior of the heart is divided into four chambers. The two upper chambers, called atria or the left atrium and right atrium, receive blood. The two lower chambers, or ventricles, pump blood. The right atrium receives blood from the veins. This blood, containing carbon dioxide, then flows into the right ventricle. It is pumped to the blood vessels in the lungs. Carbon dioxide is exchanged for oxygen. The heart's left atrium

receives the oxygen-saturated blood. It then flows into the left ventricle. There it is pumped through the arteries to all parts of the body. Two valves, one located between the right atrium and right ventricle and the other between the left atrium and left ventricle, allow the blood to flow in only one direction.

The heart functions in two phases:

1. The resting phase or diastole, when the chambers fill with blood; and

2. The contracting phase or systole, when the ventricles pump blood through the blood vessels. When a blood pressure is taken, the numbers measure these two phases.

Three types of blood vessels are found in the body: arteries, capillaries, and veins.

Arteries carry oxygen-rich blood away from the heart. The blood is pumped from the left ventricle, through the aorta, the largest artery. Blood is then pumped through other arteries that branch off from it. The coronary arteries carry blood to the heart itself.

Capillaries are tiny blood vessels that receive blood from the arteries. Nutrients, oxygen, and other substances in the blood pass from the capillaries to the cells. Waste products, including carbon dioxide, pass from the cells into the capillaries.

Veins carry the blood containing waste products from the capillaries back to the heart. Near the heart, the veins come together to form the two largest veins, the inferior vena cava and the superior vena cava. These empty into the right atrium. The inferior vena cava carries blood from the legs and trunk. The superior vena cava carries blood from the arms, head, and neck.