

The Human Circulatory System consists of:

- Heart – A pump which pushes blood around the body
- Blood Vessels – A network of tubes to carry blood around the body
- Blood – A liquid that transports materials

The heart has four chambers:

Two smaller upper chambers called atria and two larger lower chambers called ventricles.

Blood enters the atria from large veins. The pulmonary vein brings oxygenated blood from the lungs into the left atrium. The vena cava brings deoxygenated blood from the body tissues into the right atrium. The blood passes from each atrium to its corresponding ventricle, and the ventricle pumps it out into the arteries.

The artery carrying oxygenated blood to the body from the left ventricle is the aorta. The pulmonary artery carries deoxygenated blood from the right ventricle to the lungs. (See fig. 1)

In pumping the blood the muscle in the walls of the atria and ventricles contracts and relaxes. The walls of the atria contract first and force blood into the two ventricles. Then the ventricles contract and send blood into the arteries. The blood is stopped from flowing backwards by four sets of valves.

The blood pumped by the heart travels all round the body in blood vessels. It leaves the heart in arteries and returns in veins. The blood passes twice through the heart during one complete circuit; once on its way to the body and again on its way to the lungs. The circulation through the lungs is called the pulmonary circulation and the circulation round the rest of the body is called the systemic circulation. (See fig. 2 and fig. 3)

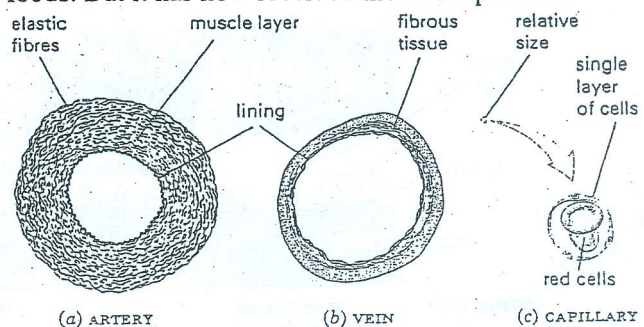
In the lungs the blood picks up oxygen and loses carbon dioxide. As the blood moves around the body it supplies oxygen to the cells and collects carbon dioxide from the cells.

As blood passes the small intestines it picks up the small digested food molecules such as glucose, amino acids and fatty acids. As the blood moves around the body it supplies cells with these food particles. (See Table 1)

The blood vessels carry blood around the body. There are three types of blood vessels:

- Arteries: These are fairly wide vessels with thick muscular walls. They carry blood from the heart to the limbs and organs of the body. The blood in the arteries except for the pulmonary artery is oxygenated.
- Veins return blood from the tissues to the heart. They have thinner walls than arteries. The blood in most veins is deoxygenated and contains less food but more carbon dioxide than the blood in most arteries. The pulmonary vein which returns blood from the lungs to the heart contains oxygenated blood.
- Capillaries: These are tiny vessels. The thin capillary walls allow some liquid to pass through i.e they are permeable. Blood pressure in the capillaries forces part of the plasma out through the walls. This fluid is called tissue fluid. This fluid bathes all the living cells of the body and supplies the cells with their needs. The tissue fluid eventually seeps back having given up its food and dissolved foods. But it has now received the waste products of the cells.

(See fig. 4)



Circulatory System

Figure 8.10 Mammalian heart

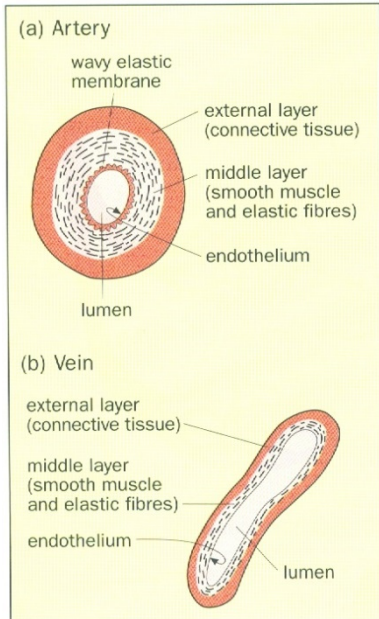


Figure 8.6 Transverse sections of blood vessels

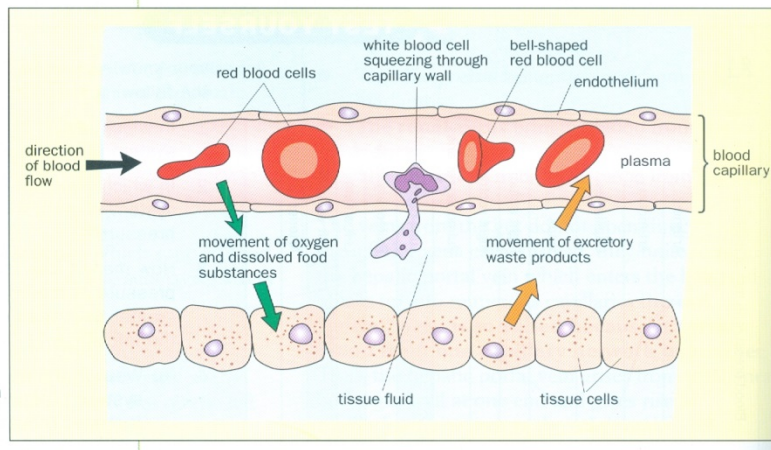
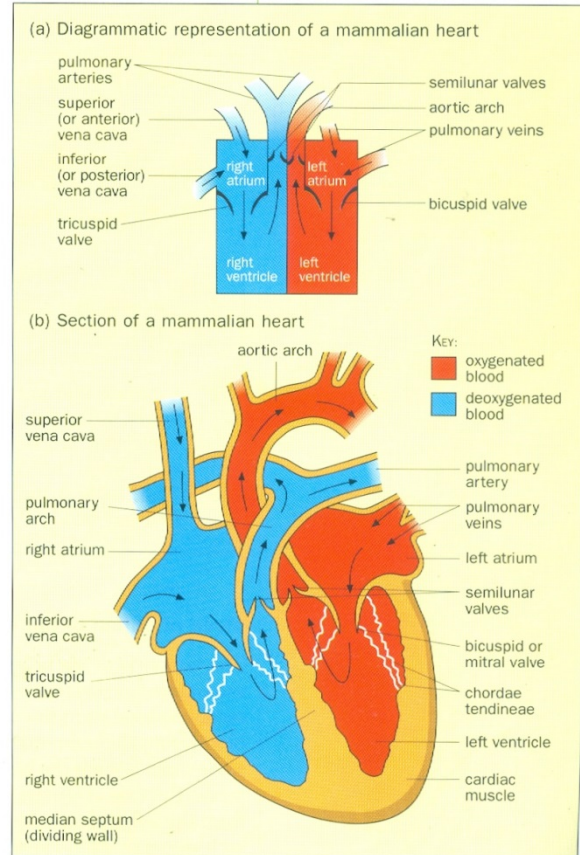


Figure 8.15 The relationship between a blood capillary, tissue fluid and tissue cells

Figure 8.16 Blood and lymph capillaries

