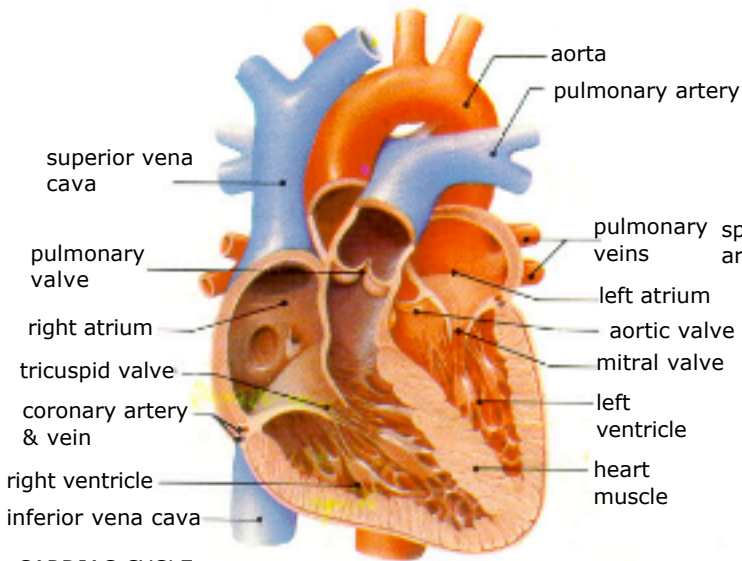


The Circulatory System 1



The many vital functions of the blood depends on its continuous circulation to all parts of the body. Blood is pumped by the right side of the heart through the pulmonary artery into the lungs, where it collects oxygen. It then returns through the pulmonary veins to the left side of the heart to be pumped through the aorta and the arterial system. It gives up this collected oxygen, which is necessary for all vital bodily processes, to every tissue in the body. The deoxygenated blood then returns through the veins to enter the right side of the heart once again.



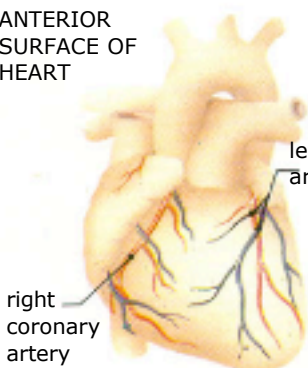
CARDIAC CYCLE



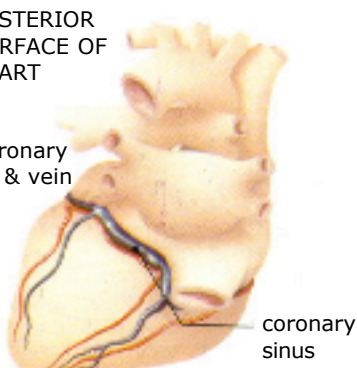
venous blood fills atria atria contract to fill ventricles ventricles contract to expel blood relaxed atria are filled again

The Heart is a double sided pump with four chambers; valves ensure the correct flow of blood. Venous blood enters the right atrium, passes into the right ventricle and is pumped along the pulmonary artery into the lungs. Blood returns from the lungs via the pulmonary veins into the left atrium, passes into the left ventricle and is forced out through the aorta. The sequence of these events is shown in the "CARDIAC CYCLE" diagram.

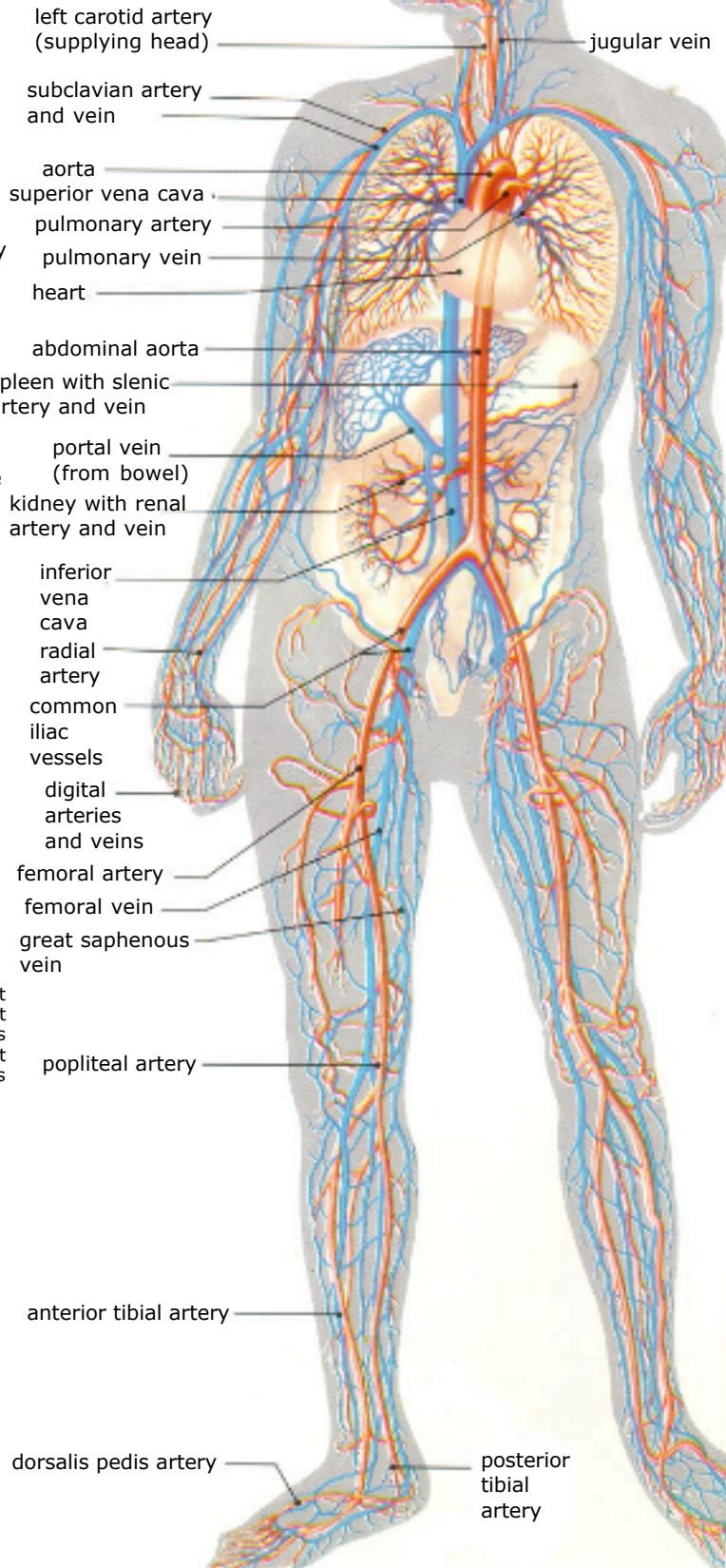
ANTERIOR SURFACE OF HEART



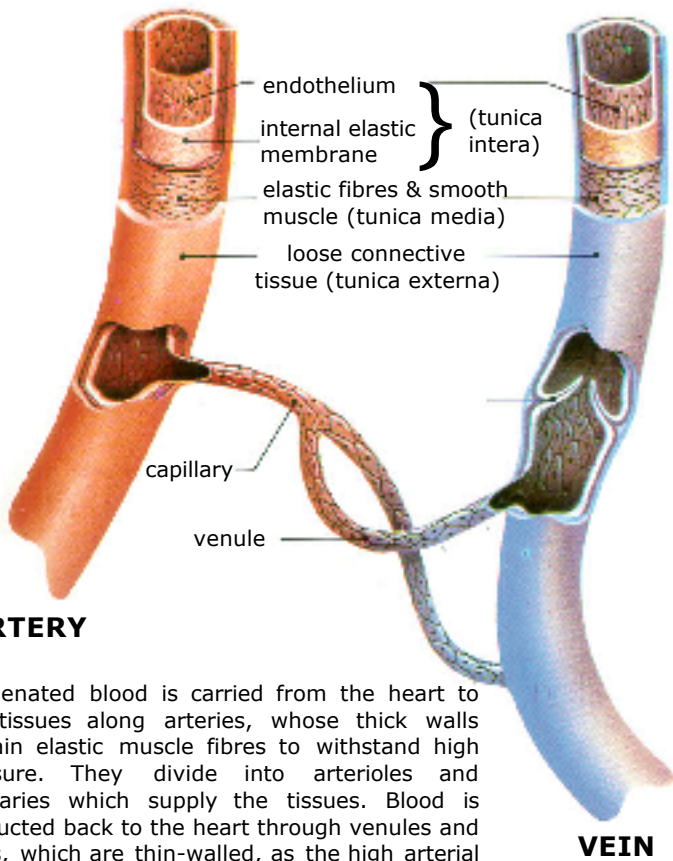
POSTERIOR SURFACE OF HEART



The heart muscle receives its oxygen from the right and left coronary arteries. If either of these vessels get blocked, a "heart attack" occurs; with muscle damage, chest pain and possible death. The coronary veins drain into the right atrium via the coronary sinus.



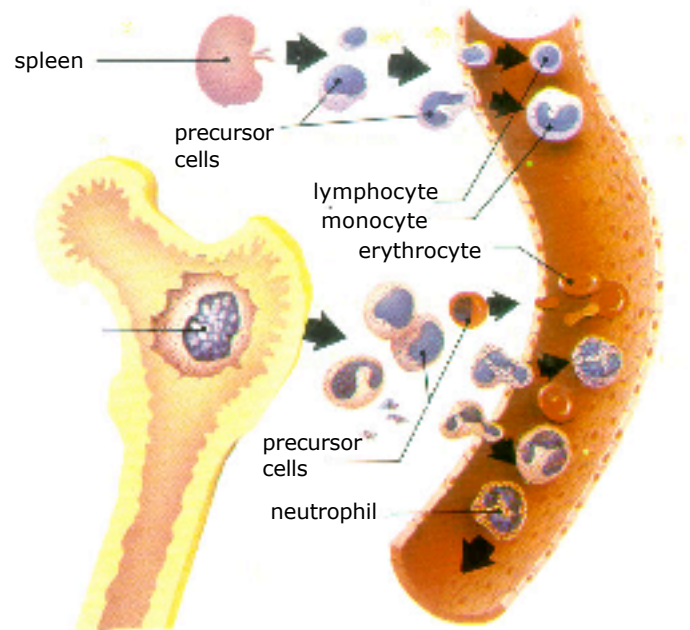
The Circulatory System 2



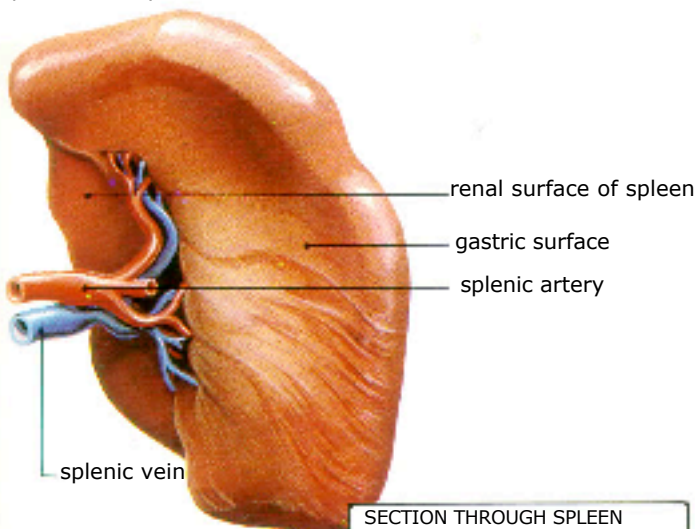
ARTERY

VEIN

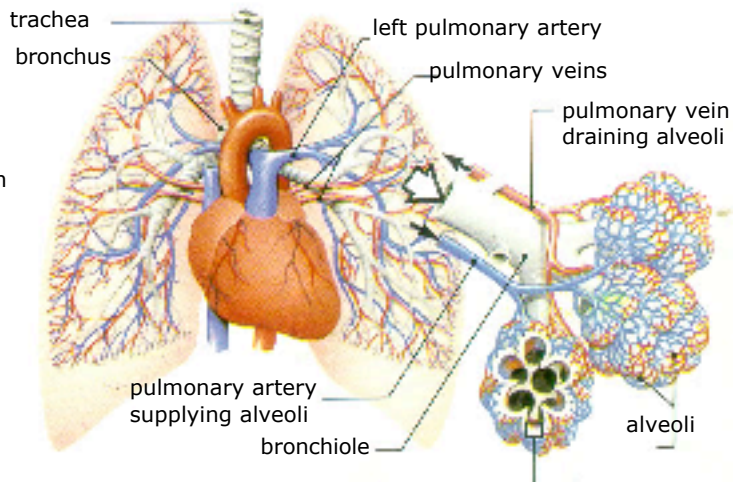
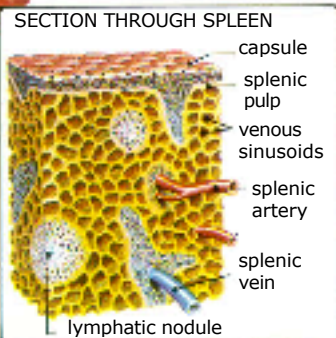
Oxygenated blood is carried from the heart to the tissues along arteries, whose thick walls contain elastic muscle fibres to withstand high pressure. They divide into arterioles and capillaries which supply the tissues. Blood is conducted back to the heart through venules and veins, which are thin-walled, as the high arterial pressure has been lost. Hence valves are necessary to ensure that blood flows in the correct direction. If valves become damaged, the back pressure may cause "varicose" veins.



The principle blood-forming organs are the bone marrow, the lymph nodes and the spleen. The active bone marrow tissue is found at the ends of most long bones, in the ribs, breastbone, skull and vertebrae. Red blood cells (which transport oxygen and are by far the most numerous type of blood cell) are formed in the bone marrow, passing through various stages of maturation before they are released into the blood stream. The bone marrow also manufactures certain types of white blood cells and platelets (important for blood-clotting). The lymphatic tissues (including the spleen) form other types of white blood cells, which similarly pass through several stages before reaching maturity. White blood cells defend the body against infection.



The Spleen is a complex organ with several functions. It acts as a filter for blood by removing old or damaged red blood cells. This takes place largely in the spaces known as the "venous sinusoids". The spleen also contains lymphatic nodules which form part of the body's immune system. These nodules also manufacture and release white blood cells into the circulation.



Gaseous interchange is the uptake by the blood of oxygen and the release of carbon dioxide. It takes place in the alveoli of the lungs. There are about 300 million alveoli, each surrounded by a mesh of blood capillaries which lie very close to the air-filled spaces (lumen) inside the alveolus. Oxygen diffuses into the blood vessels from the air in the lumen, while carbon dioxide similarly diffuses from the blood into the lumen.

