

Blood Composition

There are approx. 4 - 6 quarts of blood in the average adult. It transports:

oxygen from the lungs

carbon dioxide from the body to the lungs

nutrients from the digestive tract to the body cells

metabolic waste from the body to the organs of excretion

heat produced by the body

hormones produced by the endocrine glands to the body

Plasma - approx. 90% water

Erythrocytes - red blood cells, produced in the red bone marrow (approx. 1 million/min.). There are approx. 25 trillion of these disk shaped cells in the body. They contain **hemoglobin** - a complex protein that carries both oxygen and carbon dioxide

Leukocytes - white blood cells that can pass through capillary walls and enter body tissue. Their main function is to fight infection

neutrophils - phagocytize bacteria by secreting the enzyme lysozyme

eosinophils - remove toxins & produce antihistamines

basophils - part of the body's inflammatory response. They produce histamine, a vasodilator, and heparin, an anticoagulant.

monocytes - phagocytize bacteria and foreign materials.

lymphocytes - provide immunity by developing antibodies & protect against the formation of cancer cells.

Thrombocytes (platelets) - important for the clotting process. They secrete a chemical (serotonin) which cause the blood vessel to spasm and narrow, and release an enzyme (thromboplastin) which works with calcium, etc. to form thrombin, which acts as a gel-like net that traps particles to form a sticky plug or clot.

Note - Plasma makes up 55% of the total blood volume.

The Circulatory System

Endocardium - a smooth layer of cells that lines the inside of the heart and blood vessels.

Myocardium - muscular, middle layer of the heart

Pericardium - 2 layered of the membrane/sac around the heart; fluid prevents friction/damage

Septum - a muscular wall separating the right and left halves/sides

Arteries - carry blood away from the heart

Capillaries - connect arterioles and venules; thin wall - only one cell layer thick

Veins - carry blood back to the heart

Cardiac Cycle

Diastole - heart is resting

Systole - heart is contracting

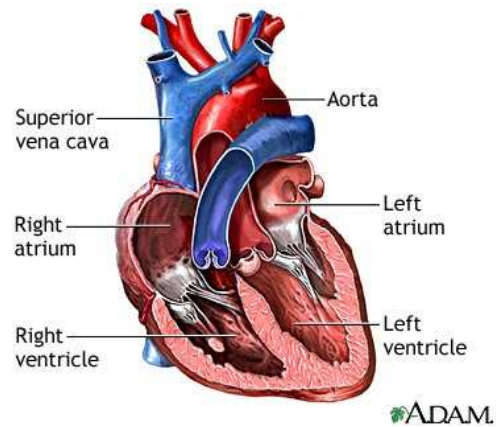
Sinoatrial (SA) node - “pacemaker” electrical impulse moves blood from atrium to ventricle

*Atrioventricular (AV) node - between atrium & ventricle; sends electrical impulse to bundle of His

*Atrioventricular bundle (bundle of His) - carries impulse down into ventricle through right & left branch

*Right & Left branch, Purkinje fibers - nerve fibers through out the ventricles

*causes ventricle to contract (the whole thing takes approximately .8 seconds)



Vena cavas - O₂ poor, return blood from body

Right atrium - O₂ poor, receives blood from vena cavas

Tricuspid valve - between right atrium & right ventricle

Right ventricle - O₂ poor, receives blood from right atrium

Pulmonary valve - between right ventricle & pulmonary arteries

Pulmonary arteries - O₂ poor, carries blood from right ventricle to lungs

Lungs - receives blood from pulmonary arteries, add O₂

Pulmonary veins - O₂ rich, carries blood from lungs back to the heart

Left atrium - O₂ rich, receives blood from pulmonary veins

Mitral valve - between the left atrium & left ventricle (also called Bicuspid valve)

Left ventricle - O₂ rich, receives blood from left atrium

Aortic valve - between the left ventricle & aorta

Aorta - O₂ rich, receives blood from left ventricle & carries it to the body

Body - uses the O₂ rich blood