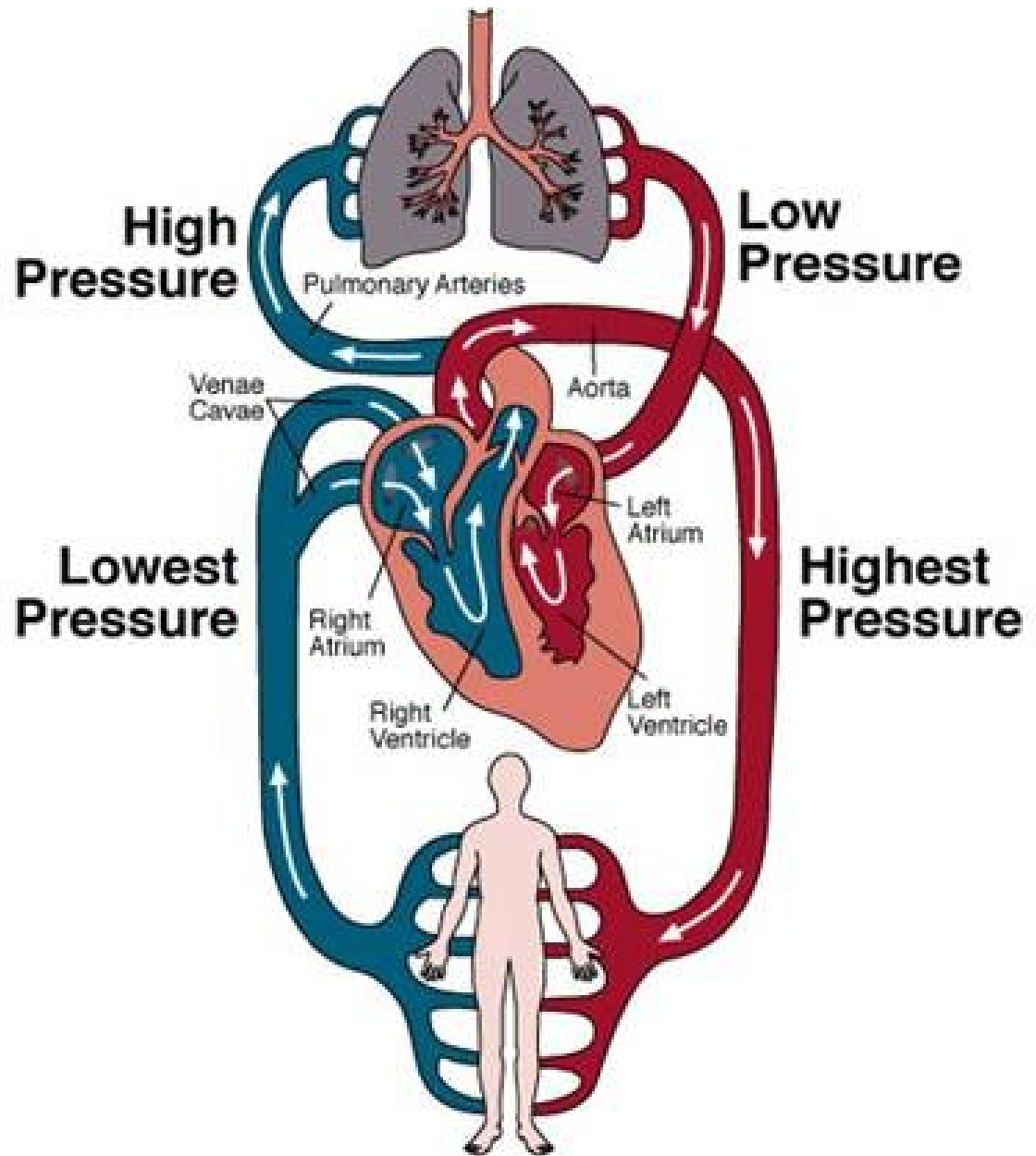
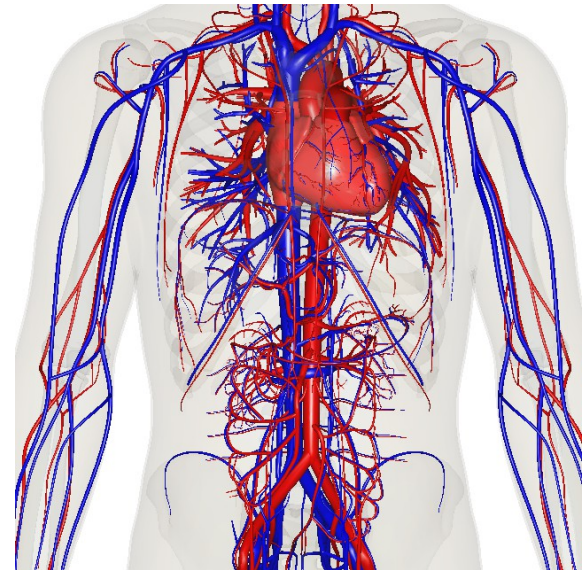


Circulatory System



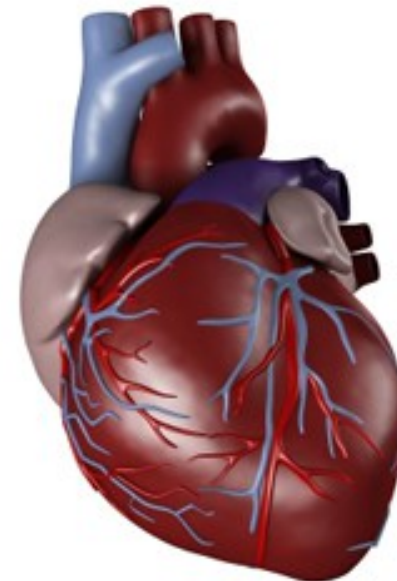
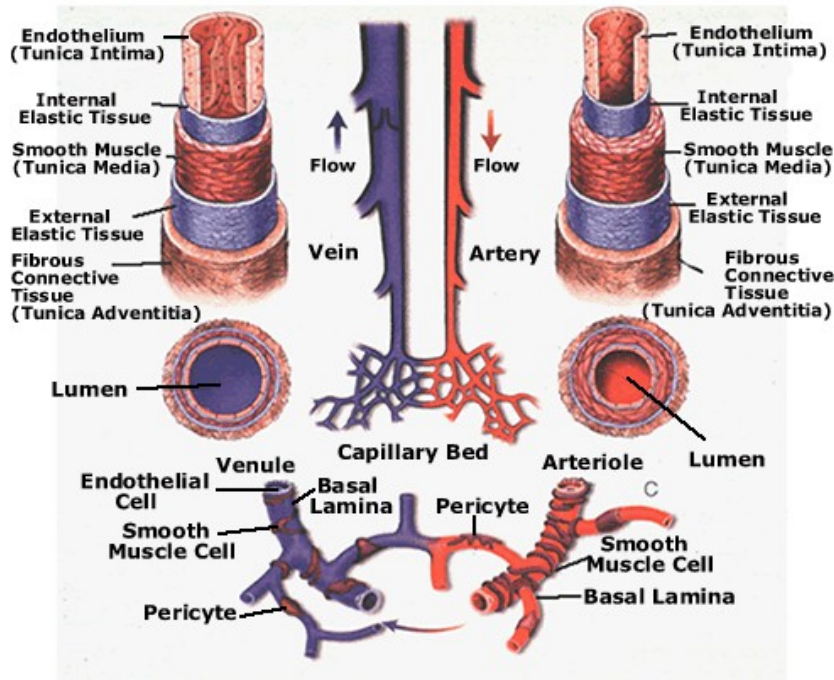
Main Functions

- 1) Transports oxygen to the cells from the lung
- 2) Transports carbon dioxide from cells to the lung
- 3) Transports essential nutrients to the cells
- 4) Carries wastes from cells



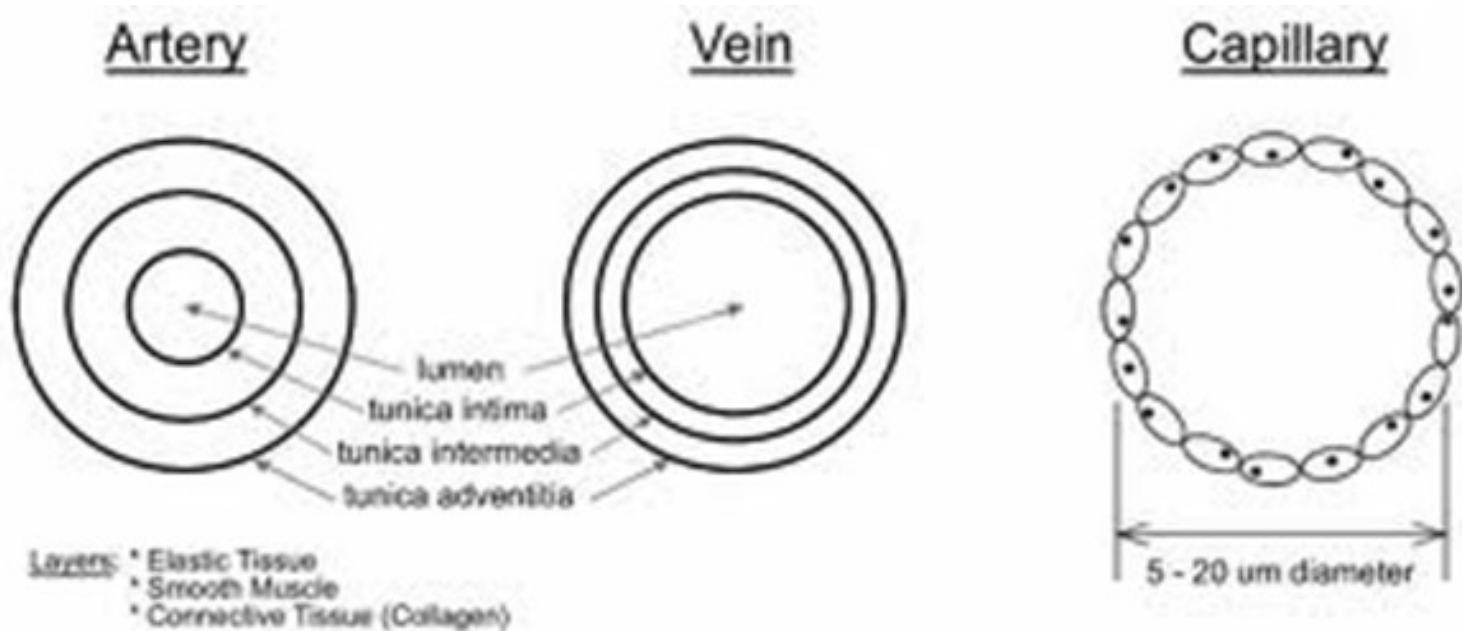
3 main parts of circulatory system

- i. Blood Vessels
- ii. Blood
- iii. Heart



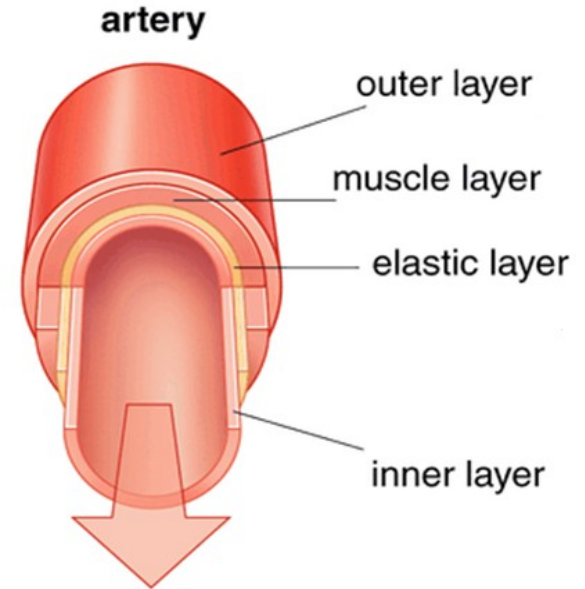
Blood Vessel Pathway

arteries - arterioles - capillaries - venules - veins



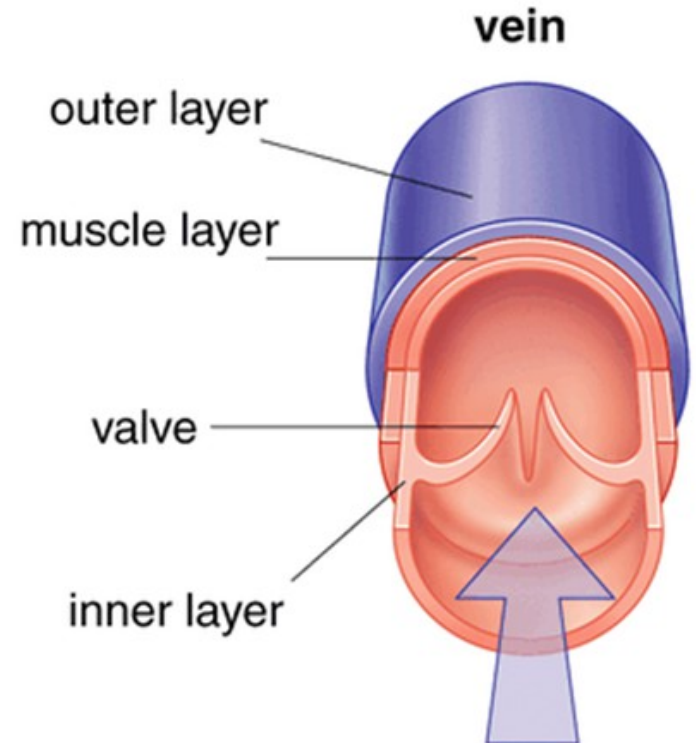
Arterial System

- carry blood away from the heart
- Thick walled
- smaller vessels are called arterioles
- Transports blood under pressure.
- Blood moves in a pulse-like wave.
- Contraction & relaxation of arterioles is the major determinant of the overall blood pressure.



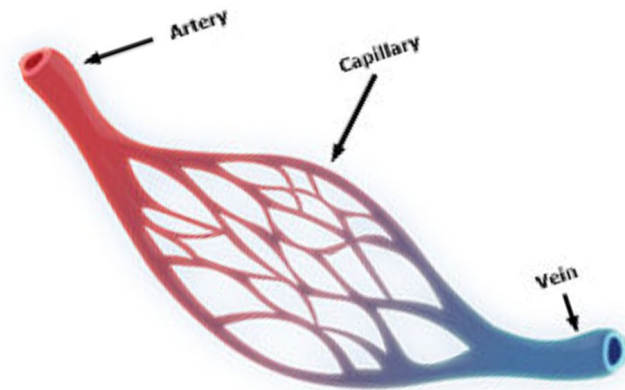
Venous System

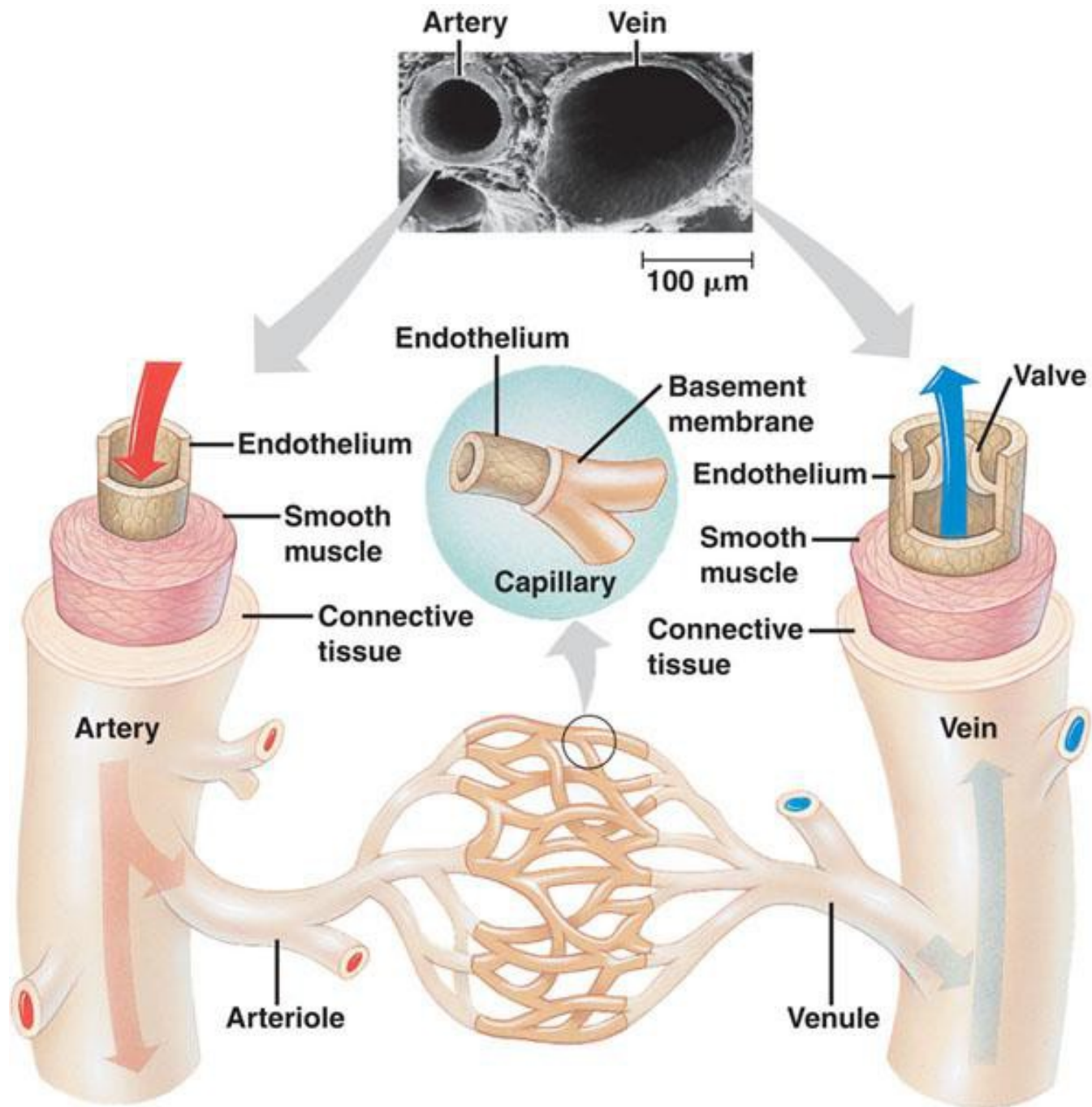
- carry blood towards the heart
- smaller vessels are called venules
- Contains valves
- Thinner walls, larger diameters & less muscle than arteries.
- Contains 70% of total blood volume.
- Most veins work against gravity.
 - Valves allow one-way flow.
 - Contraction of skeletal muscles pushes blood toward heart.



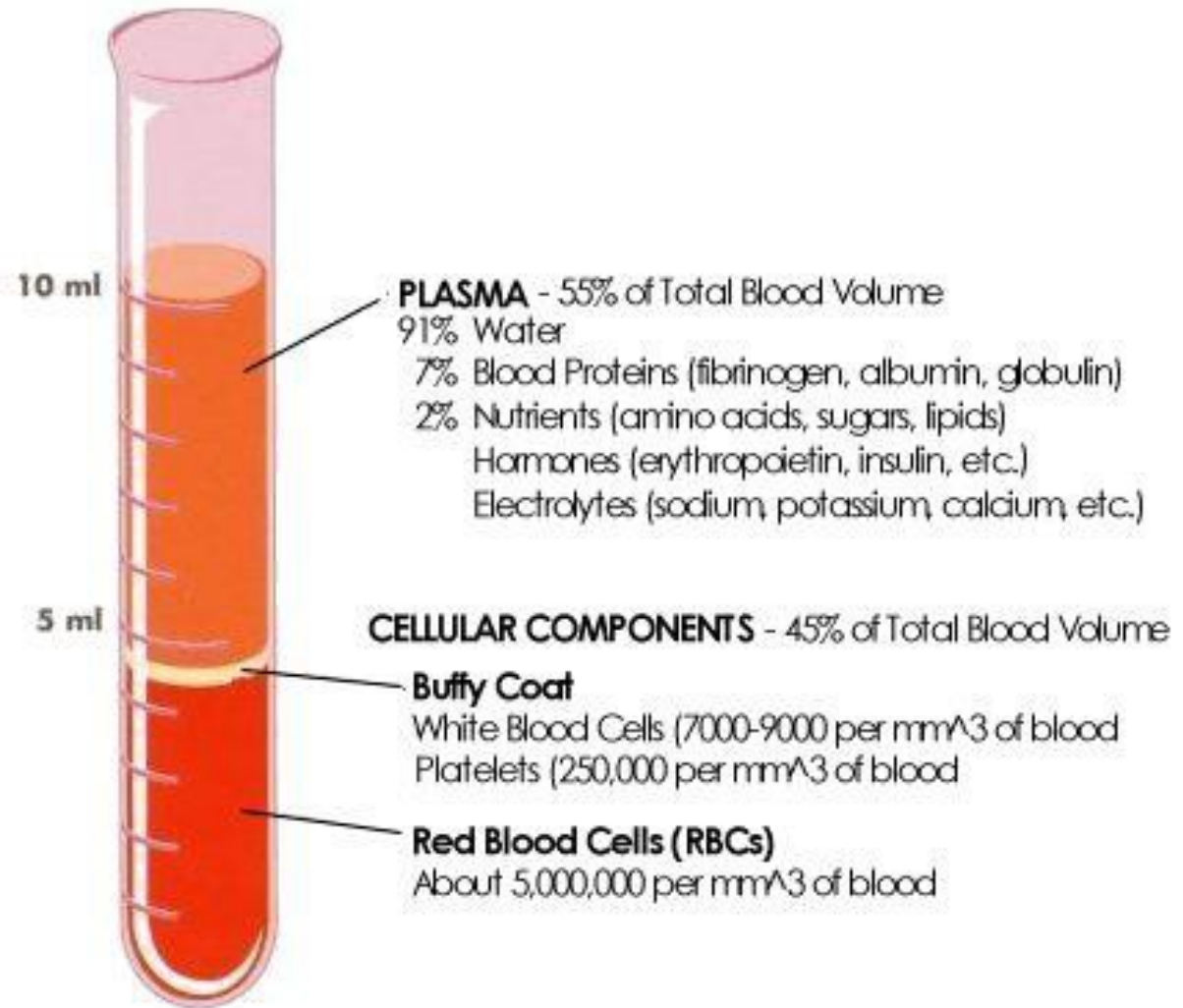
Capillaries

- connect the arteries to the veins
- Smallest of the blood vessels
- RBC's travel single file through capillaries
- Branch like system to increase surface area for diffusion
- Site of gas exchange



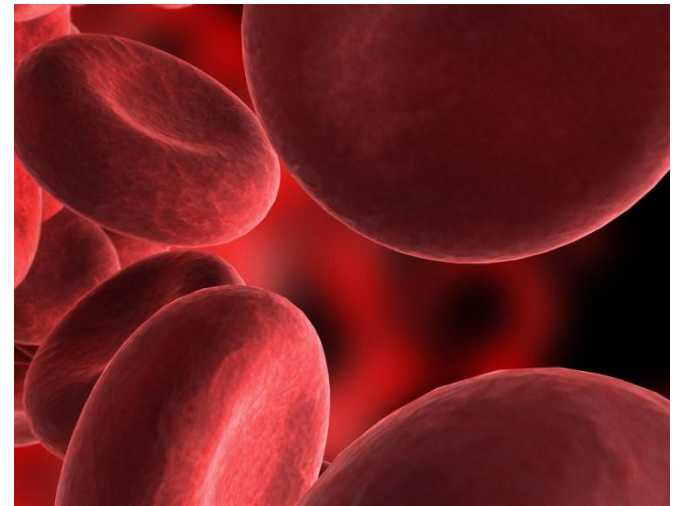


Components of Blood



Erythrocytes: Red Blood Cells

- Produced in bone marrow, stored in spleen
- Constantly destroyed and replaced
- Distinct **biconcave** shape
 - Flattened disc that is pinched in the centre
 - Makes it flexible for traveling through various blood vessels
- No nucleus
- No mitochondria
- Contains special **hemoglobin** molecule

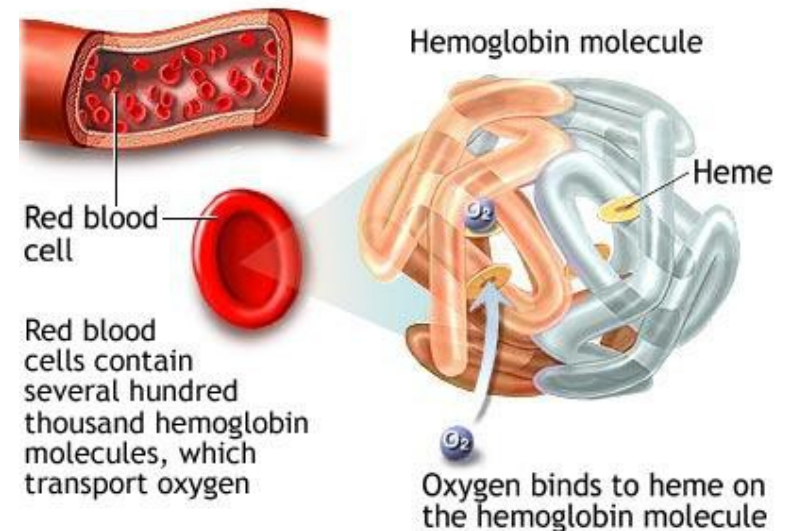


Hemoglobin

- Complex protein made up of 4 protein chains, each with a central iron-containing heme group
- Iron gives RBCs their distinct red colour
- Iron binds with oxygen
 - blood becomes **oxygenated**

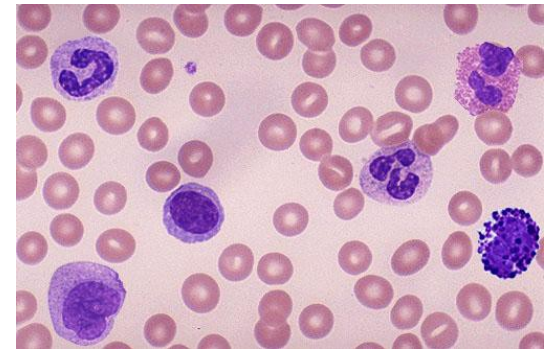
(4 O₂ molecules per hemoglobin molecule)

- Iron is recycled in bone marrow



Leukocytes: White Blood Cells

- Produced in bone marrow
- Larger than red blood cells, but much fewer in number
- Amoeboid-shaped
- Contain nucleus and lysosomes
- Part of body's immune response system
- Detects and defends body from infection and diseases
- Lysosomes digest foreign bacteria
- **Pus** is formed at site of infection
 - White blood cells (living & dead) + bacteria
 - Body's natural “soap”
- An increase in WBCs indicate the body is fighting an infection

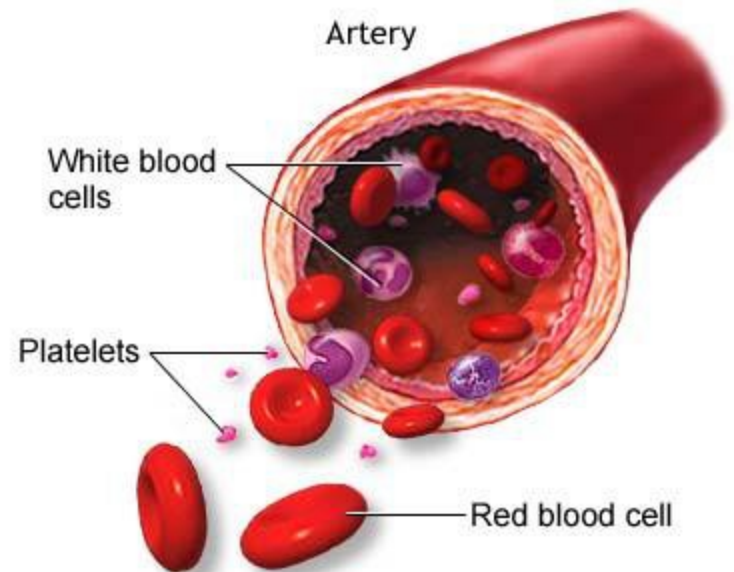


Leukemia

- Cancer of the white blood cells
- White blood cells are produced in overabundance in the bone marrow
- Bone marrow becomes crowded and is unable to manufacture other blood cells
- Malignant WBCs can leave bone marrow, travel bloodstream and affect other organs

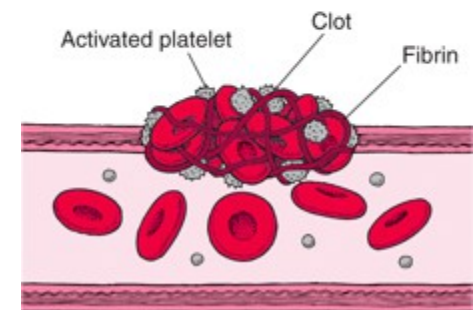
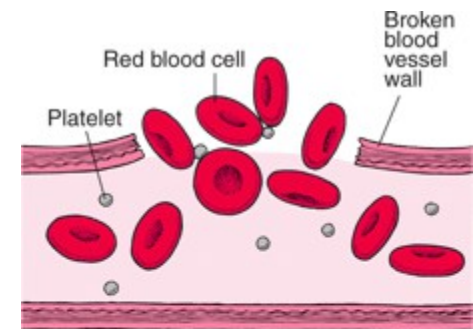
Platelets

- Fragments of special cells from the bone marrow
- Important for circulatory system repair
- Form blood clots



Platelets – Blood Clotting

- Detect damaged blood vessels
- Burst and release special adhesive chemicals
- Platelets stick together and form a **platelet plug**
- Through chemical reactions,
strand-like **fibrin** molecule forms creating a mesh. This is a blood clot.
- Clot protects body from losing
blood through the damaged vessel
- Holds vessel wound together until it can
be reconstructed with new tissue growth



Hemophilia

- X-linked genetic disorder
- Individual lacks special proteins that are needed for creating blood clots
- Can bruise easily
- Can bleed excessively if cut – sometimes bleeding to death