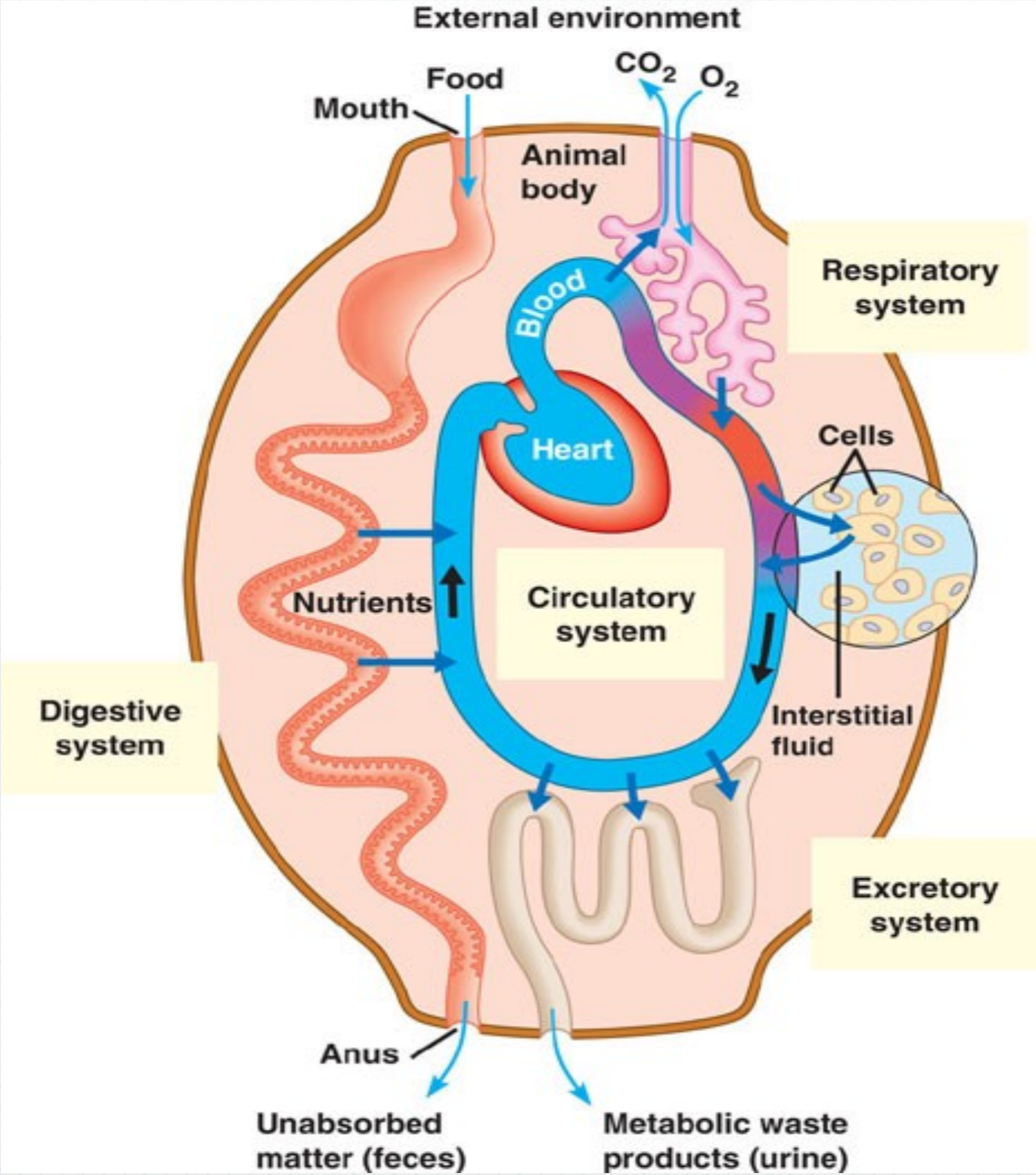
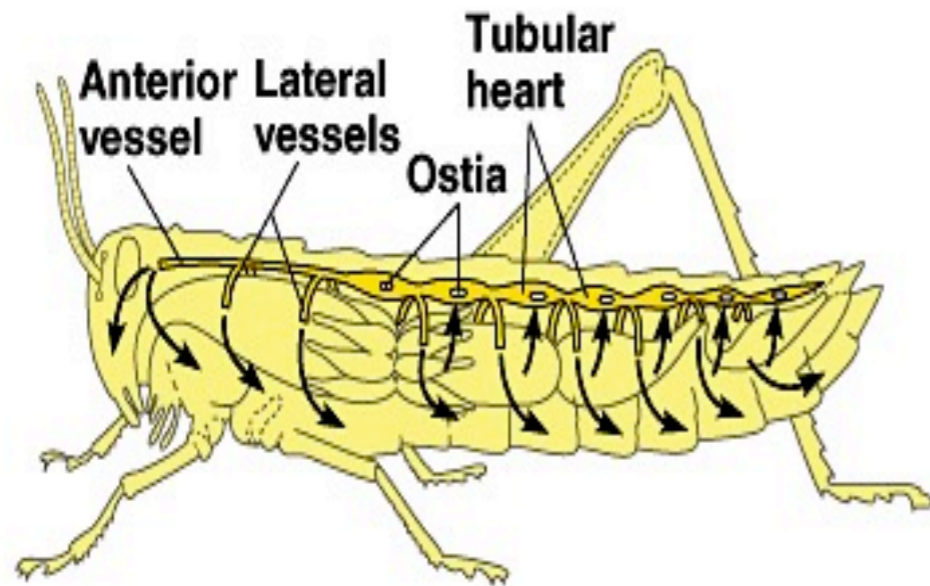
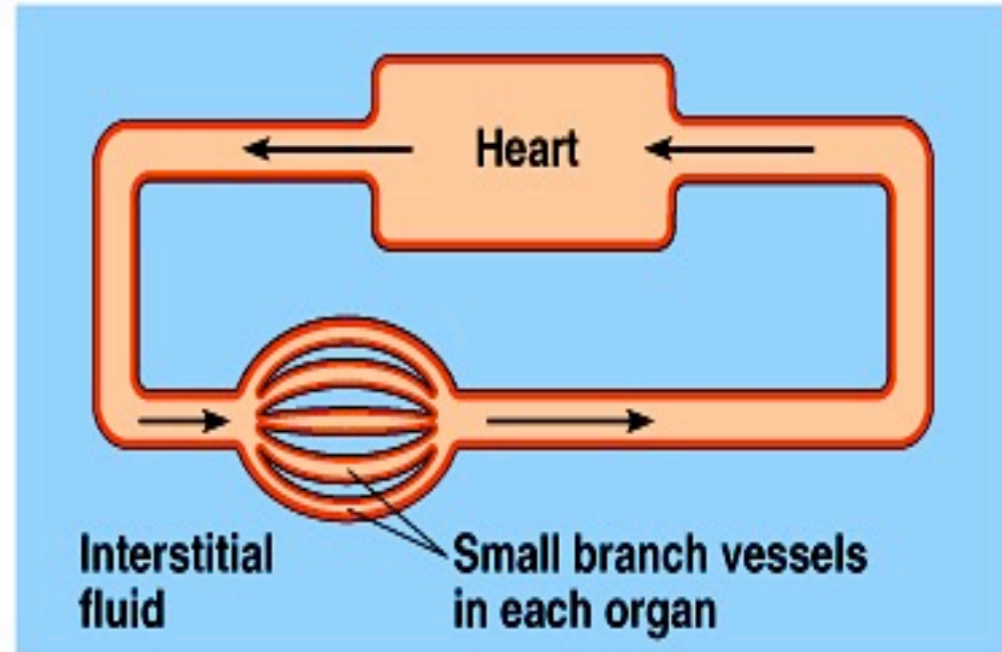
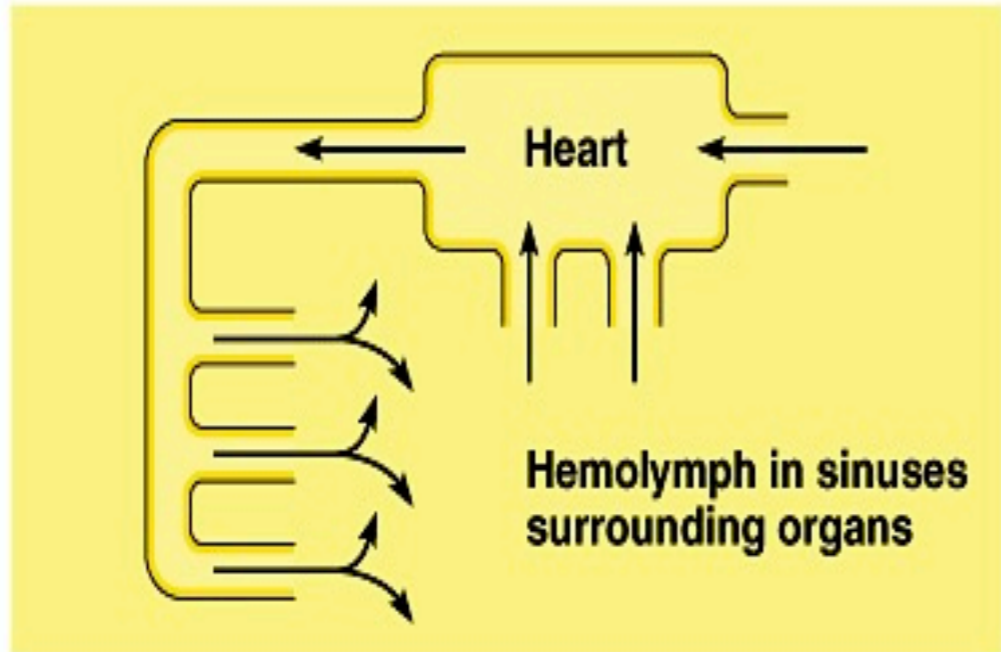


Circulatory Systems

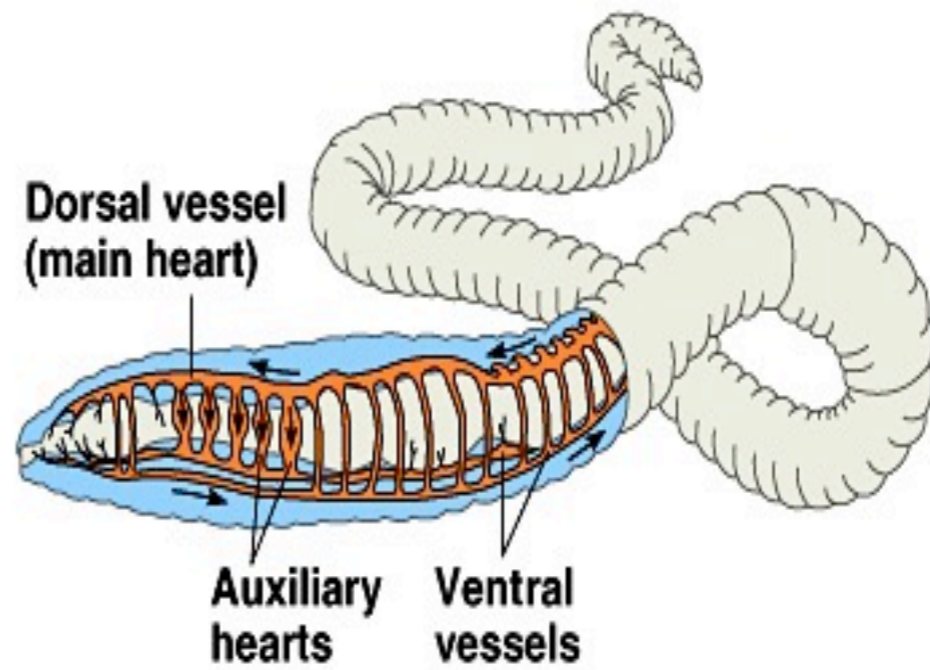


Circulatory Systems

- * All animals have:
 - * circulatory fluid = "blood"
 - * tubes = blood vessels
 - * muscular pump = heart



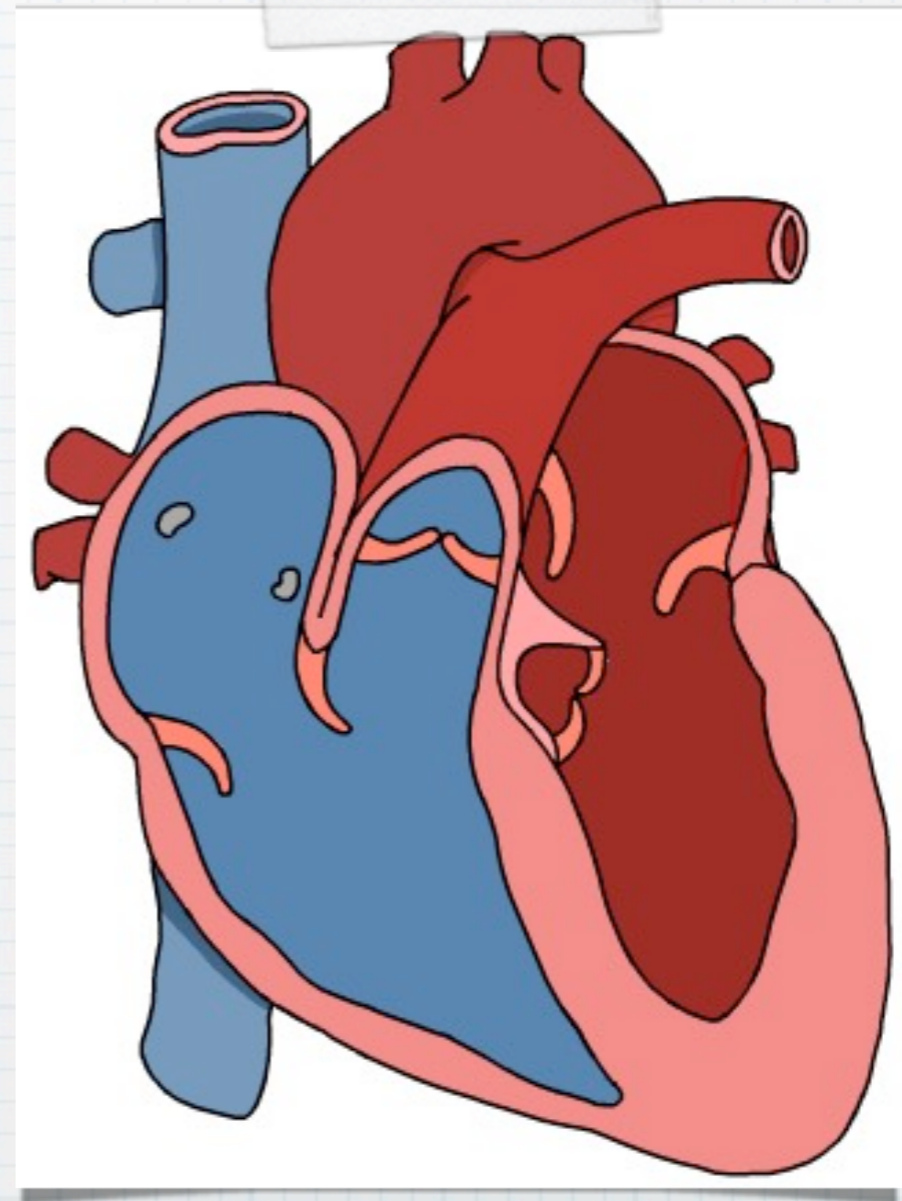
(a) Open circulatory system



(b) Closed circulatory system

Closed Circuit Cardiovascular System

- * Chambered heart
- * atrium = receive blood
- * ventricle = pump blood out



Heart Structure

- * The wall separating the left and right sides of your heart is known as the septum.

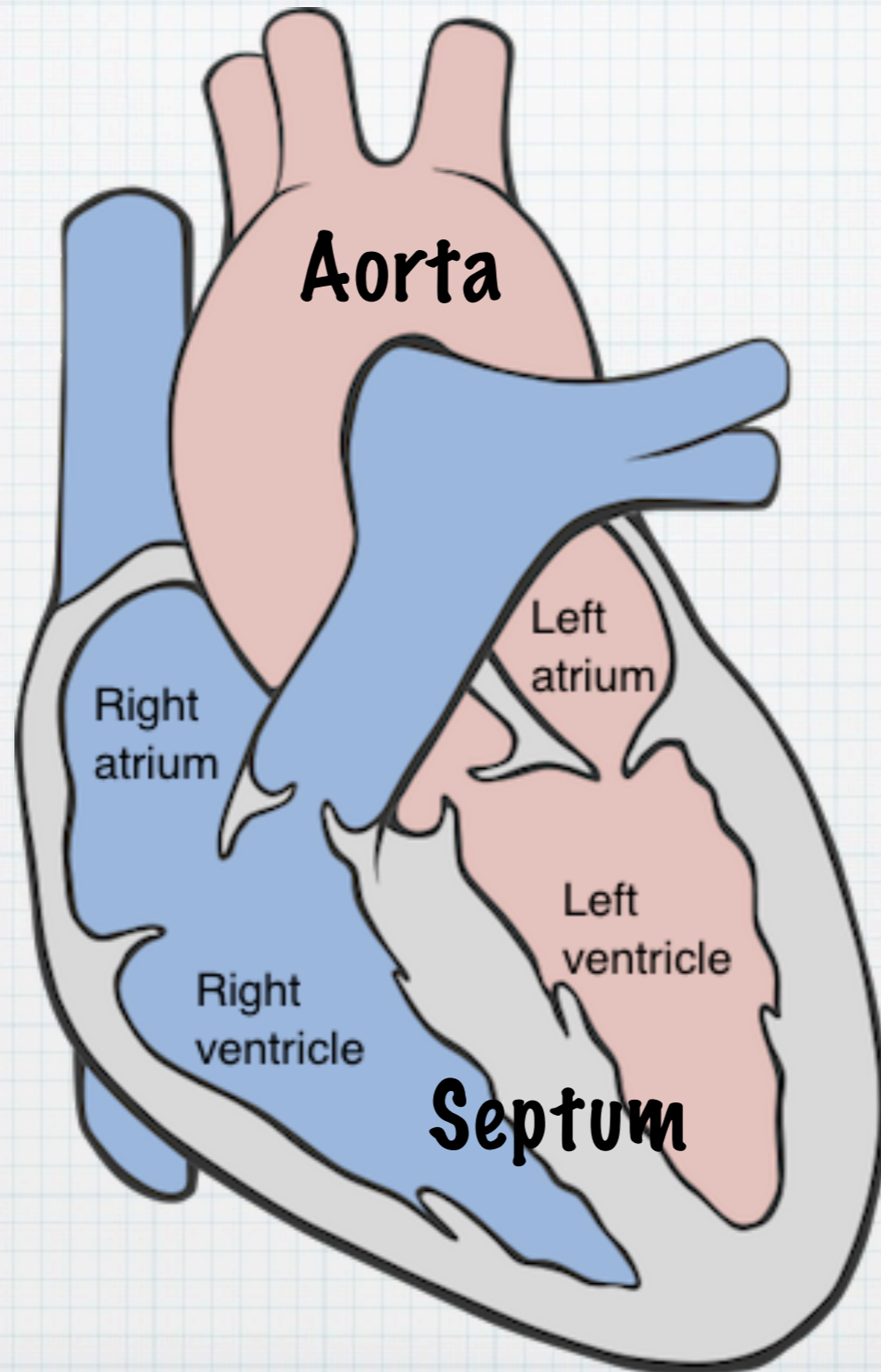
Heart Structure

- * Each side has a thin walled atrium to collect blood above a more muscular ventricle that pumps blood.

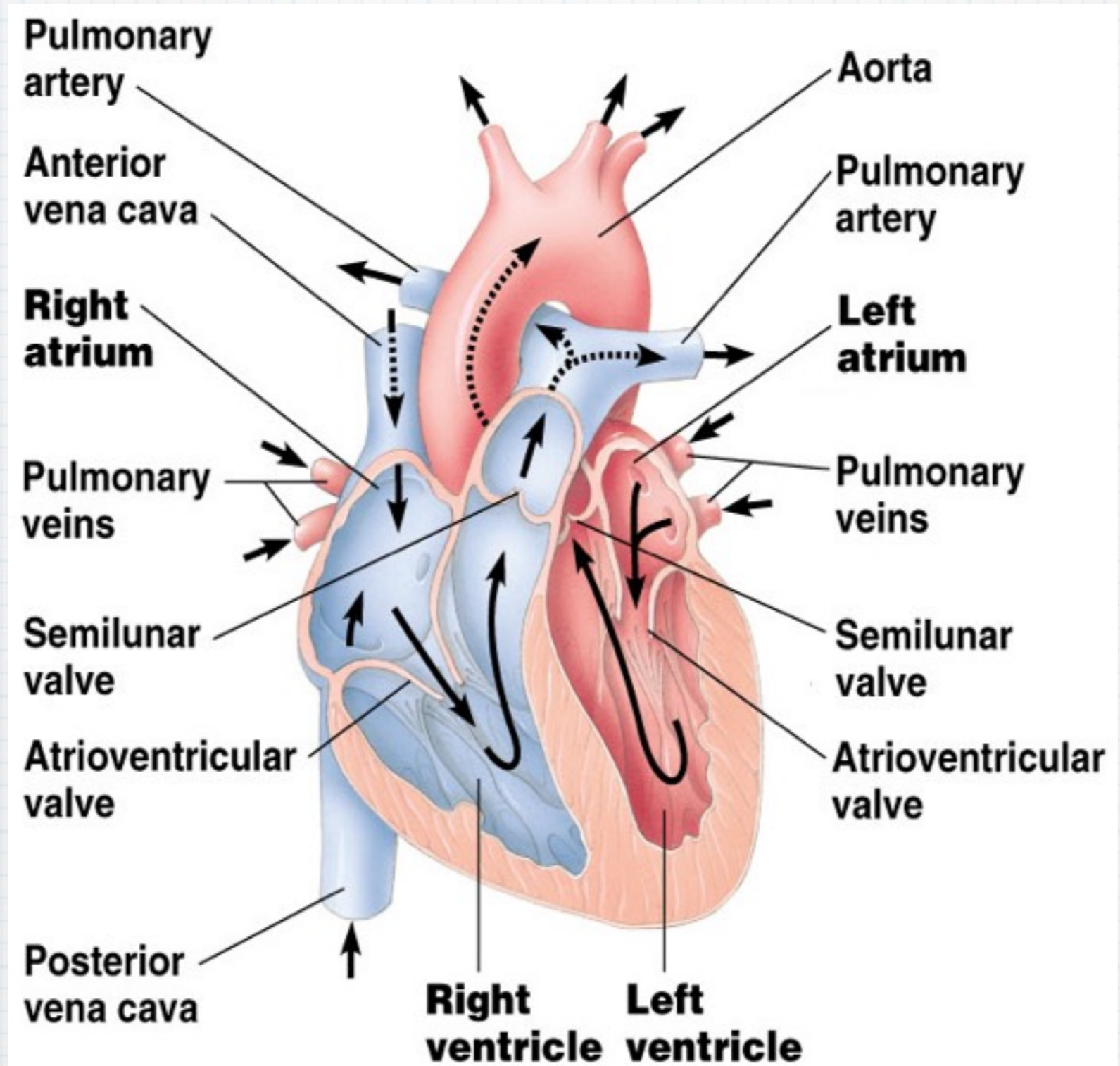
Heart Structure

- * Between the different regions of the heart are valves to ensure blood only flows in one direction.

Mammalian Heart



Mammalian Heart



Vertebrate cardiovascular system

- * Blood vessels
- * arteries = carry blood away from heart, arterioles
- * veins = return blood to heart
- * capillaries = point of gas exchange

Arteries



Arterioles



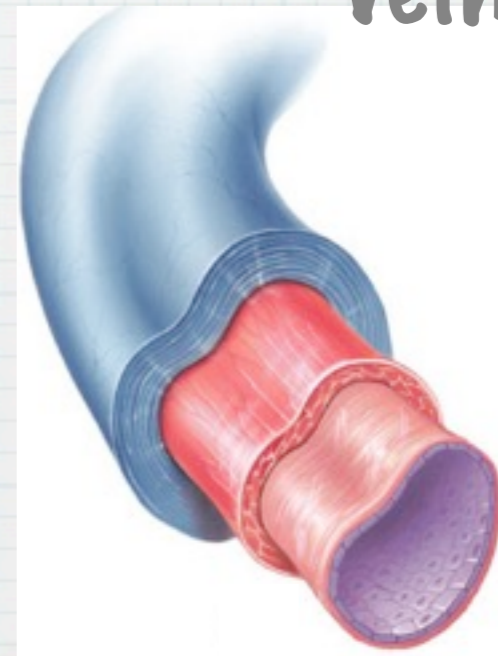
Capillaries



Venules

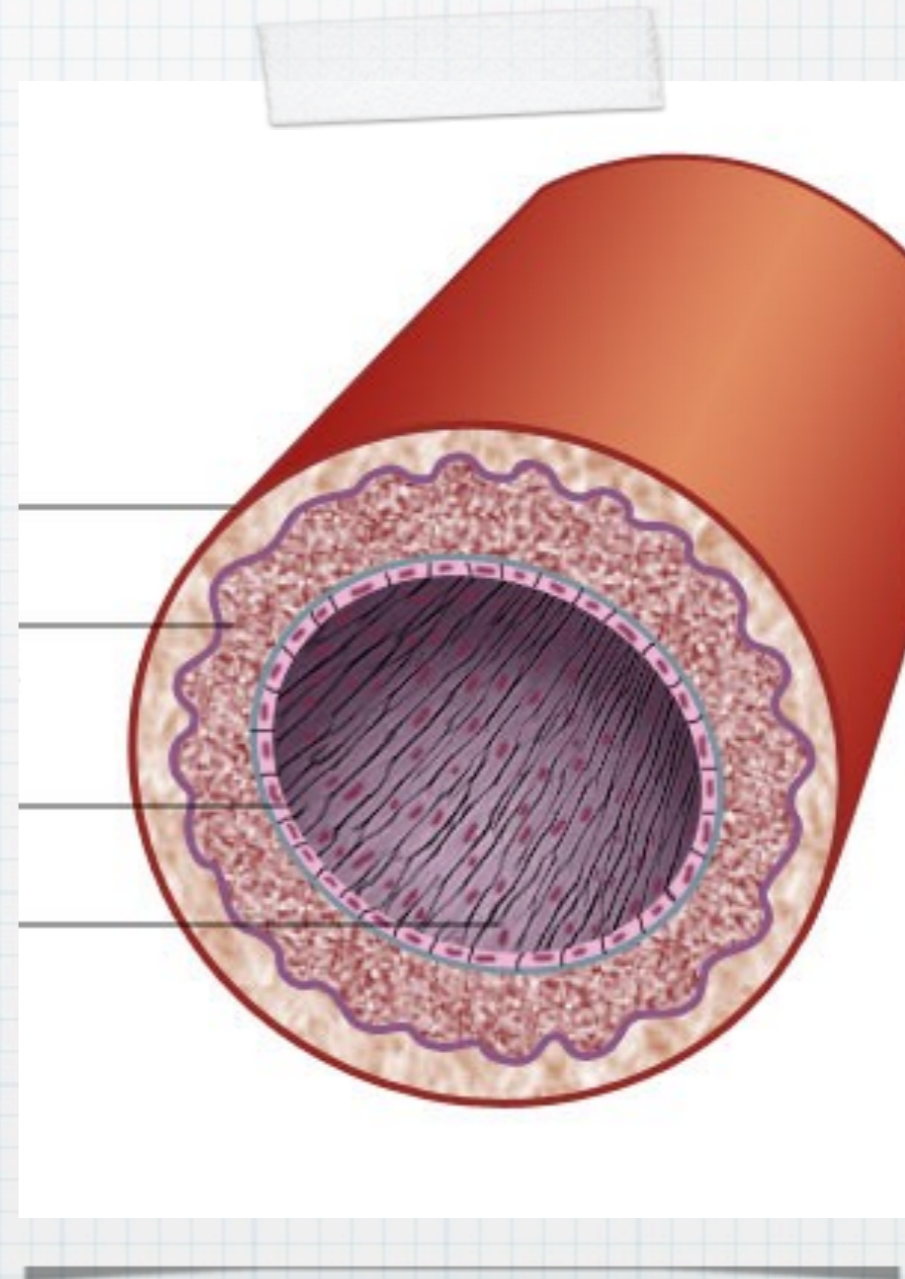


Veins



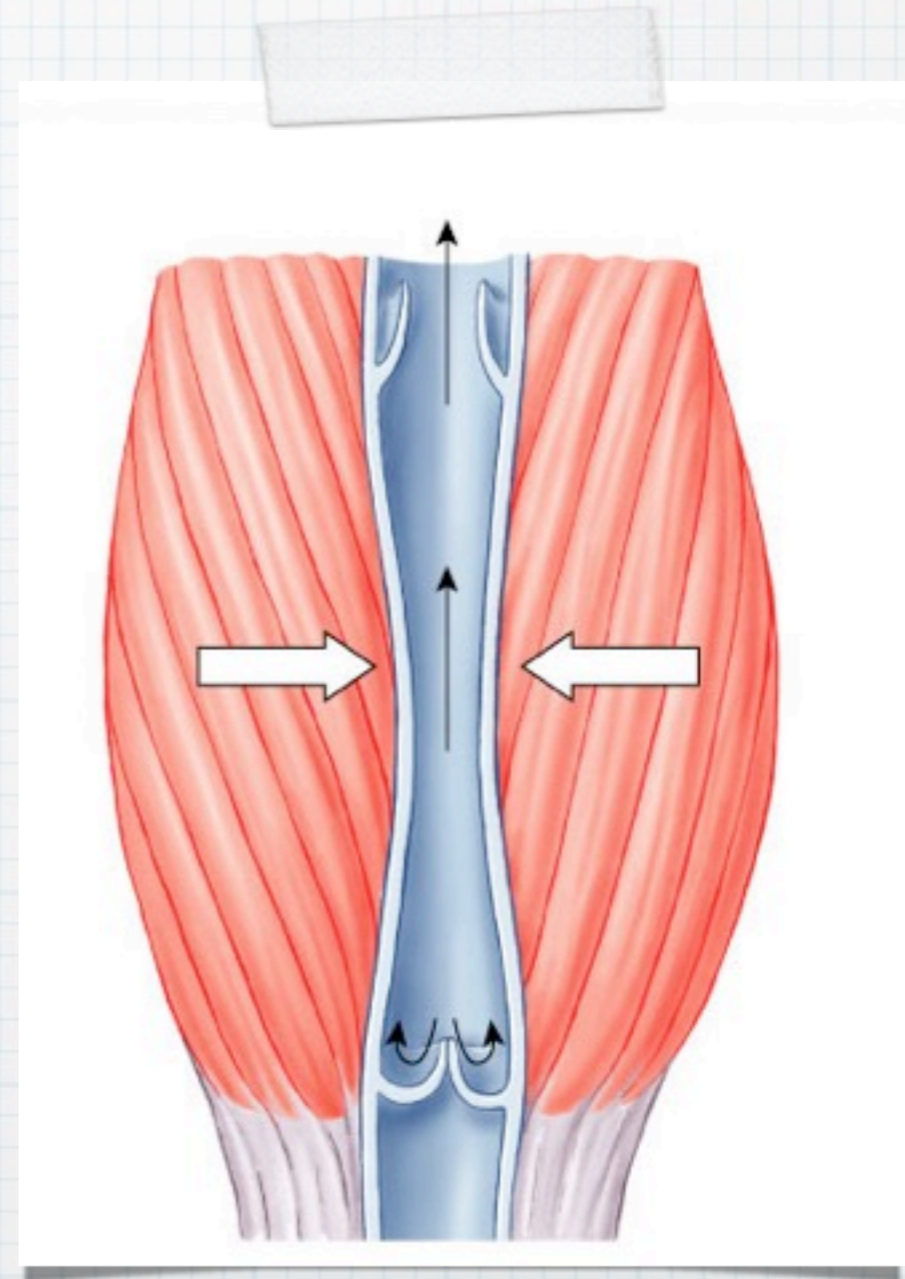
Arteries: Built for high pressure

- * Arteries carry blood away from the heart and have thicker walls to withstand the greater pressure of blood.



Veins: Built for low pressure flow

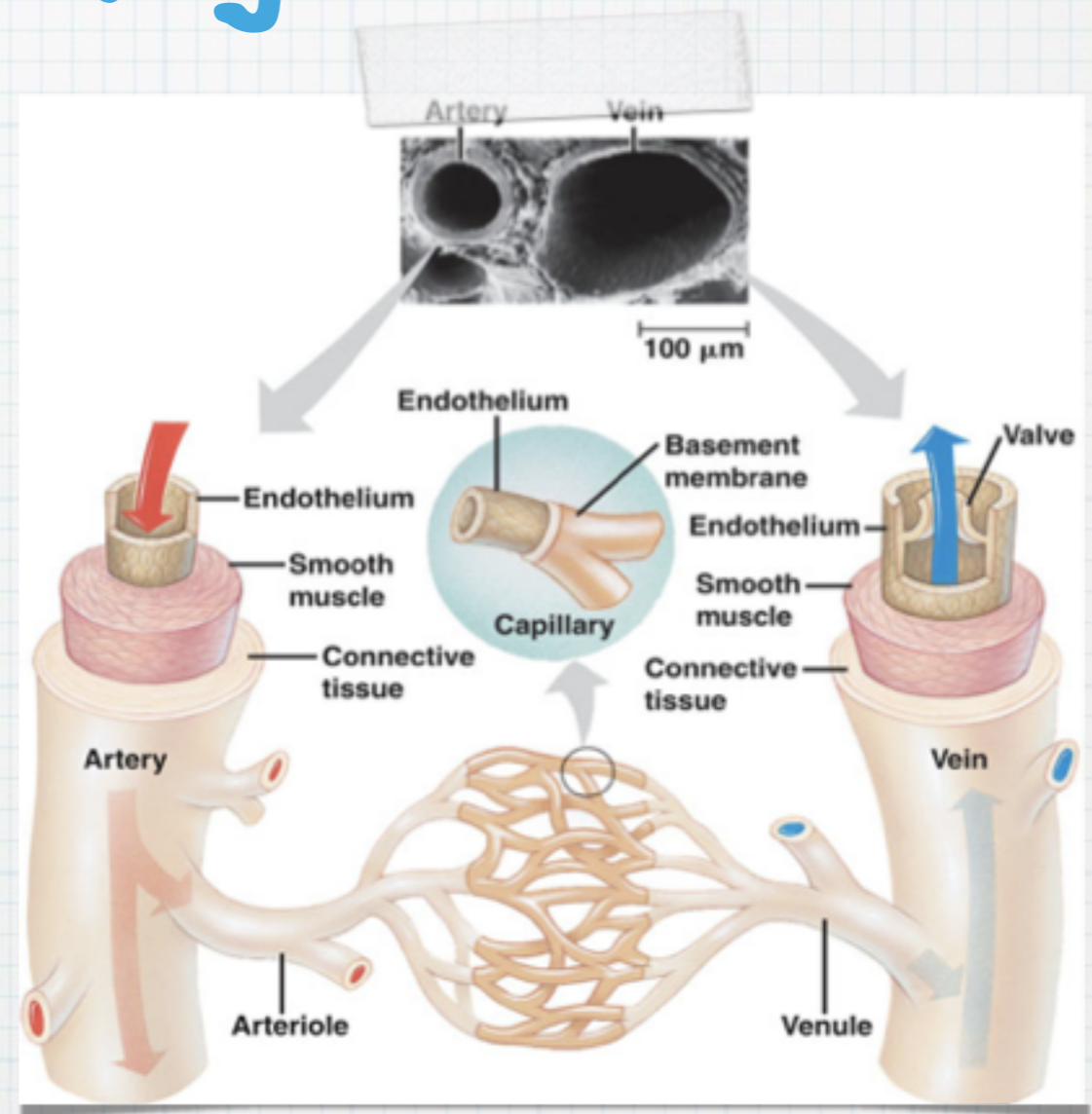
- * Thinner walled and wider
- * Have valves
- * In larger veins one-way valves allow blood to flow only toward heart





Capillaries: Built for exchange

- * Very thin walls
- * Only endothelium
- * Enhances exchange across capillary



Two Systems in One

- * The left and right side of your heart do different functions.
- * The right side of your heart pumps blood to the lungs to exchange CO₂ for O₂ in the pulmonary circuit.

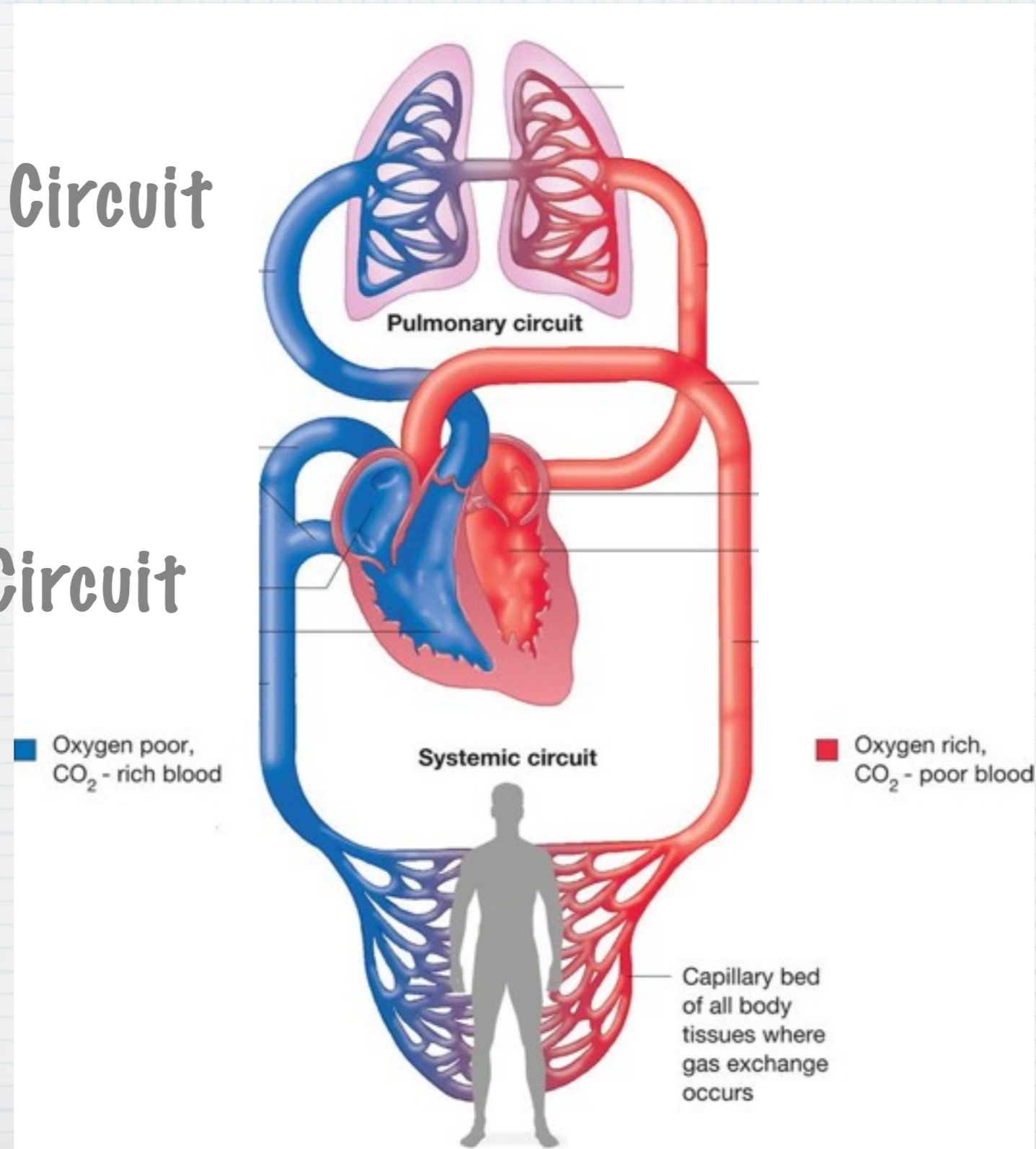
Two Systems in One

- * The left side of your heart pumps oxygen rich blood around your body in the systemic circuit.
- * Blood moving through the heart is the cardiac circuit.

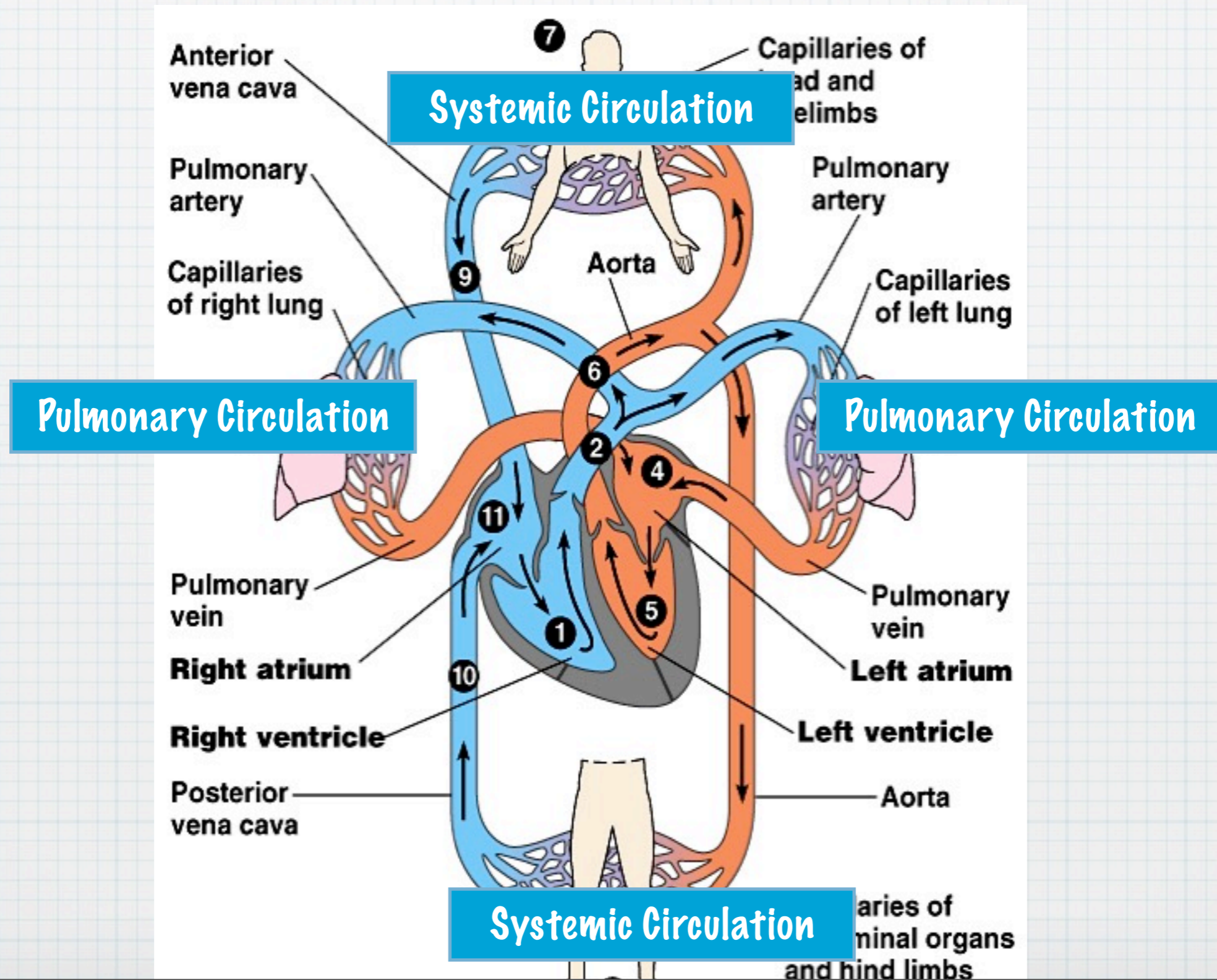
Mammalian Circulation

Pulmonary Circuit

Systemic Circuit

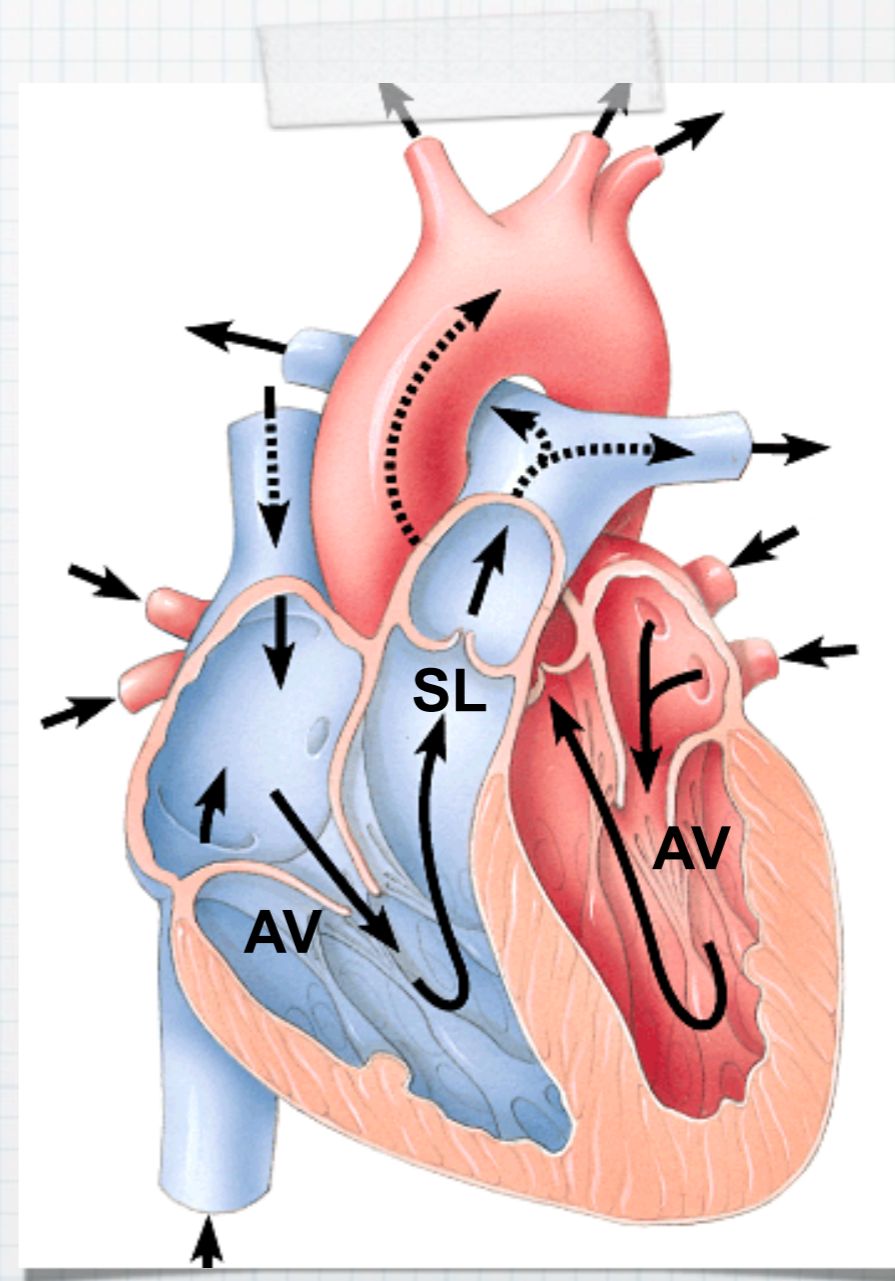


Mammalian Circulation



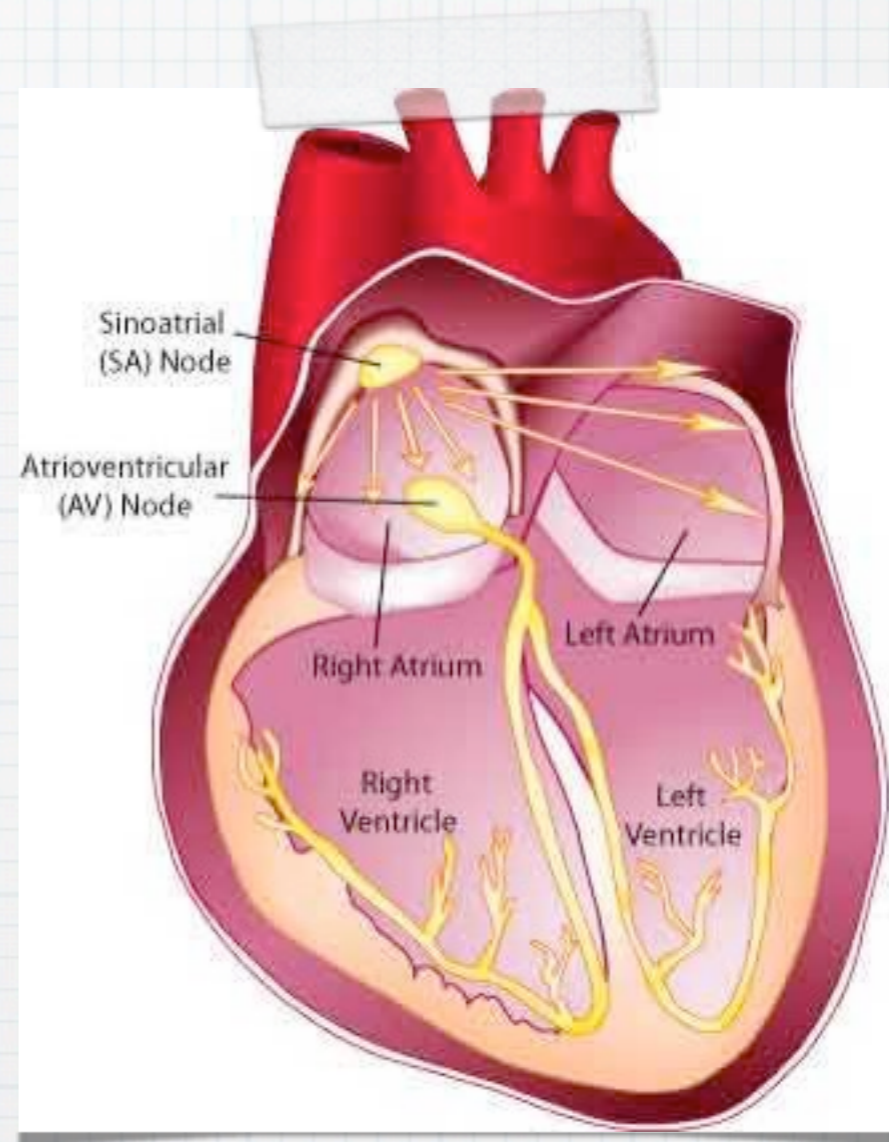
Heart Valves

- * 4 valves in the heart
- * flaps of connective tissue
- * prevent backflow



Heart Sounds

- * The heart beat is actually controlled within the heart itself by two bundles of nerves.



Lub-dub, lub-dub

- * Heartbeat caused by closing of valves
- * “Lub”: recoil of blood against closed AV valves
- * “Dub”: recoil of blood against semilunar valves
- * Heart murmur
 - * defect in valves causes hissing sound when stream of blood squirts backward through valve

Cardiac cycle

- * 1 complete sequence of pumping
- * heart contracts & pumps
- * heart relaxes & chambers fill

Cardiac cycle

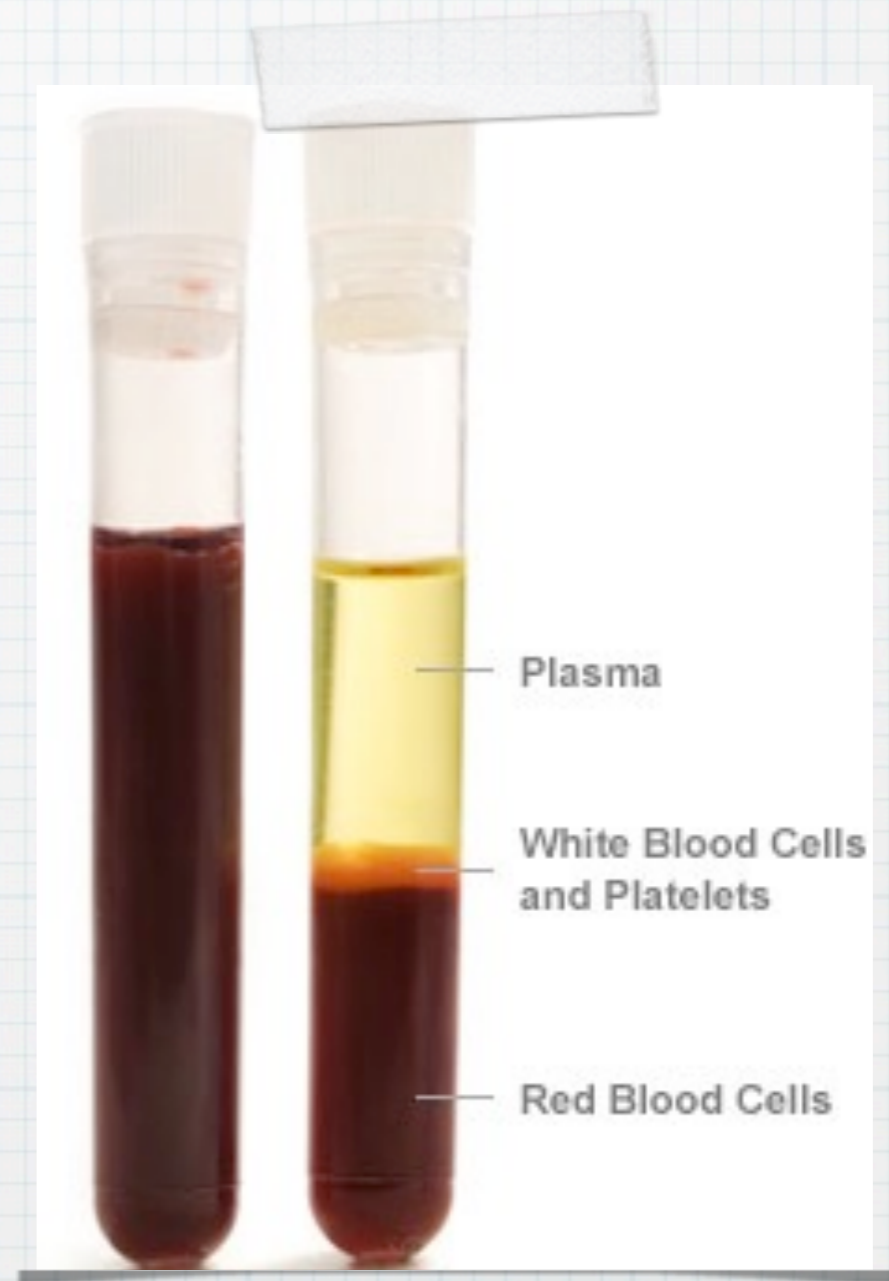
- * contraction phase
 - * systole: ventricles pumps blood out
- * relaxation phase
 - * diastole: atria refill with blood

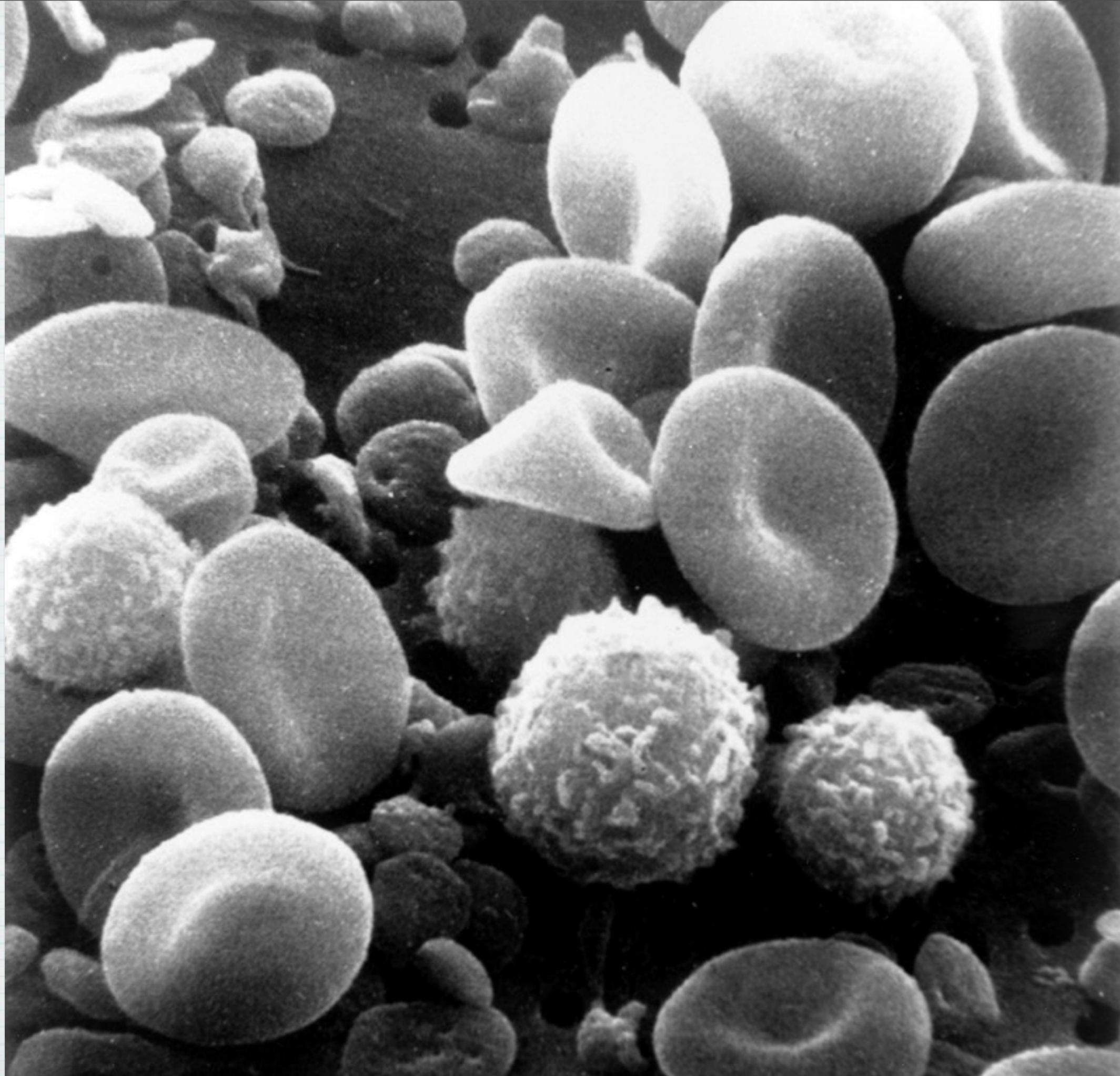
Components of Blood

- * The average human has 5 litres of blood
- * A transporting fluid that carries substances to all parts of the body

Components of Blood

- * Plasma (55%)
- * Red blood cells (40-45%)
- * (5-6-million /ml)
- * White blood cells (1%)
- * Platelets





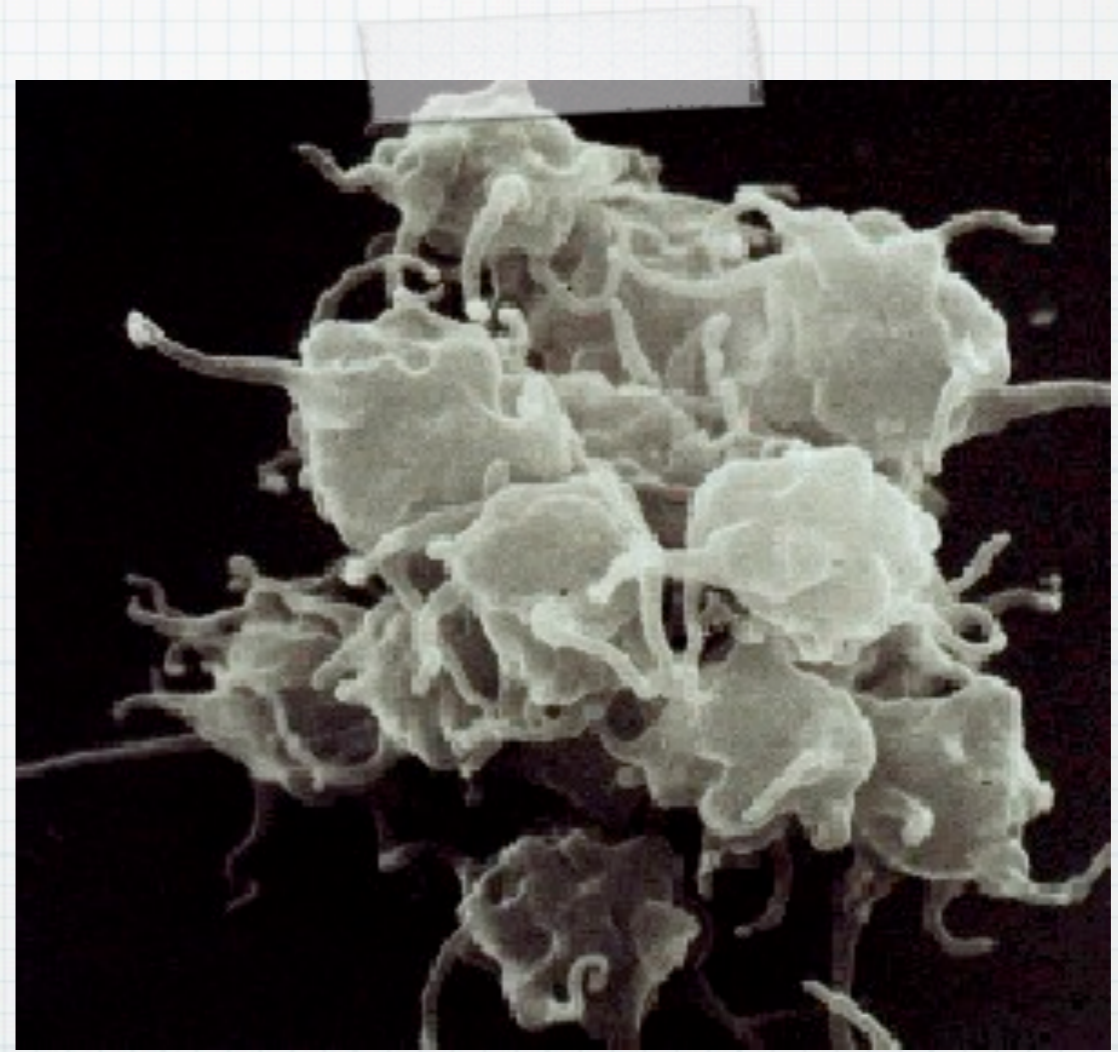
Plasma

* Liquid part of blood



Platelets

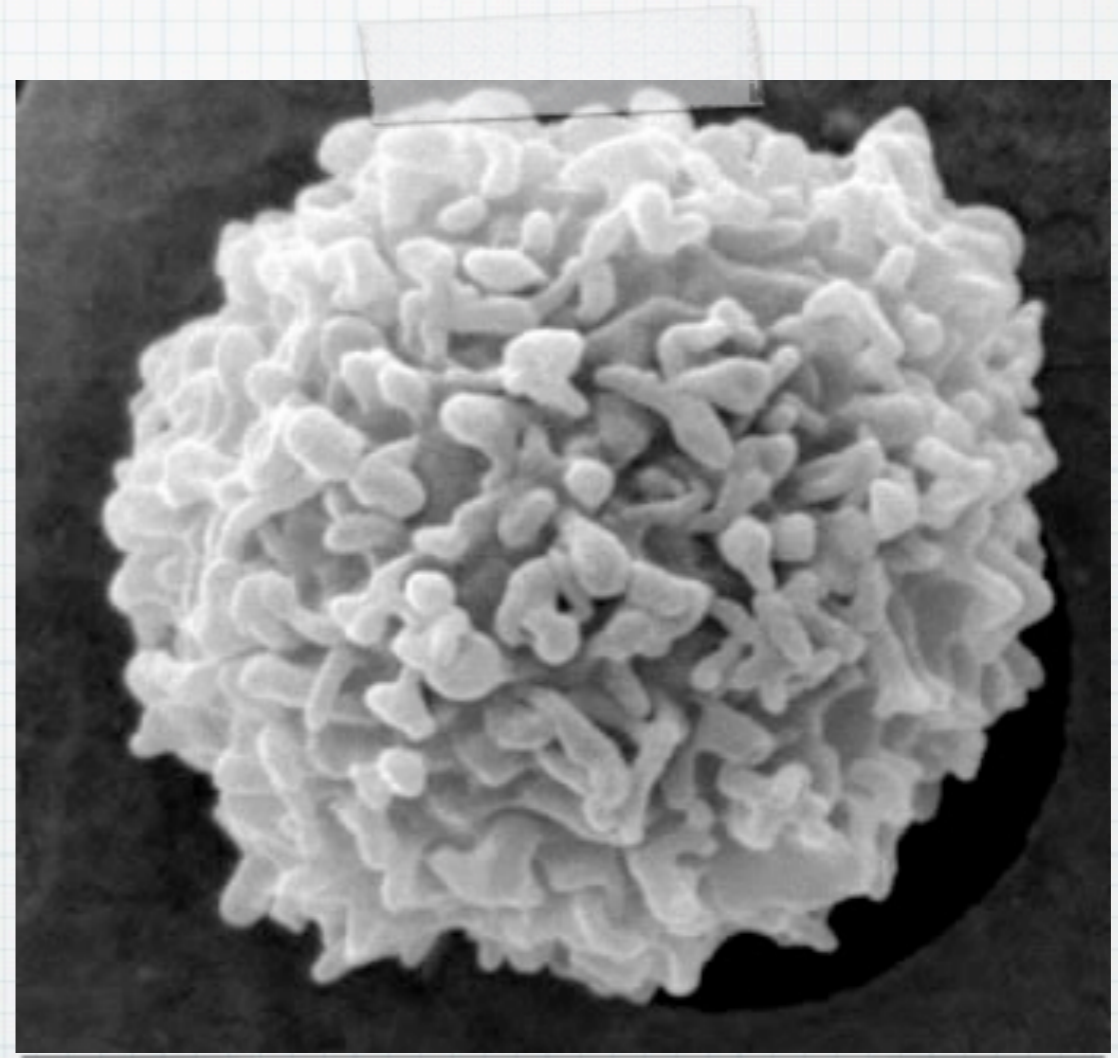
- * Produce tiny fibrin threads that trap blood cells (scab).



Thrombocytes

White Blood Cells

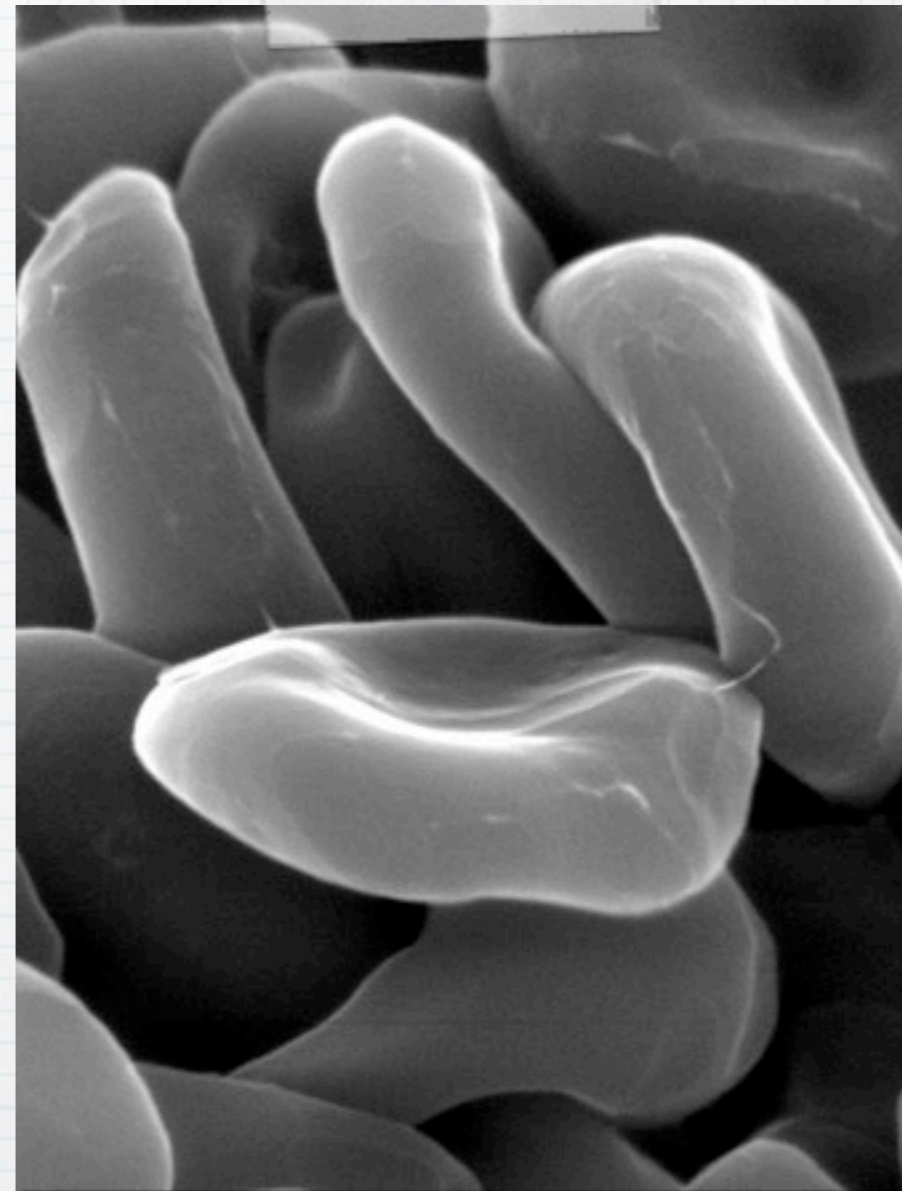
- * The body's defense, part of the immune system response



Leukocytes

Red Blood Cell

- * Transport gasses (oxygen) to and from blood.
- * Contain iron to bind with oxygen.
- * No nucleus to allow more O_2 to be carried



Erythrocytes