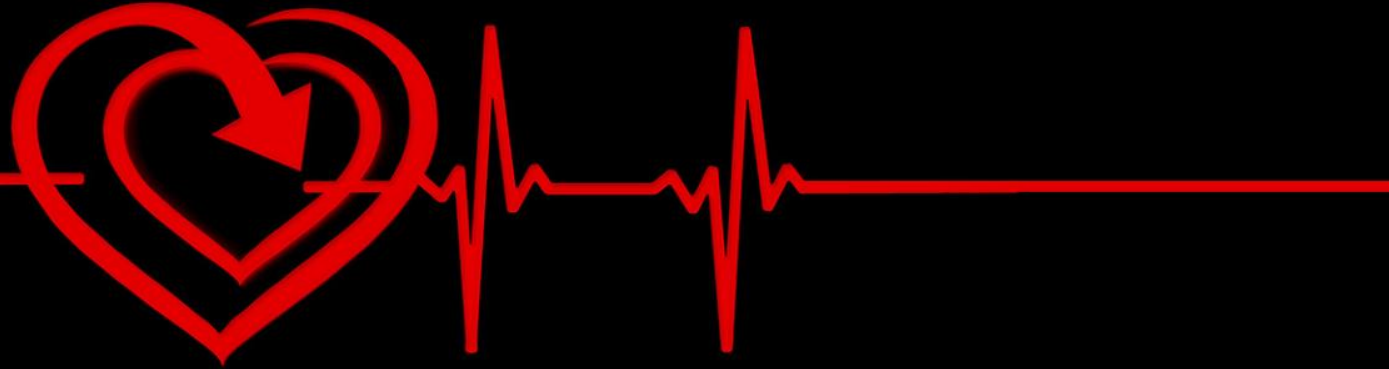
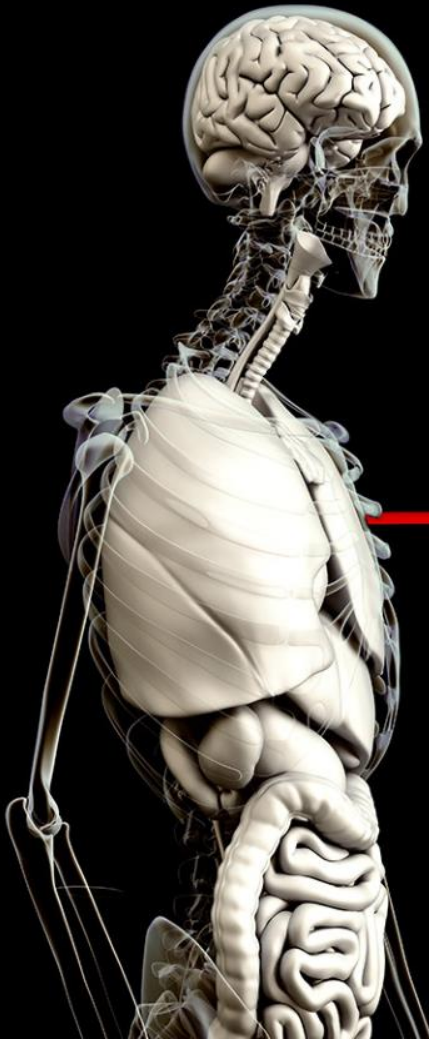


Chapter 8

TRANSPORT



OVERVIEW

8.0 TRANSPORT SYSTEM



Mammalian heart and its regulation



Human Lymphatic System



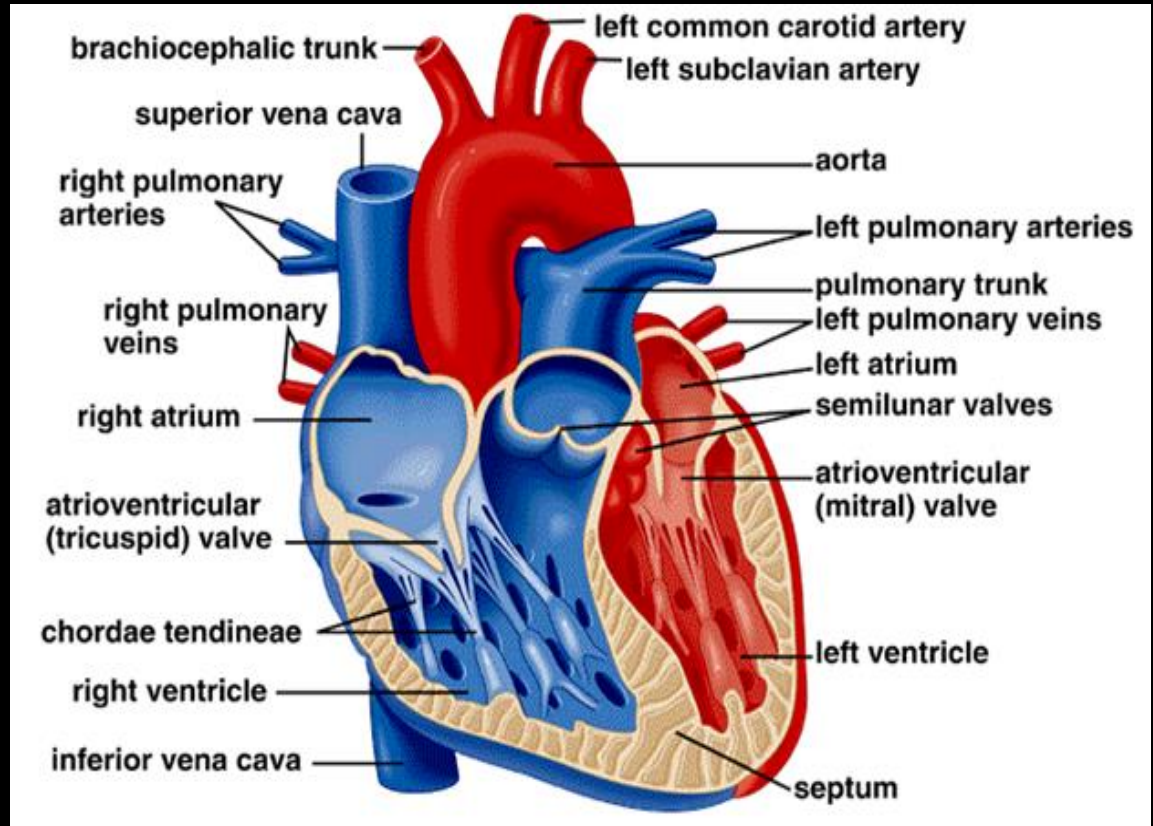
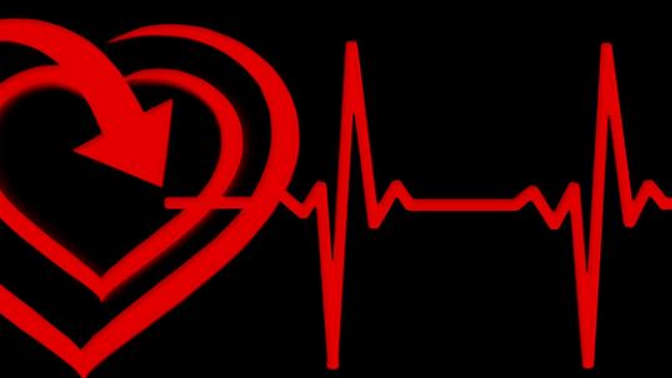
Transport In Plants



MAMMALIAN HEART AND ITS REGULATION

- (a) Explain initiation of heart beat
- (b) Explain cardiac cycle
- (c) Explain ECG emphasizing on P wave, QRS complex and T wave
- (d) Explain the factors affecting heart beat
 - i- pH
 - ii- temperature

STRUCTURE OF HEART



INITIATION OF HEART BEAT

Component of heart beat

Sinoatrial Node (SA node)

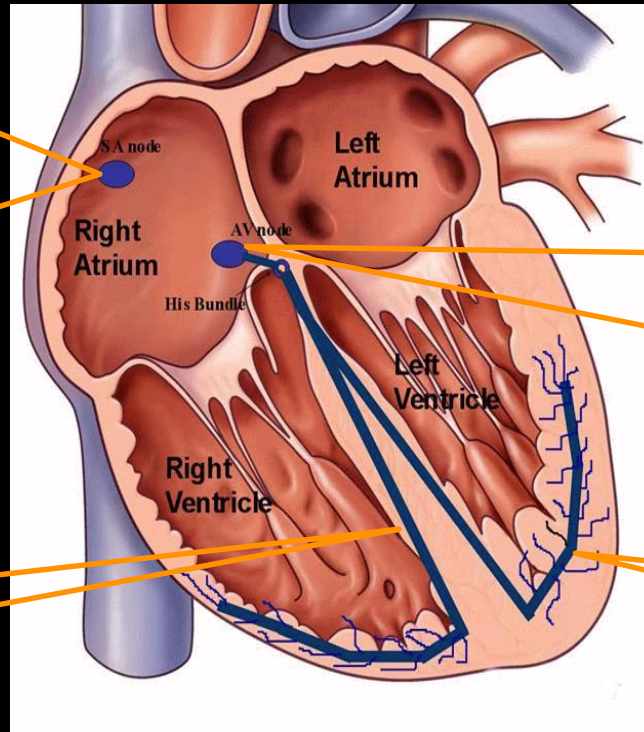
- Located in the wall of right atrium
- Act as a pacemaker

Atrioventricular Node (AV node)

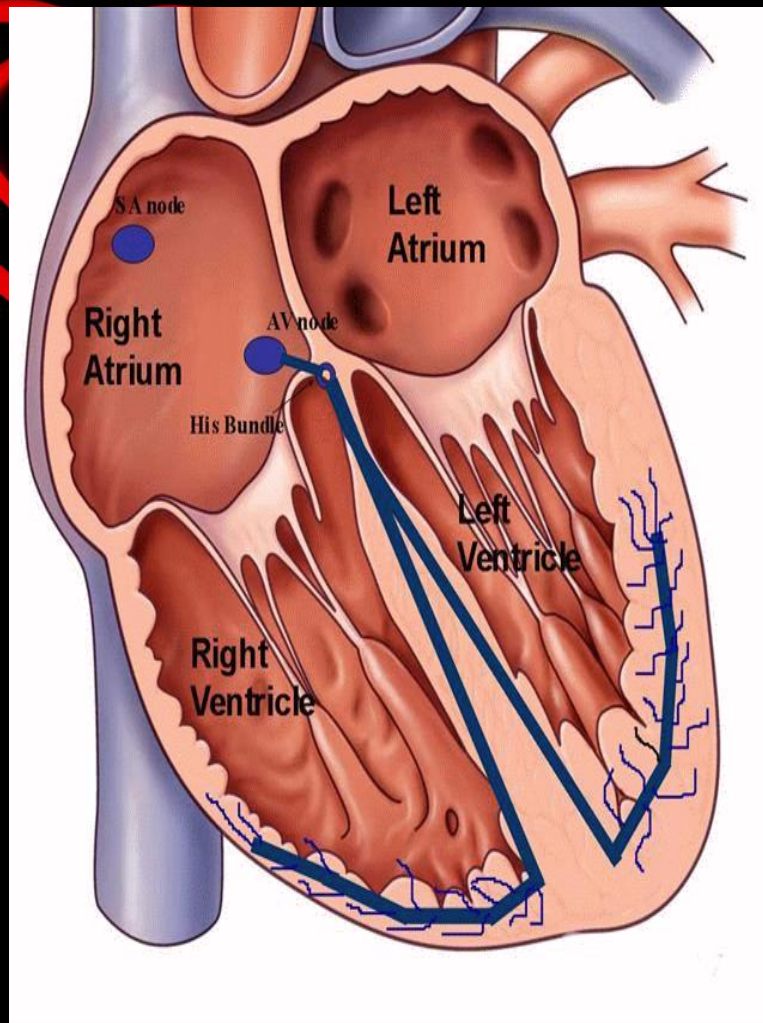
- Located in the wall between left and right atria

Bundle branches

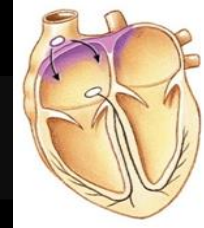
Purkinje fiber



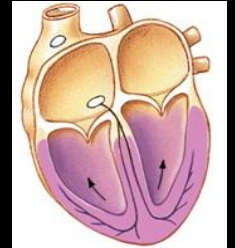
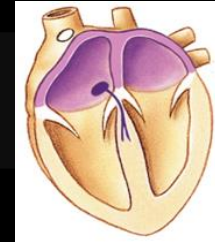
INITIATION OF HEART BEAT



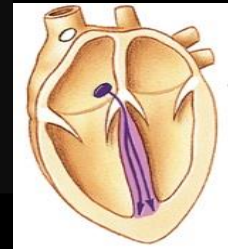
Signals from SA node spread through atria



Signals delayed at AV node



Bundle branches pass signals to heart apex



Signals spread throughout ventricles



CARDIAC CYCLE

- The sequence of events that makes up one heart beat (about 0.8 seconds)



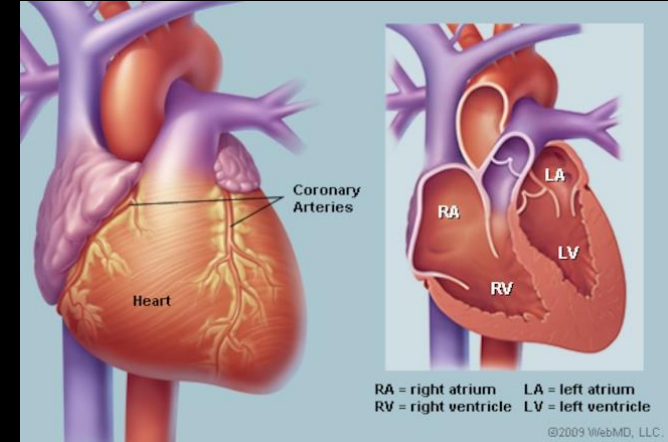
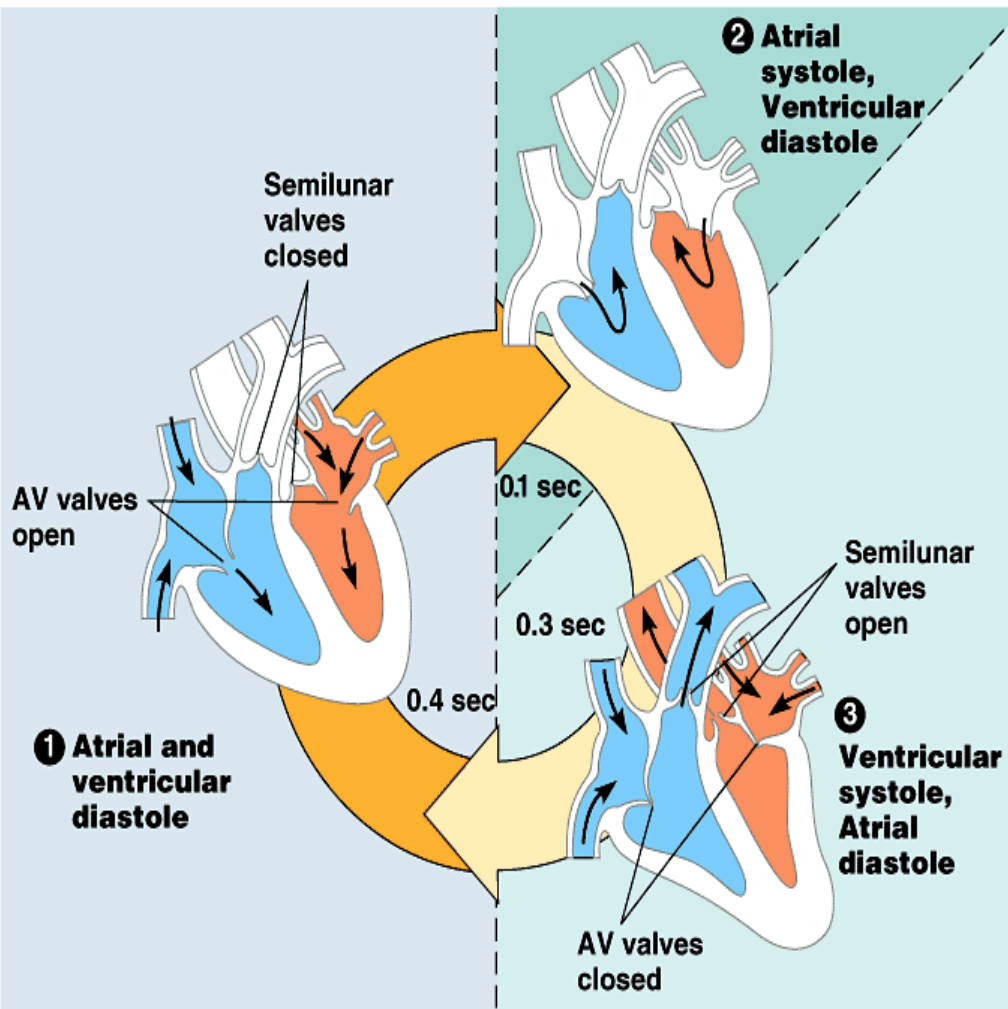
Diastole

- Heart muscle relax

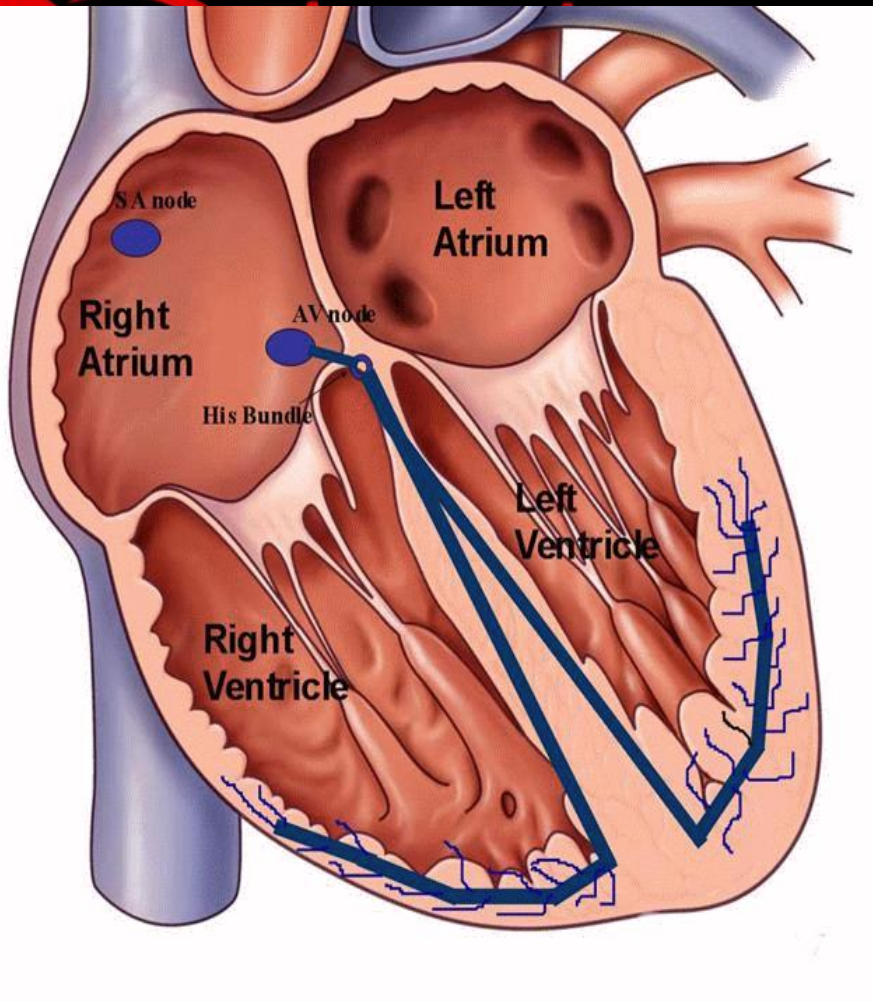
Systole

- Heart muscle contract

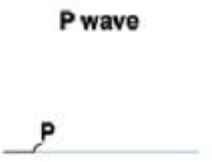
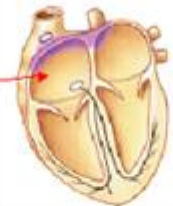
CARDIAC CYCLE



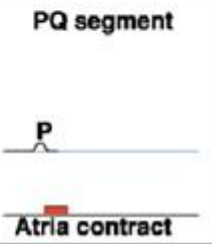
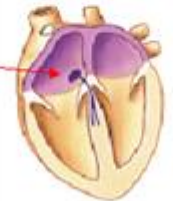
	ATRIUM	VENTRICLE
0.10 sec	Systole	Diastole
0.30 sec	Diastole	Systole
0.40 sec	Diastole	Diastole



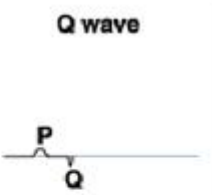
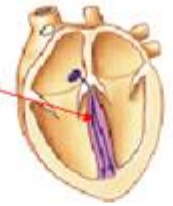
impulses spread across atria (0.3)



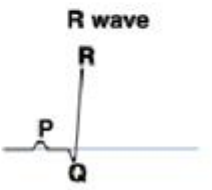
P - atrial systole

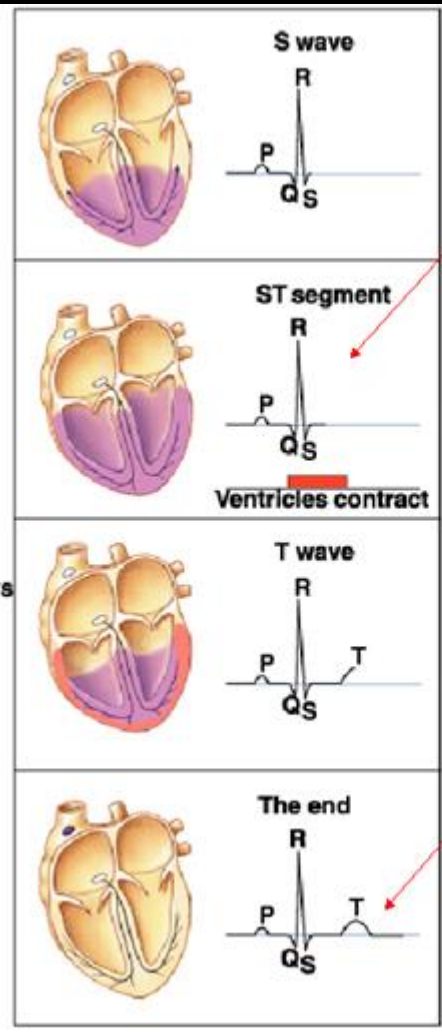
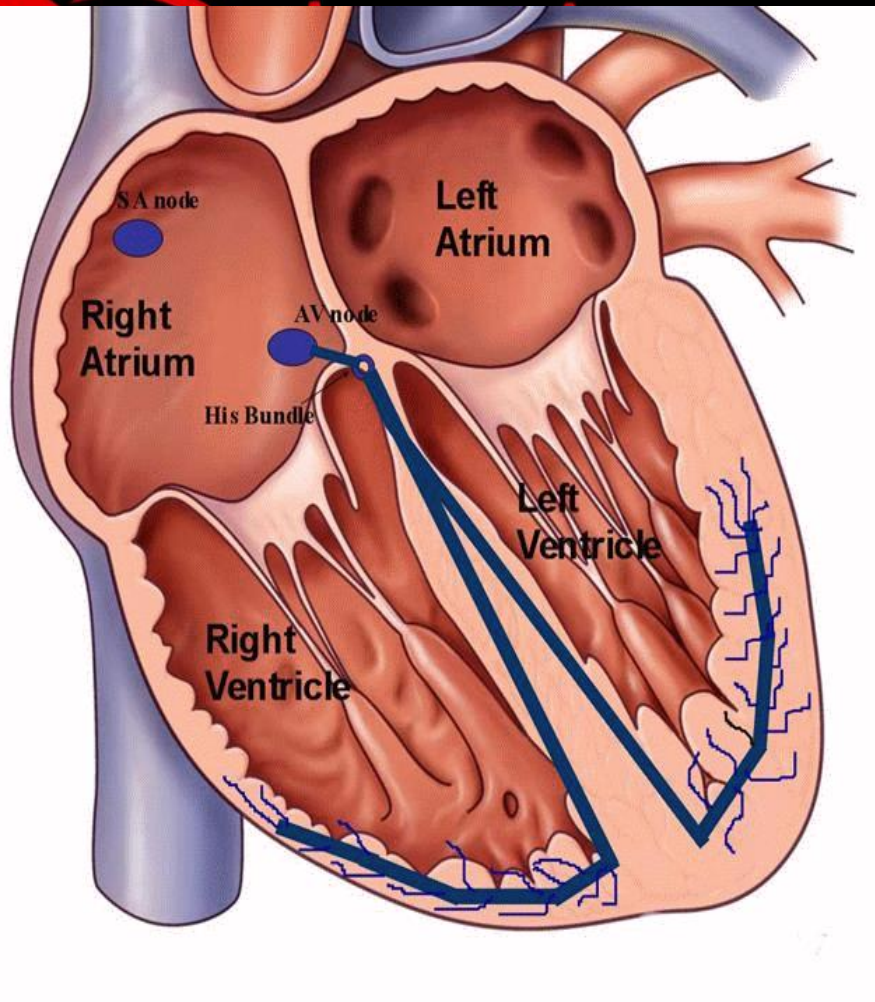


SA node stimulates AVN impulse (0.1)



AVN spreads impulse to ventricles





QRS –
ventricles
contract
(0.4)

Ventricular
diastole

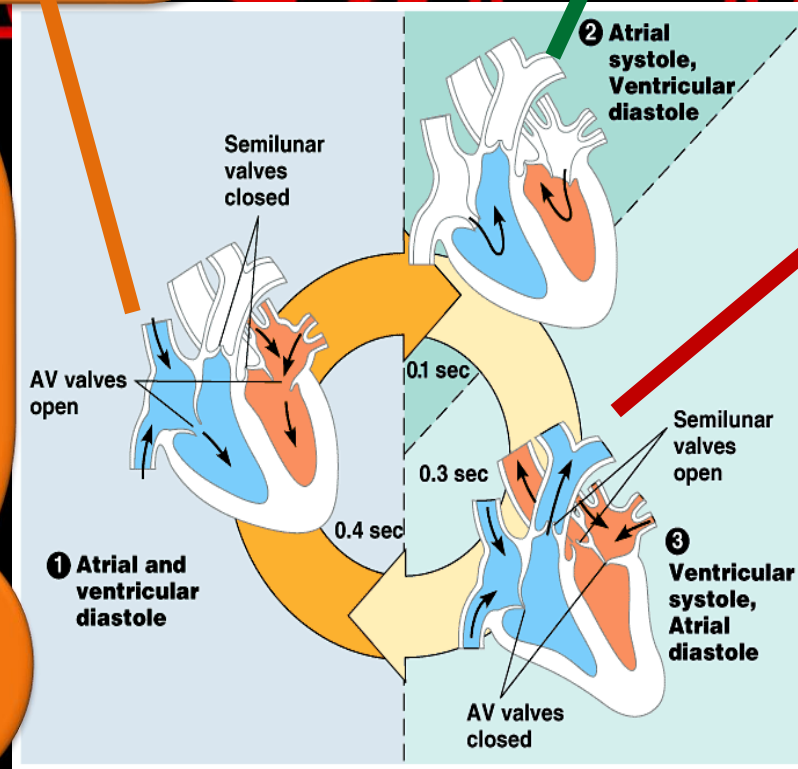
Atria and ventricles relaxed
→ ventricular pressure below aorta & pulmonary arteries

Semilunar valves close
→ prevent backflow of blood from arteries to the ventricles
→ produce 'dup' sound (recoil of blood against semilunar valves)

AV valves open
→ allow blood to pass through to the ventricles

CARDIAC CYCLE

SA node triggering the atrium to contract
→ atrial empties its contents into the ventricles



Ventricles receives impulses from Purkinje fibers and contracts

→ pressure of blood forces semilunar valves to open
→ forcing blood into pulmonary arteries and aorta

Pressure generated by powerful contraction of ventricles closes AV valves

→ produces sound 'lub' (recoil of blood against closed AV valves)

- prevents blood from flowing back into atria

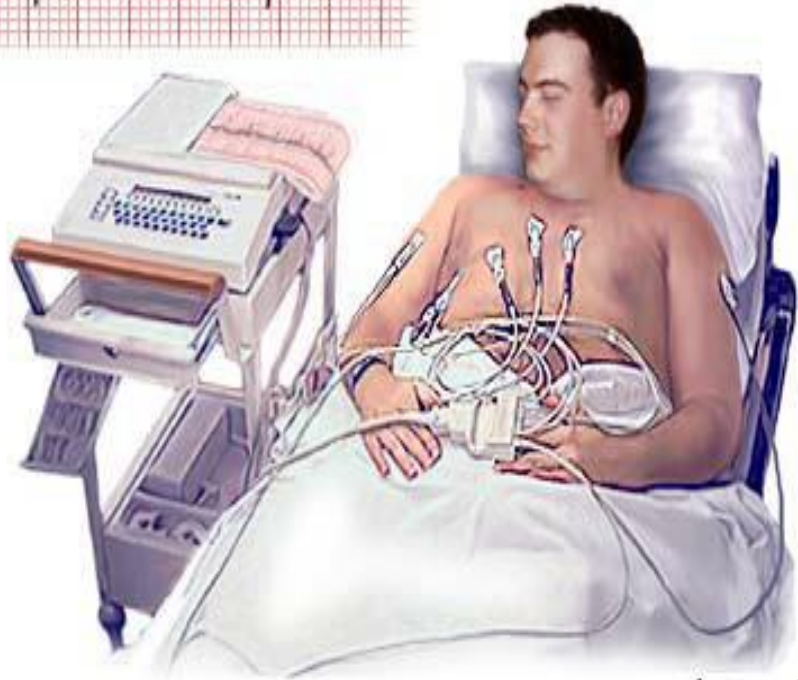


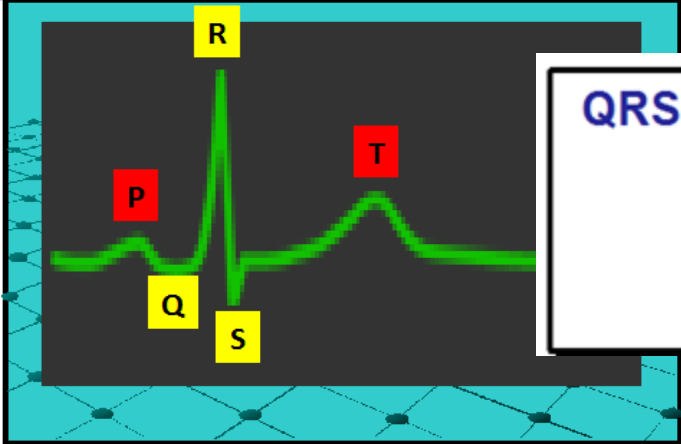
Illustration of a patient getting an ECG. ADA

ELECTROCARDIOGRAM

- Recording electrical changes (activity) that occur during cardiac cycle
- Taken to detect the abnormalities that may confirm a suspected heart attack.

ELECTROCARDIOGRAM

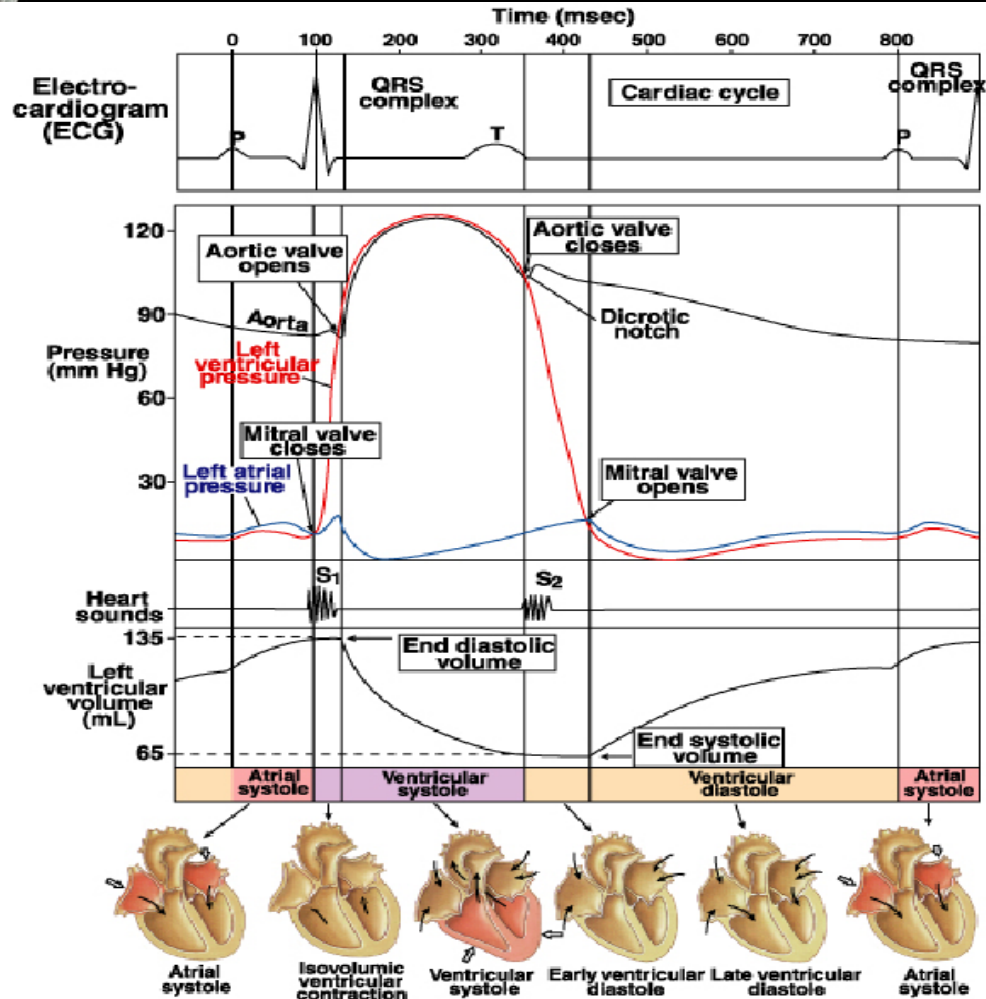
P wave - spread of impulse through atria before atria systole/ contract



QRS complex - spread the impulse through
- ventricles systole/ contract
- atria are diastole/relaxing

T wave
- ending of ventricular systole
- Ventricular muscle fibers recover

Pressure and volume change



FACTORS AFFECTING HEART BEAT



Body temperature

Body temperature may increase during fever, exercise
→ heart beat increase



Blood pH

Carbon dioxide high cause blood pH low
→ heart beat increase



HUMAN LYMPHATIC SYSTEM

(a) Describe the pathway of lymph from tissue to blood circulatory system

(b) Describe the transport of lipids from small intestine into the blood stream

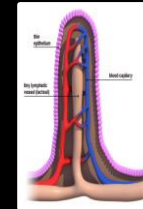
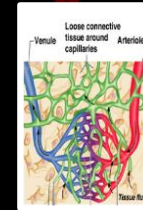
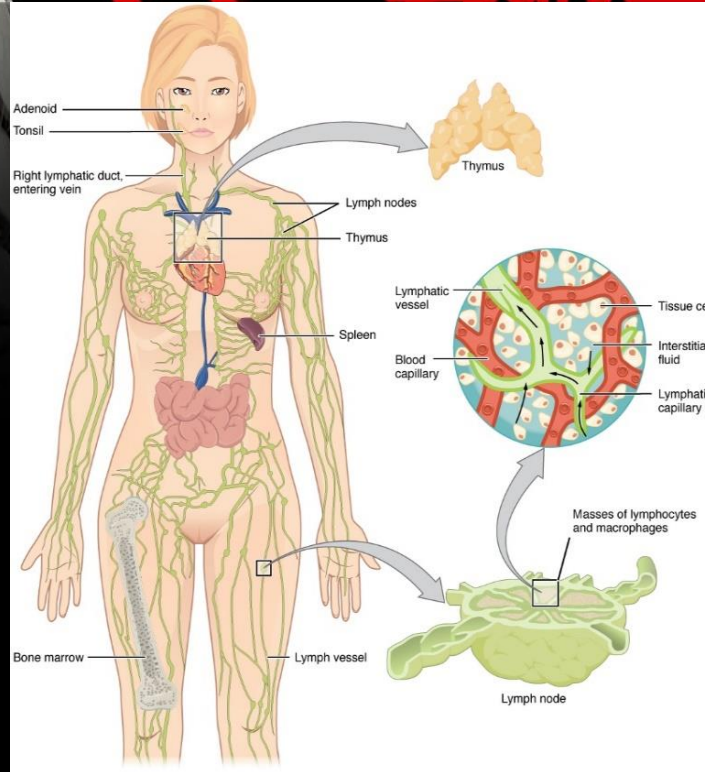
LYMPHATIC SYSTEM

FUNCTION

Transport excess interstitial fluid back to the blood

Absorbed fats and some vitamins from small intestine to the blood

Provide immunological defense against disease causing agents.



- The networks of vessels that convey lymph from the tissue fluids to the bloodstream

FLUID RETURN

BY LYMPHATIC SYSTEM

4

Lymphatic vessels return lymph to the blood via two large ducts that drain into veins near the shoulders

1

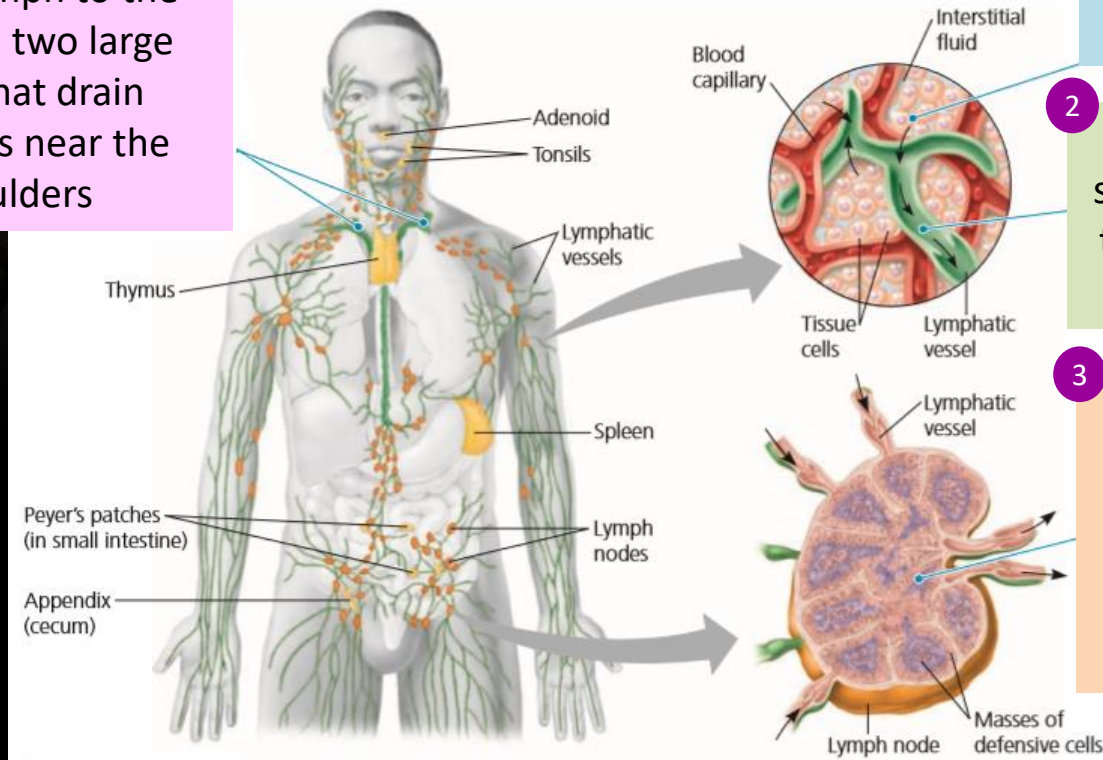
Interstitial fluid enters lymphatic vessels.

2

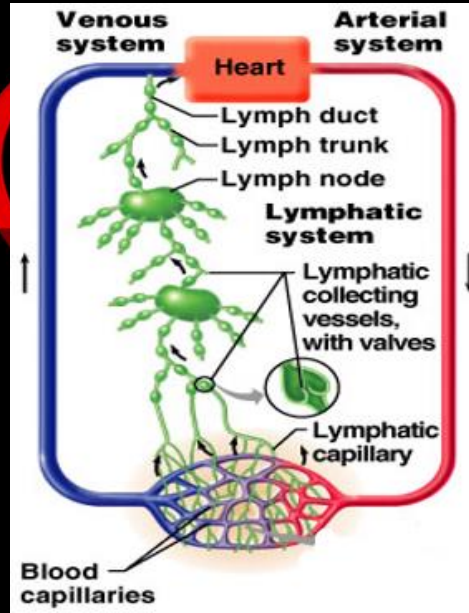
Fluid inside the lymphatic system, called lymph flows through lymphatic vessels throughout the body

3

Within lymph nodes, pathogens and foreign particles activate macrophages and other cells that carry out defensive actions



PATHWAY OF LYMPH



Lymphatic capillary

Lymphatic vessel

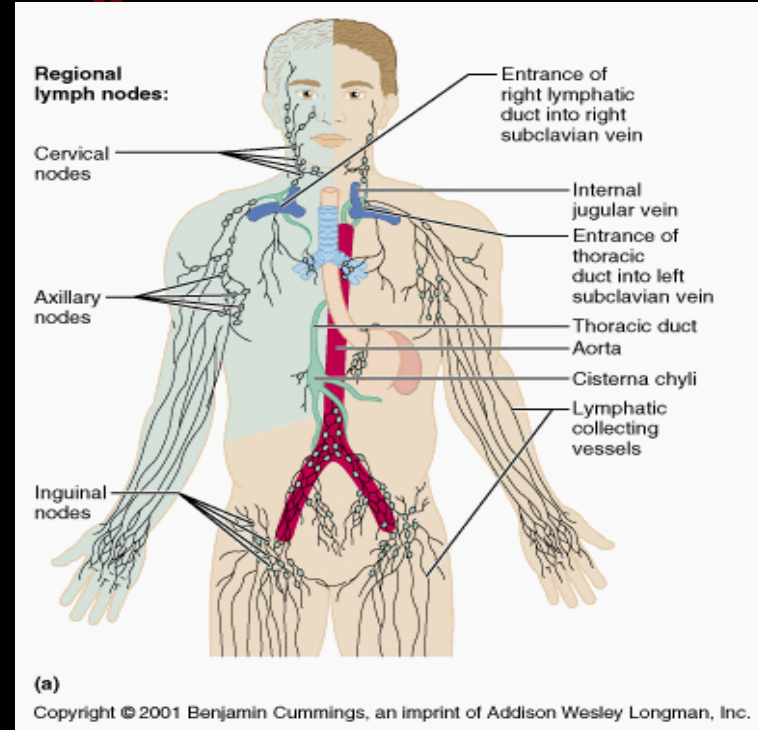
Lymphatic node

Right Lymphatic duct

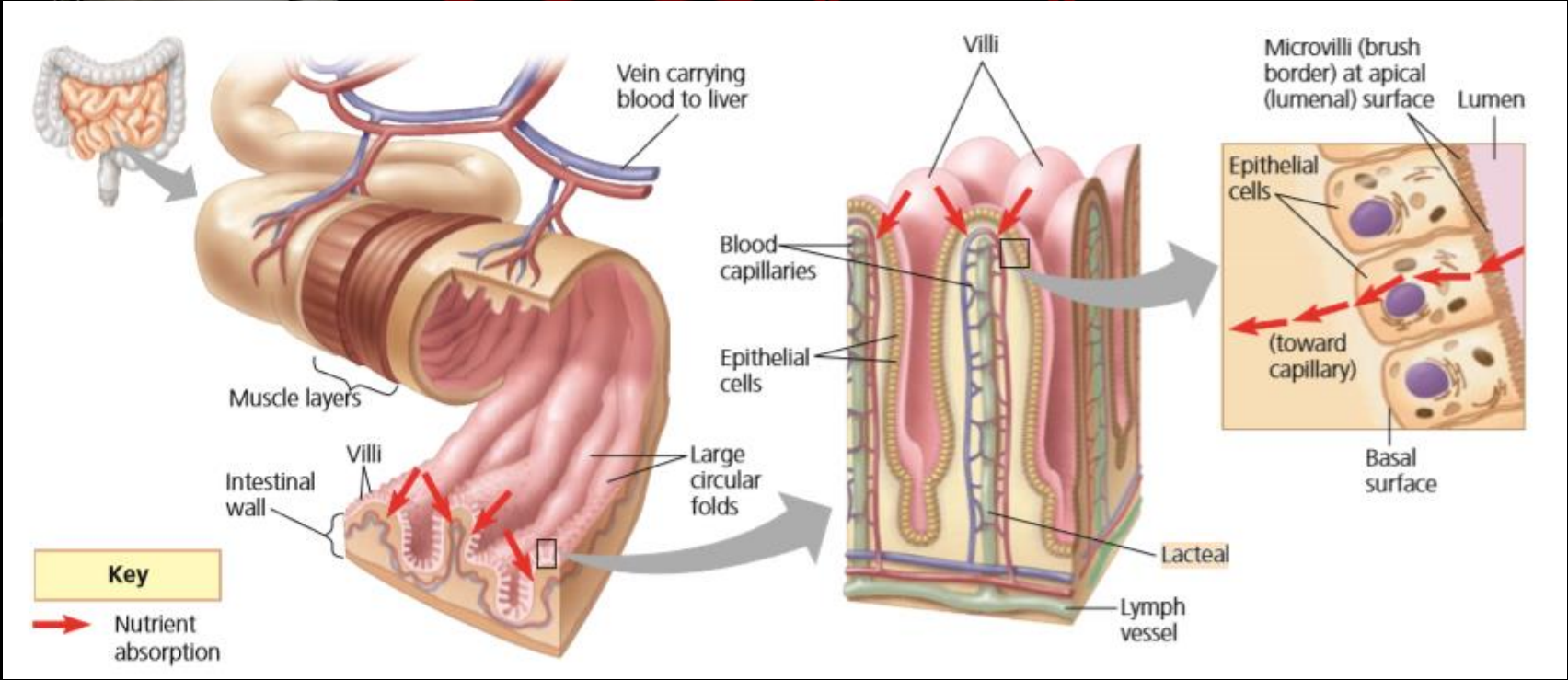
Right Subclavian vein

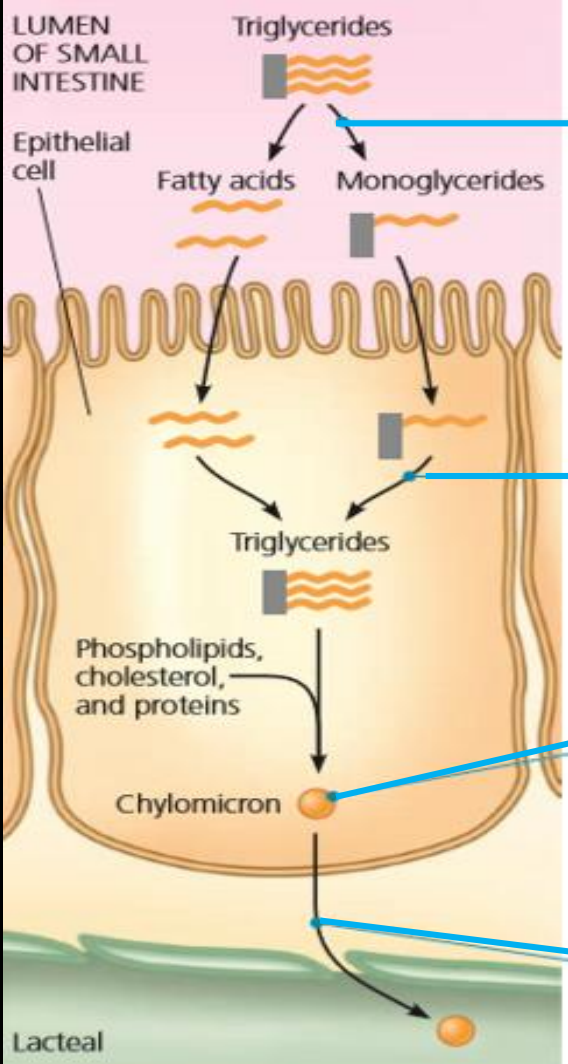
Thoracic duct

Left Subclavian vein



TRANSPORT OF LIPID



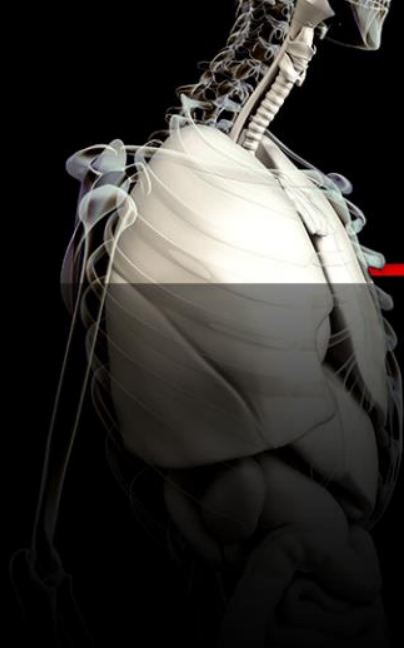


In the lumen, lipase breaks triglycerides to fatty acids and monoglyceride

After diffusing into epithelial cells, monoglycerides and fatty acids are re-formed into triglycerides. (Some glycerol and fatty acids pass directly into capillaries)

Triglycerides are incorporated into water-soluble globules called chylomicrons

Chylomicrons leave epithelial cells by exocytosis and enter lacteals, where they are carried away by the lymph and later pass into large veins



Next lecture



Transport In Plants