

**Aim: Transport- Why is it so important to multicellular organisms?**



**I. Transport-**

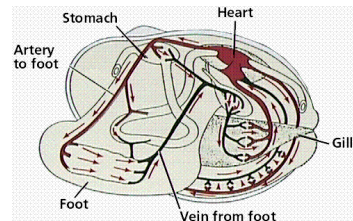
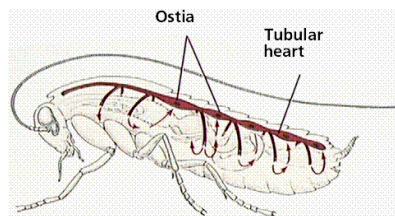
the absorption and circulation that allows substances to pass into or out of cells and move throughout the organism.

**A. absorption-**

substances move across cell membranes into cells (diffusion)

**B. circulation- (distribution)**

movement of materials within a cell or between parts of an organism



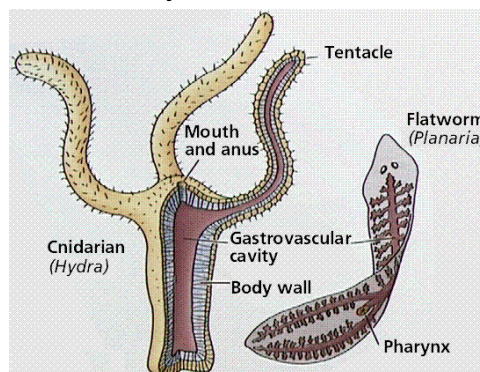
Nov 30-7:30 PM

**II. Why do large multicellular organisms need a transport system and unicellular or very simple multicellular organisms don't?**

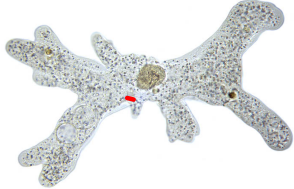
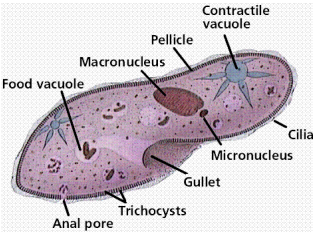
Multicellular organisms are more complex, and their cells are not all in contact with their environment. Thus, a circulatory system is required to move materials through the organism.

The cells of unicellular organisms are in direct contact with their external environment, and so materials can readily diffuse across the membrane into the cell.

\*Cyclosis-circular movement of cytoplasm




Nov 30-7:33 PM

**Transport in Protists:**


1. Diffusion
2. Cyclosis -  
Circular movement of cytoplasm.




Jan 2 - 10:16 AM

### HUMAN CIRCULATORY SYSTEM


- Closed circulatory system  
- blood is always in a blood vessel.
- 3 essential parts:
- 1. Heart -> pump
- 2. Blood -> transport medium
- 3. Vessels -> tubes to carry blood



**Heart**



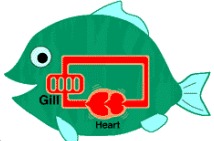
**Blood vessels**



**Blood**

**Closed circulatory system**

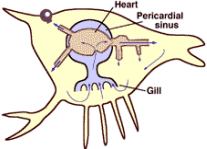
Vertebrates, and a few invertebrates, have a closed circulatory system. Closed circulatory systems have the blood closed at all times within vessels of different size and wall thickness. In this type of system, blood is pumped by a heart through vessels, and does not normally fill body cavities.



• Blood is always in a blood vessel

**Open circulatory system**

The open circulatory system is common to molluscs and arthropods. Open circulatory systems (evolved in crustaceans, insects, mollusks and other invertebrates) pump blood into a hemocoel with the blood diffusing back to the circulatory system between cells. Blood is pumped by a heart into the body cavities, where tissues are surrounded by the blood.



• Blood is NOT always in a Blood vessel.

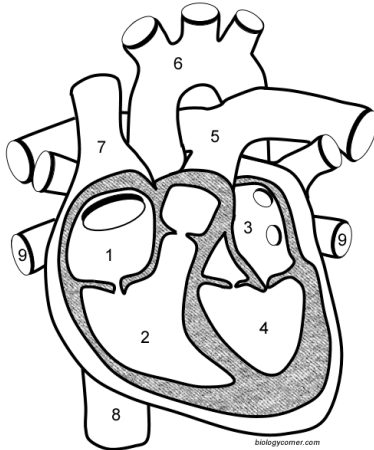
Dec 5-3:07 PM

1. Structure of the Heart:

- **Pericardium:**
- protective membrane surrounding heart.
- **Myocardium:**
- heart muscle enables it to contract 24 hour seven days a week
- **4 chambers double pump:**

1. Atria (left and right): **(top chambers)**  
 2 collecting or receiving chambers (thin walled). Pump only to ventricles.

2. Ventricles (left and right): **(bottom chambers)**  
 Pumping chambers (thick walled).



1. R. atrium
2. R. Ventricle
3. L. Atrium
4. L. Ventricle
5. Pulmonary Artery
6. Aorta
7. Superior Vena Cava
8. Inferior Vena Cava
9. Pulmonary veins

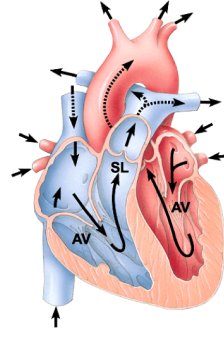
Dec 5-3:11 PM

- **Septum:**
- Keeps oxygenated and deoxygenated blood separate.
- Divides left and right side **of the heart**
- **Valves:**
- Prevent backflow between atria and ventricles. They make the "lub-dub" sound (open and close)

[http://www.phschool.com/science/biology\\_place/biocoach/cardio1/cycle.html](http://www.phschool.com/science/biology_place/biocoach/cardio1/cycle.html)

**Lub-dub, lub-dub**

- **Heart sounds**
  - ♦ 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



Dec 5-3:11 PM

### CONTROL OF HEARTBEAT

Cardiac muscle has a built-in or innate ability to contract.

.Rate of Heartbeat regulated by 2 nerves:



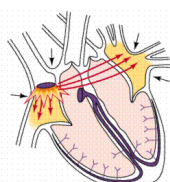
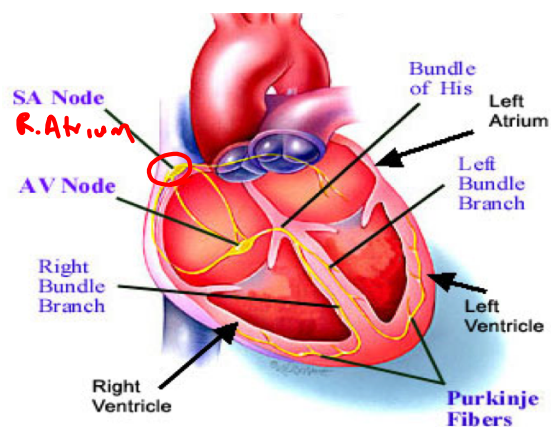
Dec 5-6:40 PM

[http://www.phschool.com/science/biology\\_place/biocoach/cardio1/electrical.html](http://www.phschool.com/science/biology_place/biocoach/cardio1/electrical.html)

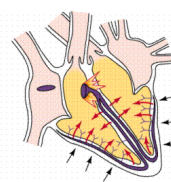
**Sinoatrial node:**

**Pacemaker – the S.A. node**

Specialized group of cells, which send out electrical impulses



Sinoatrial node fires, action potentials spread through atria which contract



Atrioventricular node fires, sending impulses along conducting fibers; ventricles contract

Jan 10-11:38 AM

[http://www2.needham.k12.ma.us/eliot/technology/lessons/cir\\_sys/](http://www2.needham.k12.ma.us/eliot/technology/lessons/cir_sys/)



<http://www.pbs.org/wgbh/nova/body/map-human-heart.html>



Another test the cardiologist might do is an echocardiogram. This test uses sound waves to make a picture of the heart as blood is pumped through its chambers and valves. It takes about 20 minutes and it doesn't hurt either.

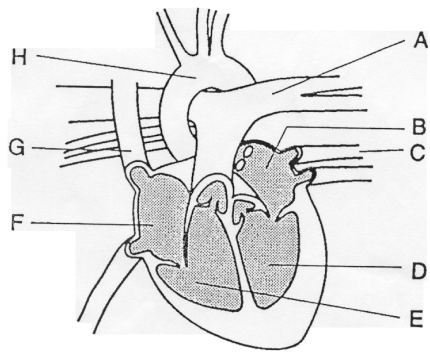
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### EKG

**Electrocardiogram (EKG):**  
Machine which records electrical impulses of the heart

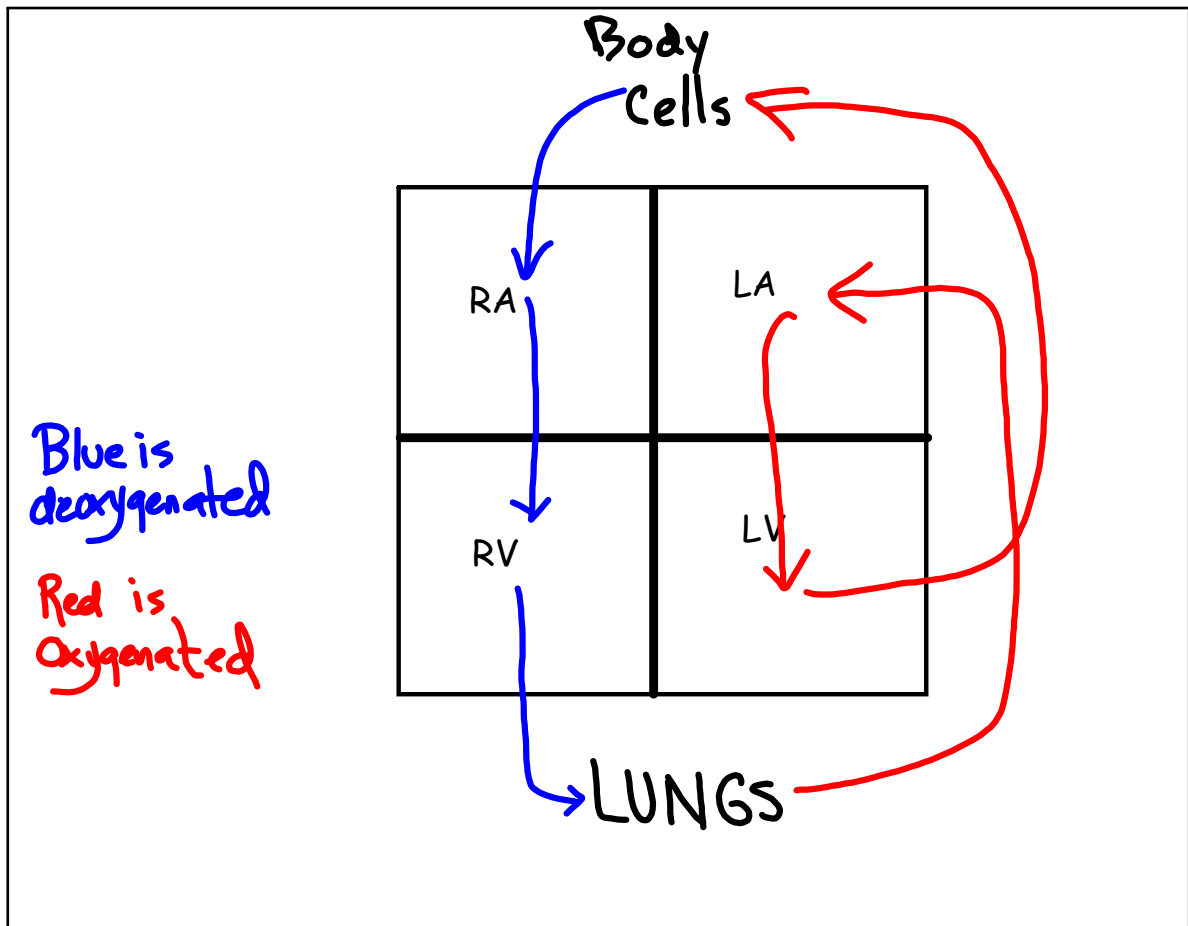
Electrocardiogram ( ECG )

Jan 10-11:47 AM



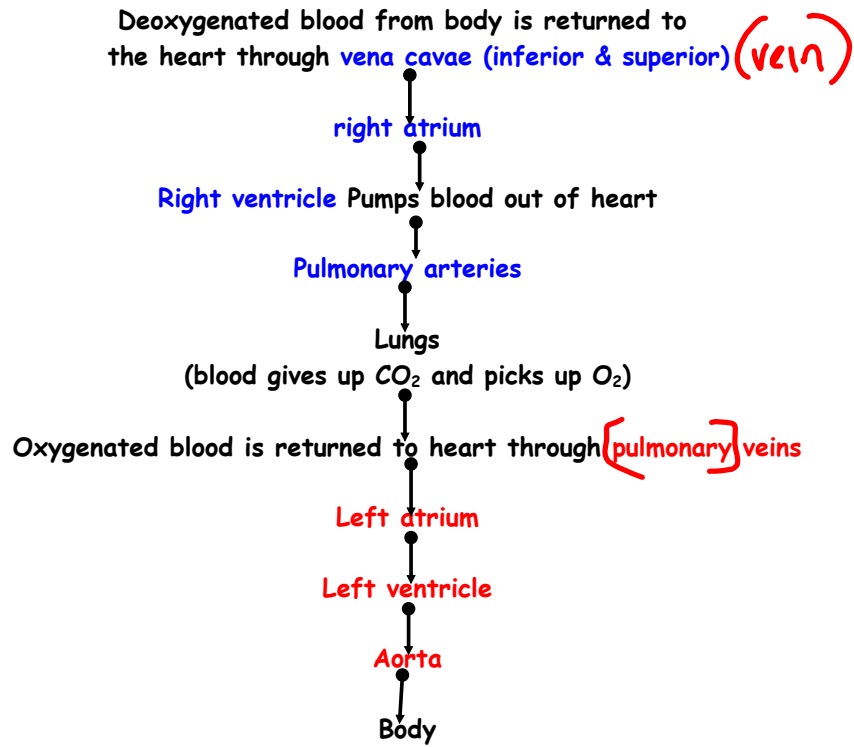
Right Side	Left Side
Receives blood coming from the body cells	Receives blood from Lungs
Blood is oxygen poor (deoxygenated)	Blood is oxygenated (oxygen rich)
Sends blood to LUNGS	Sends blood to all the Body Cells

Jan 4-10:52 AM



Jan 5-1:01 PM

**Circulation Through the Heart:** Blood is pumped through the blood vessels of the body by contractions of the heart.



Dec 5-6:35 PM