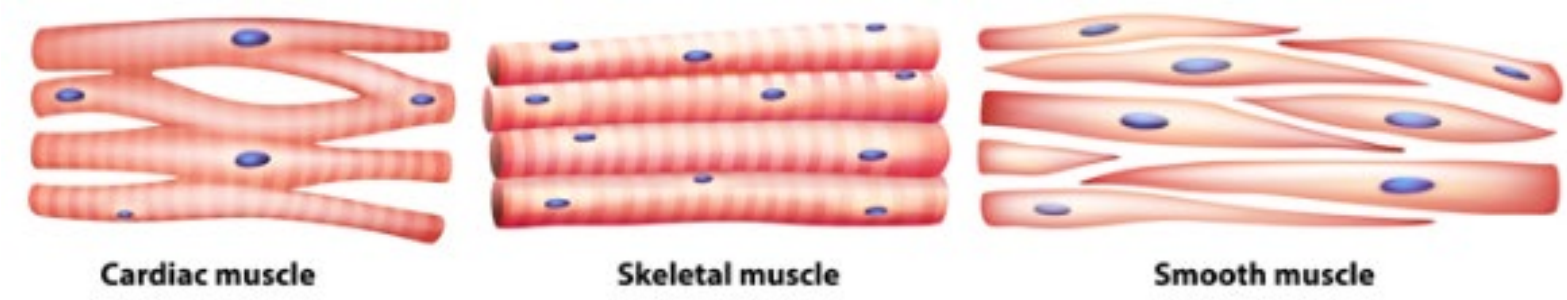
ETH zürich

Muscle and Cardiovascular Tissues

Amilen Souto Cortês

Muscle tissue

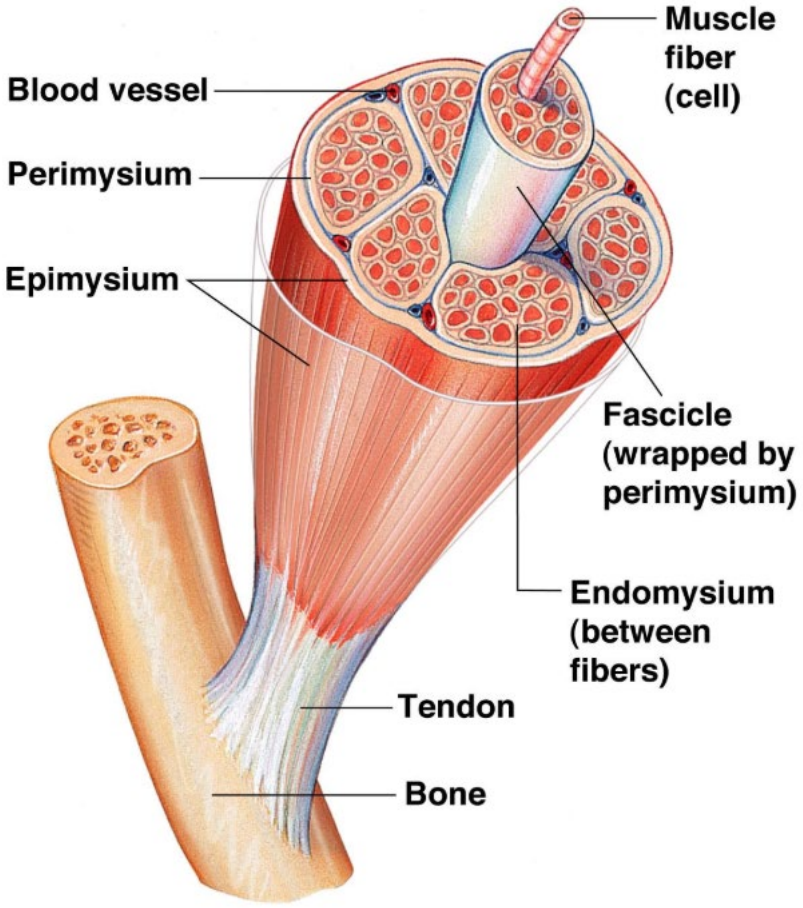


- Striated
- Tubular, branched
- Uninucleated fibers
- Involuntary

- Striated
- Tubular
- Multinucleated fibers
- Voluntary

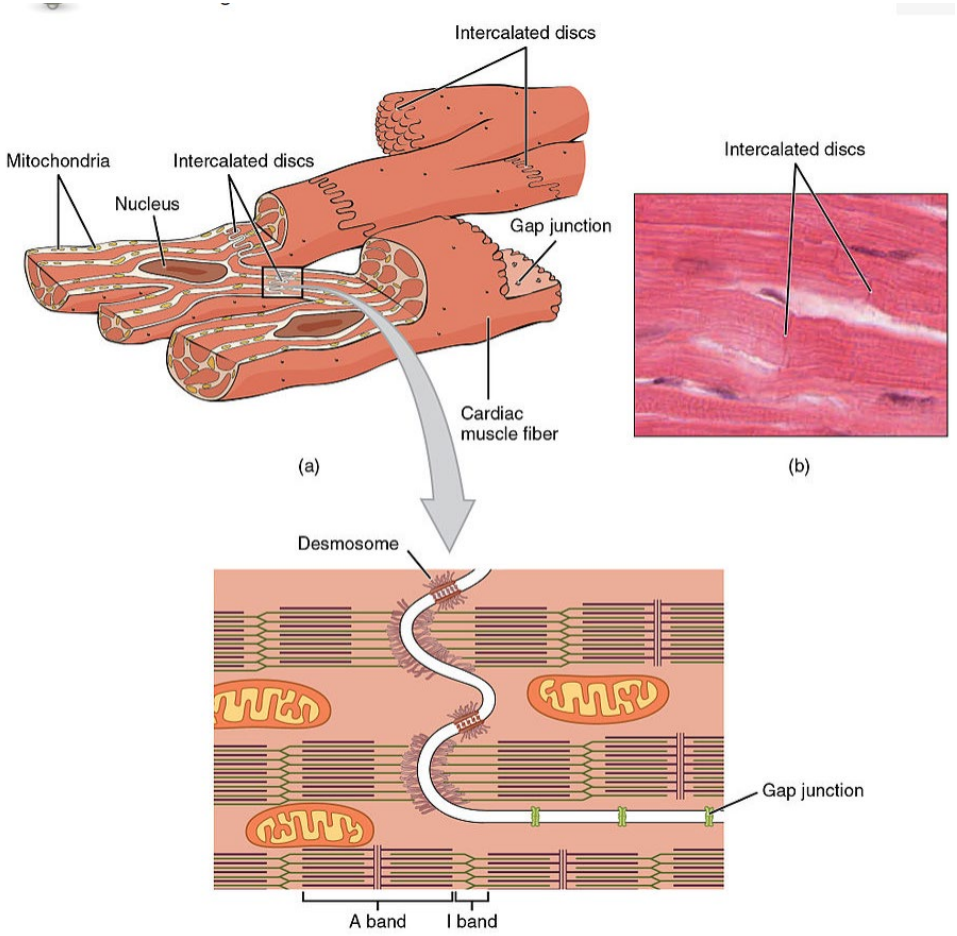
- Non-striated
- Spindle-shaped
- Uninucleated fibers
- Voluntary

Skeletal Muscle



Cardiac Muscle

- **Intercalated discs**
- Sliding filament mechanisms
- Self-excitable or autorhythmic



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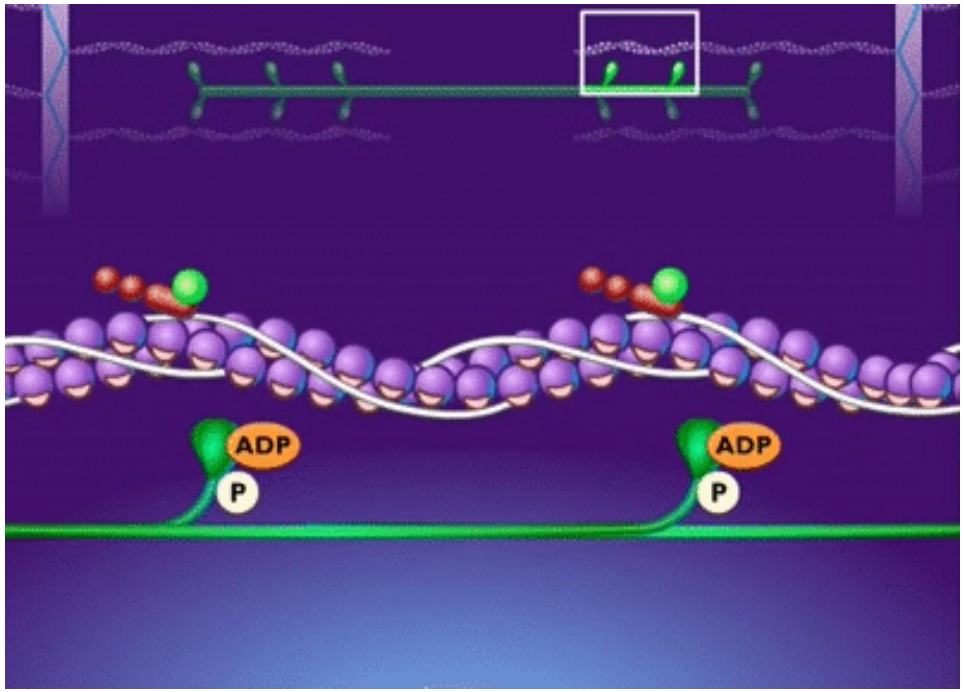

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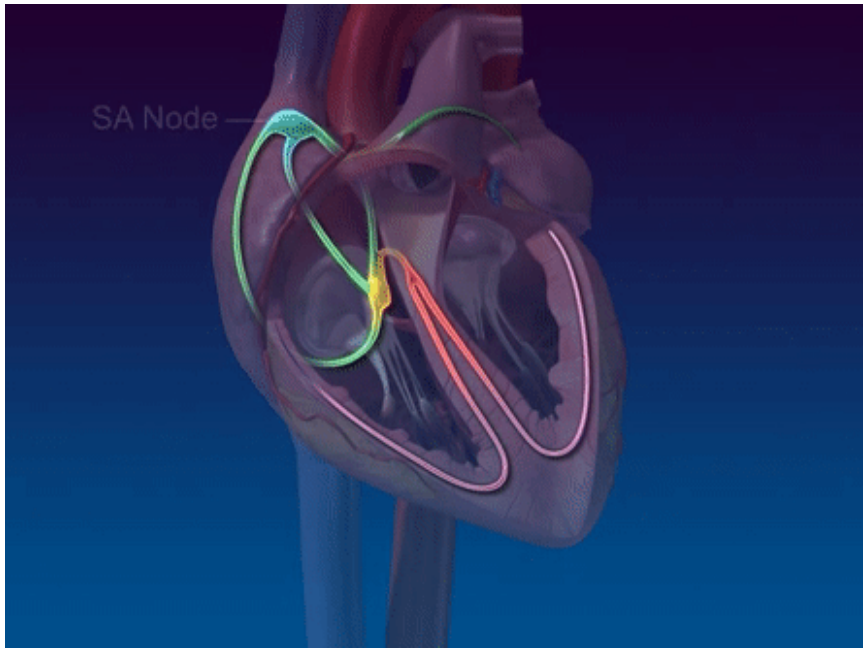
Electrical Conduction in the Heart



1) SA node

Generates electrical signal→Atria contracts

2) AV node (Atria→Ventricle)

Slows the electrical signal→ delay

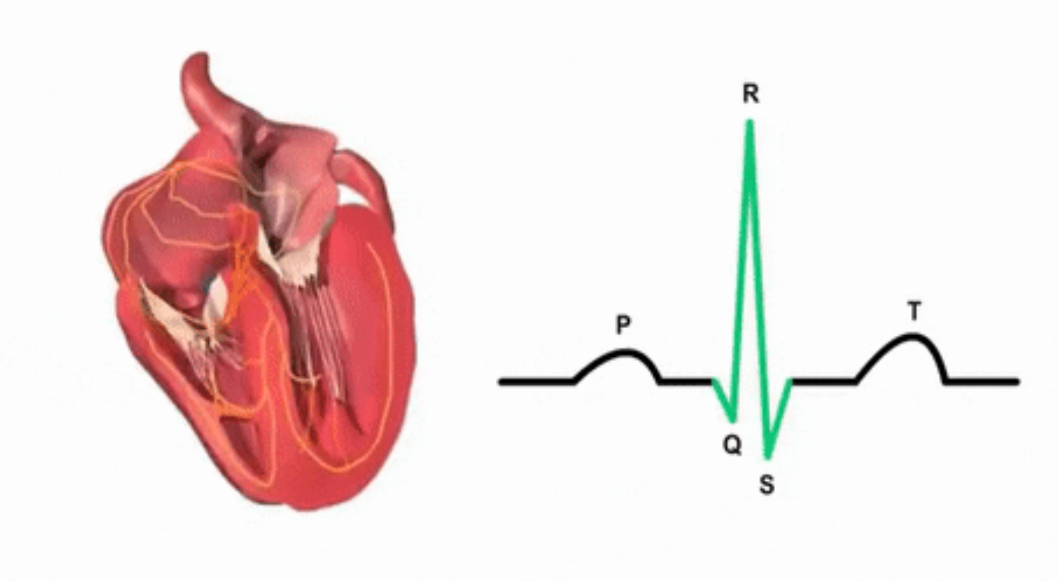
3) Bundle of HIS

4) Bundle Branch

5) Purkinje Fibers

Acceleration through ventricles

ECG Signals

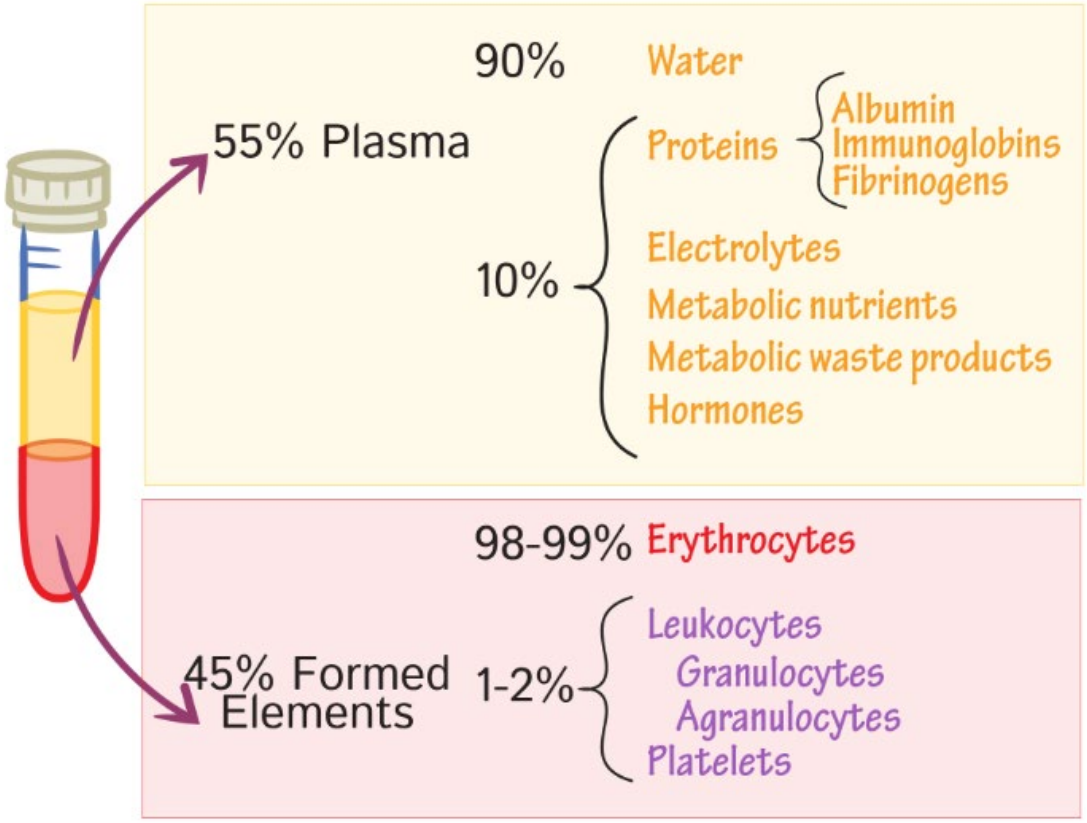


P: Atrial contraction

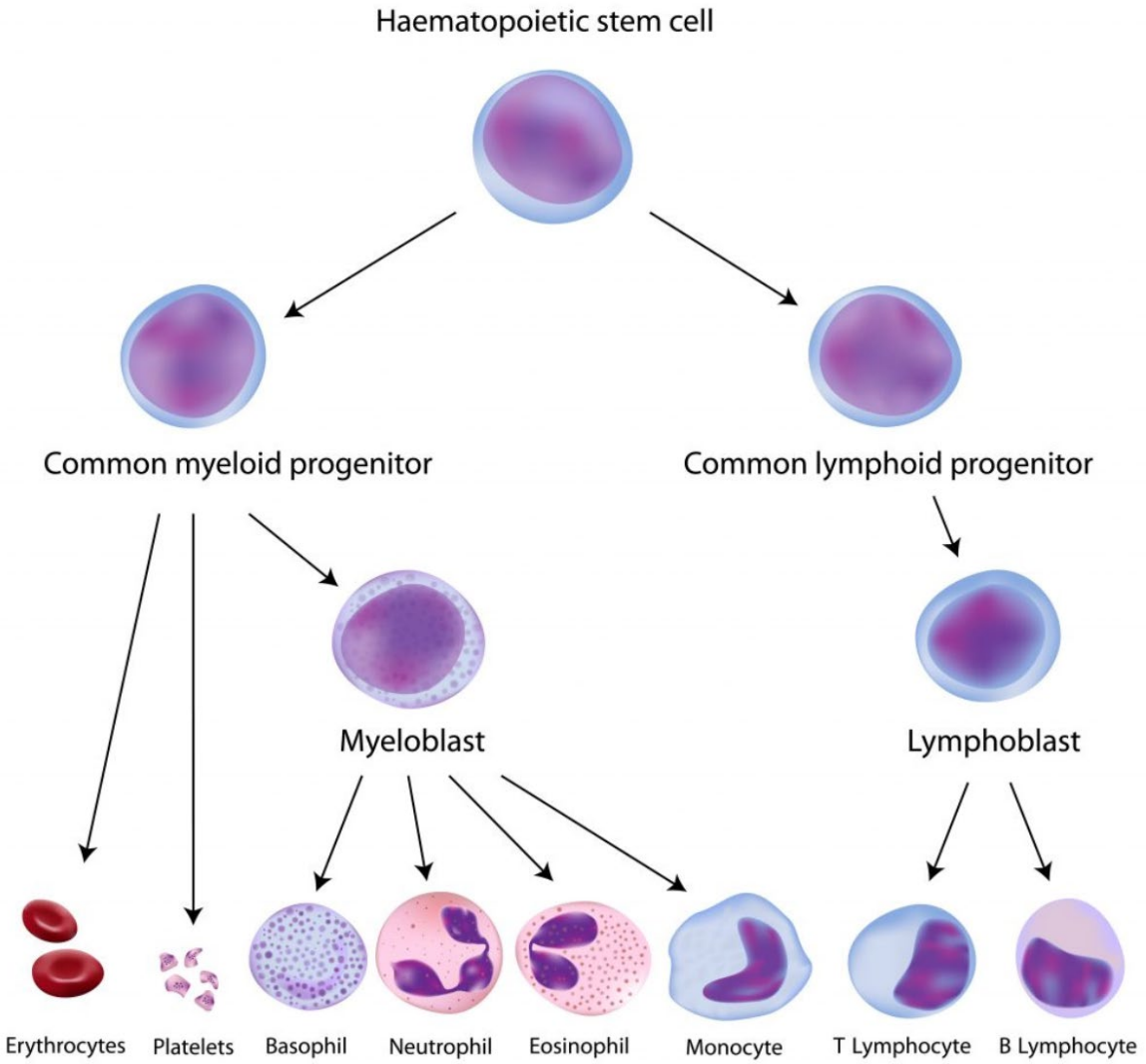
QRS: Contraction of the ventricles

T: Relaxation of the ventricles

Blood Composition



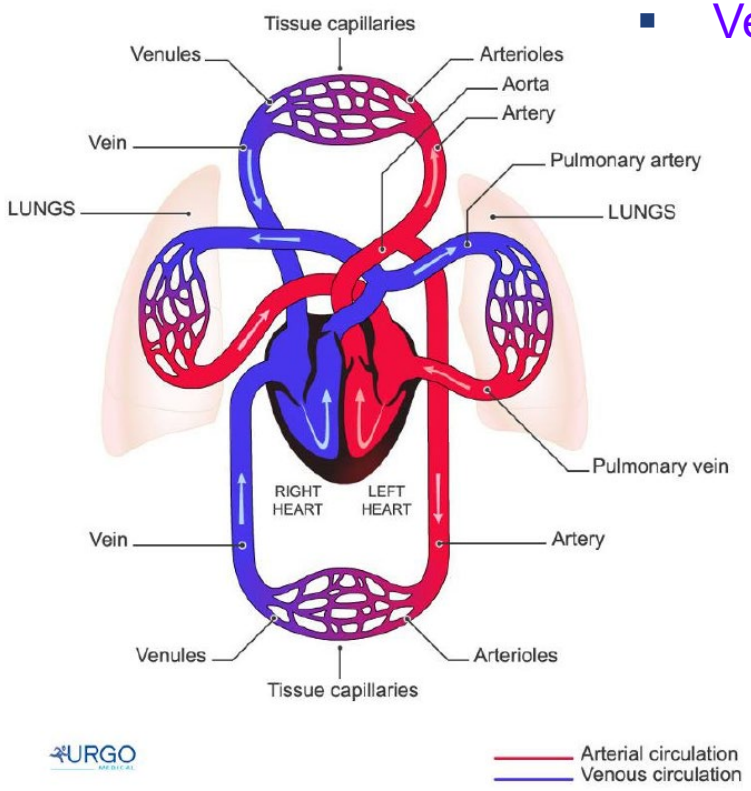
Origin of the Blood Cells

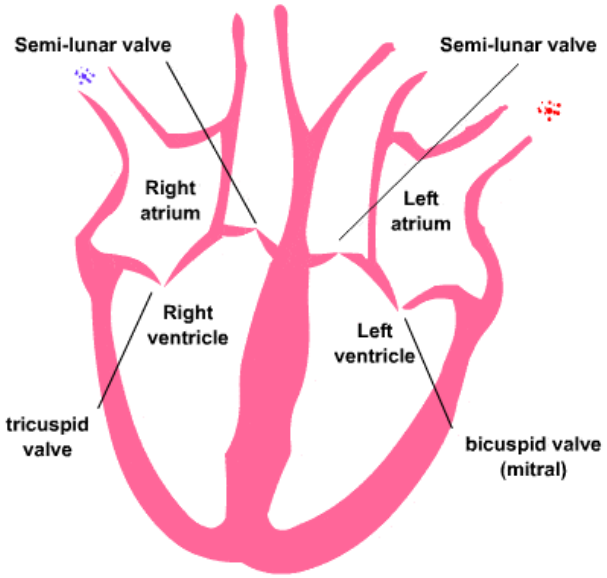


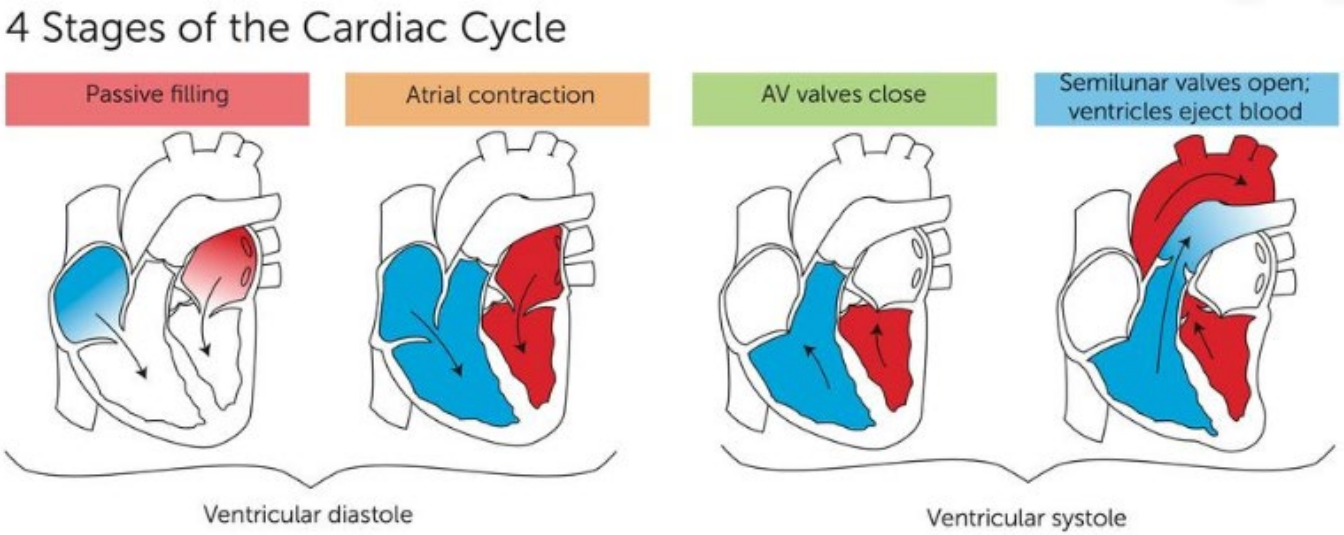
Blood Circulation

- Arteries(O2-Rich): From heart→Body
- Veins(O2-Poor): From Body→Heart

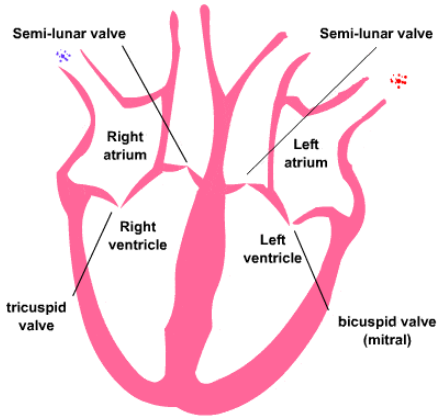
  Exception: pulmonary artery







- Diastole(=Filling phase)
- Systole(=Ejection phase)



Stroke volume, Ejection Fraction, Cardiac Output

Stroke Volume: the volume of blood pumped from the left ventricle per beat.

Stroke volume = EDV – ESV

EF% = (SV / EDV) x 100

Ejection Fraction: The percentage of blood that is pumped out of the ventricles with each contraction.

CO = SV x HR

cardiac output = stroke volume X heart rate

(ml/minute) (ml/beat) (beats/min)

Cardiac output: The volume of blood pumped from each ventricle per minute

a. Average heart rate = 70 bpm
b. Average stroke volume = 70−80 ml/beat
c. Average cardiac output = 5,500 ml/minute