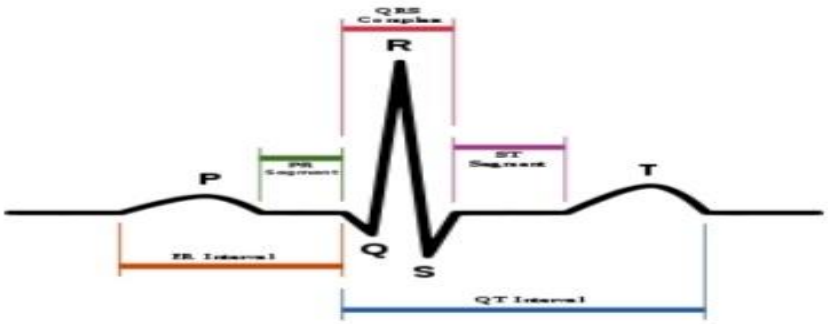
ECG BACK TO BASIC



ECG BACK TO BASIC

TENTATIVE

8 AM – 8.30 AM – Registration

8.30 AM – 8.45 AM – Pre Test

8.45 AM – 10.30 AM – Ice Breaking
Know Your Heart
Normal ECG (happy Heart)

10.00 AM – 11.00 AM – Tea Time

11 AM --- 12. 45 AM –Abnormal ECG
Arithmias

12.45 AM ---2.00 PM ---Lunch

2.00 PM ---4.00 PM –What to do When Emergency

4.00 PM ---4.30 PM --- Post Test

5.00 PM - disperse

U can save people life

ECG

BACK TO BASIC

LETS LEARN

IT'S EASY

EVERYONE CAN READ ECG

Speaker : Miss Sumaiyah Jamaludin

Kulliyyah of Nursing

IIUM

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25200 Kuantan

019-4845300

1. KNOW YOUR HEART

2. HAPPY HEART

ANATOMY & PHYSIOLOGY OF THE CARDIOVASCULAR SYSTEM

3

Thandar Soe @ Sumaiyah Jamaludin

sumaiyah@iium.edu.my

LEARNING OUTCOME

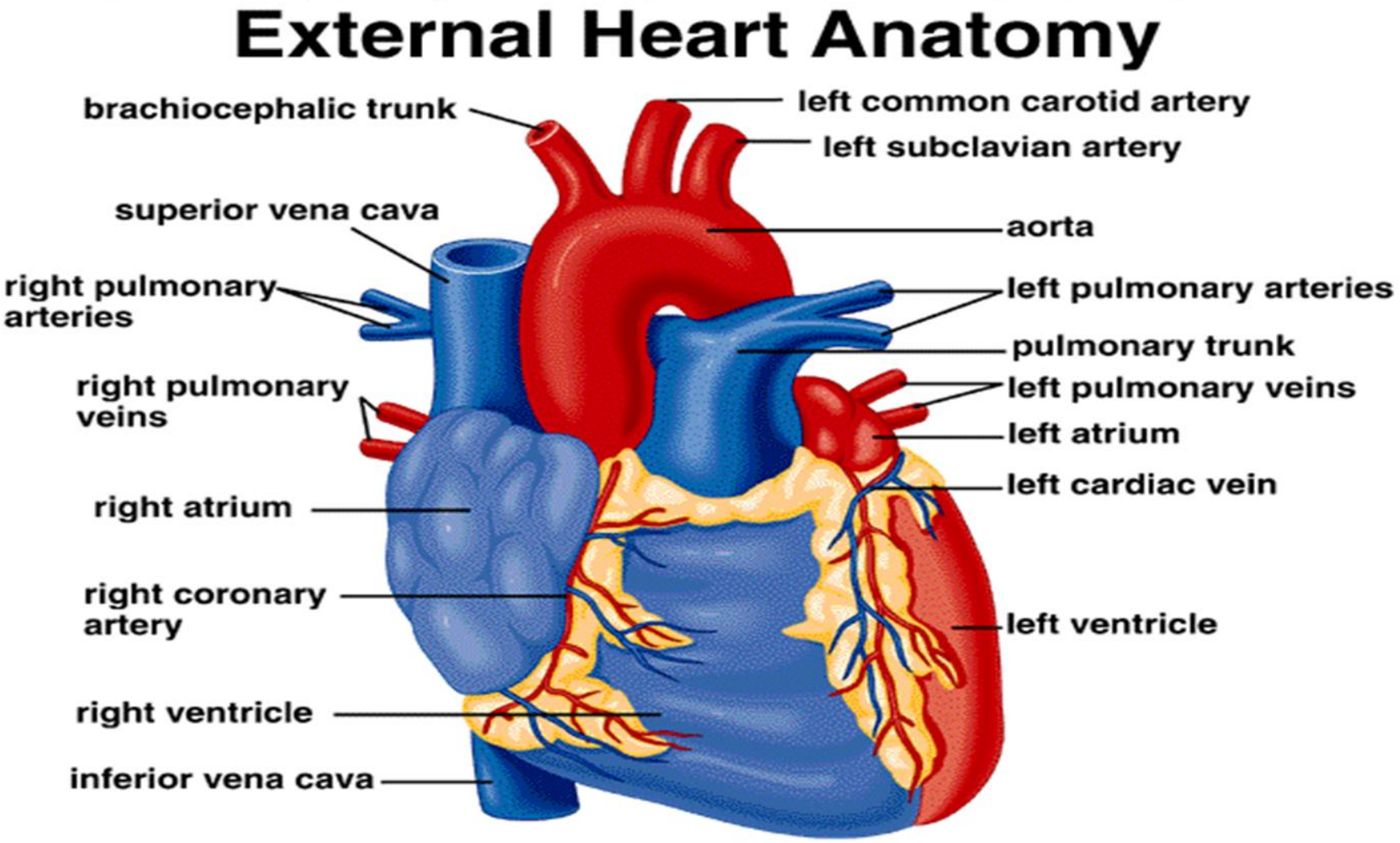
- List down the anatomy of cardiovascular system.
- Explain the physiology of cardiovascular system.
- Describe the anatomy and physiology of cardiovascular system
- Discuss the function of anatomy and physiology of cardiovascular system.

ANATOMY OF THE HEART

LOCATION OF THE HEART

- Fist-sized
- Rests on the diaphragm
- Near the midline of the thoracic cavity (Mediastinum)

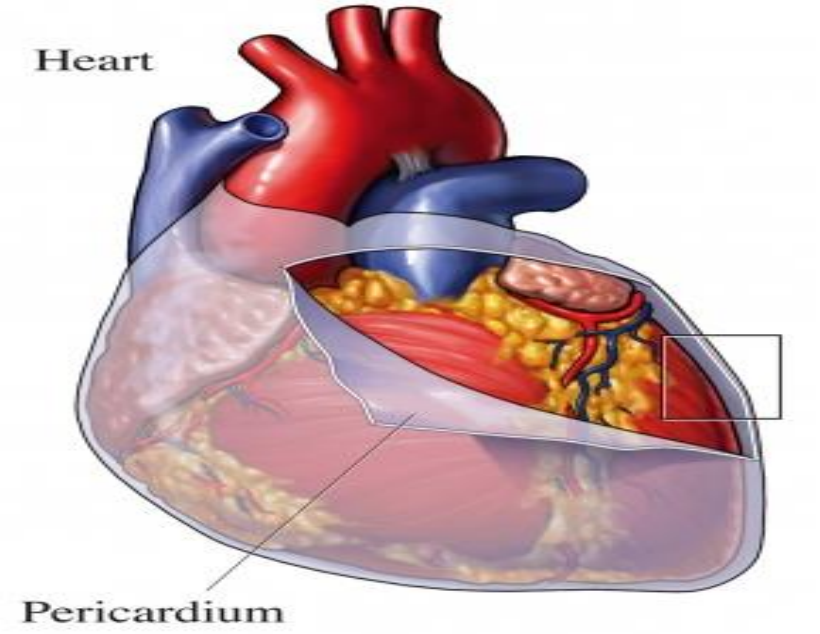
SURFACE ANATOMY OF THE HEART

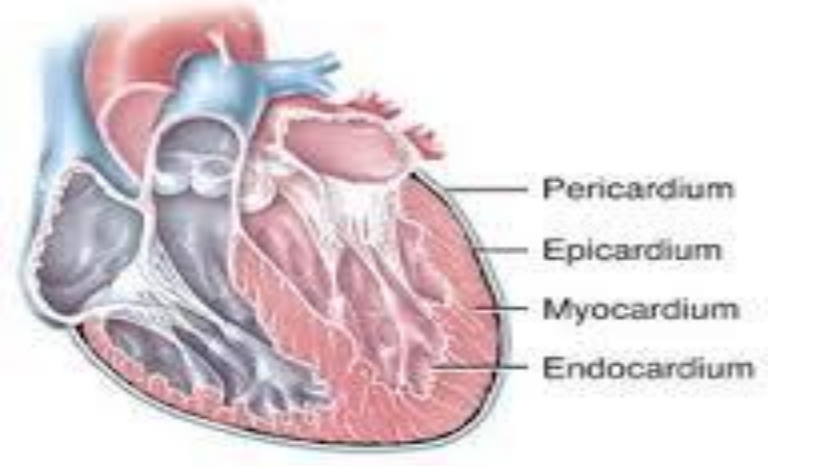


LAYERS OF THE HEART

Pericardium

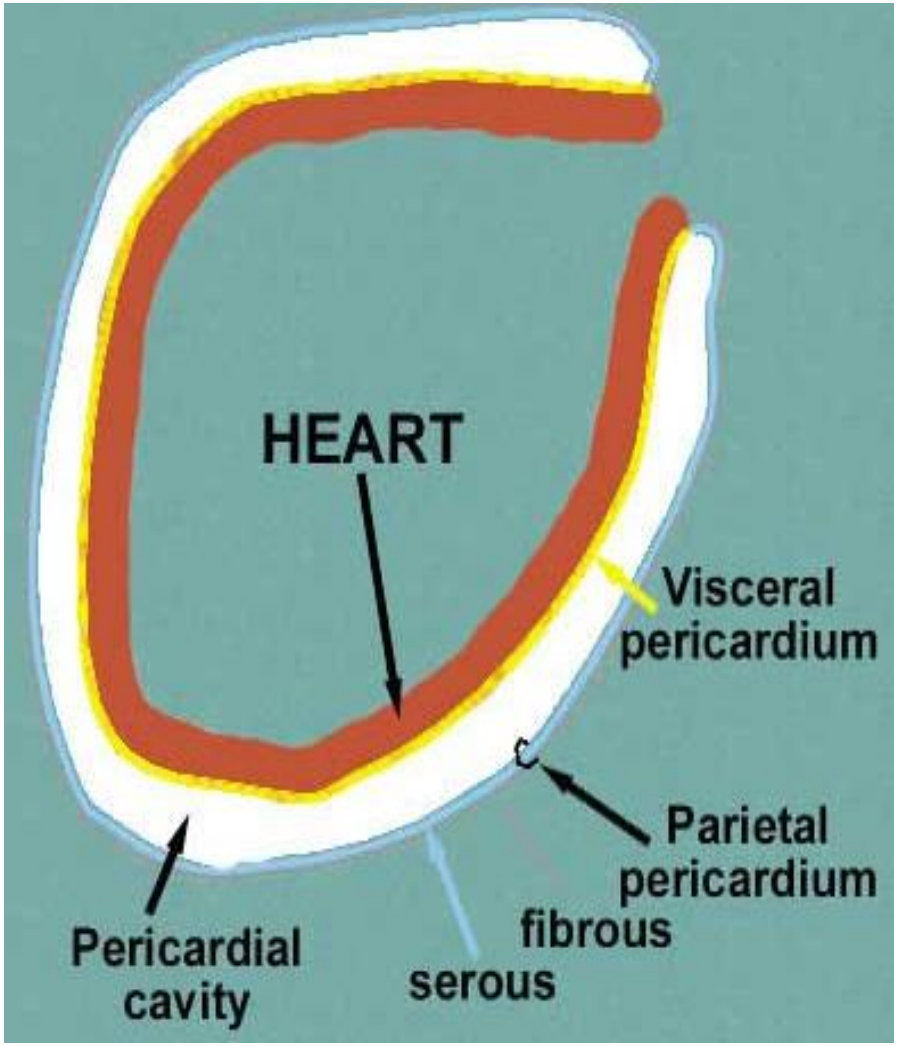
- Confines heart to the mediastinum
- Allows sufficient freedom of **movement**.
- Consists of two parts: the **fibrous** and **serous**.





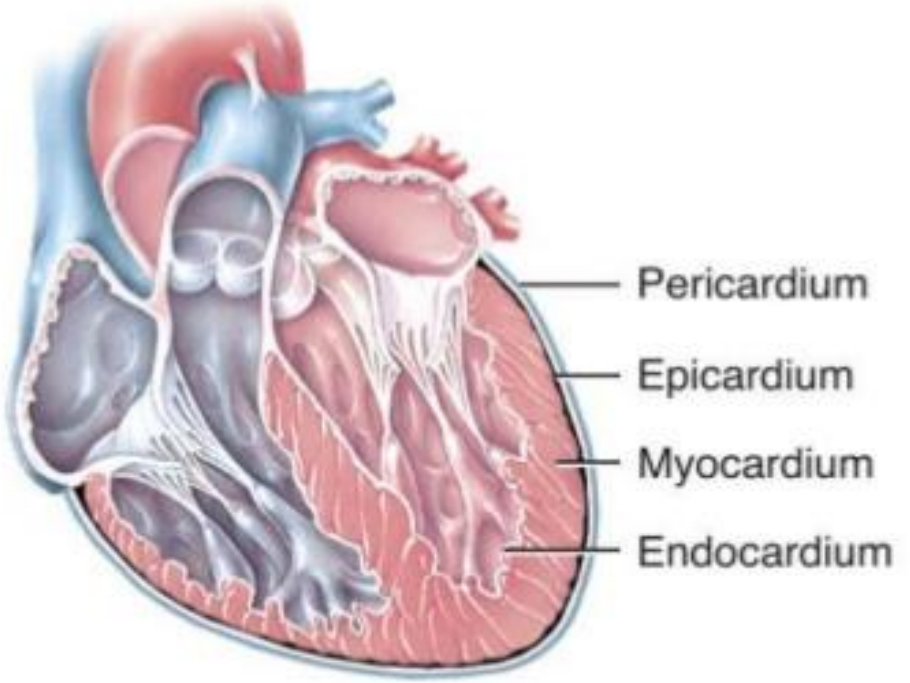
PERICARDIUM

- **Fibrous**: thin inelastic, dense irregular connective tissue and helps in **protection**, **anchors** heart to mediastinum
- **Serous:** thinner, more delicate divided into **parietal and visceral**

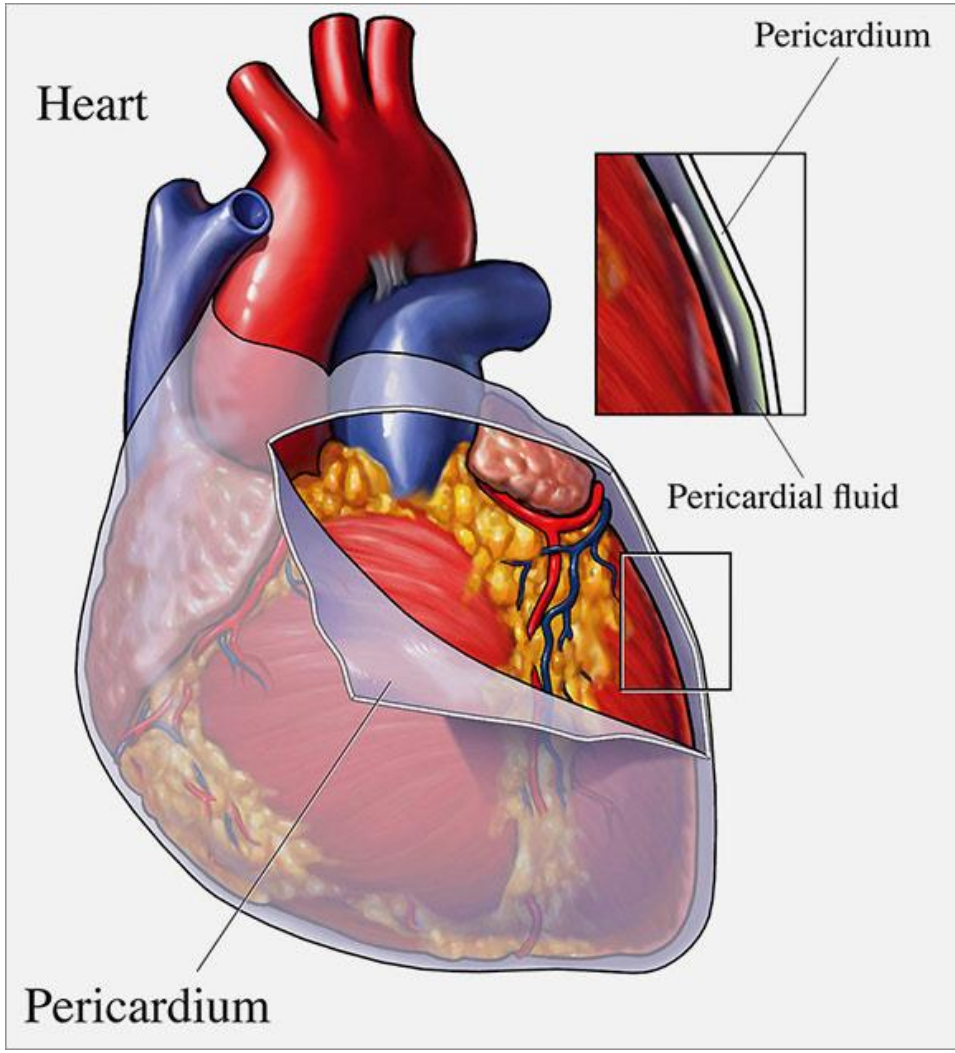


LAYERS OF THE HEART

- The wall of the heart is composed of three distinct layers. From superficial to deep they are:
  - The **epicardium**
  - The **myocardium**
  - The **endocardium**

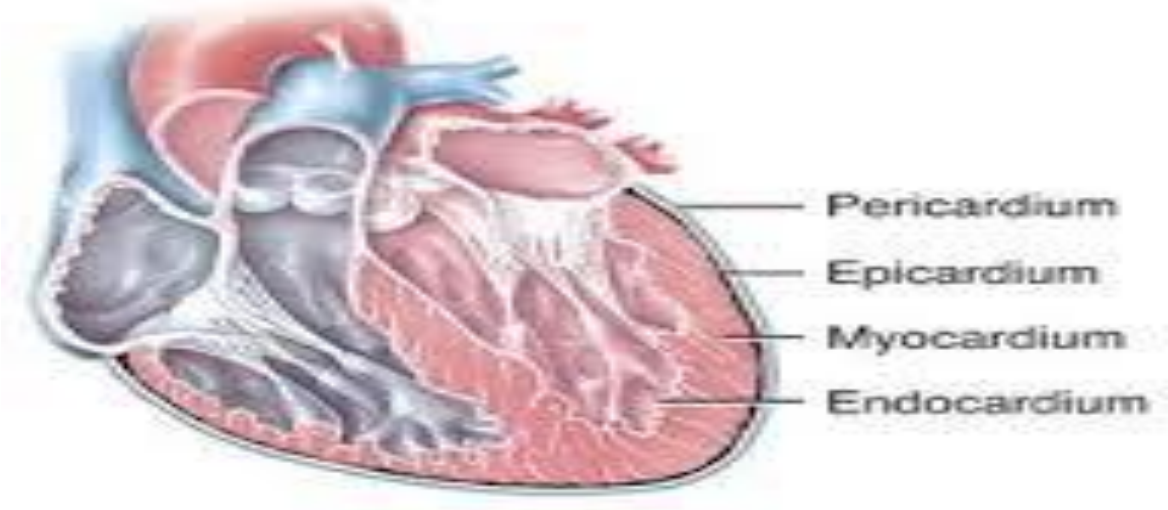


Pericardium is a double-walled sac containing the heart and the roots of the great vessel. The pericardial sac has two layers, a serous layer and a fibrous layer. It encloses the pericardial cavity which contains pericardial fluid.



EPICARDIUM

- Epicardium (inner layer of a double walled sac that surrounds the heart).
- Composed of mesothelium and delicate connective tissue (imparts a **slippery texture** to the outer surface of the heart).

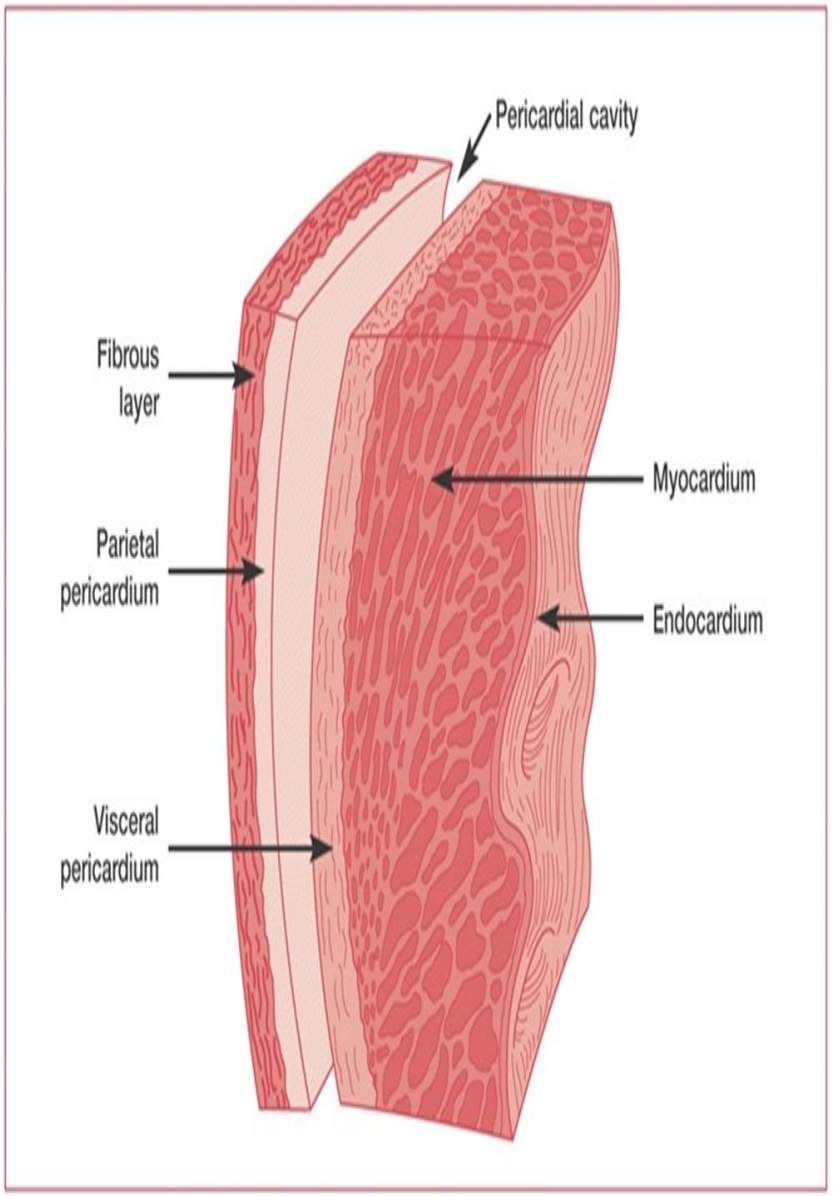


MYOCARDIUM

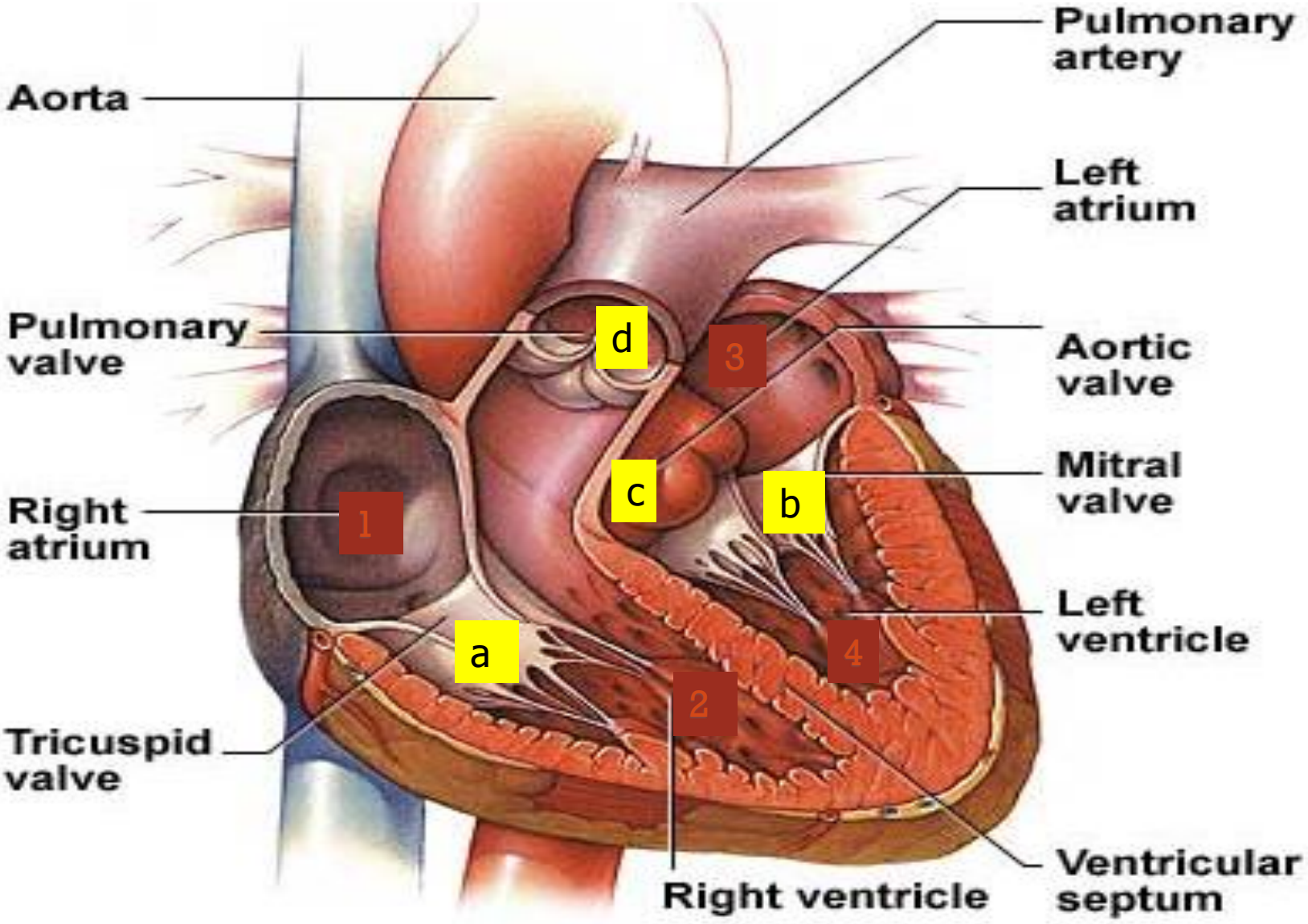
- Myocardium (thickest part of the heart; consists of cardiac muscle).
- **Responsible for pumping**

ENDOCARDIUM

- Thin layer of endothelium which is continuous with the lining of the large blood vessels attached to the heart chambers and valves.

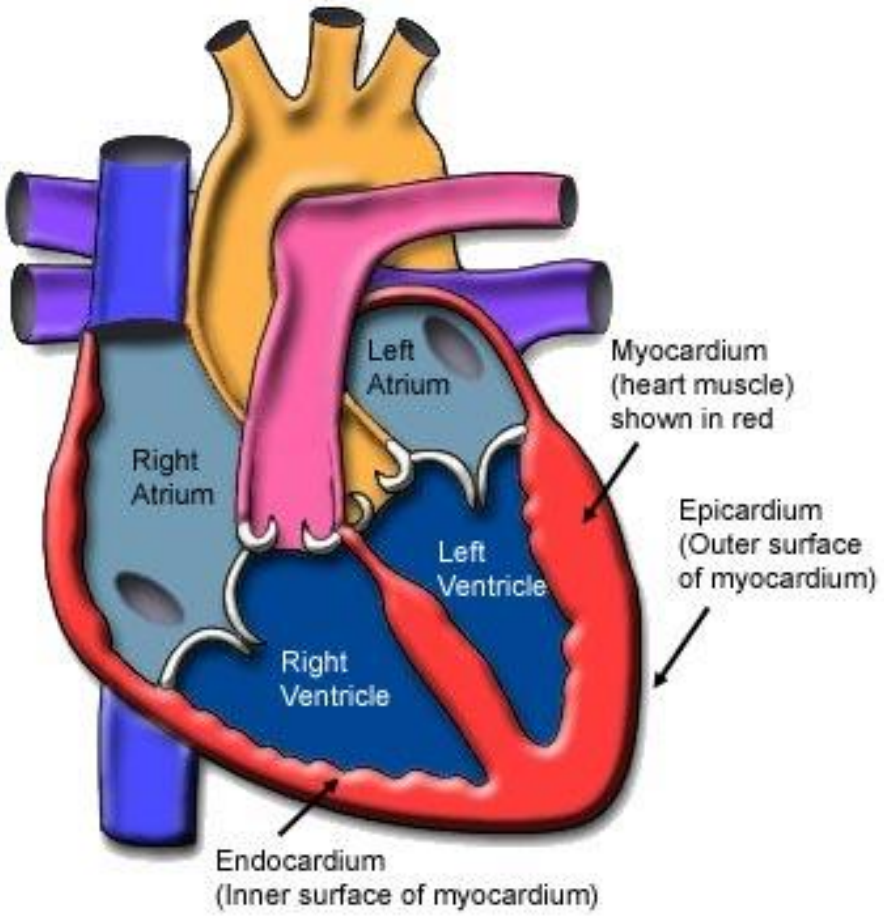


CHAMBERS OF THE HEART



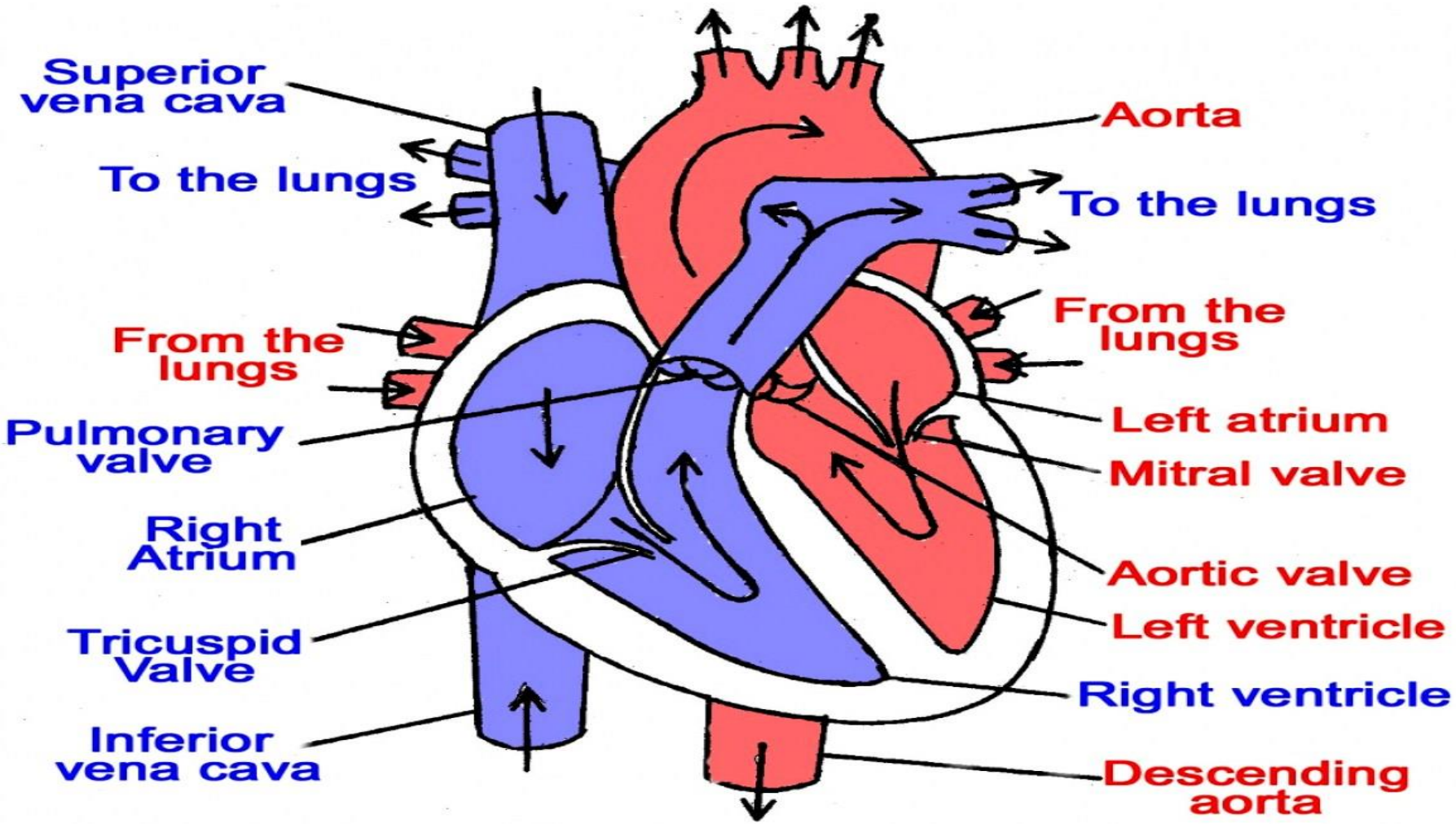
MYOCARDIAL THICKNESS AND FUNCTION

- **Atria** : thin walled
- **Ventricles** :thick walled
- **Lt ventricle is thicker than the Rt ventricle.**



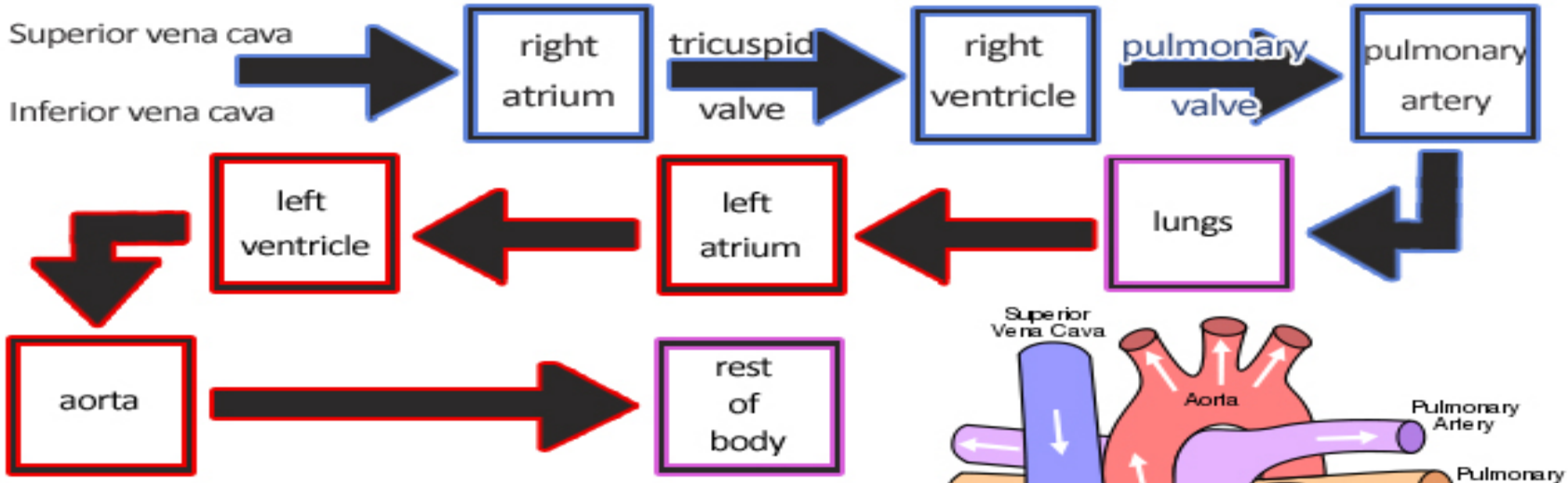
PHYSIOLOGY OF THE HEART

BLOOD FLOW THROUGH THE HEART

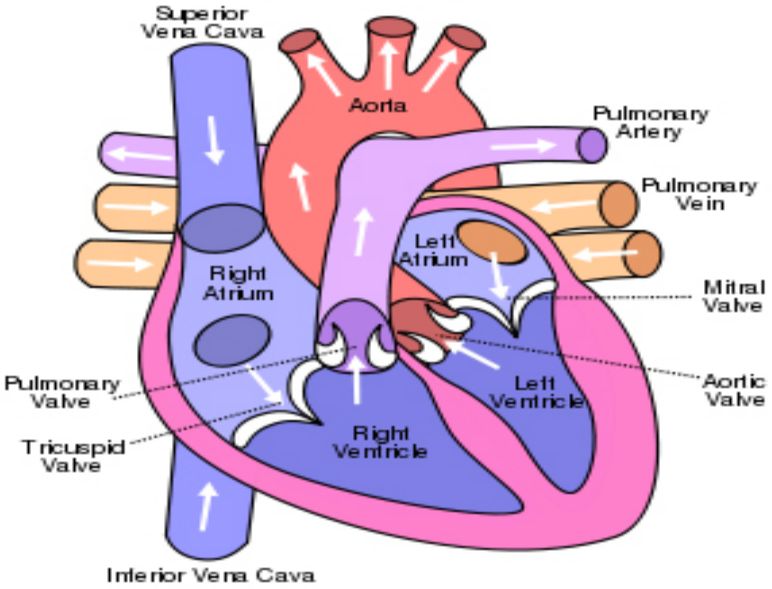


CIRCULATION OF BLOOD AND HEART VALVES

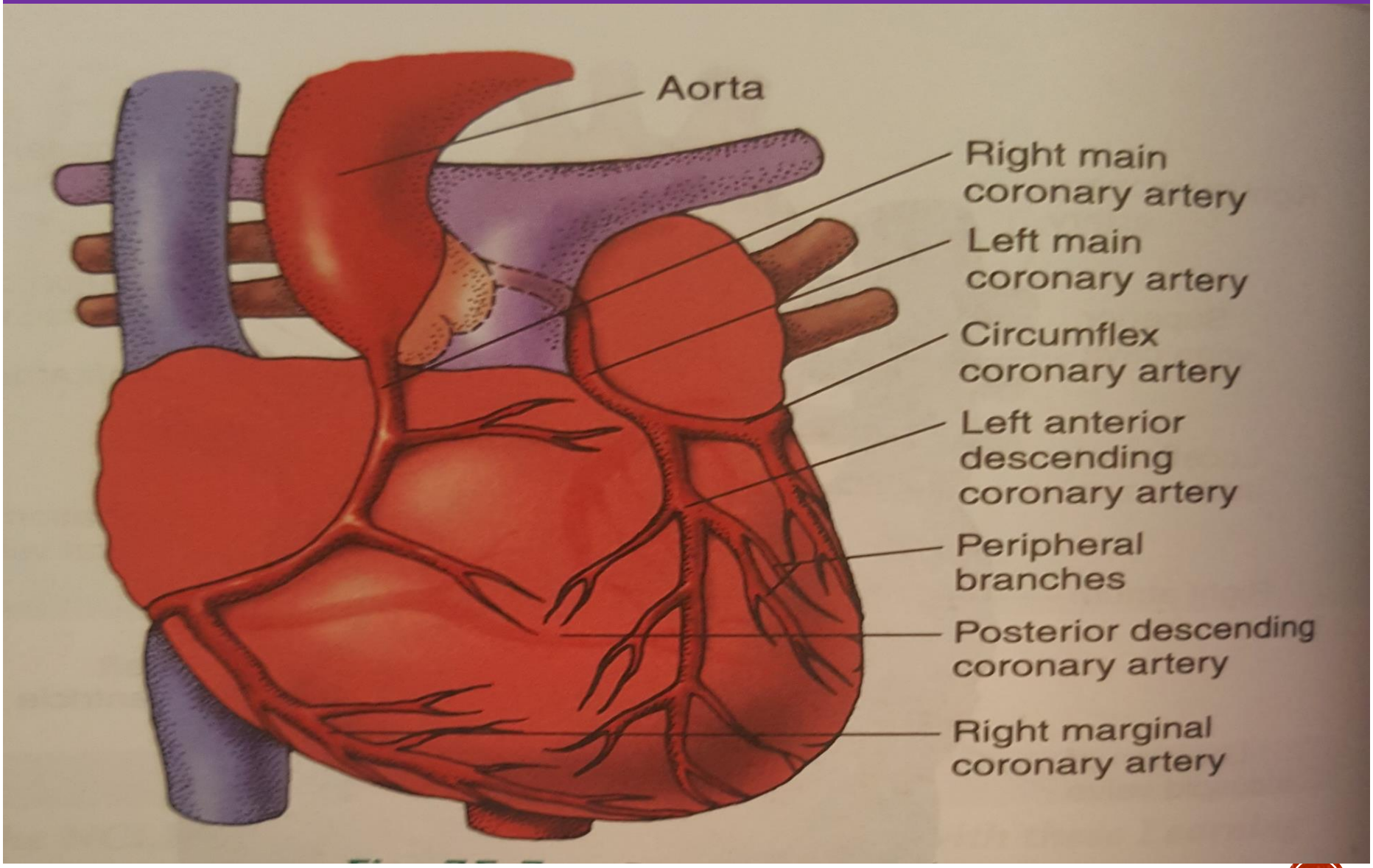
CIRCULATION OF THE HEART



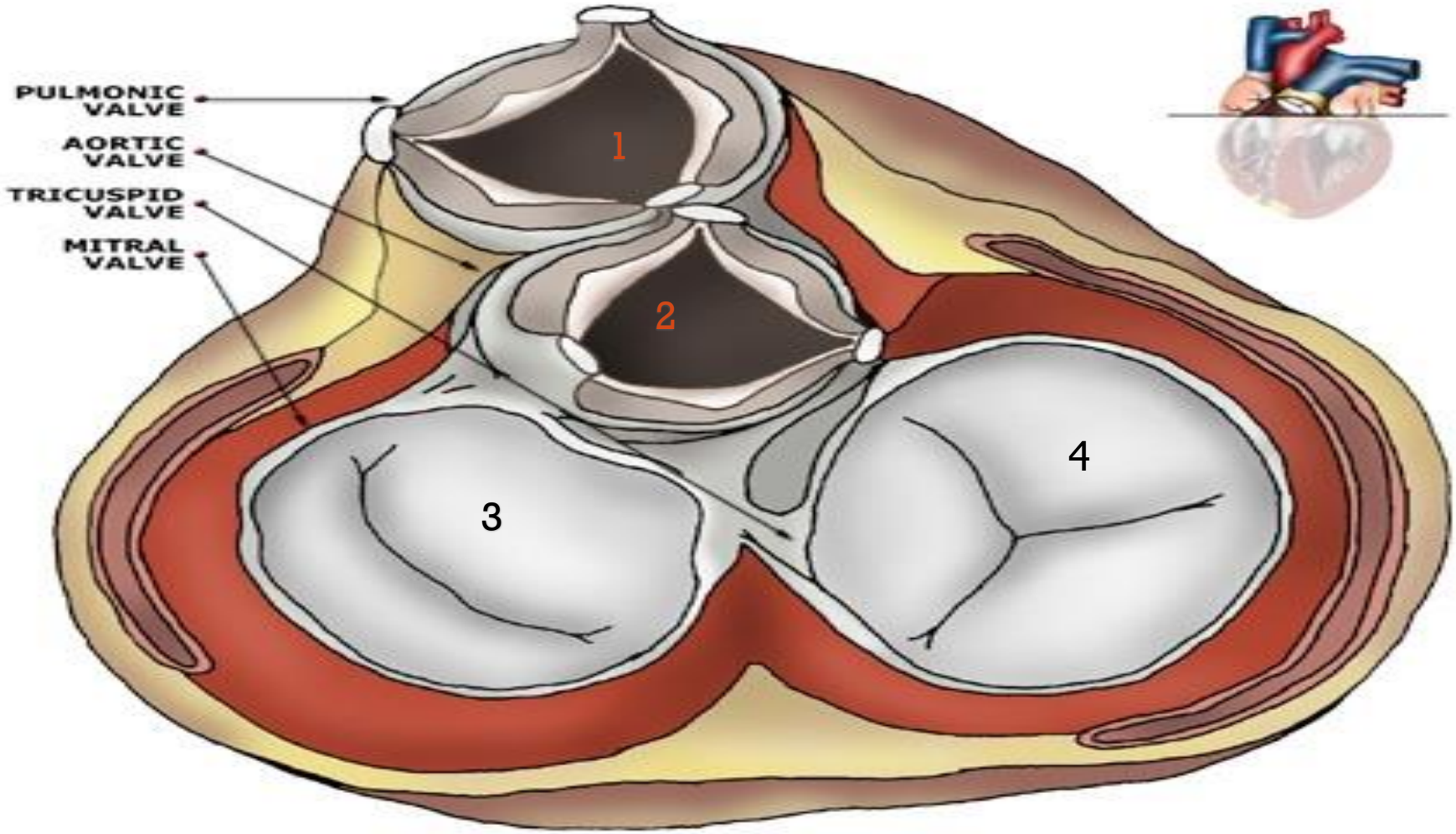
Circulation of Blood Through the Heart:



CORONARY ARTERIAL SYSTEM

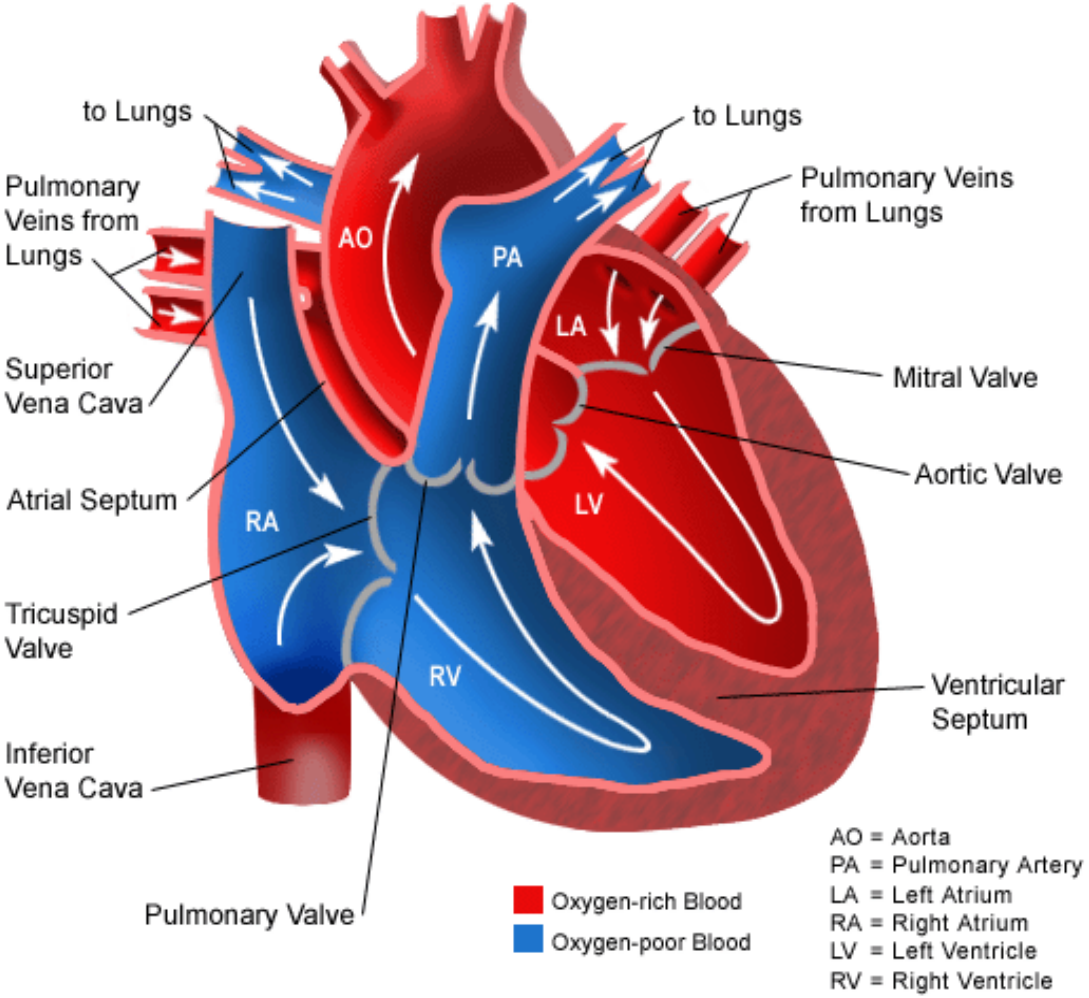


ATRIOVENTRICULAR & SEMILUNAR VALVES



SYSTEMIC AND PULMONARY CIRCULATION

- **Left side** is a pump to the **systemic circulation**.
- **Right side** is a pump to the **pulmonary circulation**.

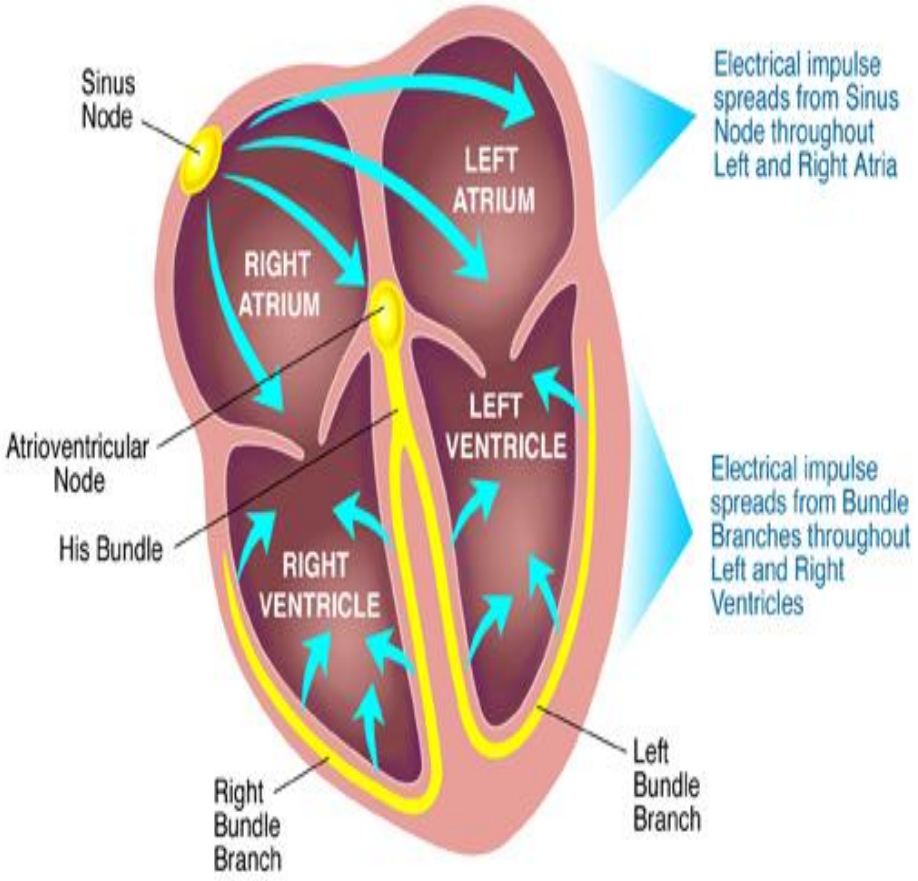


THE CONDUCTION SYSTEM

- Inherent and rhythmical beat is due to **auto-rhythmic fibers** of the cardiac muscle.
- These fibers have 2 important function

  - Act as **pace maker**

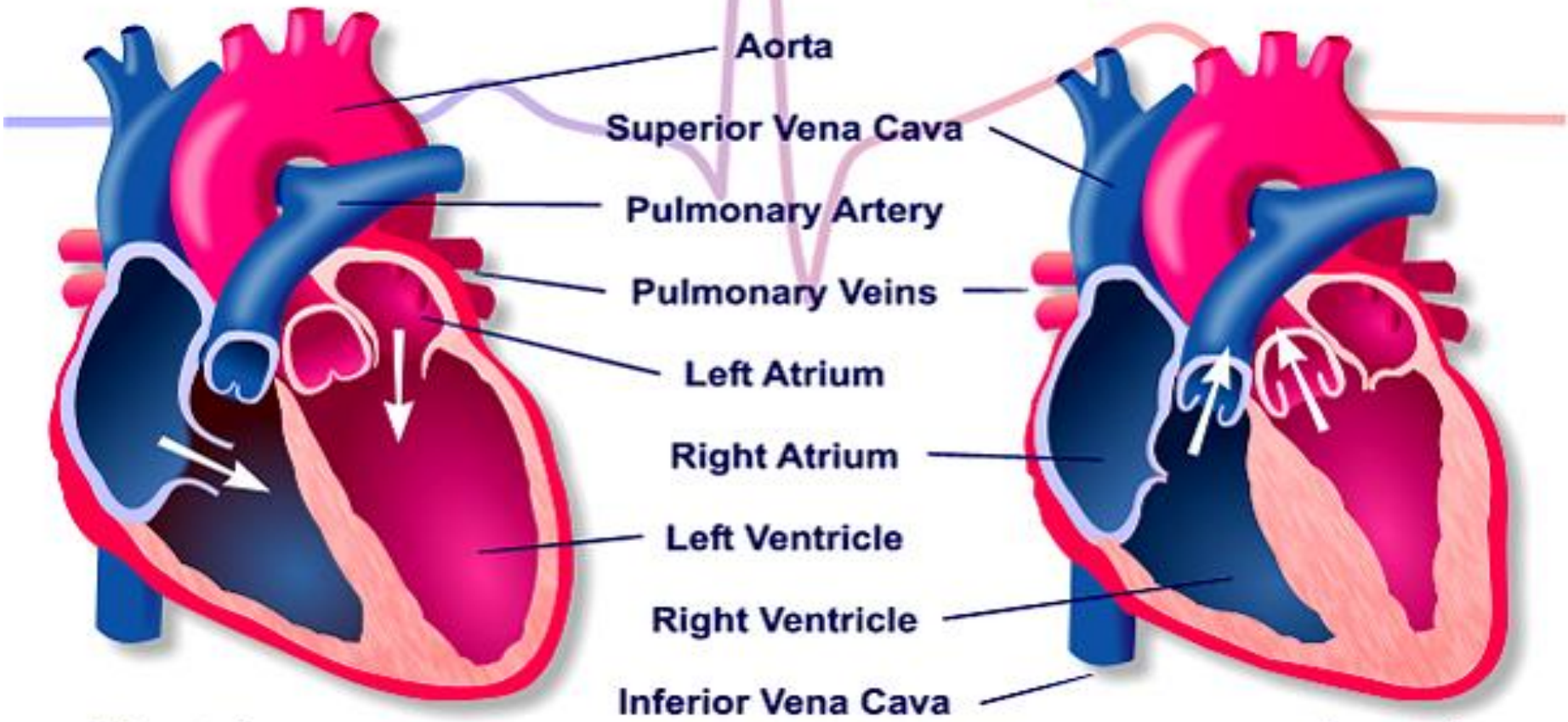
  - Form **the conduction system**



PHYSIOLOGIC CHARACTERISTICS OF THE CONDUCTION CELLS

1. **Automaticity**
2. Excitability
3. Conductivity
4. Rhythmicity
5. Contractility
6. Tonicity

The Cardiac Cycle

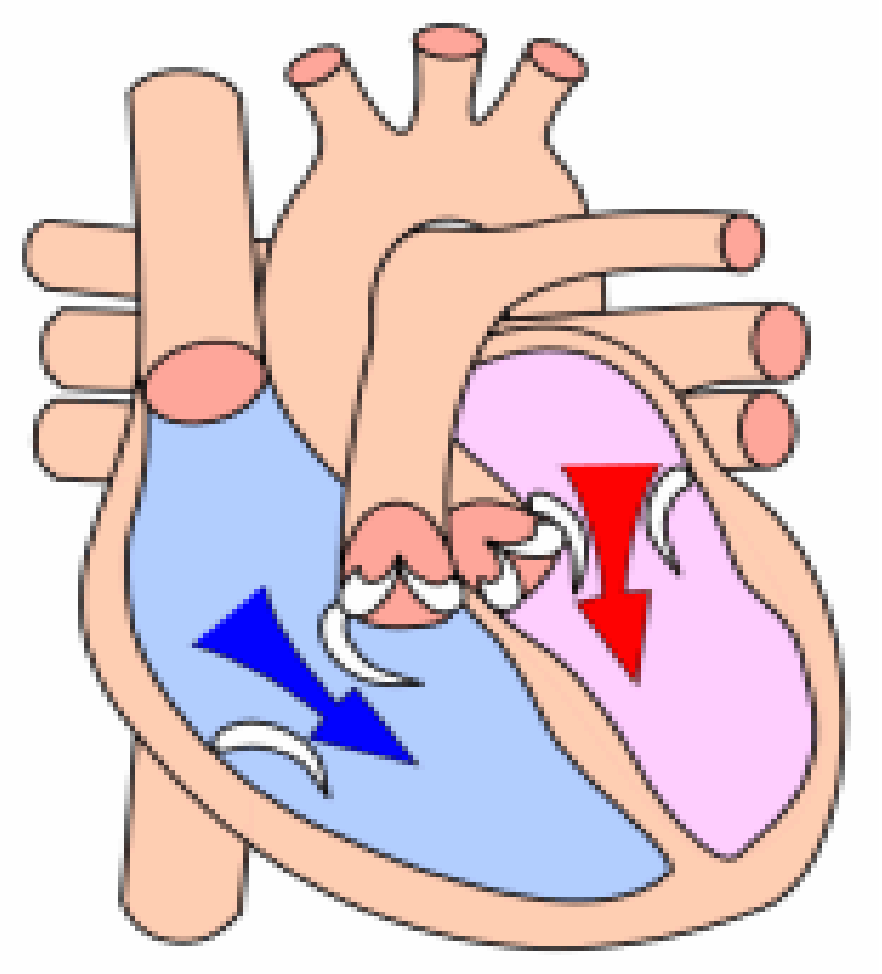


Diastole
Ventricular Relaxation and Filling

Systole
Ventricular Contraction and Ejection

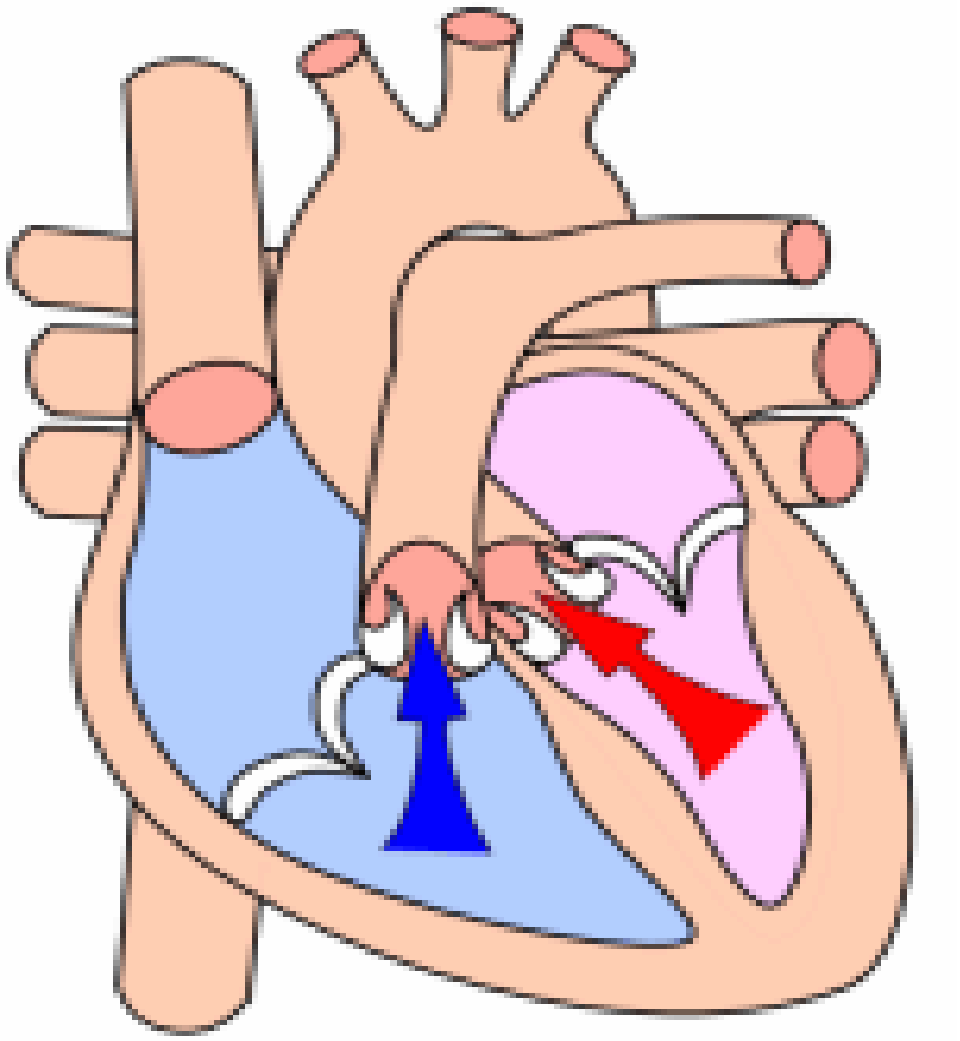
ATRIAL SYSTOLE

- **Atrial depolarization** causes atrial systole
- End of atrial systole is also end of **ventricular diastole**



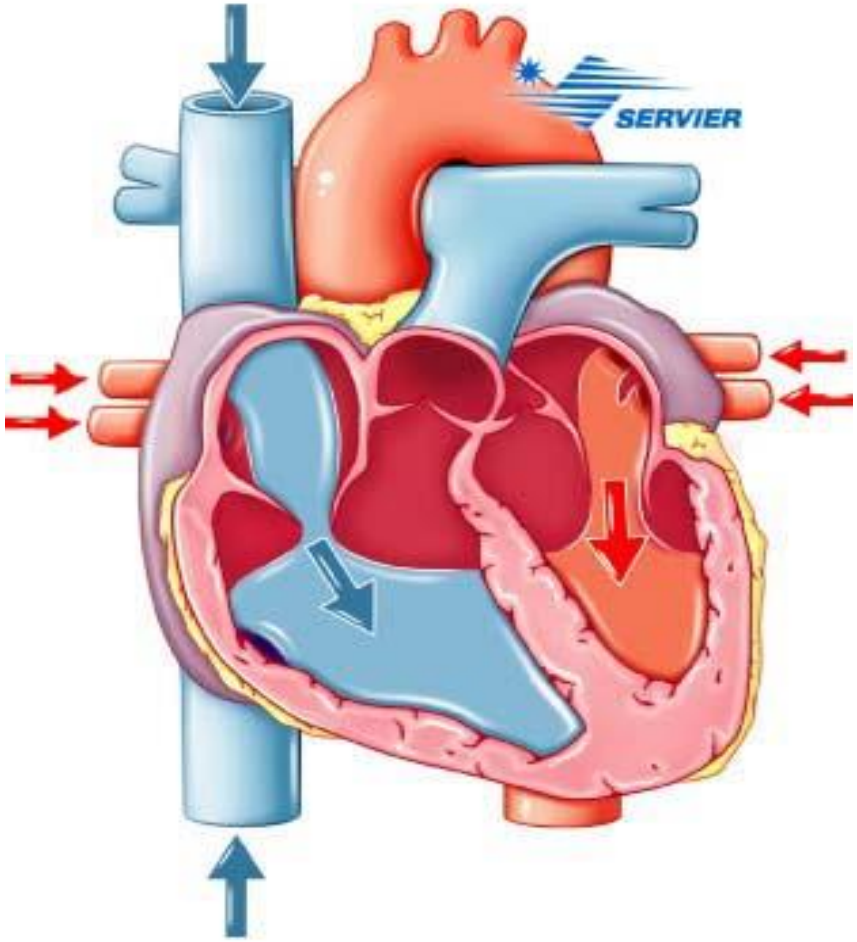
VENTRICULAR SYSTOLE

- It is caused by **ventricular depolarization**



RELAXATION PERIOD

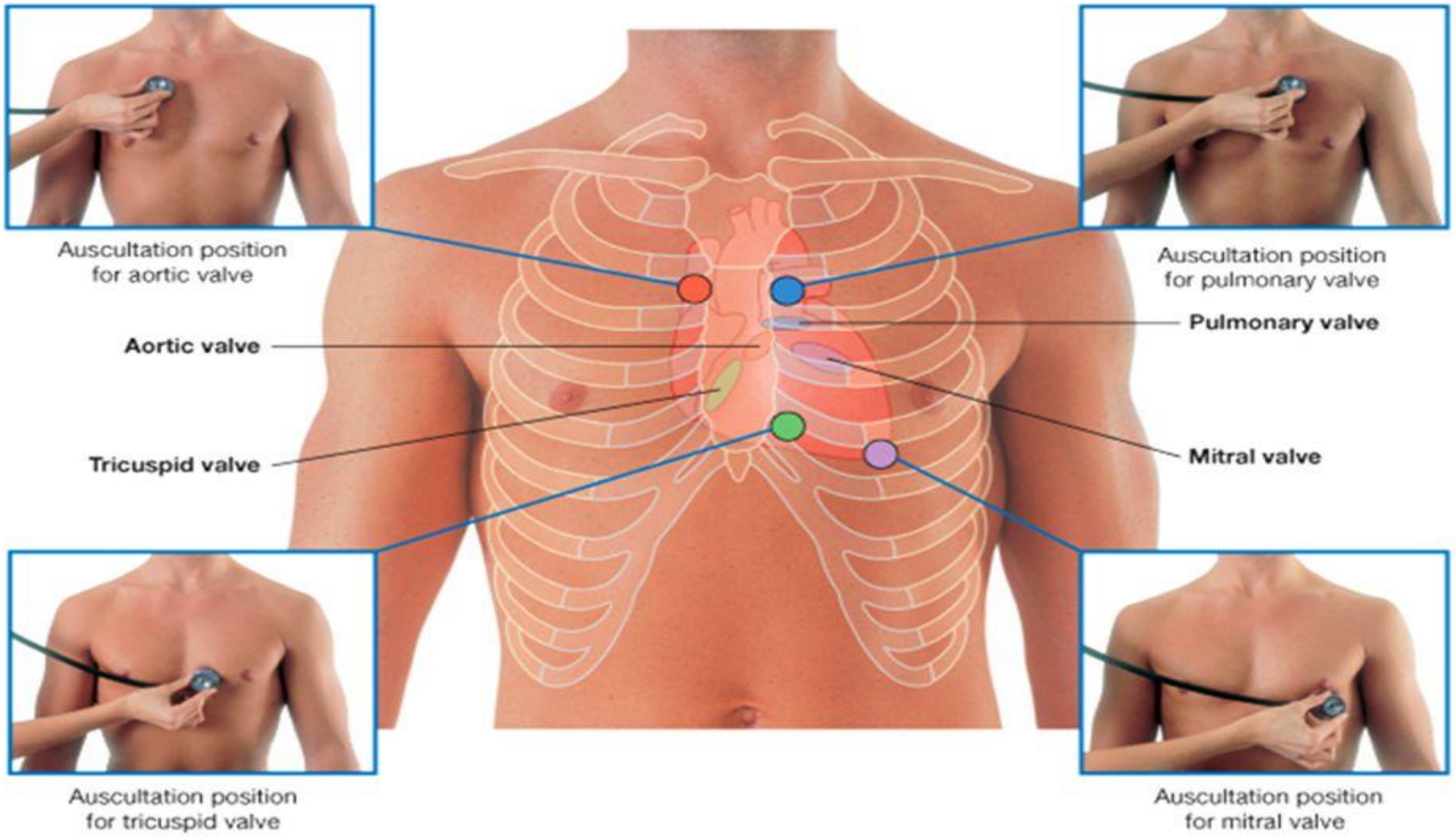
- Both atria and ventricles are relaxed .
- It **lasts for 0.4 sec**.
- When heart beats faster, the relaxation time shortens.
- **Ventricular repolarization causes ventricular daistole**.



HEART SOUNDS

- Produced from blood turbulence caused by **closing of heart valves**
- **S1 – atrioventricular valve closure**
- **S2 – semilunar valve closure**
- **S3 – rapid ventricular filling**
- **S4 – atrial systole**

AUSCULTATION



CARDIAC OUTPUT (CO)

- **CO = SV X HR**

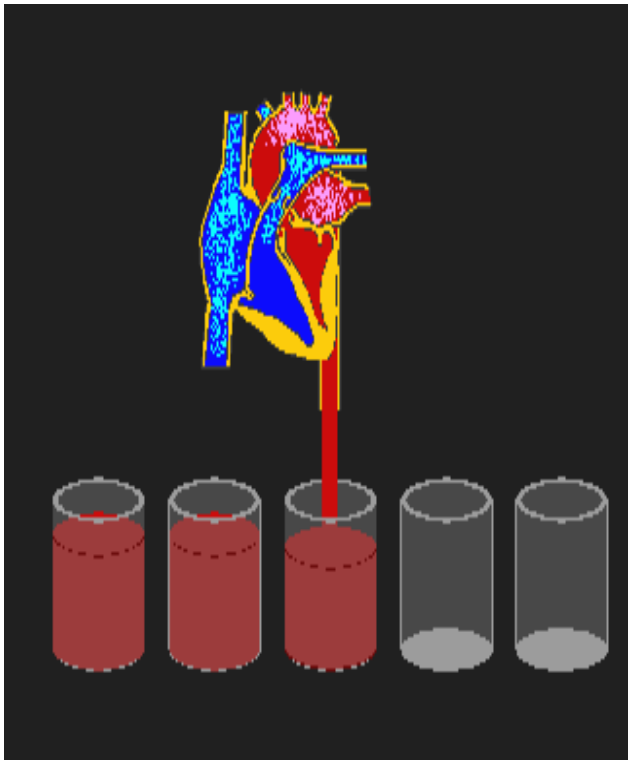
  mL/min mL/beat (Beats/min)

- ***FOR A RESTING ADULT***

  CO = 70mL/beat x 75beats/min

  = 5250 mL/min

  = **5.25 L/min**

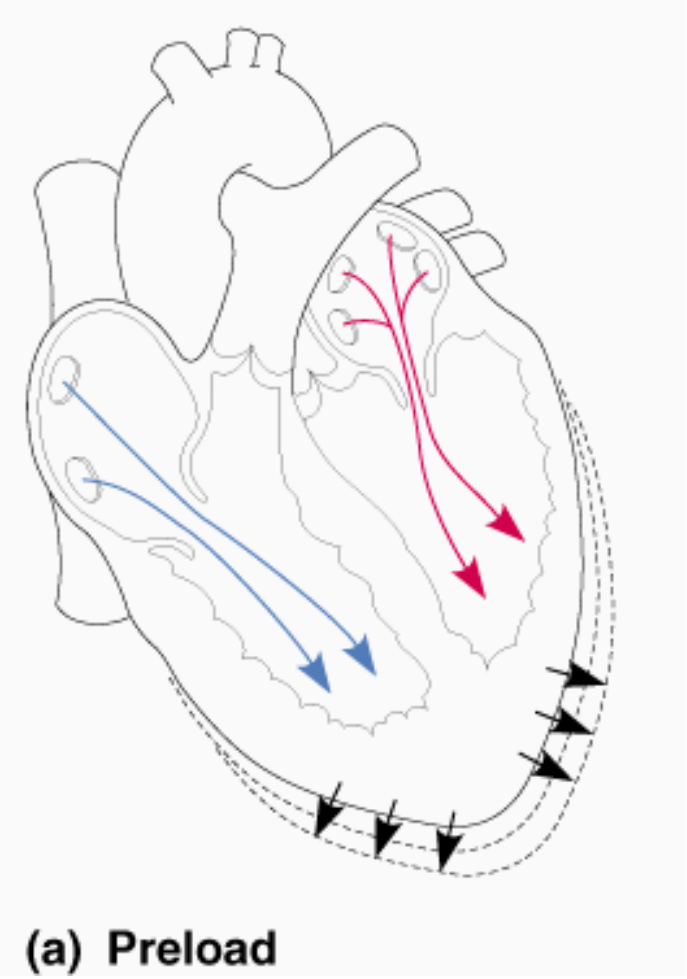


REGULATION OF STROKE VOLUME

- Three factors regulate stroke volume
  - -Preload
  - -Contractility
  - -Afterload

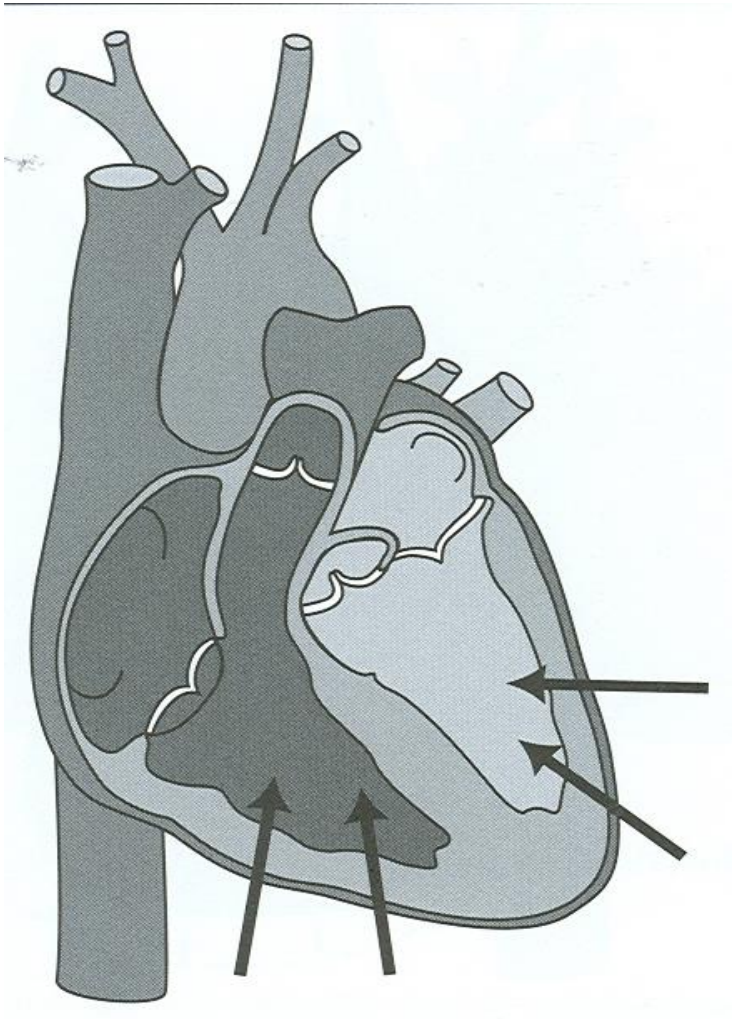
PRELOAD

- **Stretch of cardiac muscle prior to contraction.**
- Frank-starling law
- Preload is proportional to end diastolic volume
- If heart rate is more than 160 beats/min stroke volume declines due to short filling time.



CONTRACTILITY

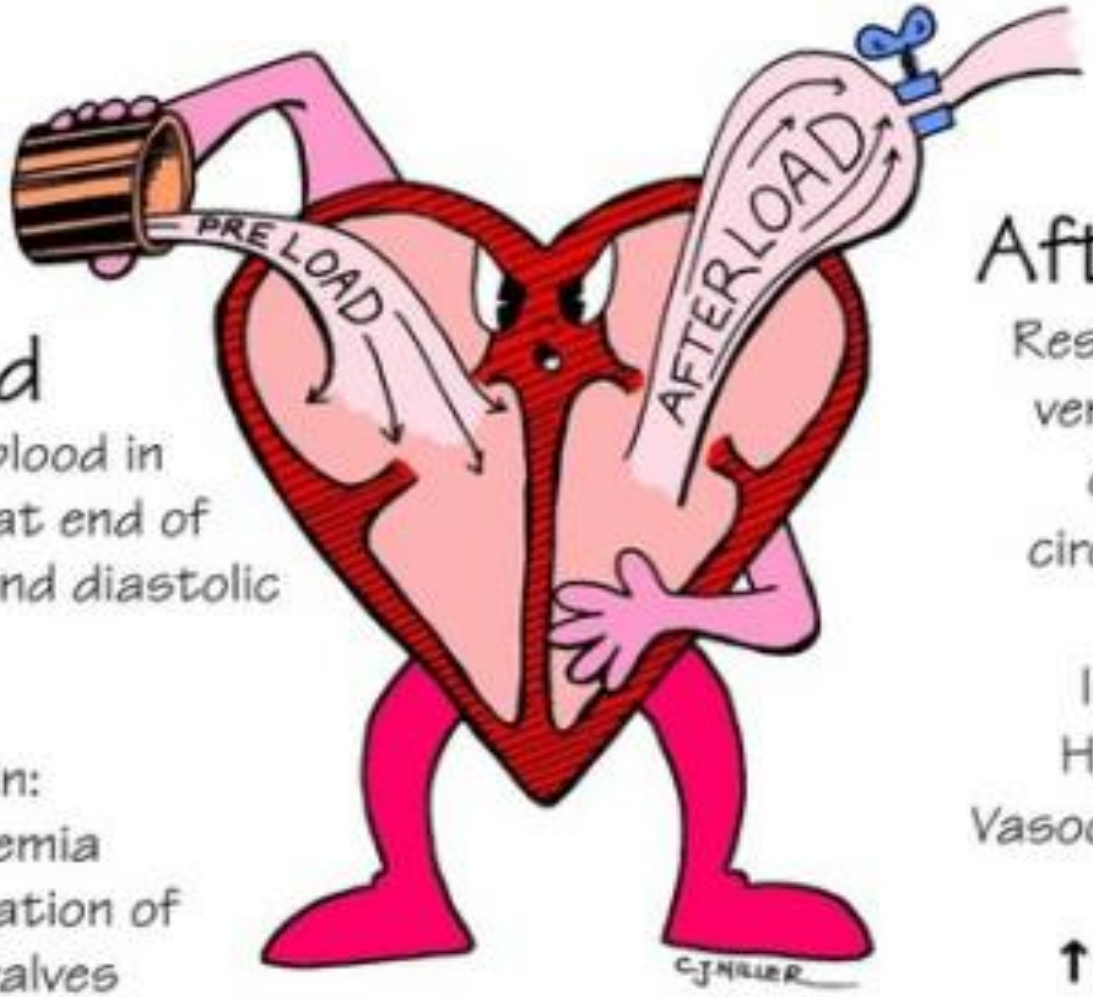
- It is the strength of contraction at any given preload.
- Positive and negative inotropic.
- **Stimulation** of sympathetic division: leads to positive inotropic effect
- **Inhibition** of sympathetic division: leads to negative inotropic effect



AFTERLOAD

- The pressure that must be overcome before a semilunar valve can open is termed the afterload.
- Increase in afterload cause decrease in stroke volume
- Hypertension and atherosclerosis increases the afterload.

PRELOAD AND AFTERLOAD



Preload

Volume of blood in ventricles at end of diastole (end diastolic pressure)

Increased in:

- Hypervolemia
- Regurgitation of cardiac valves
- Heart Failure

Afterload

Resistance left ventricle must overcome to circulate blood

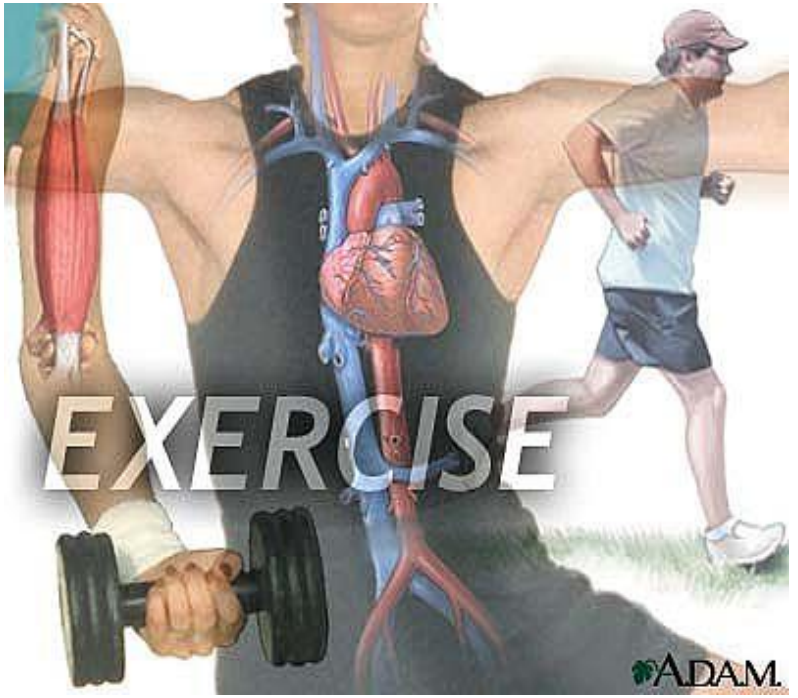
Increased in:

Hypertension
Vasoconstriction

↑ Afterload = ↑ Cardiac workload

REGUALTION OF HEART RATE

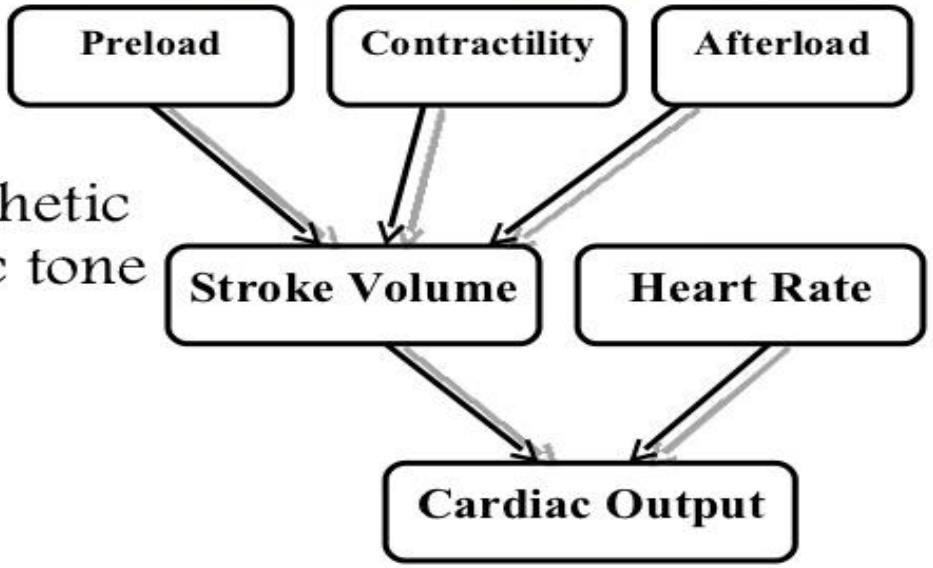
- SA node initiates 100 beats/min.
- Tissue require different volume of blood flow under different conditions (ex: exercise)
- Hormones of adrenal medulla are important in regulating the heart rate.



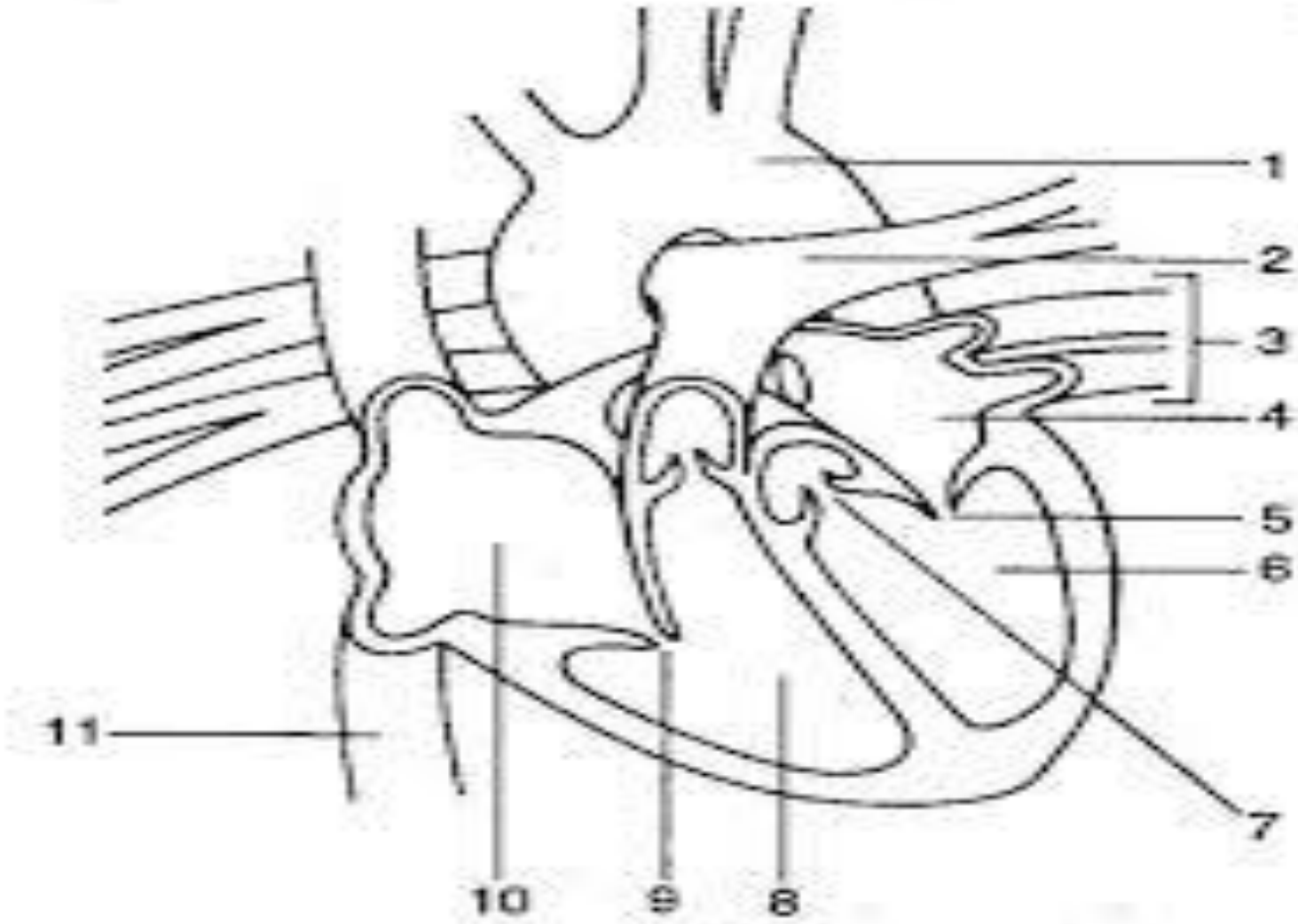
CARDIAC PHYSIOLOGY

Cardiac Physiology (remember this?)

- CO = SV x HR
- HR: parasympathetic and sympathetic tone
- SV: preload, afterload, contractility



EXERCISE



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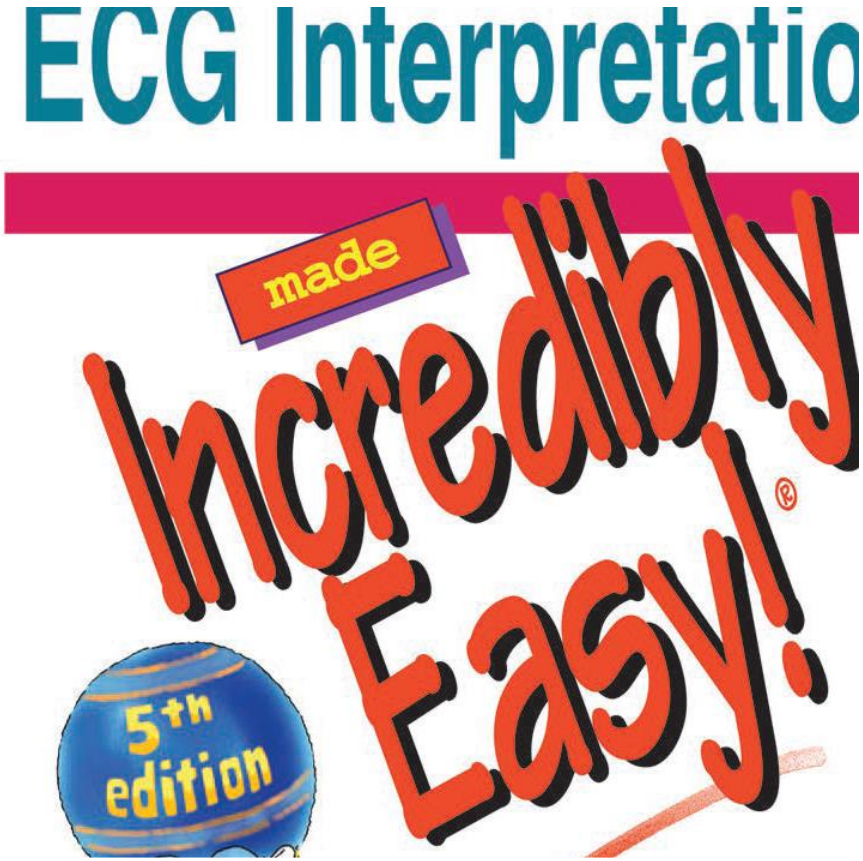

THANK YOU