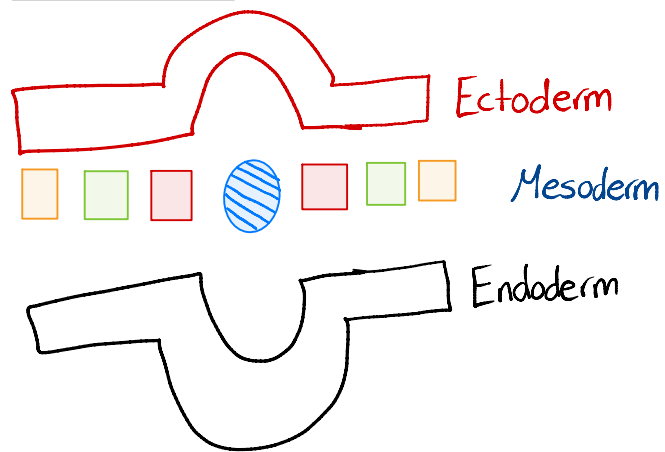


Lecture 1

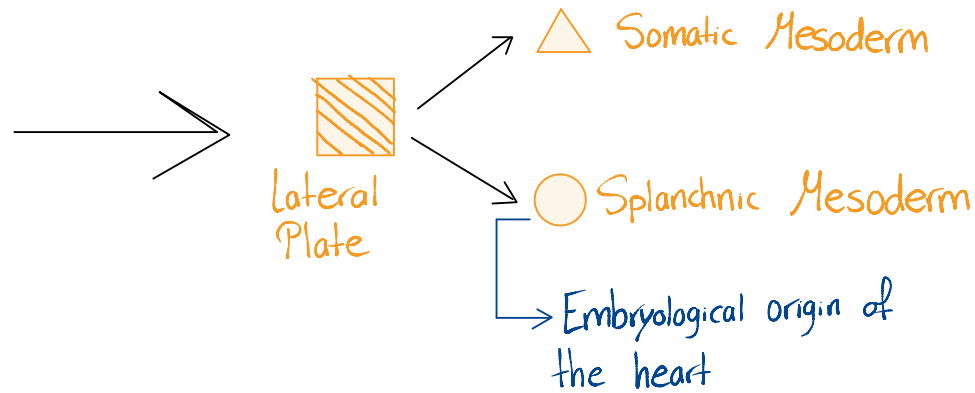
Development of the Heart - 1

* General Info:

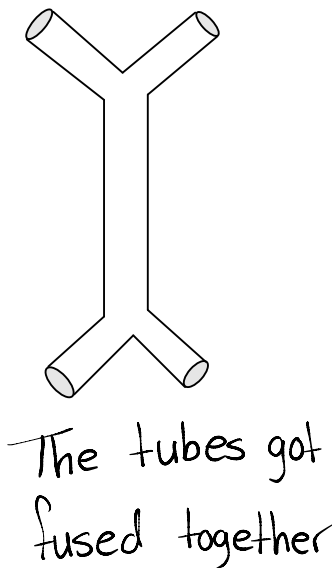
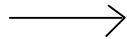
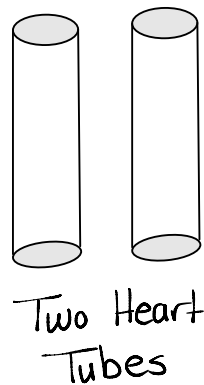
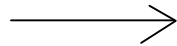
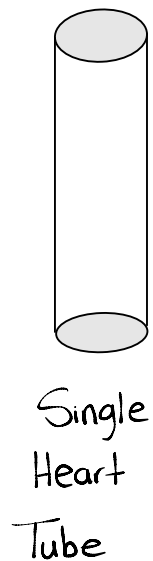


- Legend:

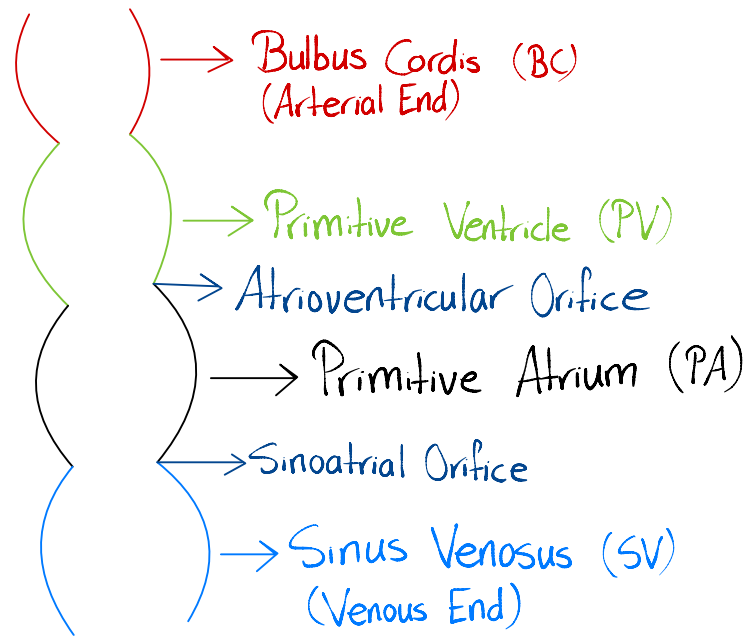
- Notochord
- Paraxial Plate
- Intermediate Plate
- Lateral Plate



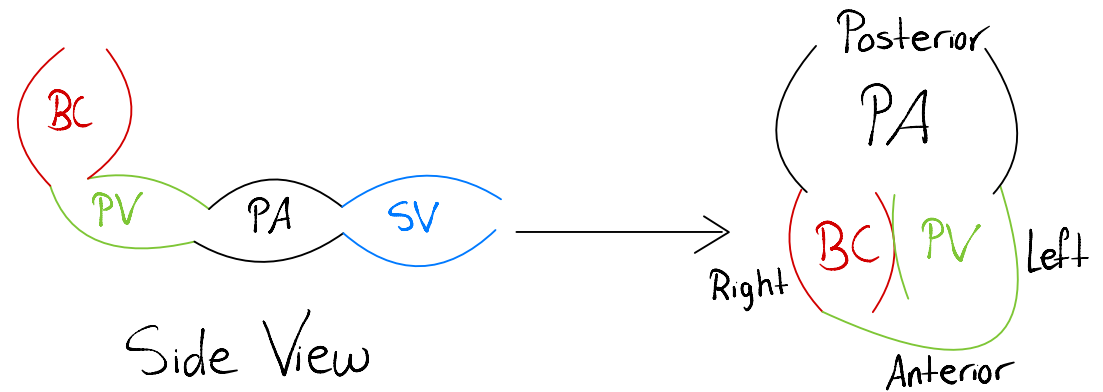
* Development of the Heart Tube:



* Constrictions of the Heart Tube:



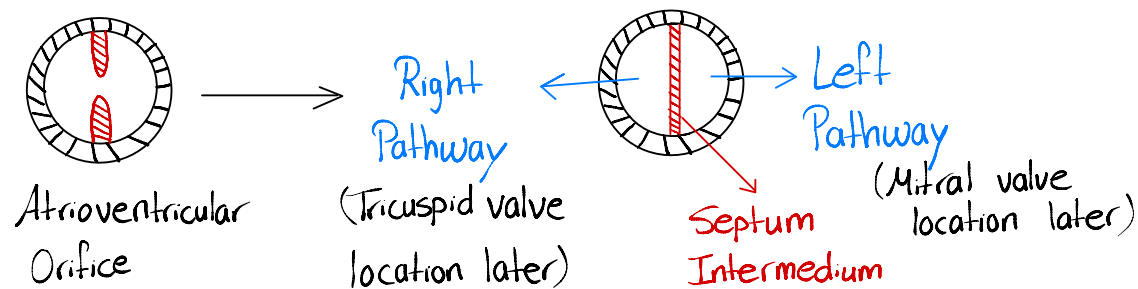
* Anatomical Views of the Constrictions:



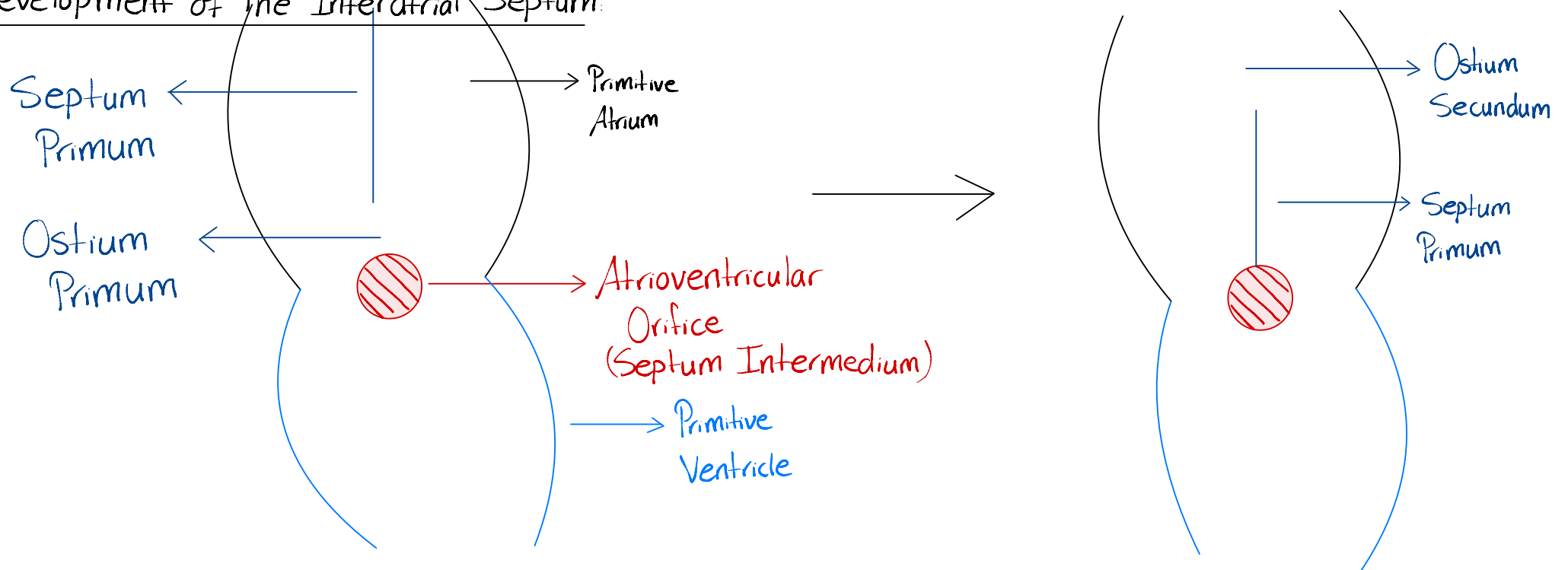
- Bulbus Cordis: Anterior to the right
- Primitive Ventricle: Anterior to the left
- Primitive Atrium: Posterior
- Sinus Venosus: Posterior to the PA

* Atrioventricular Orifice:

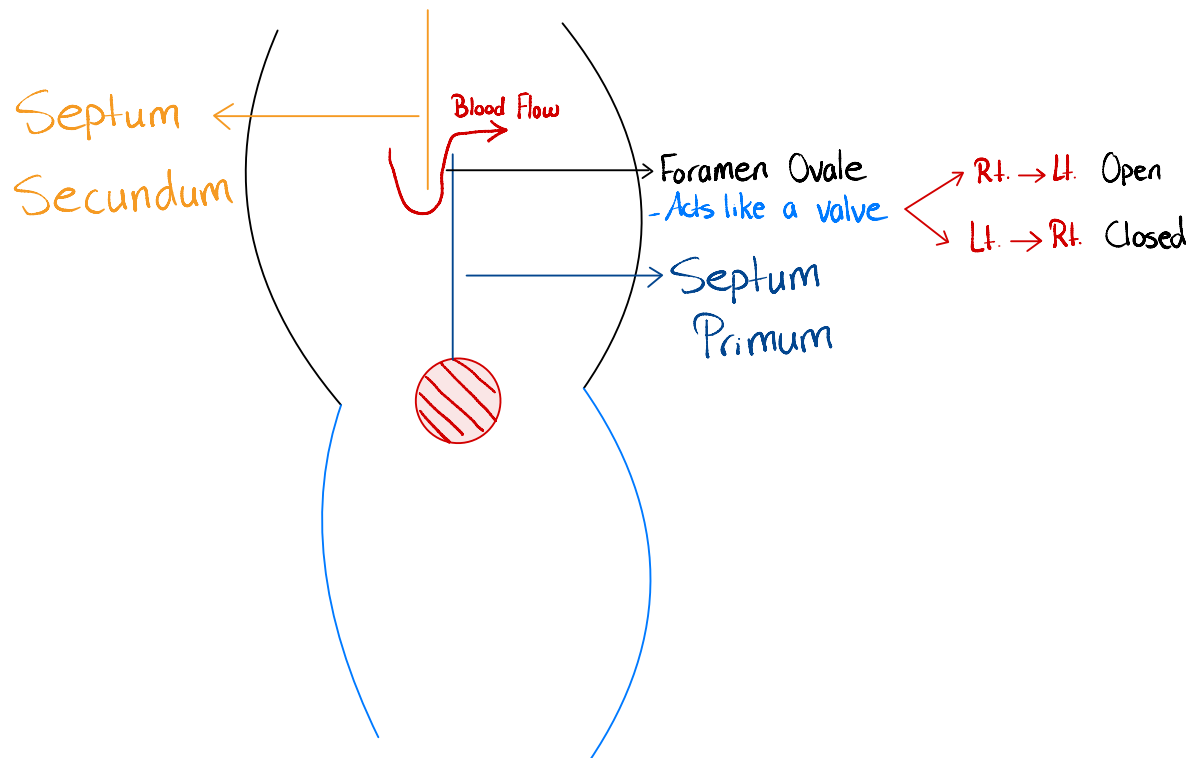
- Location: Between the PV and PA
- AV Valves Future Location



* Development of the Interatrial Septum:



* After Birth:

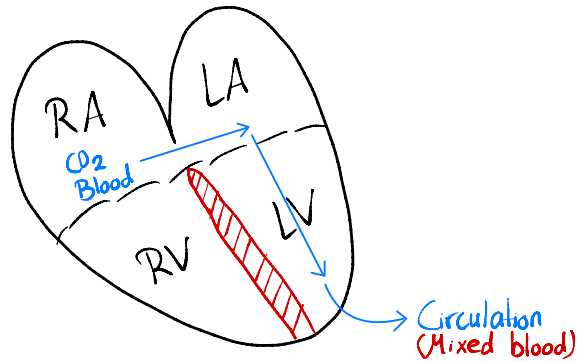


1. Septum primum: forms the lower part of interatrial septum with the formation of the fossa ovalis.
2. Septum secundum: forms the upper part of interatrial septum.
3. The free caudal edge of the septum secundum forms the annulus ovalis.

Septum secundum closes on septum primum

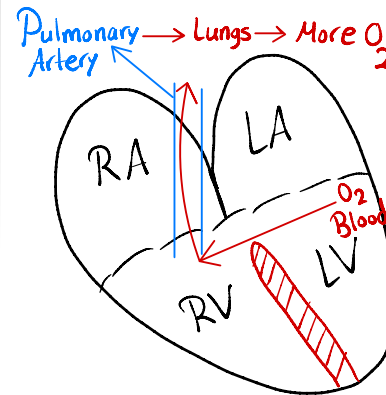
* Congenital Anomalies:

1. Shunt of Blood from the Rt. to the Lt.:



- Deoxygenated blood moves from the right atrium to the left atrium.
- Patient is cyanotic.

2. Shunt of Blood from the Lt. to the Rt.:

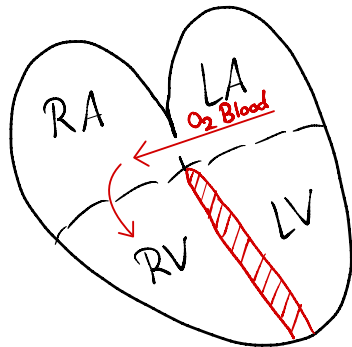


- Oxygenated blood moves from the left ventricle to the right ventricle.
- Patient is non-cyanotic.

Q What determines the direction of the movement of the blood?

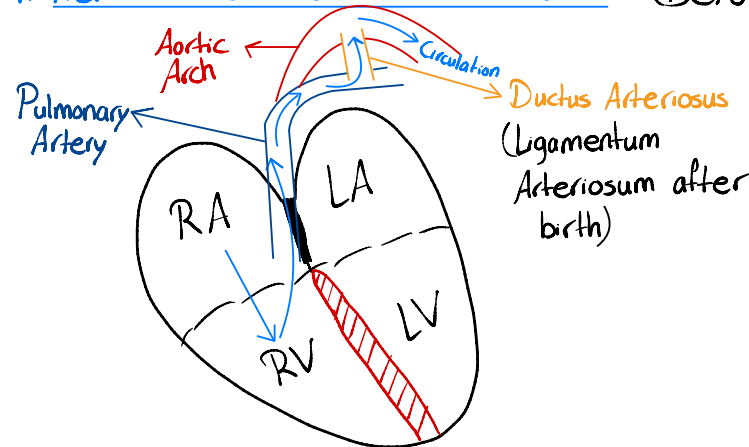
A. The Pressure

3. Atrial Septal Defect - ASD:



- Oxygenated blood moves from the left atrium to the right atrium due to the higher pressure in the left atrium.
- Patient is non-cyanotic & asymptomatic.
- Patient can live up to 30 years without any complications.

4. Premature Closure of Foramen Ovale: (Before Birth)

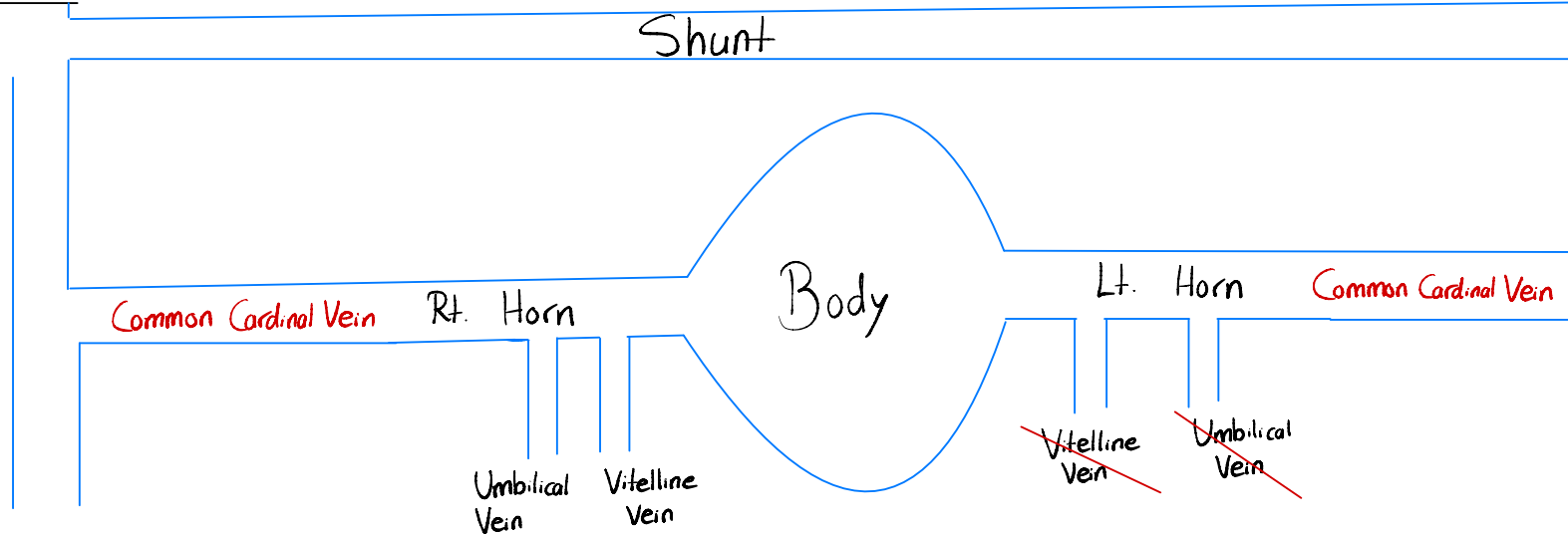


- Blood Flow: Right atrium → Right ventricle → Pulmonary Artery → Lungs → Ductus arteriosus (Fetal life) → Aortic Arch → Circulation
- No blood reaching the left side
 - Rt. side: Hypertrophy
 - Lt. side: Atrophy

Lecture 2

Development of the Heart - 2

* Sinus Venosus:



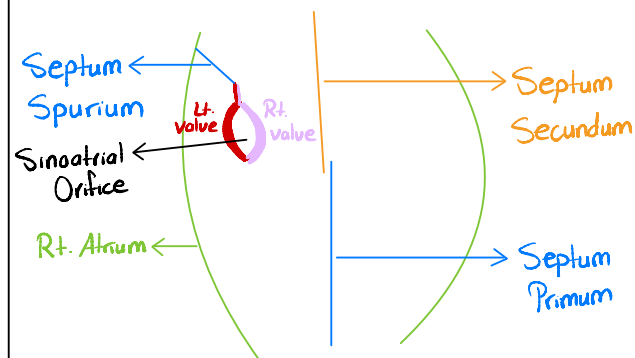
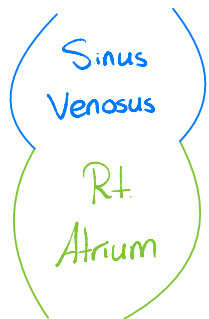
- Sinus venosus consists of:

- A body
- Each body has two horns (Rt. + Lt.)
- Each horn receives 3 veins:
 1. Vitelline
 2. Umbilical
 3. Common Cardinal

- The left horn loses connection with the vitelline and umbilical veins and becomes smaller and atrophied, forming the

Coronary sinus

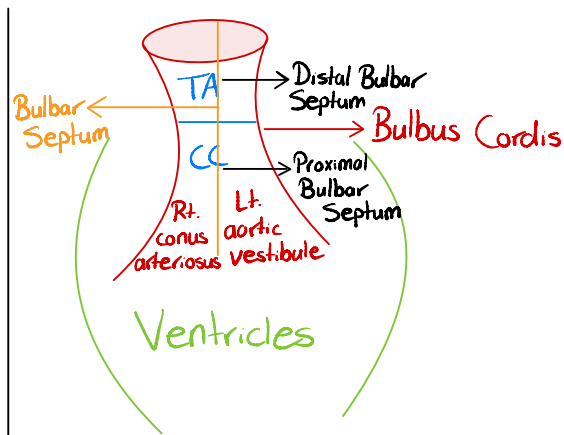
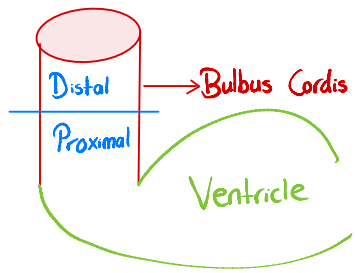
* Sinoatrial Orifice:



- Sinus venosus is located posterior to the right atrium. (Cannot be seen)
- What can be seen is the sinoatrial orifice.

- Left valve and septum spurium fuse with interatrial septum.
- Right valve:
 - Its cranial part forms crista terminalis.
 - Its caudal part forms the valves of I.V.C. and coronary sinus (Eustachian and Thebesian valves respectively)

* Bulbus Cordis:



- Bulbus cordis is divided into two parts:

1. Distal Part: Truncus Arteriosus - TA

Gives rise to the proximal parts of the ascending aorta and pulmonary trunk.

2. Proximal Part: Conus Cordis - CC

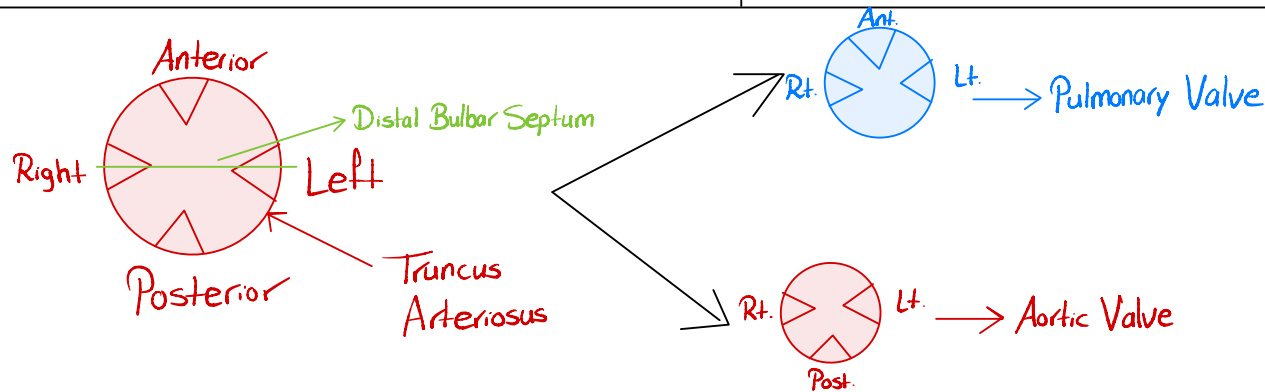
Forms the smooth outflow of both ventricles.

- Rough inflow: Formed from the ventricles.

- Bulbus cordis moves to the left to become anterior to the ventricles.

- Bulbar septum divides
 Proximally: The outflow part of the ventricles. (Rt. conus arteriosus + Lt. aortic vestibule)
 Distally: The ascending aorta and pulmonary trunk. (Arterial end)

- Inflow part: Divided by the interventricular septum.

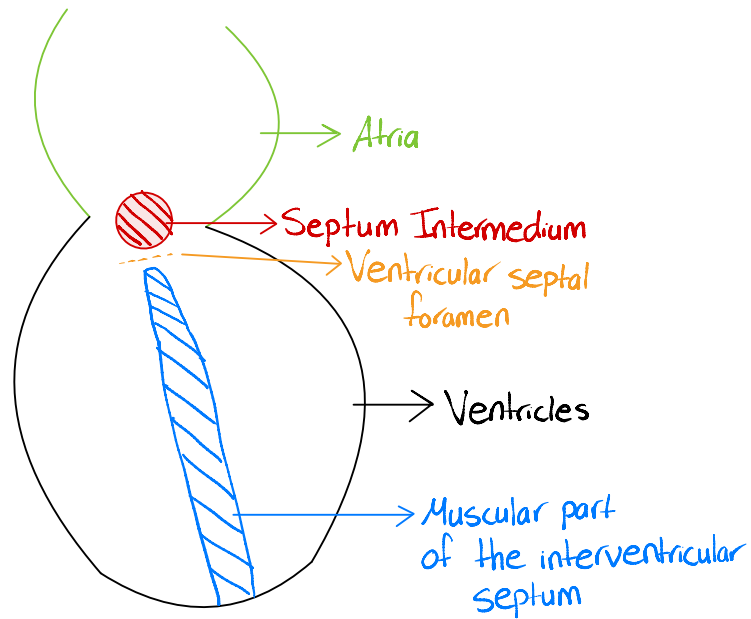


- Distal bulbar septum divides the opening of the truncus arteriosus into:

1. Pulmonary Valve: Anterior, right and left cusps.

2. Aortic Valve: Posterior, right and left cusps.

* Interventricular Septum:

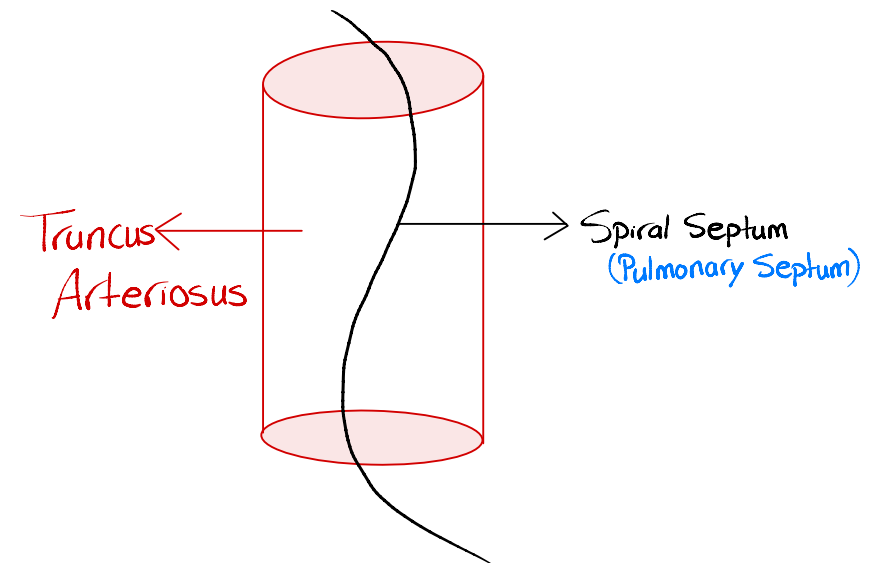
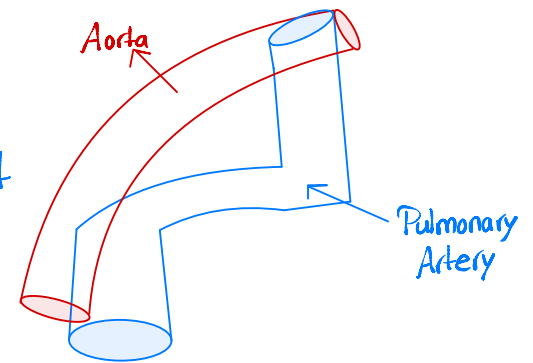


- The interventricular septum consists of two parts.
 1. Muscular part: formed by the floor of the ventricles.
 2. Membranous part: - Closes the ventricular septal foramen at birth.
- Formed by:
 - Proximal bulbar septum
 - Septum intermedium
 - Muscular part

* Pulmonary Artery:

- Relation to the Aorta:

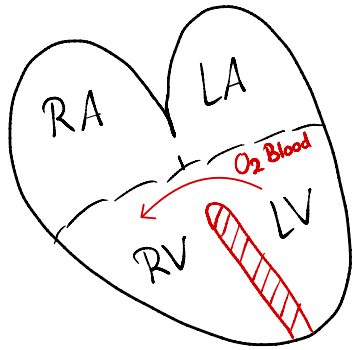
- The pulmonary artery is located anterior to the left and posterior to the Aorta.



- Truncus arteriosus is divided spirally to achieve the relation mention above between the pulmonary artery and aorta.

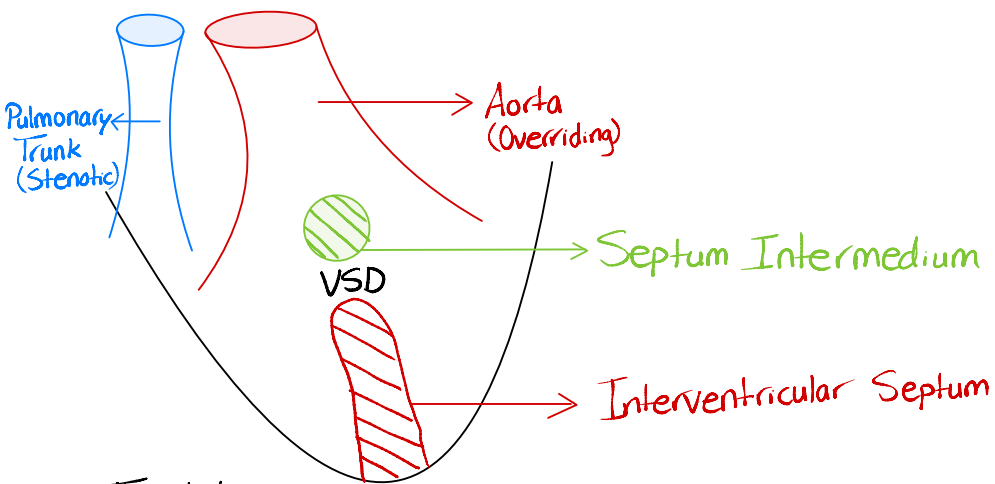
* Congenital Anomalies:

1. Ventricular Septal Defect - VSD:



- More common in males.
- Patient is **non-cyanotic**.
- More blood going to the right ventricle → **Thickened**
- Pulmonary trunk also gets thickened → **Pulmonary Hypertension**

2. Teratology of Fallot:



- Teratology:

1. Ventricular Septal Defect - VSD.
2. Overriding of the Aorta.

- VSD in the beginning → **Non-cyanotic**

- Later, blood moves from the right ventricle to the left ventricle due to hypertrophy of the right ventricle.

- Patient becomes **cyanotic**.

- This condition is known as **Eisenmenger Syndrome**

3. Stenosis of the Pulmonary Trunk.

4. Right Ventricular Hypertrophy

- + Boot-shaped heart on X-ray
- + Loss of lung markings on X-ray