

**SEPTATION OF BLUBUS CORDIS
And
Truncus arteriosus**

Two opposing ridges are developed
in the walls of the

Truncus Arteriosus

Called

Truncal ridges

And

in the walls of

Bulbus Cordis

Called

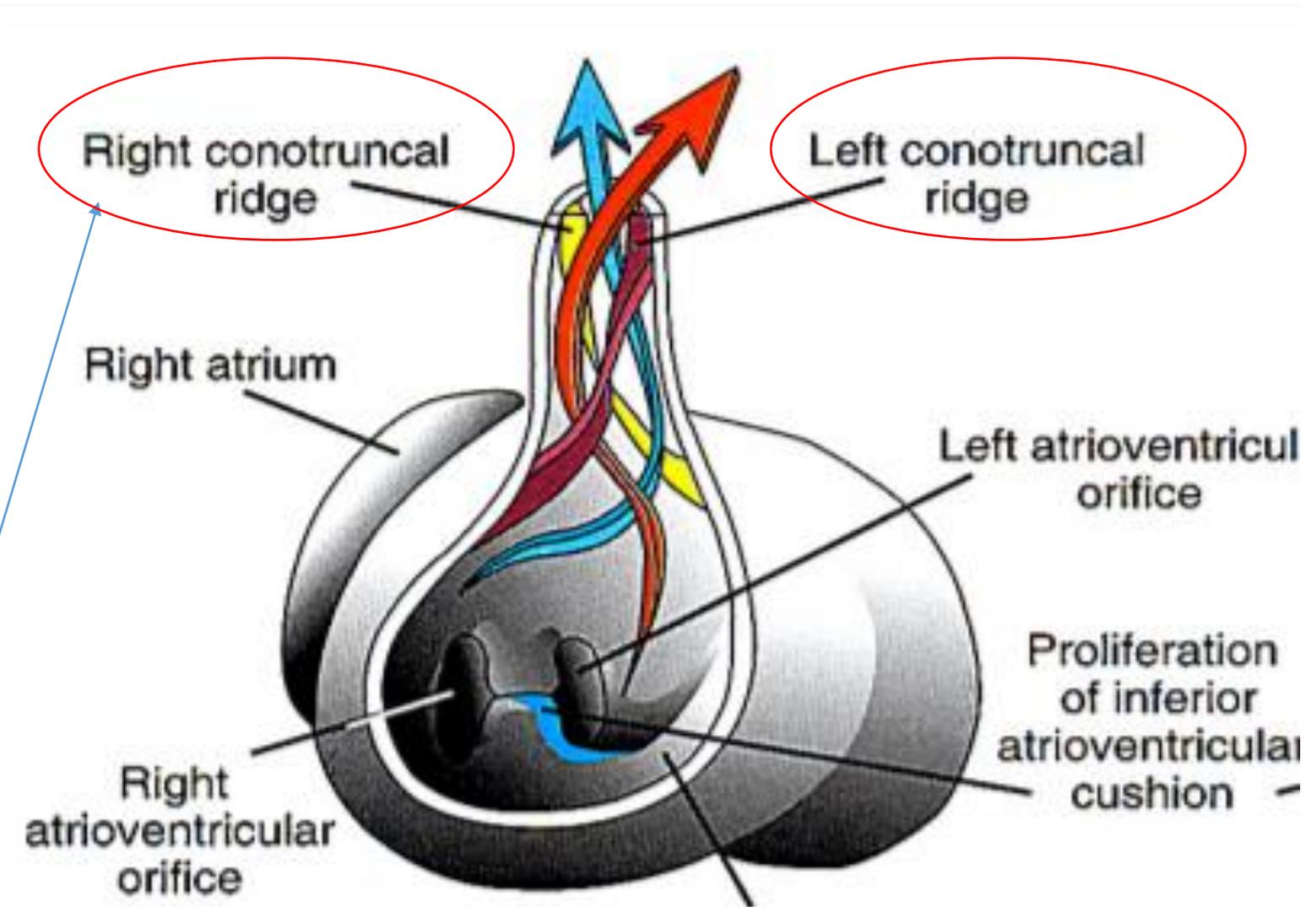
Bulbar ridges

The bulbus cordis is also some times
named **conus** and therefore

The ridges developed inside it are also
called conal.

And with those developed in the truncus
arteriosus they also together called

Conotruncal Ridges



These ridges are derived mainly from the

neural crest

When these ridges are fused with each other,
They form Septa

So ridges developed **in the truncus arteriosus**
after their fusion are called

Truncal septum

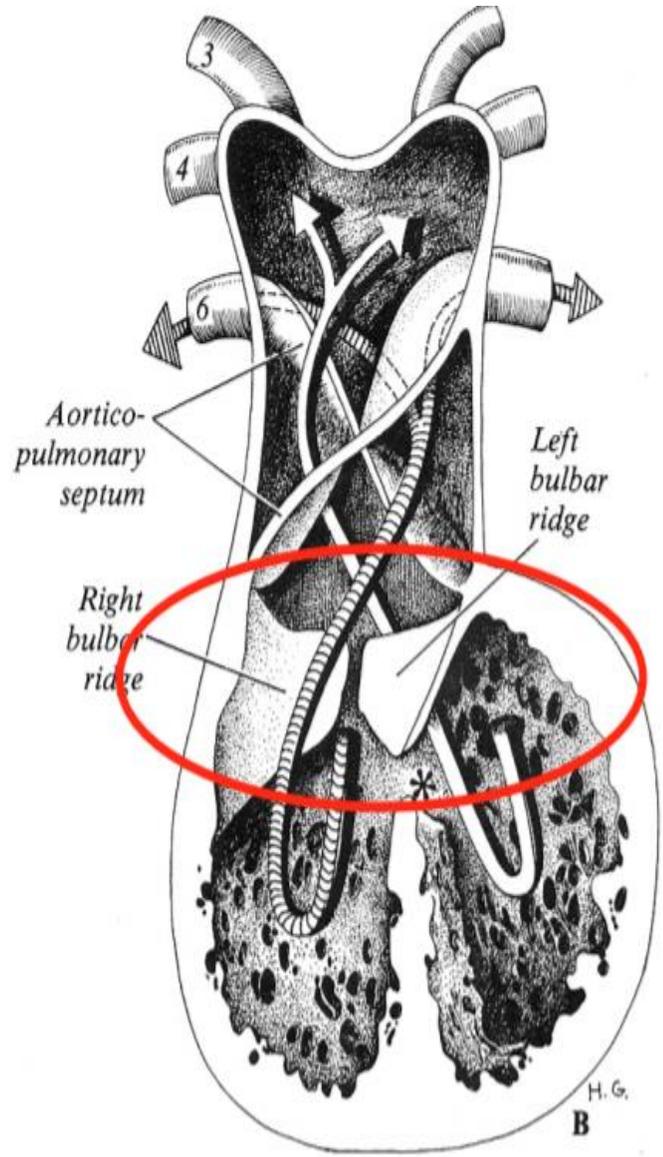
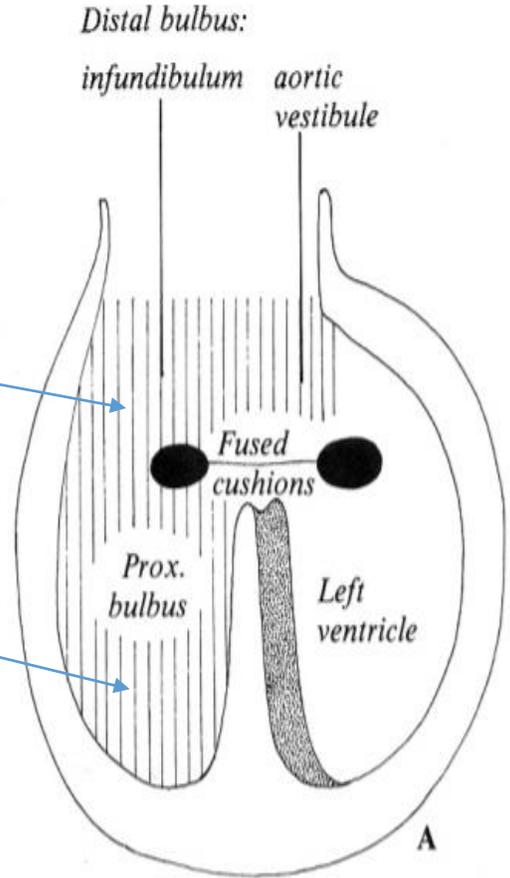
ridges developed in the lumen **of the bulbus cordis**
after their fusion are called

bulbar septum

We will study first of all the bulbar septum

The Distal bulbar septum

The Proximal bulbar septum



The proximal bulbar septum



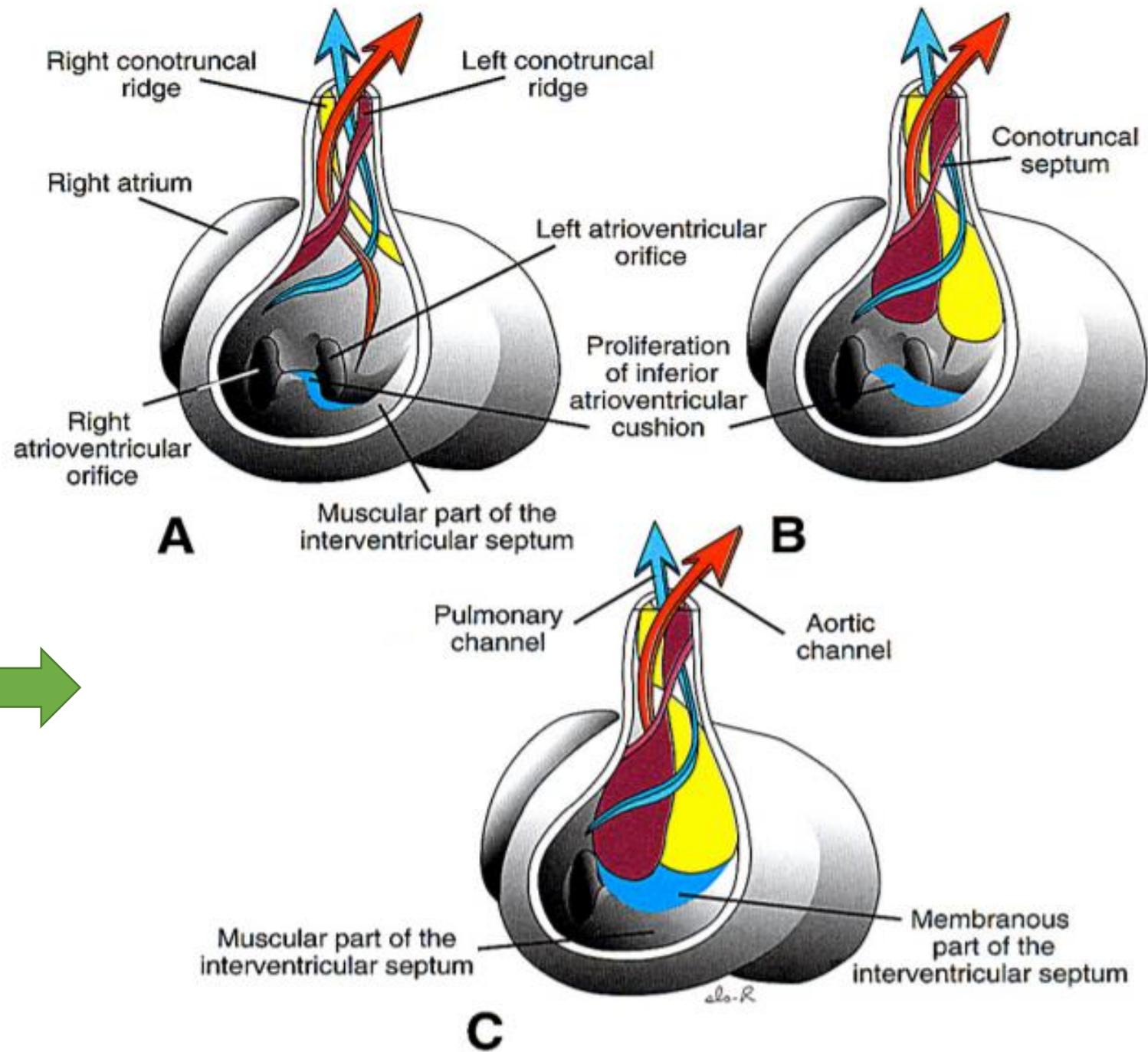
shares

A) in closing the

interventricular foramen



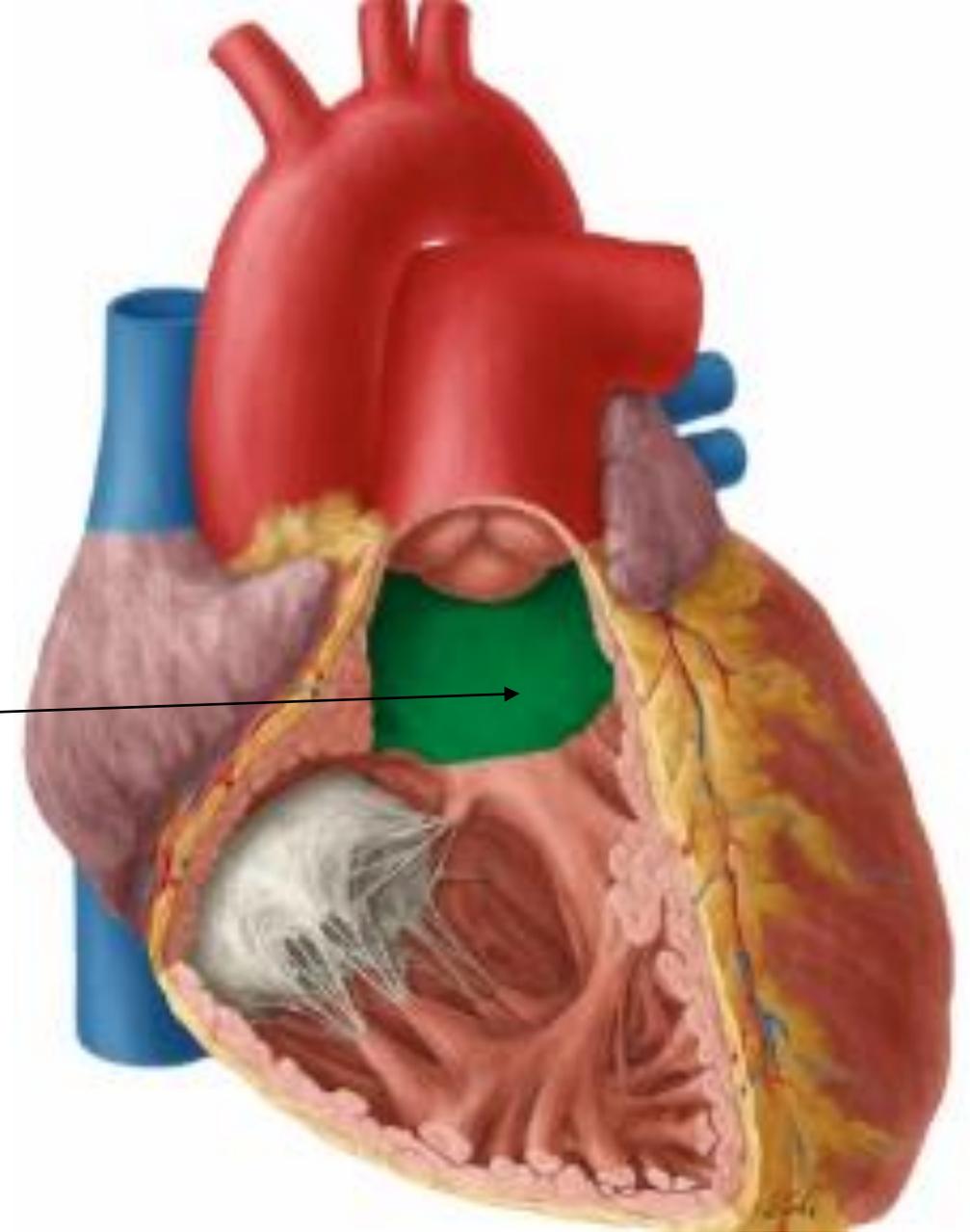
The proximal bulbar septum also



B) incorporated into the walls of the definitive ventricles in several ways:

into the **infundibulum**
and the vestibule

In the right ventricle, the bulbus cordis is represented by **the conus arteriosus (infundibulum)**, which gives origin to the pulmonary trunk



In the left ventricle, the bulbus cordis forms the walls of the

aortic vestibule

the part of the ventricular cavity just inferior to the aortic valve.

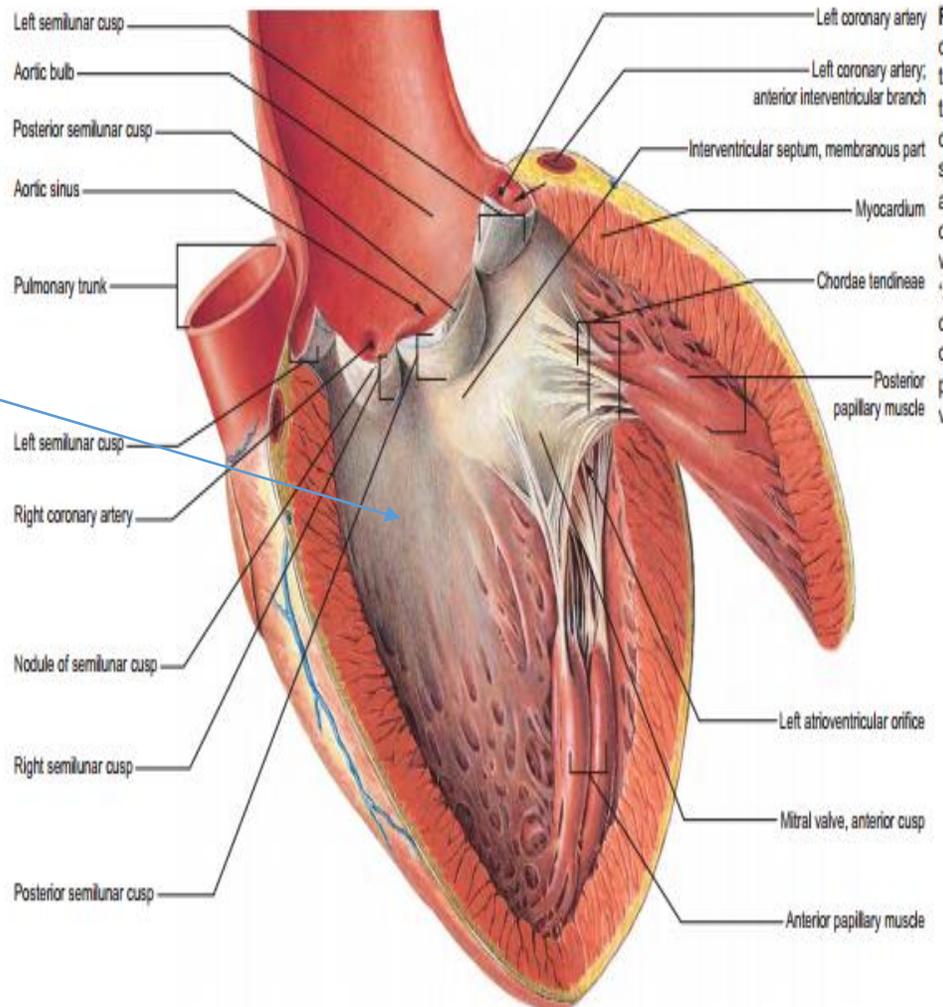
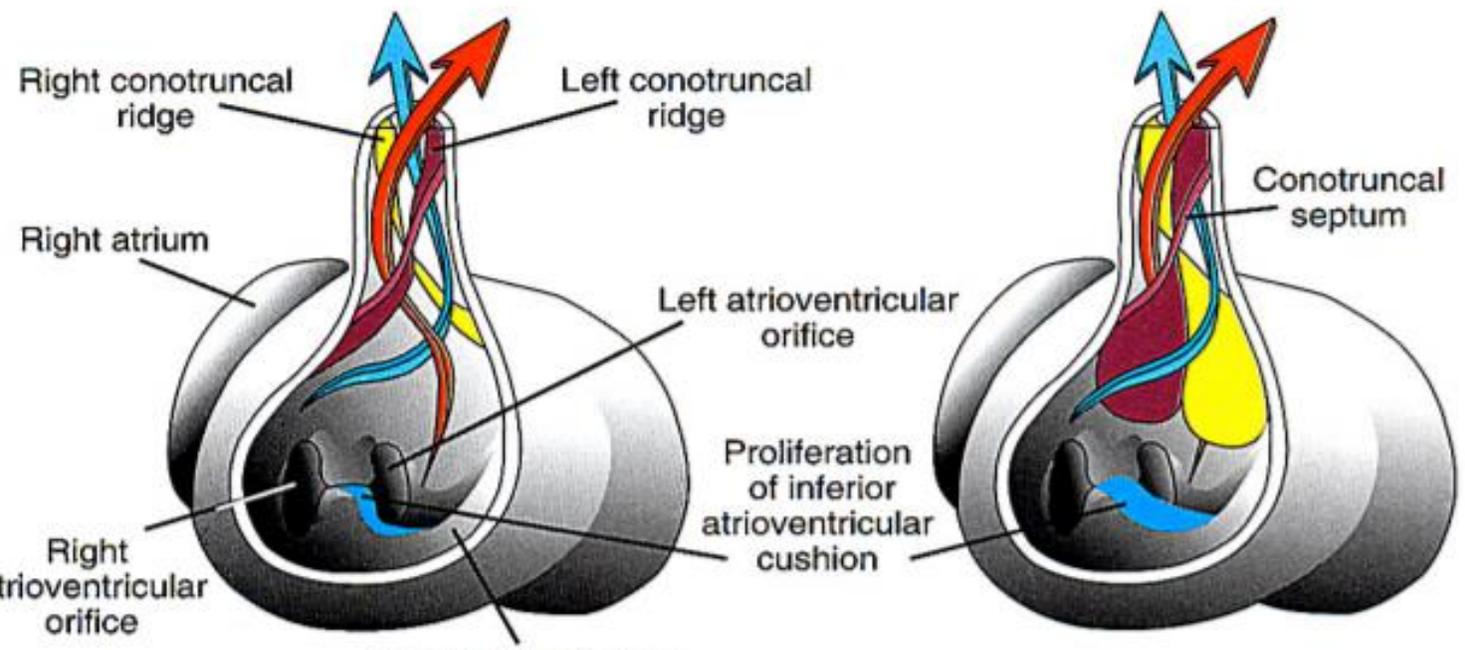
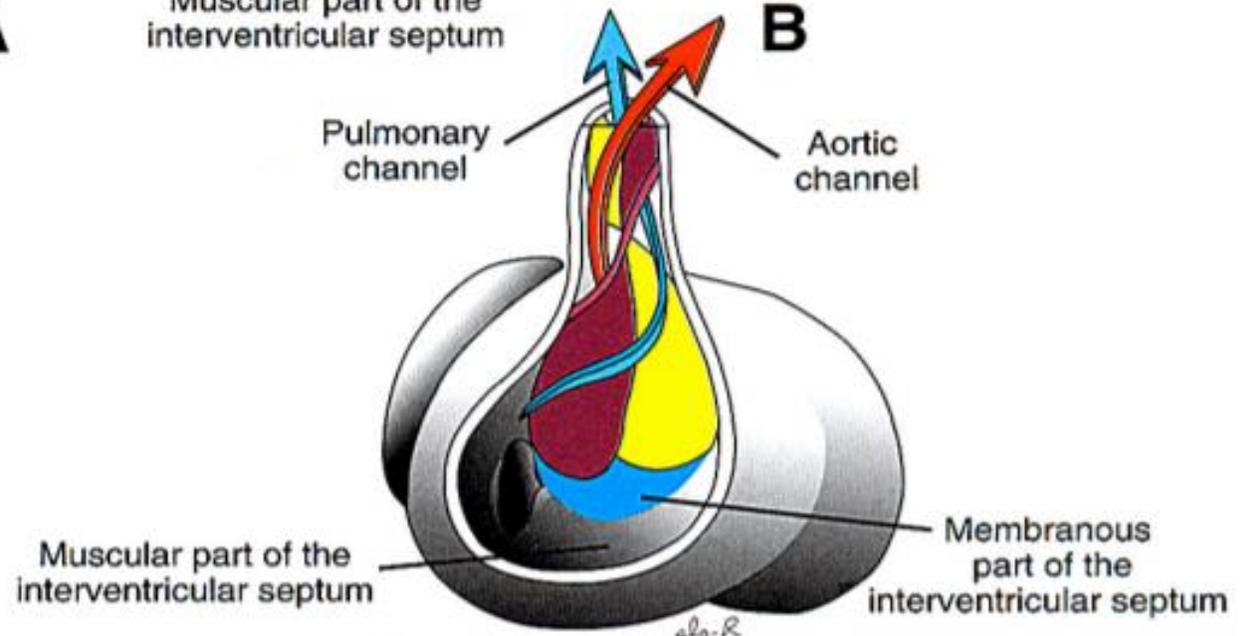


Fig. 56.13 The aortic orifice opened from the front to show the cusps of the aortic valves, their nodules, lunules, commissures and the triple-scalloped line of anular attachment. Also shown is the continuity of the subaortic curtain with the mitral anterior cusp (i.e. 'aortic baffle') and the coronary ostia, and the spatial relationship of the aortic orifice to the pulmonary orifice and to the left ventricle. (From Sobotta 2006.)

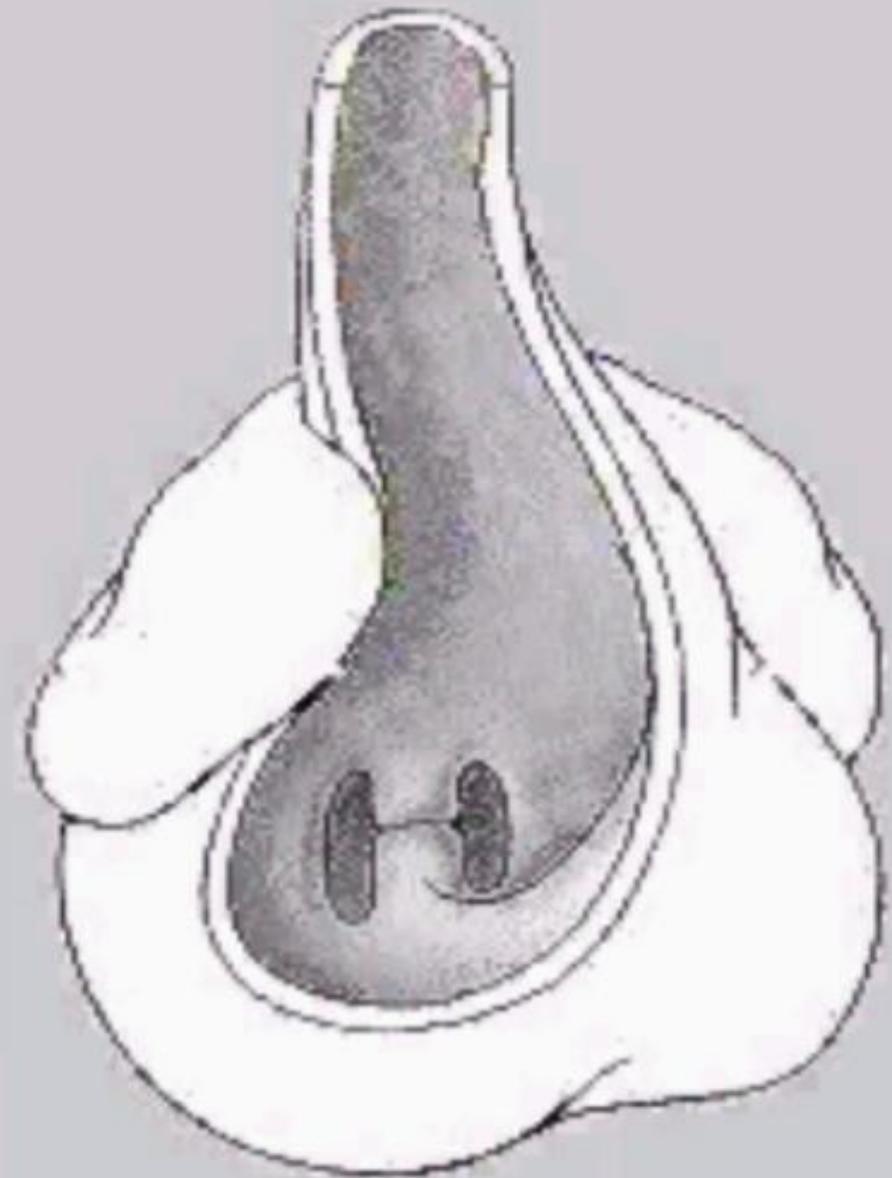


A

B

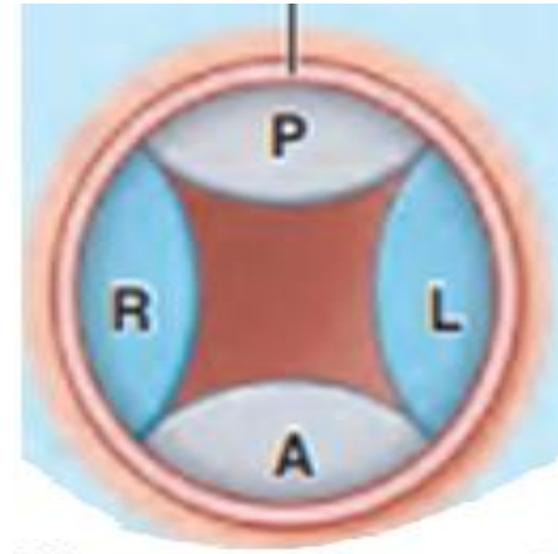


C



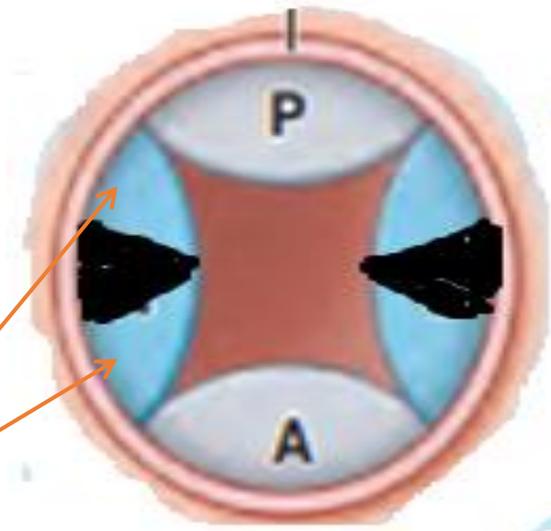
The distal bulbar septum

1- Four endocardial cushions
(one anterior, one posterior,
and two lateral right and left)
are developed in the distal part of the bulbus cordis.

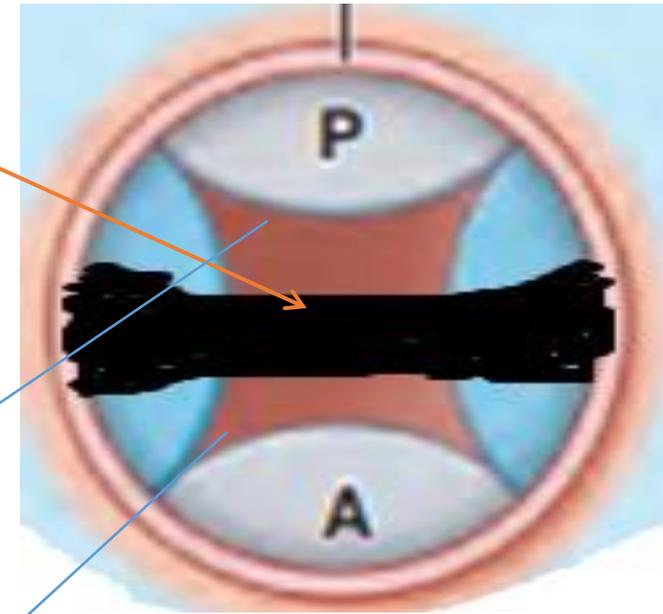
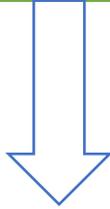


2- A ridge is developed in the middle of each of
the two lateral cushions.

It should be noted that the development of these ridges
will divide each of the lateral cushions into two



3-These ridges will fuse to form a complete septum called **the distal bulbar septum**.

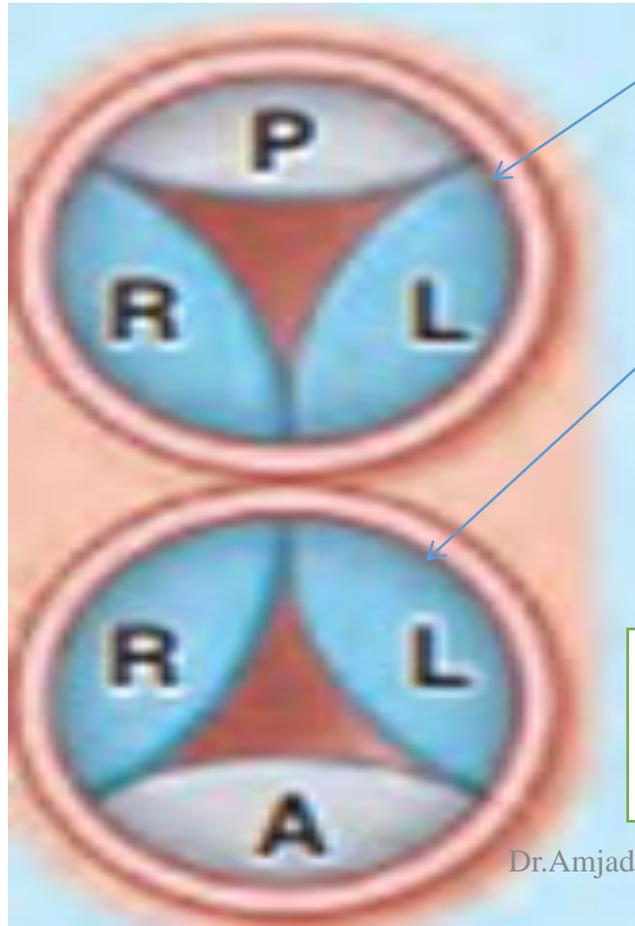


4- **The distal bulbar septum will divide the cranial end of bulbus cordis into two orifices:**

The pulmonary orifice **anteriorly**
and

The aortic orifice **posteriorly**

Posterior

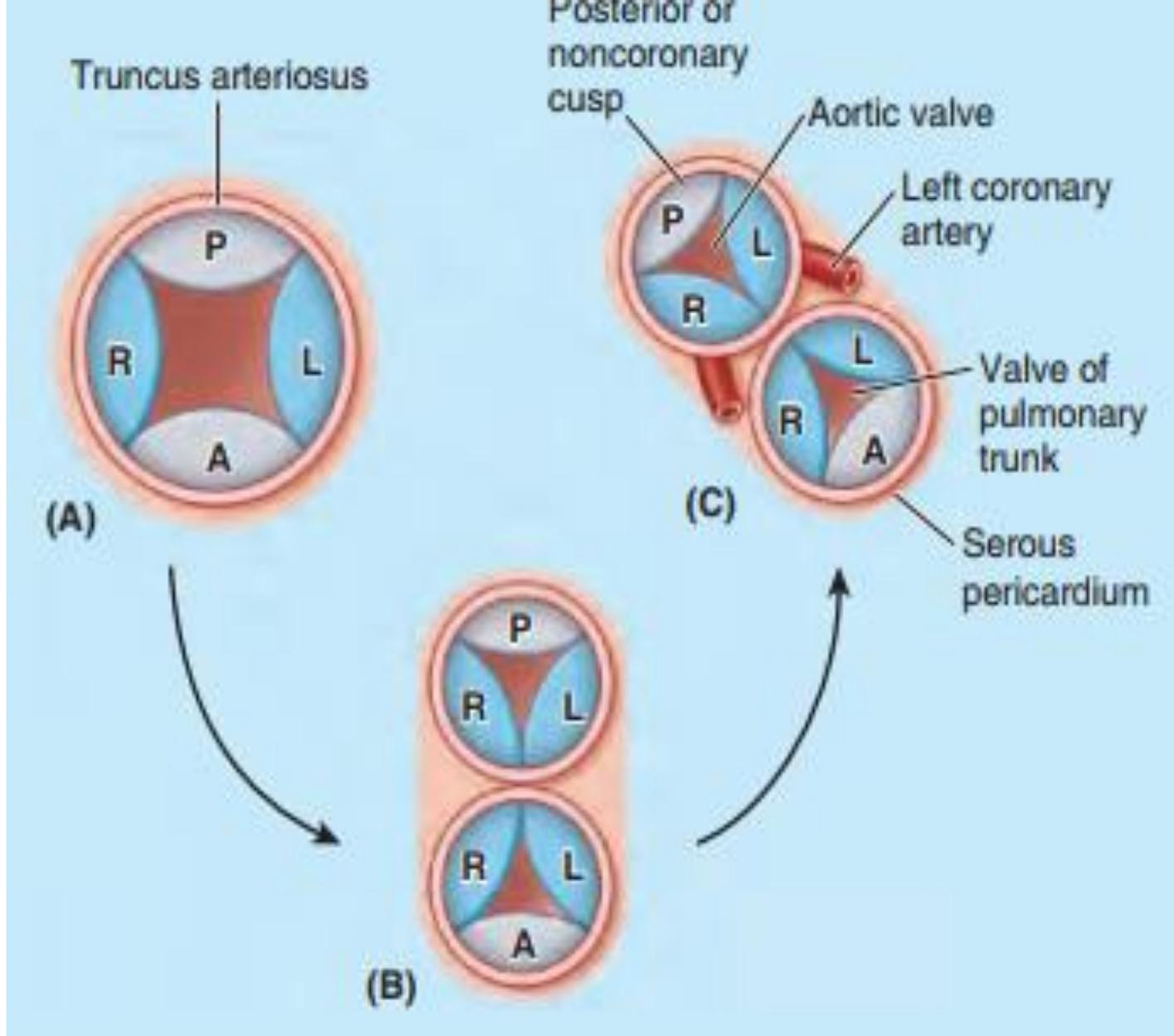


Anterior

5- **The distal bulbar septum will also divide the pulmonary and aortic orifices three cushions. These cushions form the cusps**

6- The cusps of the pulmonary valve are one anterior and two posterior but as a result of rotation of the vessels the two cusps become anterior and one posterior

7- The cusps of the aortic valve are two anterior and one posterior but as a result of rotation of the vessels one cusp becomes anterior and two posterior.



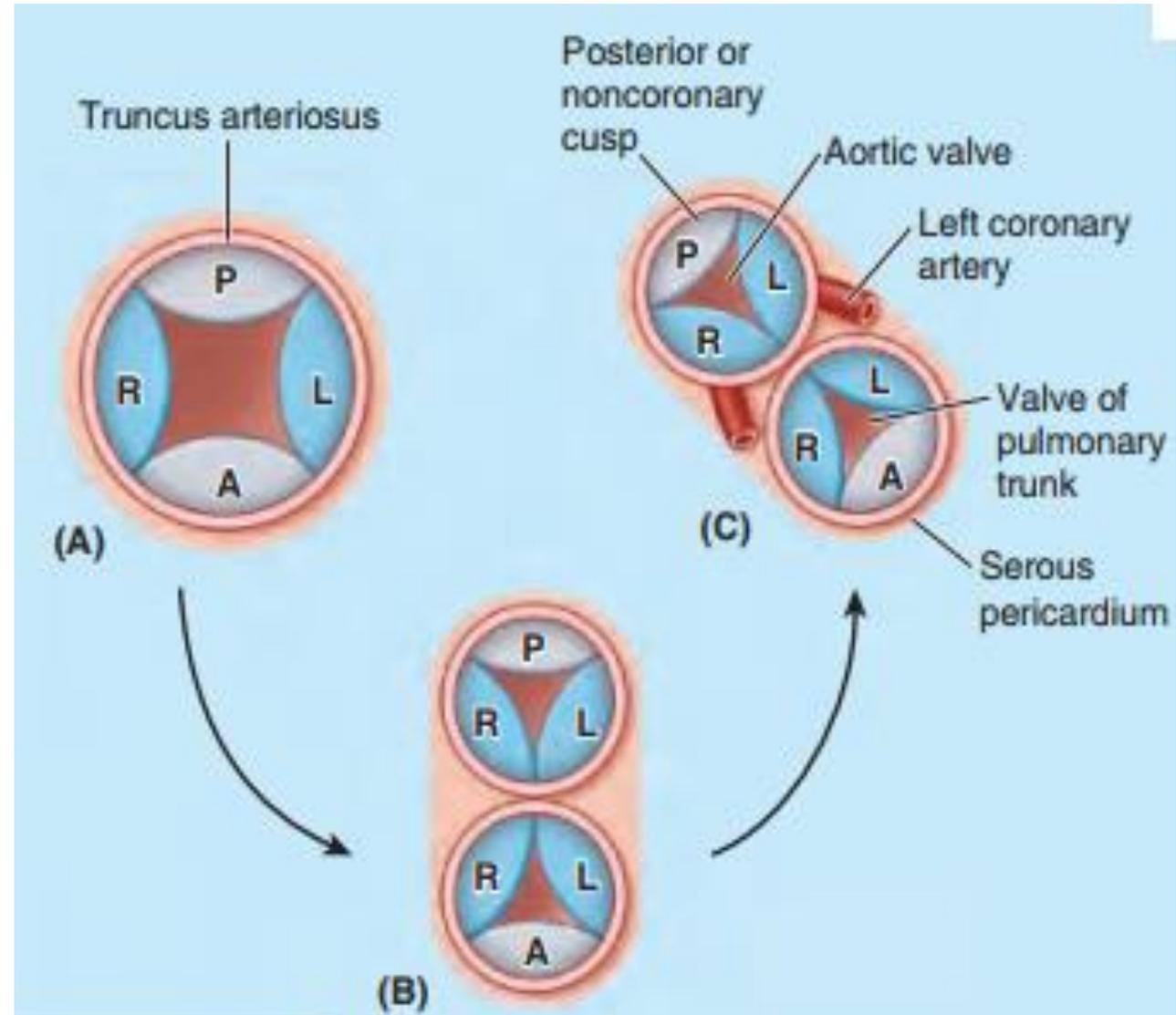
The cusps of the pulmonary and aortic valves are named according to their position in the fetus before the heart has rotated to the left. This, unfortunately, causes a great deal of unnecessary confusion

It is difficult to name the cusps and corresponding sinuses of the pulmonary valve and trunk precisely according to the coordinates of the body, because the valvular orifice is obliquely positioned.

The official nomenclature (Terminologia Anatomica 1998)

refers to **an anterior**, a **posterior** and a **septal cusp**, based on their position in **the fetus**.

The position changes with development and in the adult ***there is one anterior semilunar cusp***, and ***right and left semilunar cusps***

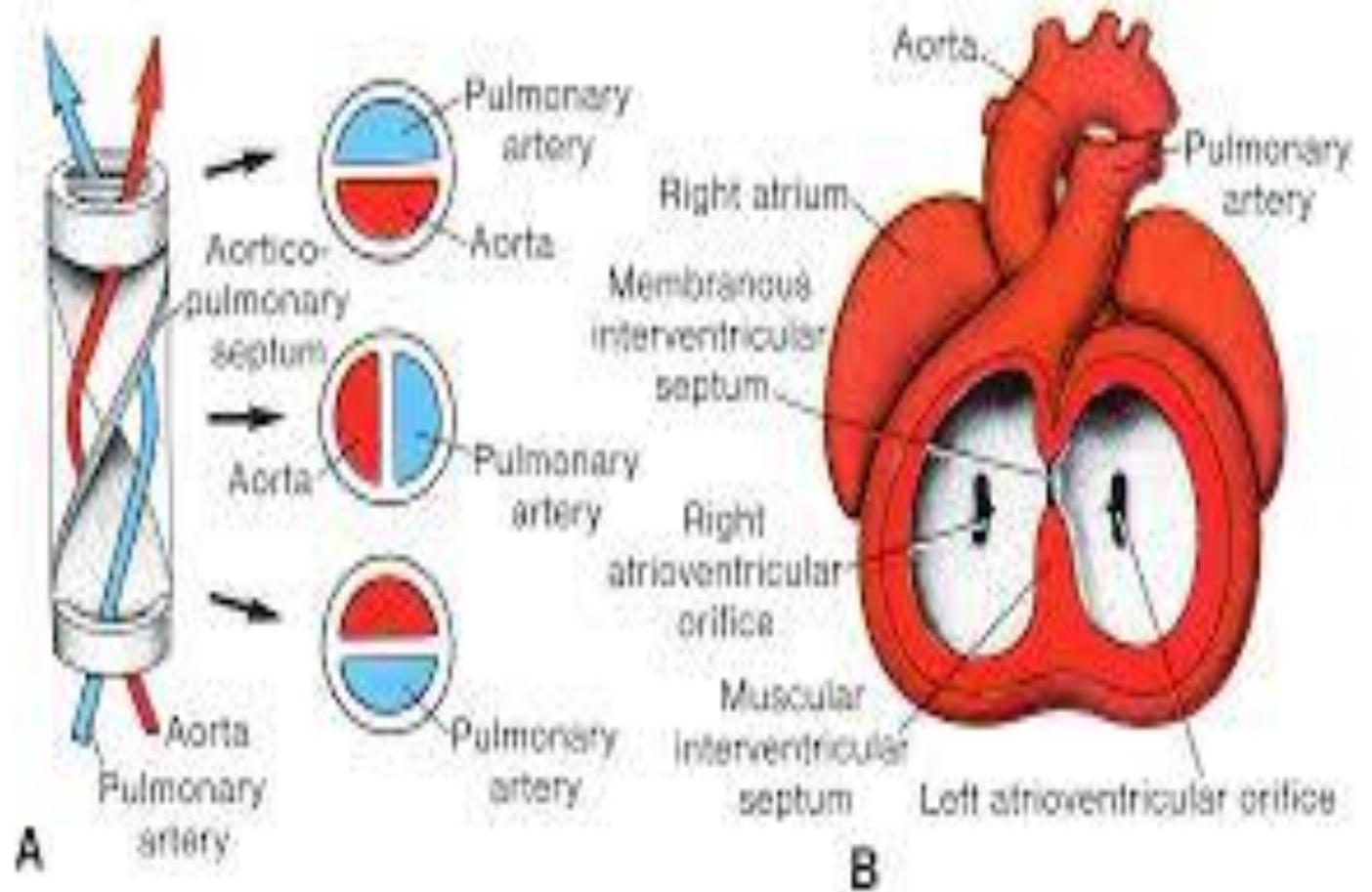


Truncal septum

C- in the upper part of the truncus the anterior ridge becomes left while the posterior ridge becomes right

B- in the middle of the truncus the right ridge becomes anterior while the left ridge becomes posterior

A- in the lower part of the truncus the ridges are right and left as traced upwards



When the two ridges fuse together a spiral septum is formed which is called the

Spiral aortico-pulmonary septum

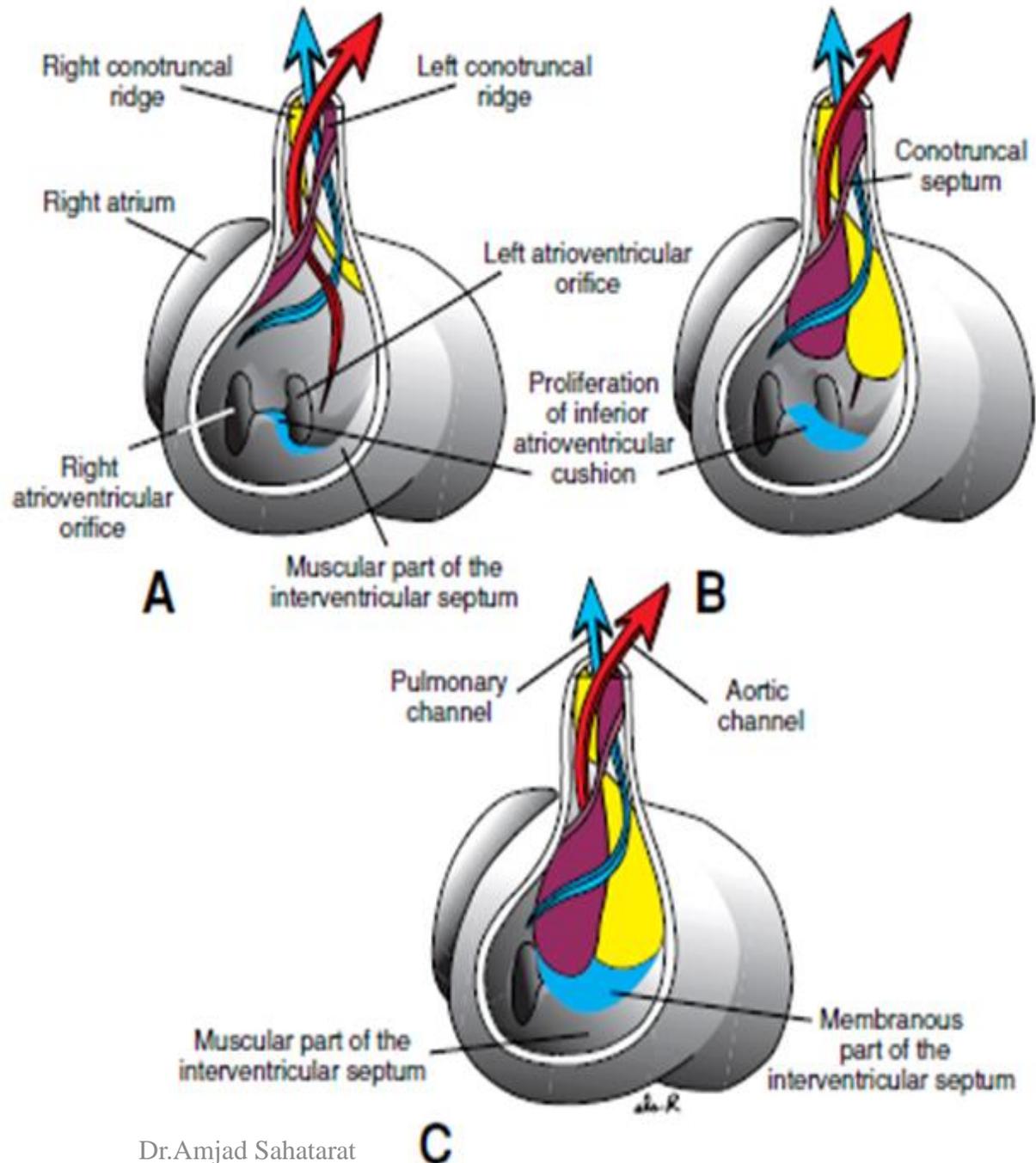
The bulbar and truncal ridges undergo 180-degree spiraling results in the formation of a spiral aortopulmonary septum when the ridges fuse

This septum the truncus arteriosus

into two arterial channels



The Ascending AORTA and the PULMONARY TRUNK



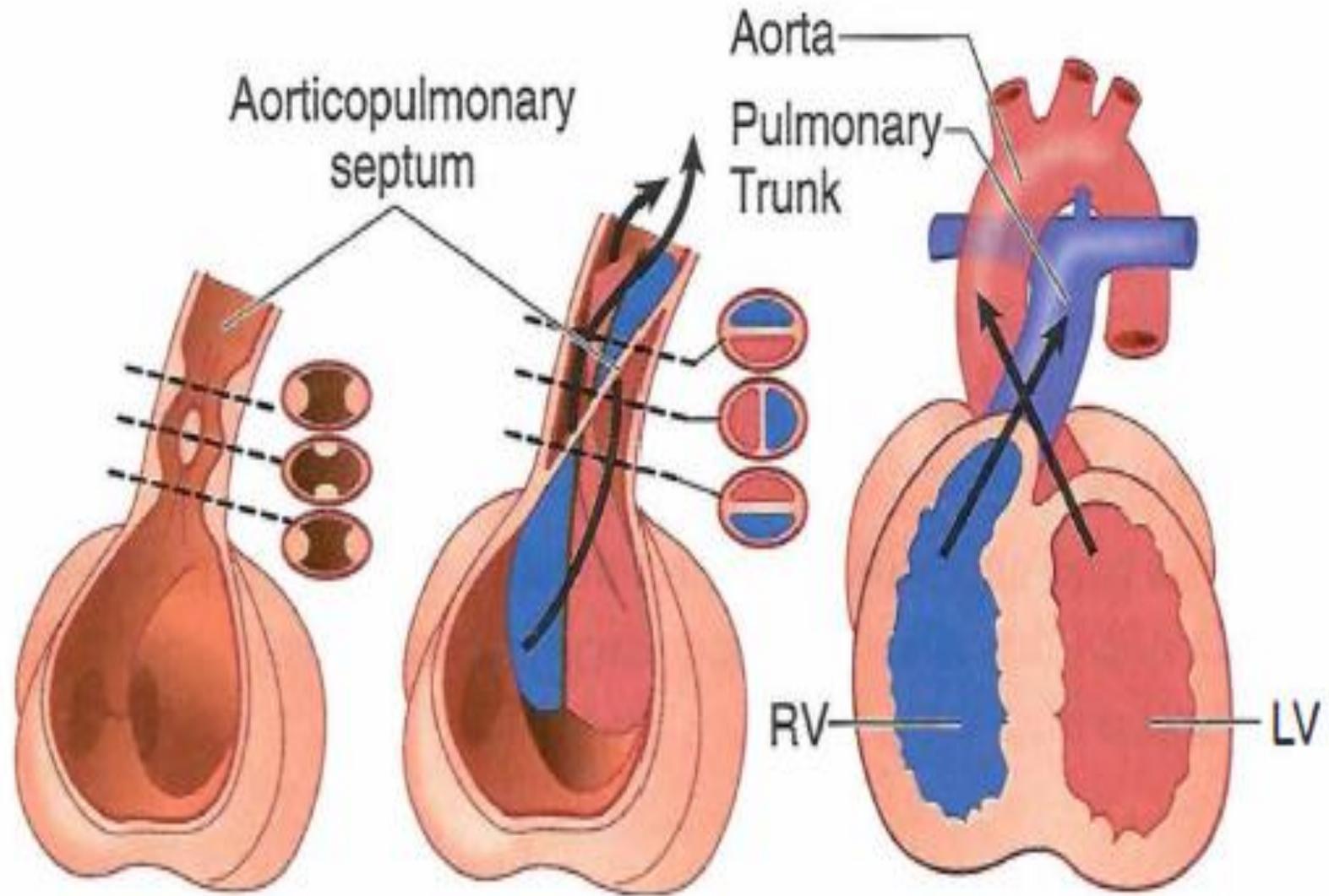


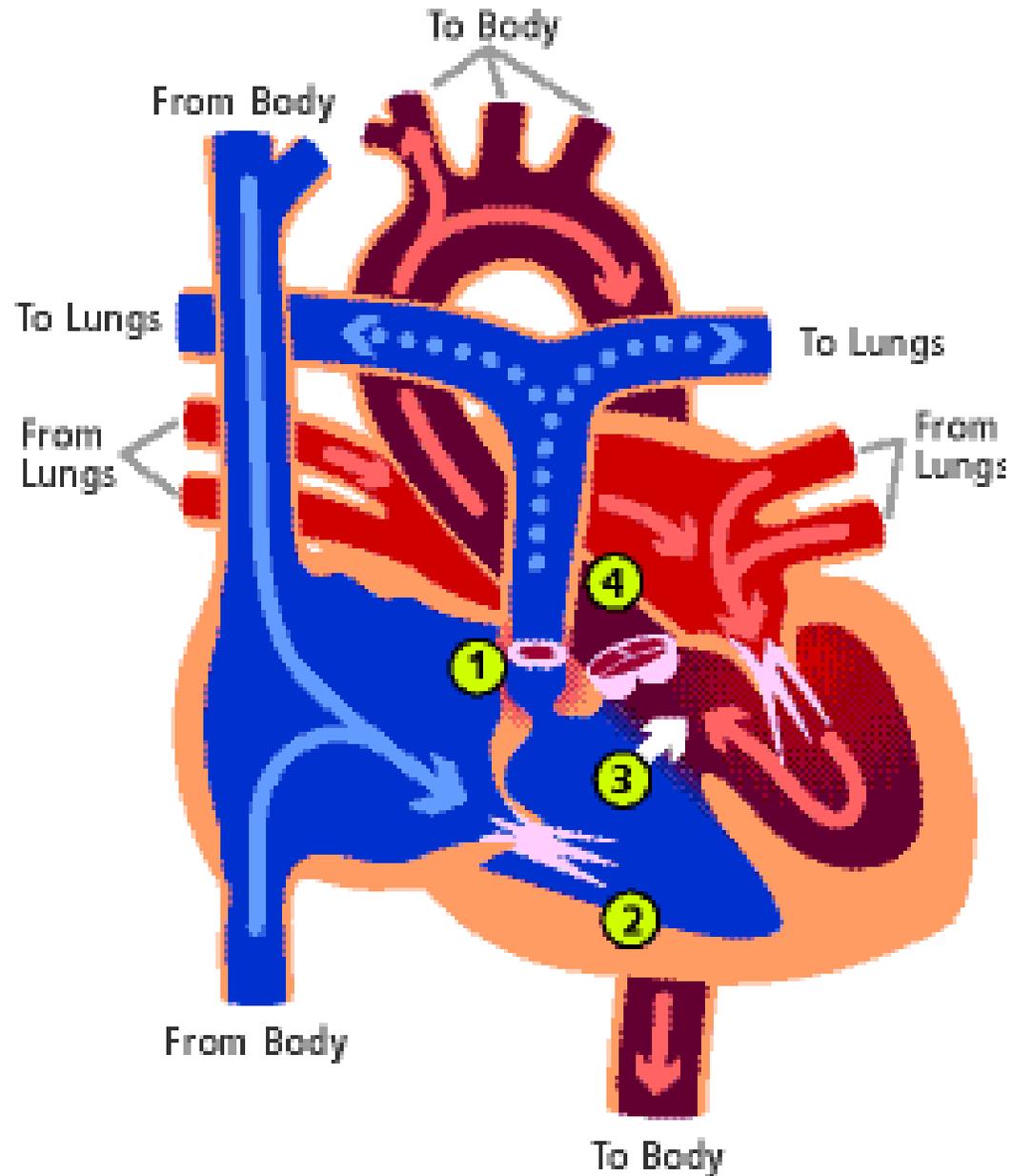
Figure III-2-18. Formation of the Aorticopulmonary Septum

Truncus arteriosus defects

Three classic **cyanotic congenital heart abnormalities** occur with defects in the development of the aorticopulmonary septum and are related to the failure of neural crest cells to migrate into the truncus arteriosus:

1. **Tetralogy of Fallot**  is the **most common** cyanotic congenital heart defect. Tetralogy occurs when the AP septum fails to align properly and shifts anteriorly to the right. This causes **right-to-left** shunting of blood with resultant **cyanosis** that is usually present sometime after birth. Imaging typically shows a boot-shaped heart due to the enlarged right ventricle.

- There are 4 major defects in Tetralogy of Fallot:
 - Pulmonary stenosis (most important)
 - Overriding aorta (receives blood from both ventricles)
 - Membranous interventricular septal defect
 - Right ventricular hypertrophy (develops secondarily)

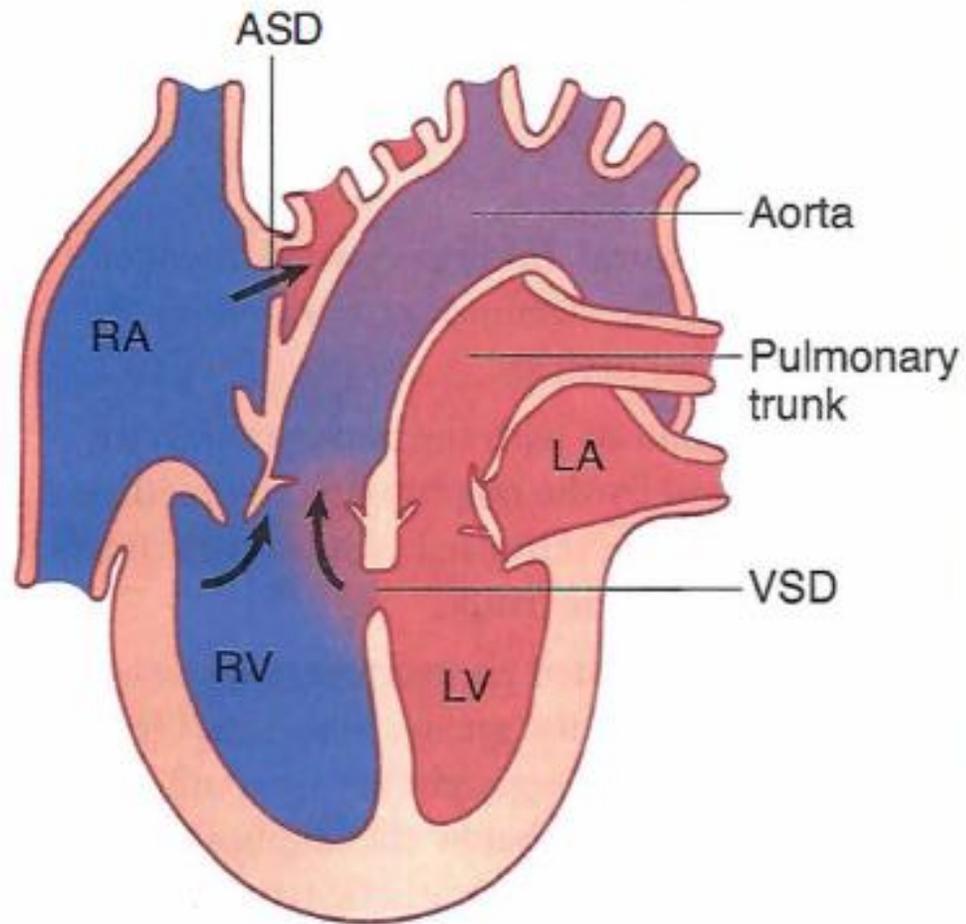


- There are 4 major defects in Tetralogy of Fallot:

- 1 - Pulmonary stenosis (most important)
- 4 - Overriding aorta (receives blood from both ventricles)
- 3 - Membranous interventricular septal defect
- 2 - Right ventricular hypertrophy (develops secondarily)

2. **Transposition of the great vessels**  occurs when the AP septum fails to develop in a spiral fashion and results in the aorta arising from the right ventricle and the pulmonary trunk arising from the left ventricle. This causes right-to-left shunting of blood with resultant cyanosis.

- Transposition is the most common cause of severe cyanosis that persists immediately at birth. Transposition results in producing 2 closed circulation loops.
- Infants born alive with this defect usually have other defects (PDA, VSD, ASD) that allow mixing of oxygenated and deoxygenated blood to sustain life.

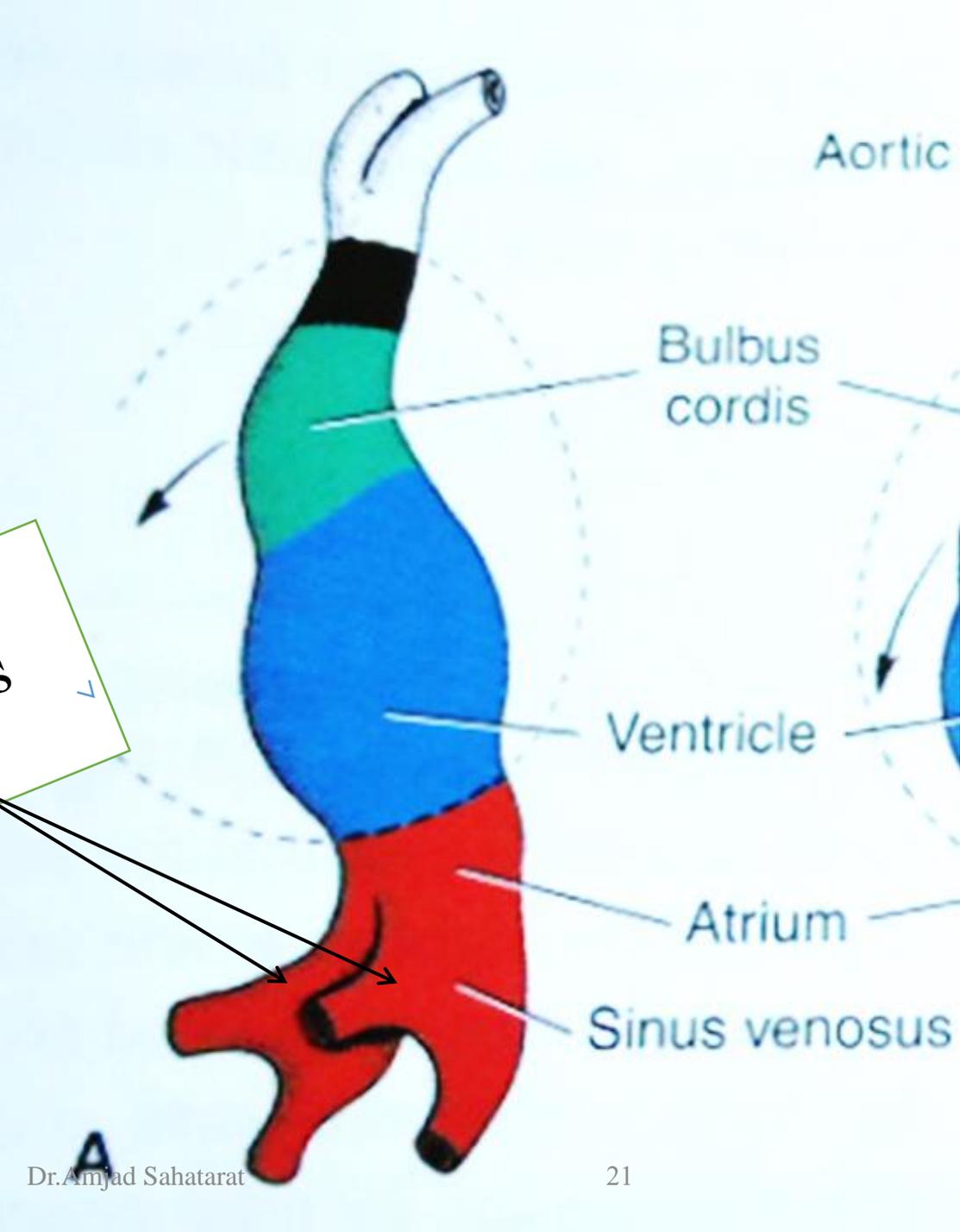


1. Aorta arises from the right ventricle
2. Pulmonary trunk arises from the left ventricle
3. Usually associated with a VSD, ASD, or patent ductus arteriosus

Figure III-2-20. Transposition of the Great Vessels

Changes in Sinus Venosus

Remember that the sinus venosus has two horns



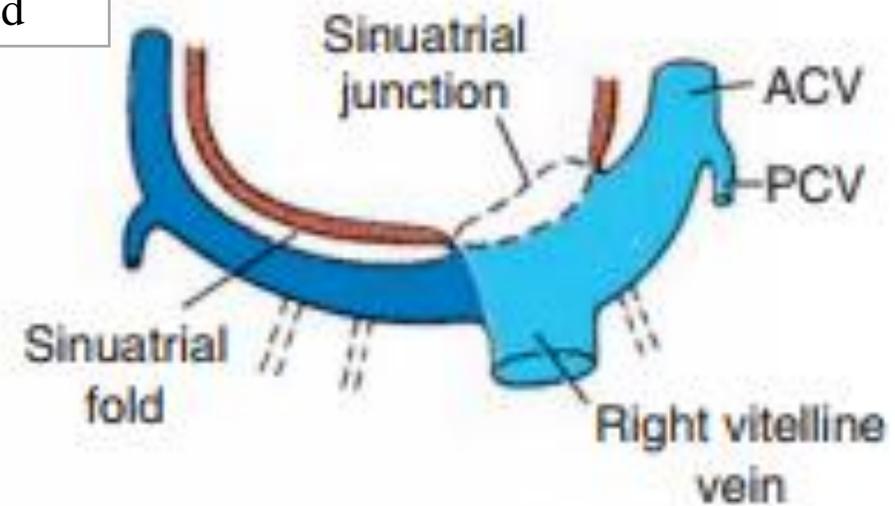
The Left horn

At 10 weeks

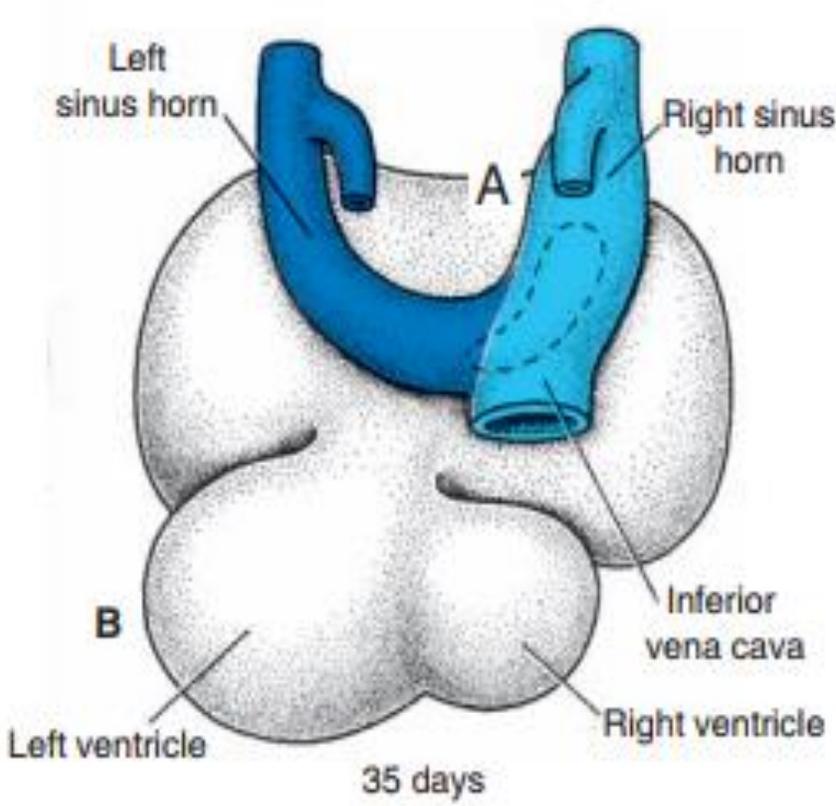
the left common cardinal vein is obliterated



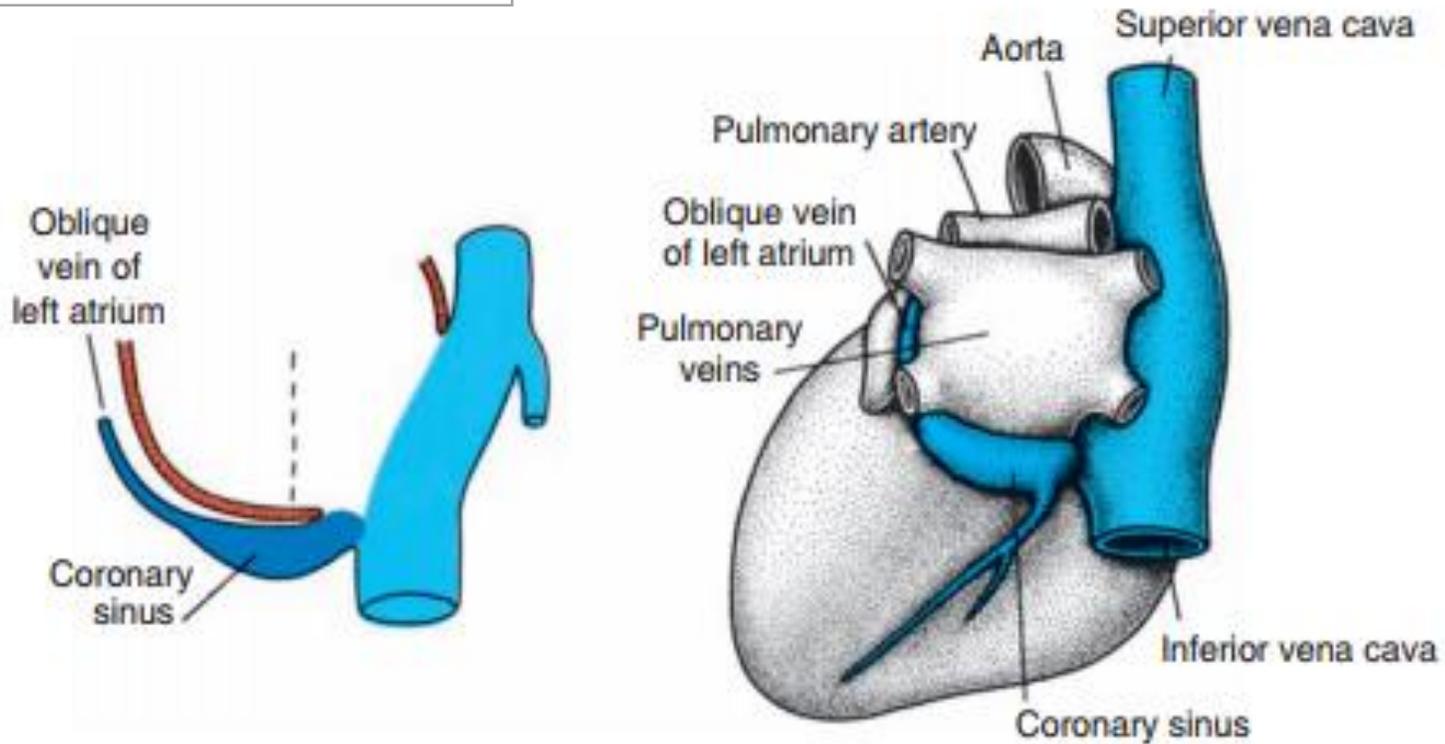
The left sinus horn rapidly loses its importance



all that remains of the left sinus horn is



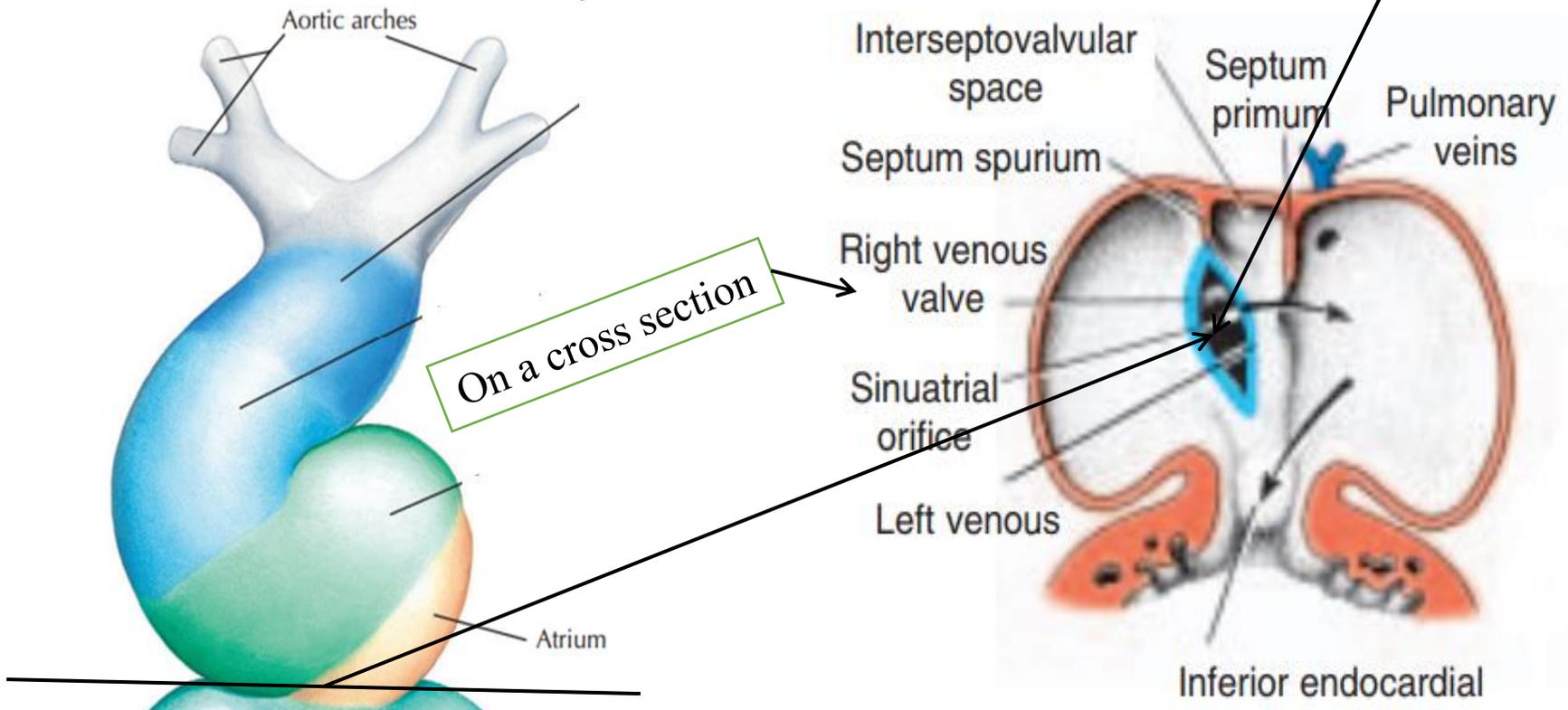
The oblique vein of the left atrium and the coronary sinus



Thus, what has been left from the sinus venosus is **the right horn**



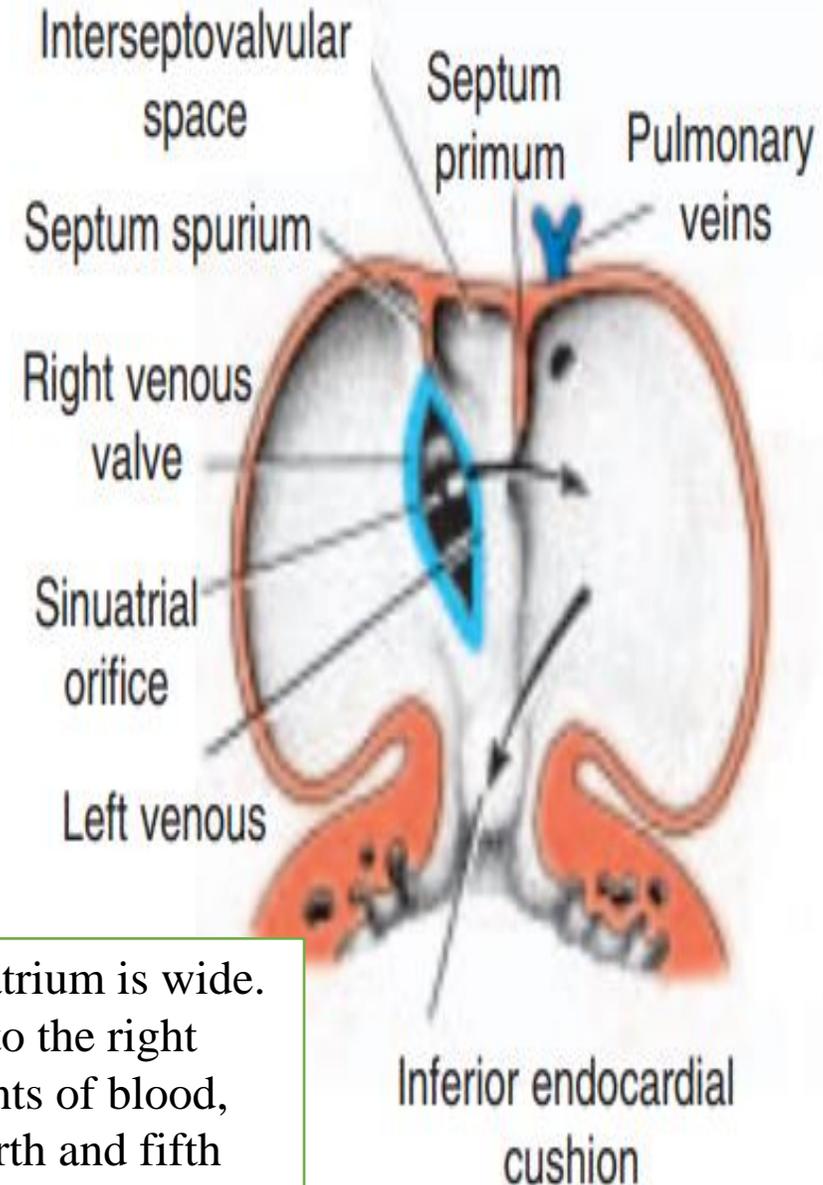
the sinus venosus (the right horn)
and the primordial atrium of the cardiac tube
communicate with each other through the sinuatrial orifice



Remember

- The atrium is made of one chamber that has began to divided
- Initially, the sinus venosus opens into the center of the posterior wall of the primordial atrium

- By the end of the fourth week, the right sinusal horn becomes larger than the left sinusal horn
- As this occurs the sinuatrial orifice moves to the right and opens in the part of the primordial atrium that will become the adult **right atrium**
- As the right sinuatrial horn enlarges, it receives all the blood from the head and neck through the SVC, and from the placenta and caudal regions of the body through the IVC



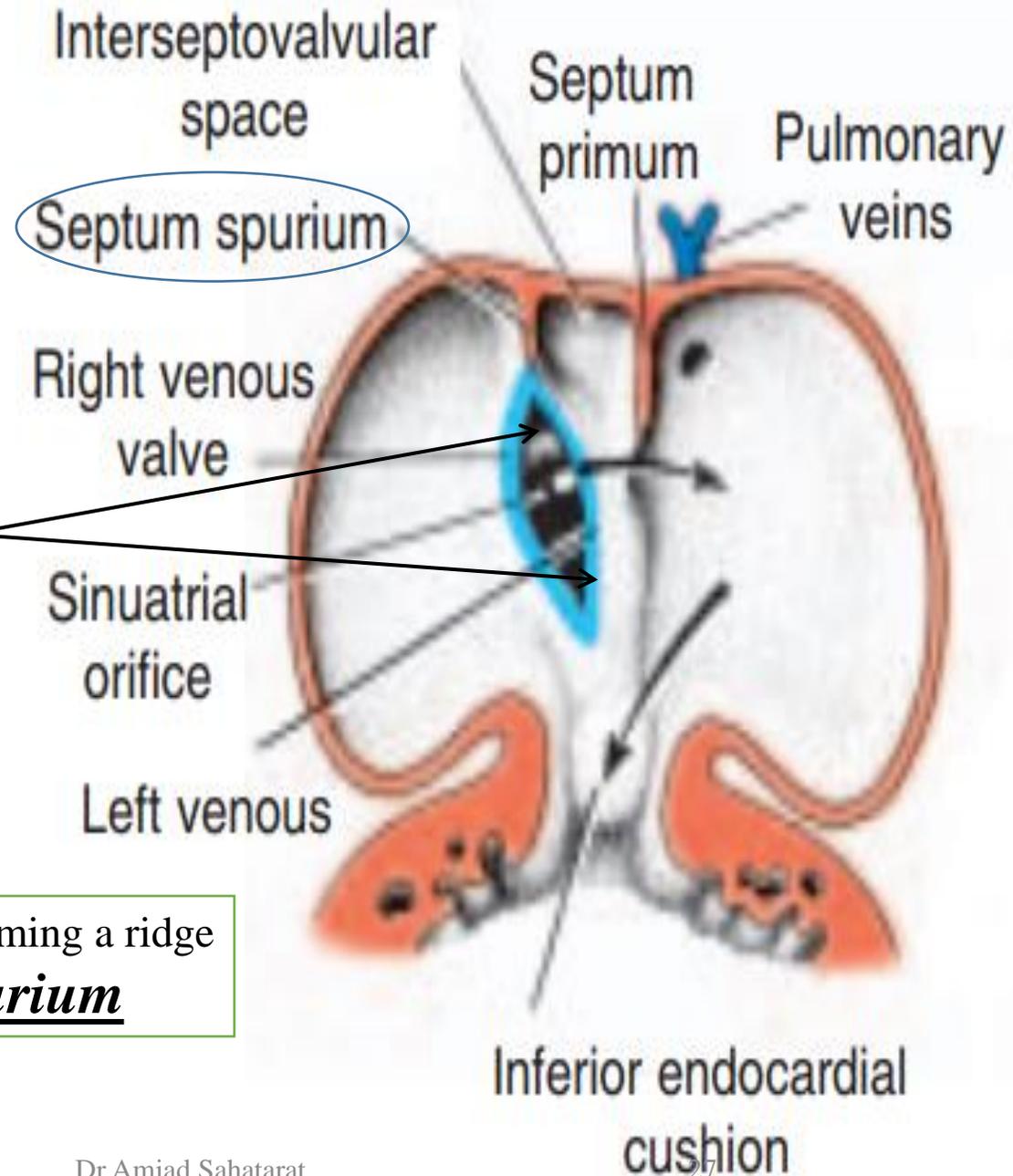
At first communication between the sinus and the atrium is wide. Soon, however, the entrance of the sinus shifts to the right. This shift is caused primarily by left-to-right shunts of blood, which occur in the venous system during the fourth and fifth weeks of development.

The right horn of the sinus **Venosus**

is incorporated into the right atrium to form the smooth-walled part of the right atrium

Its entrance, **the sinuatrial orifice**, is flanked on each side by **a valvular fold the right and left venous valves**

Dorso cranially the valves fuse, forming a ridge known as **the septum spurium**



The right sinuatrial valve

The cranial part of the right sinuatrial valve of the right venous valve becomes
The crista terminalis

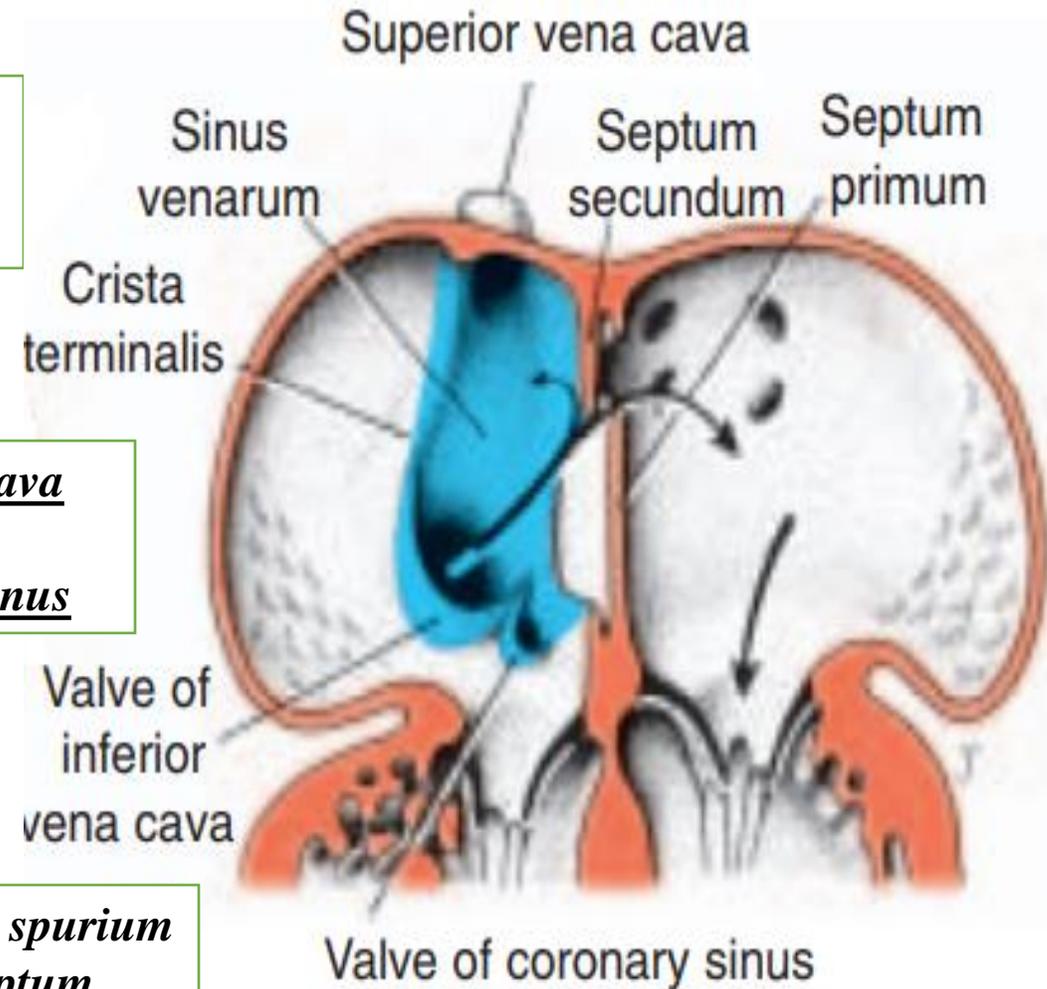
The inferior portion develops into two parts:

(a) ***The valve of the inferior vena cava***

(b) ***The valve of the coronary sinus***

The left venous valve

The left venous valve and the septum *spurium*
fuse with the developing atrial septum



➤ The right horn of the sinus venosus

is incorporated into the wall of the
right atrium

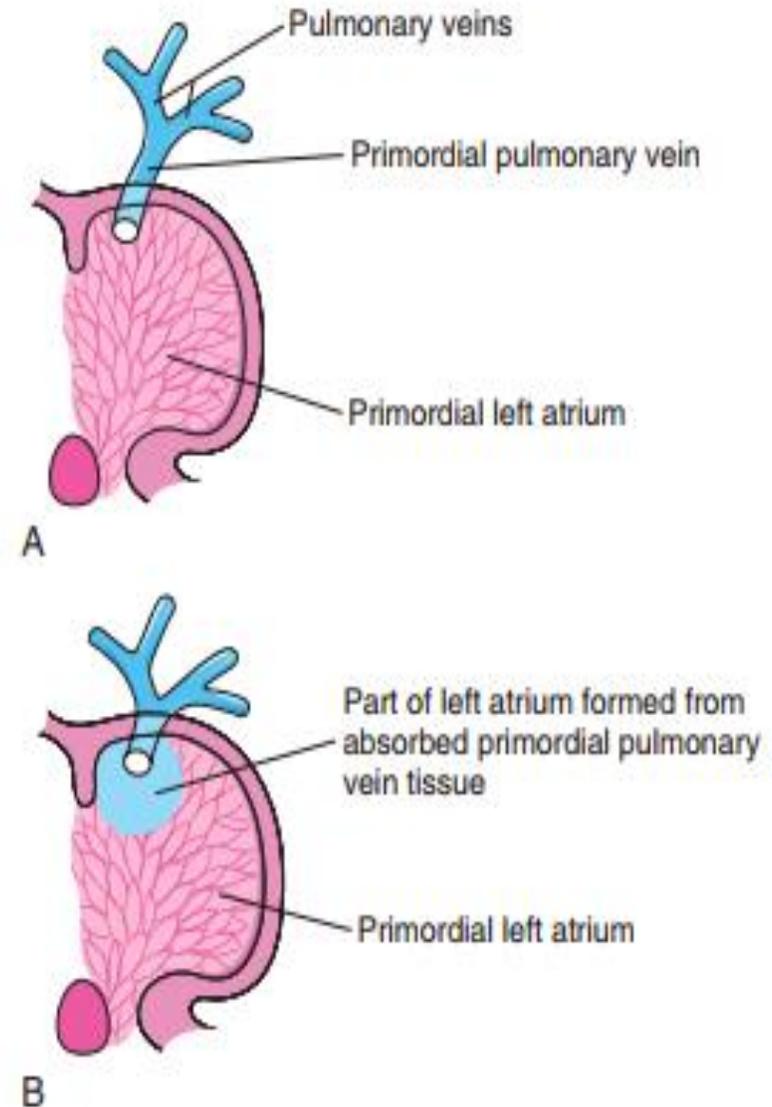
becomes the smooth part of the internal wall of the right

atrium—

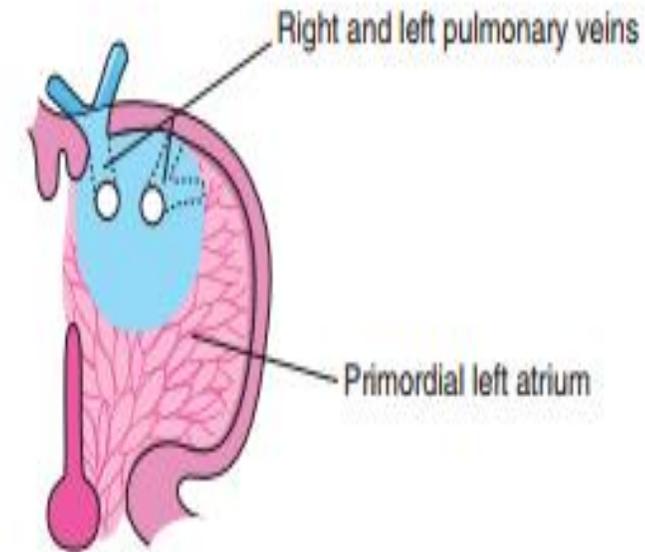
THE SINUS VENARUM

Primordial Pulmonary Vein and Formation of Left Atrium

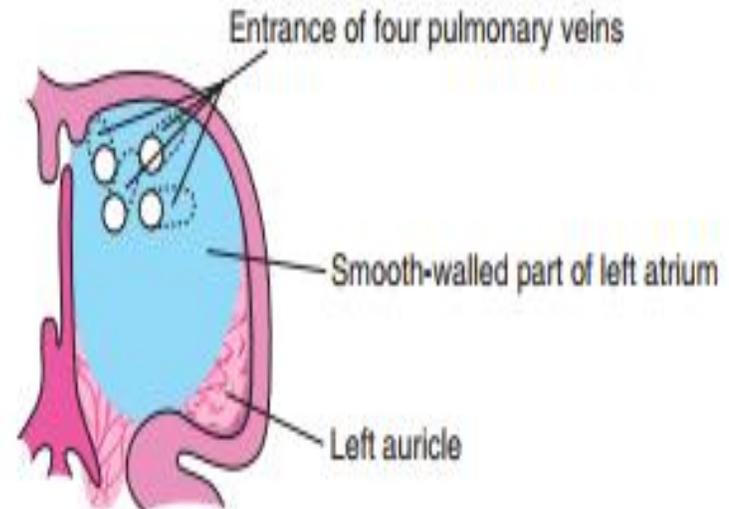
- Most of the wall of the left atrium is smooth because it is formed by the incorporation of the primordial pulmonary vein
- This vein develops as an outgrowth of the dorsal atrial wall, just to the left of the septum primum.
- As the atrium expands, the primordial pulmonary vein and its main branches are gradually incorporated into the wall of the left atrium



- As a result, four pulmonary veins are formed
- The small left auricle is derived from the primordial atrium; its internal surface has a rough, trabeculated appearance

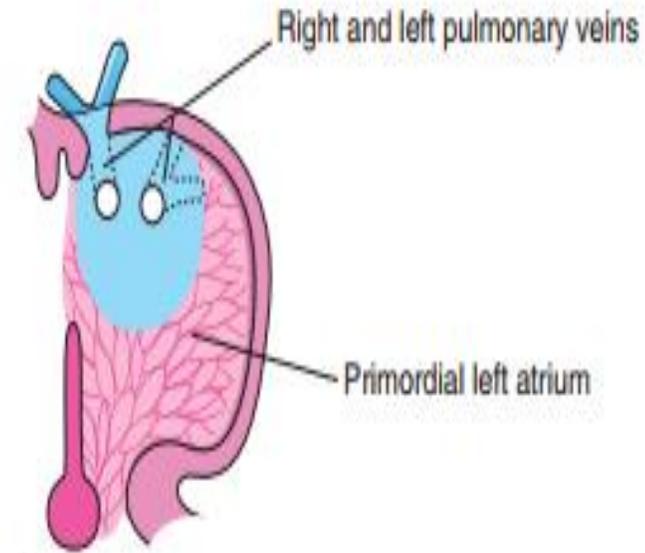


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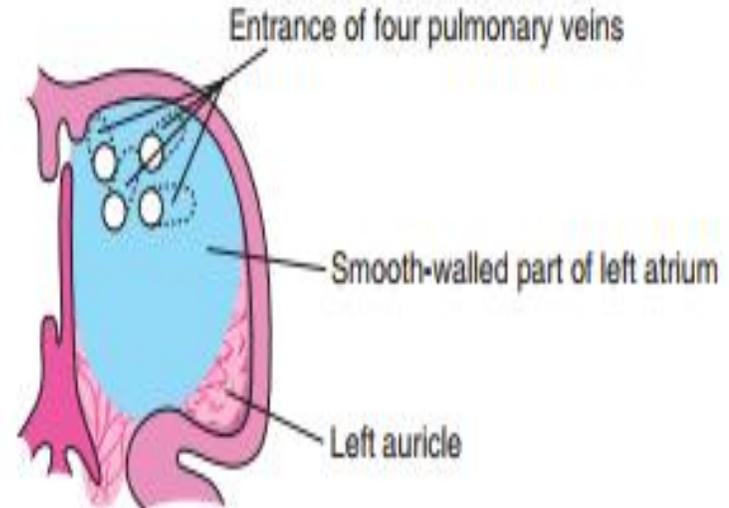


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