



# The module: Cardiovascular system

Duration : 1 hr

## (Chambers of the heart )

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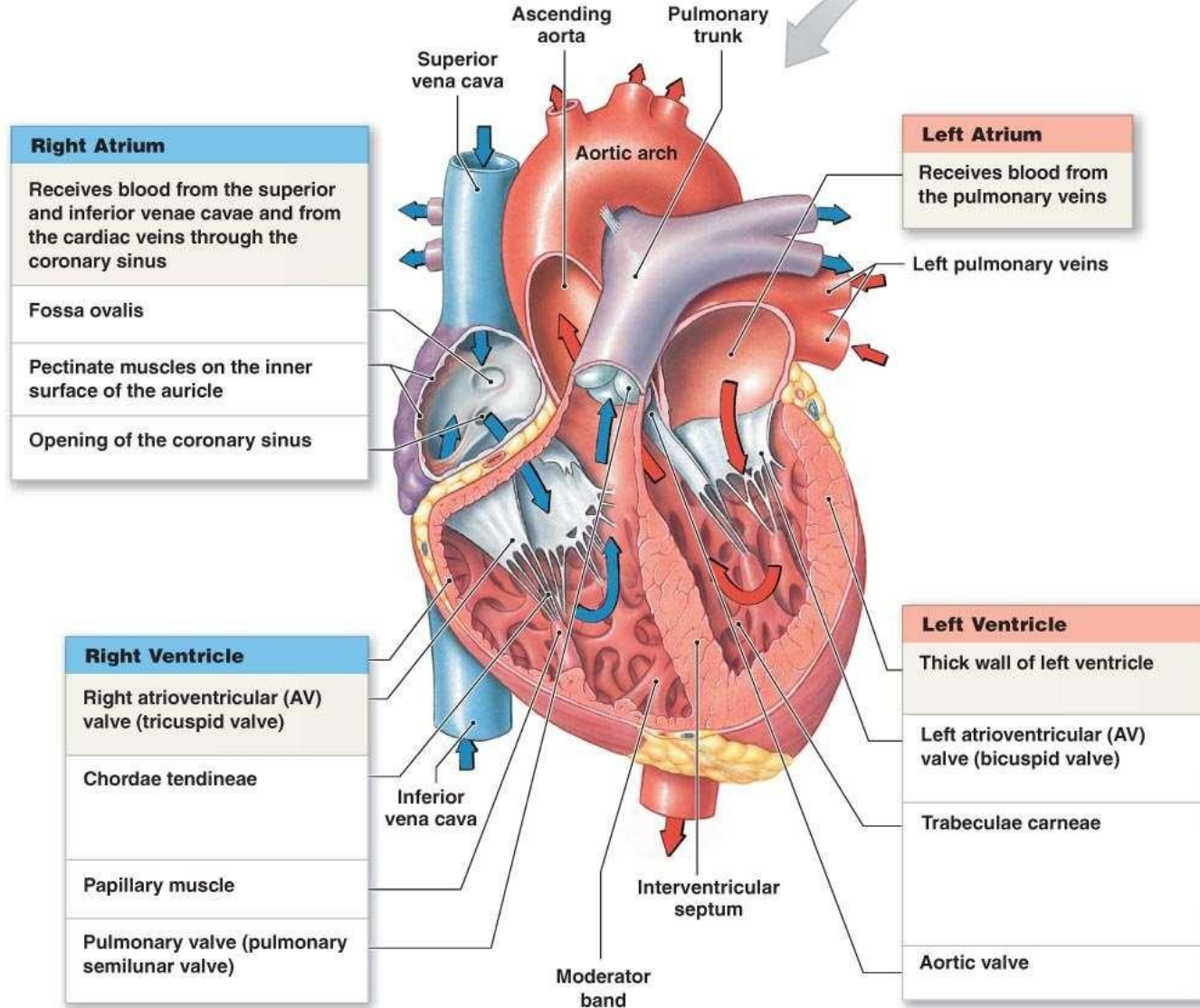
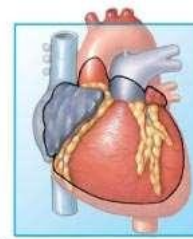
As in work book



For more discussion, questions or cases need help please post to the session group



The internal anatomy of the heart and the direction of blood flow between the chambers





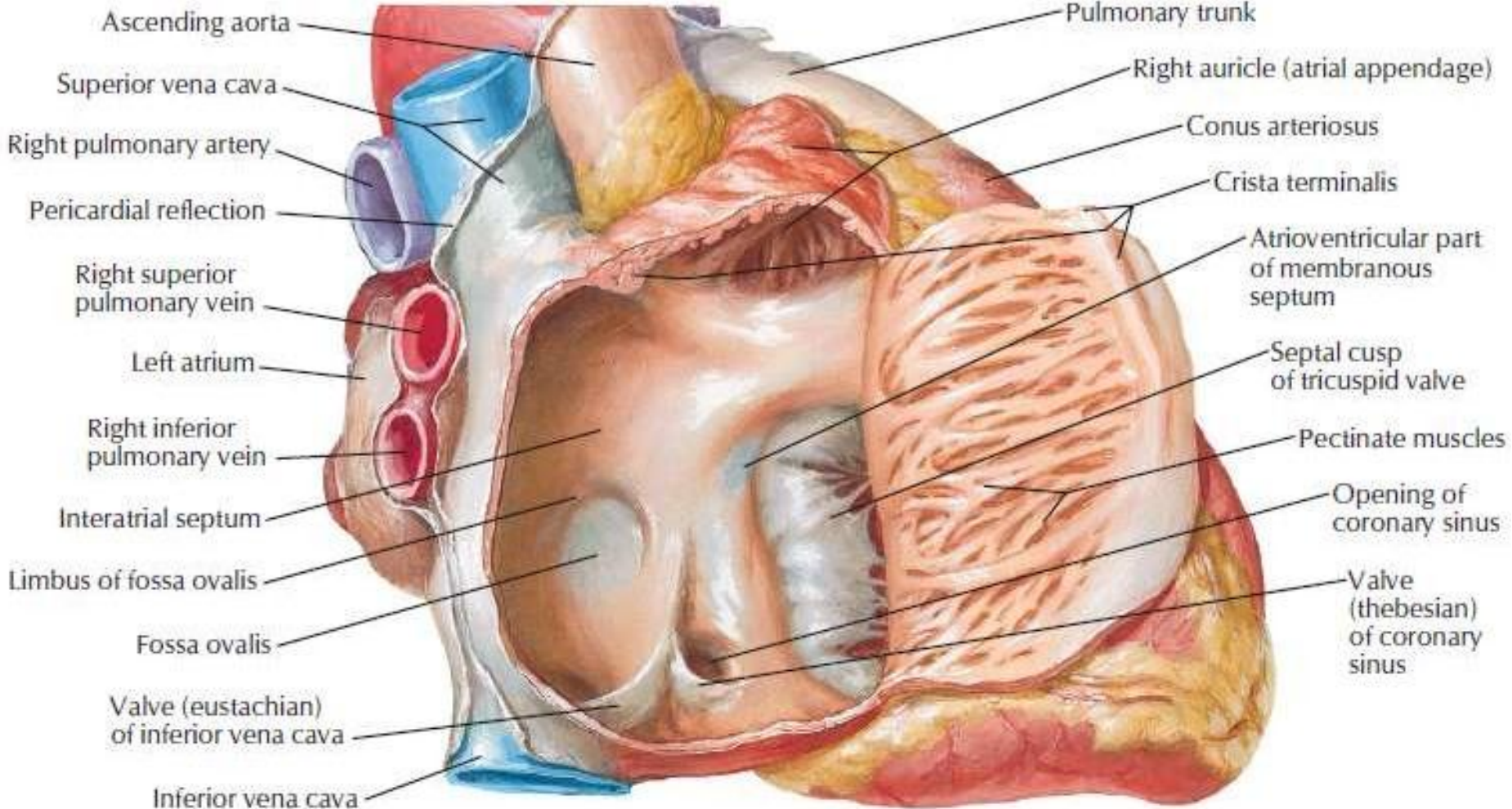
- The heart is composed of 4 chambers :—
  - Right atrium.
  - Right ventricle,
  - Left atrium,
  - Left ventricle.
- Blood returning to the heart enters the atria, and is then pumped into the ventricles.
- From the left ventricle, blood passes into the aorta and enters the **systemic circulation.**
- From the right, it enters the **pulmonary circulation** via the pulmonary arteries





- The 2 atrial chambers are divided from every other by a vertical septum the **interatrial septum** and the 2 ventricular chambers are divided from every other by a vertical septum the **interventricular septum**.
- The right atrium interacts with the right ventricle via right atrioventricular orifice, that is guarded by 3 cusps.
- The left atrium interacts with all the left ventricle via the left atrioventricular orifice, that is guarded by 2 cusps





Opened right atrium: right lateral view





## Rt atrium

- The right atrium receives deoxygenated blood from the **superior** and **inferior vena cavae**, from the **coronary veins** & from the **vene cordae minimae**.
- It pumps this blood through the right **atrioventricular orifice**(guarded by the tricuspid valve) into the **right ventricle**.
- In the anatomical position, the right atrium forms the **right border** of the heart..

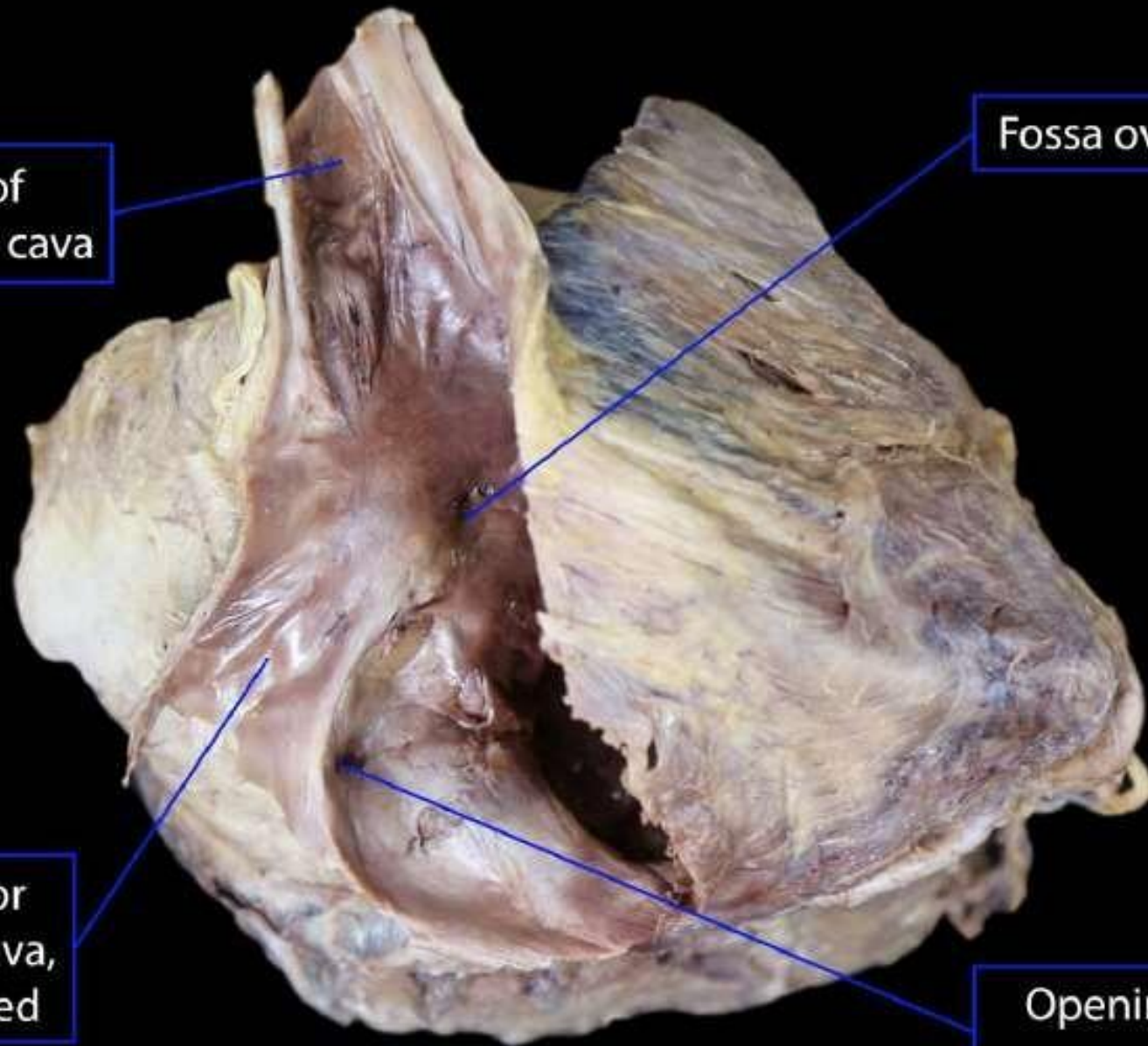


Opening of  
superior vena cava

Fossa ovalis

Inferior  
vena cava,  
reflected

Opening of  
coronary sinus



Right atrium, internal anterolateral

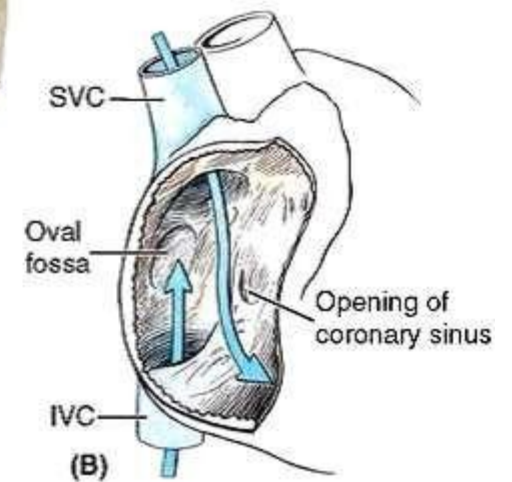
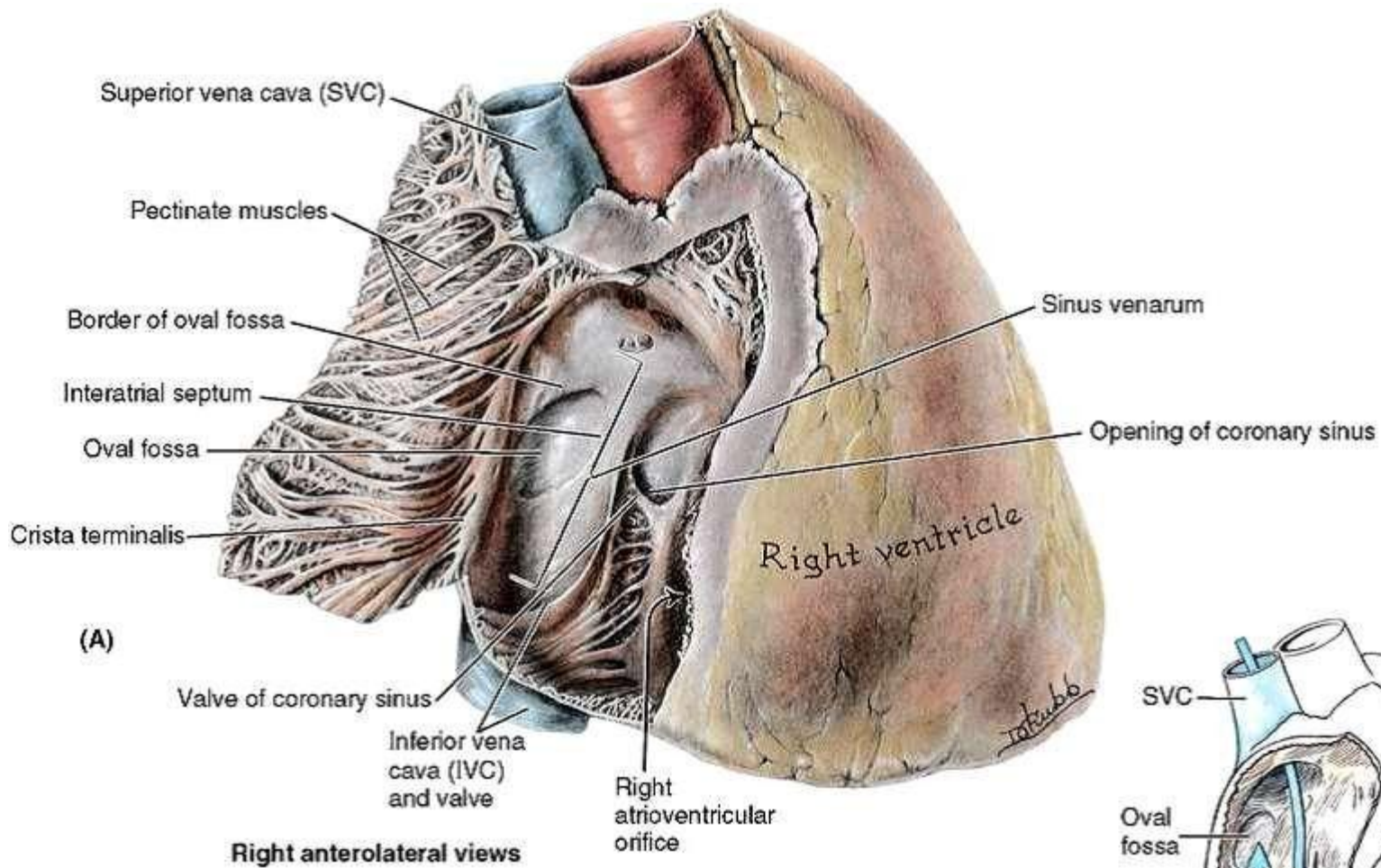


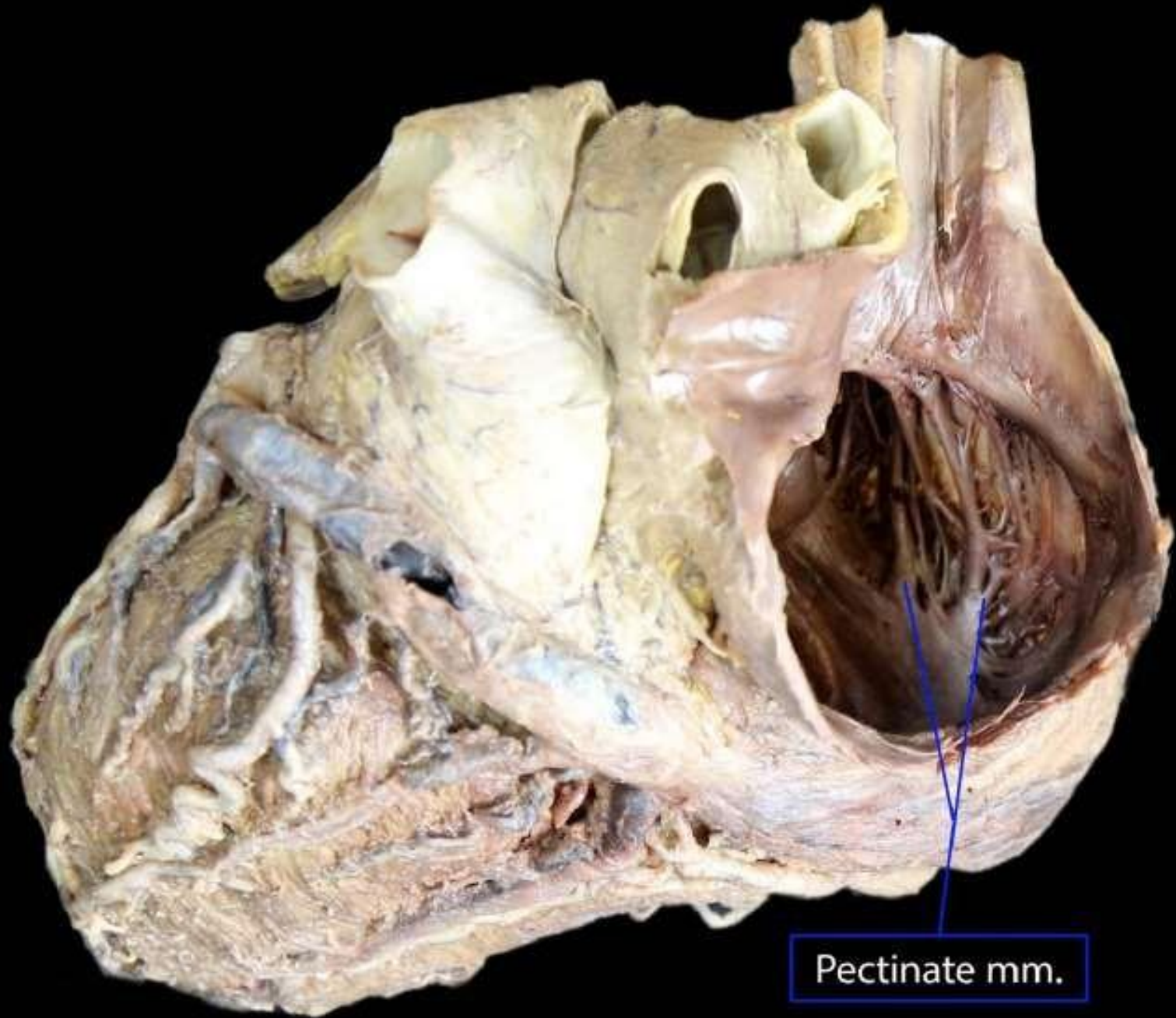
## OPENING INTO THE RIGHT ATRIUM

- **A. Opening of SVC:** The SVC opens at the upper end of the right atrium and has no valve. It returns the blood to the heart from the upper half of the body.
- **B. Opening of IVC:** The IVC opens at the lower end of the right atrium near the interatrial septum. It is guarded by a rudimentary non- [functioning semilunar valve referred to as valve of the inferior vena cava/Eustachian valve.](#)
- **C. Opening of coronary sinus:** The coronary sinus, which drains the majority of the blood from the heart, opens into the right atrium between the openings of IVC and right atrioventricular orifice. It is also guarded by a rudimentary non-functioning valve, **Thebesian valve.**
- **D. Right atrioventricular(tricuspid)orifice (largest opening):** It interacts the right atrial chamber with all the right ventricular chamber. It is located anterior to the opening of IVC and is guarded by the tricuspid valve.
- **E. Many small orifices of small veins:** These are the opening of venae cordis minimae (Thebesian veins) and anterior cardiac veins







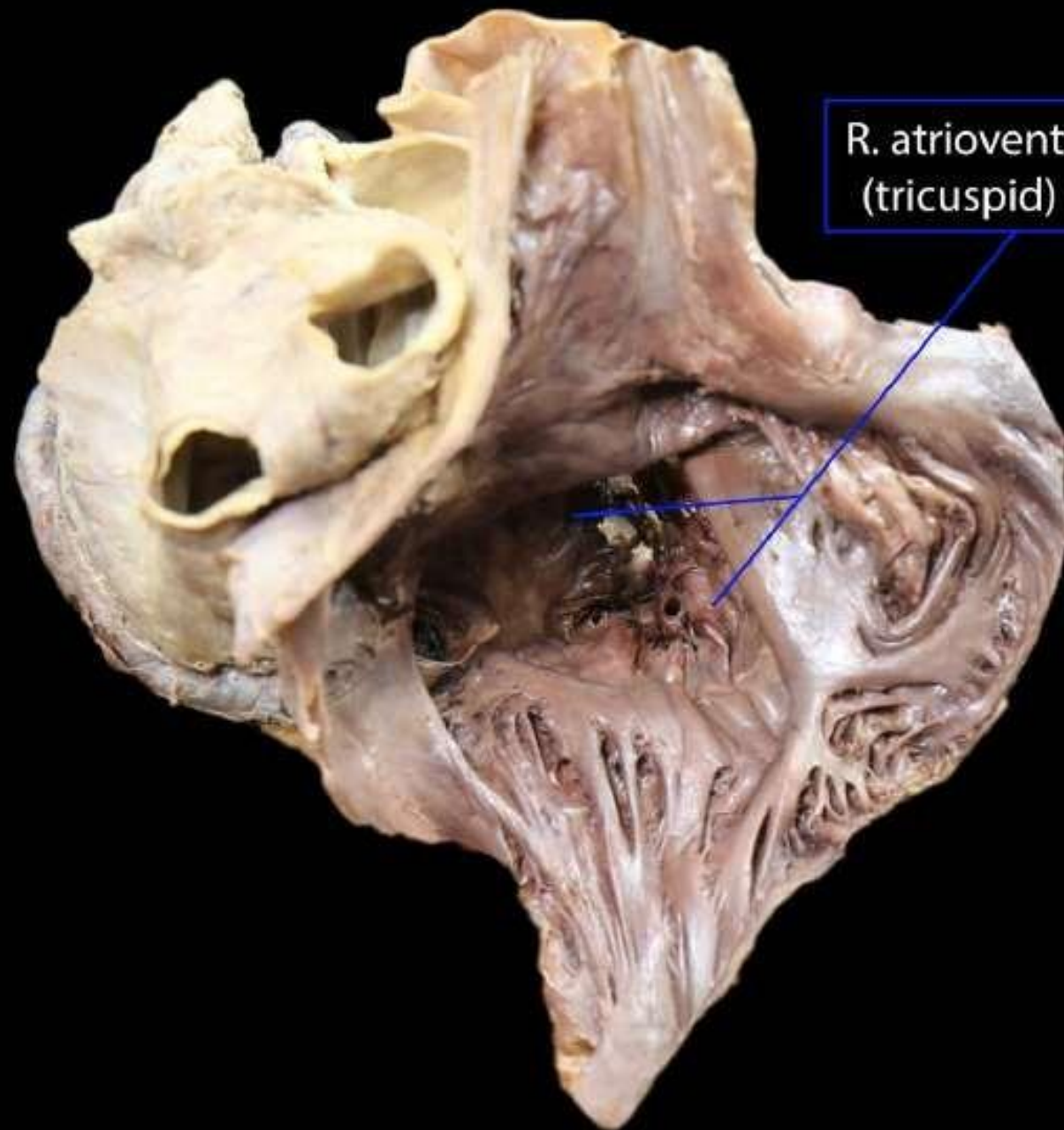


Pectinate mm.

Right atrium, internal posterolateral

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R. atrioventricular  
(tricuspid) valve

Right atrium, internal

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## Inter atrial Septum

- The **interatrial septum** is a solid muscular wall that separates the right and left atria.
- The septal wall in the right atrium is marked by a small oval-shaped depression called the **fossa ovalis**.
- This is the remnant of the **foramen ovale** in the foetal heart, which allows right to left shunting of blood to bypass the lungs.
- It closes once the newborn takes its first breath.



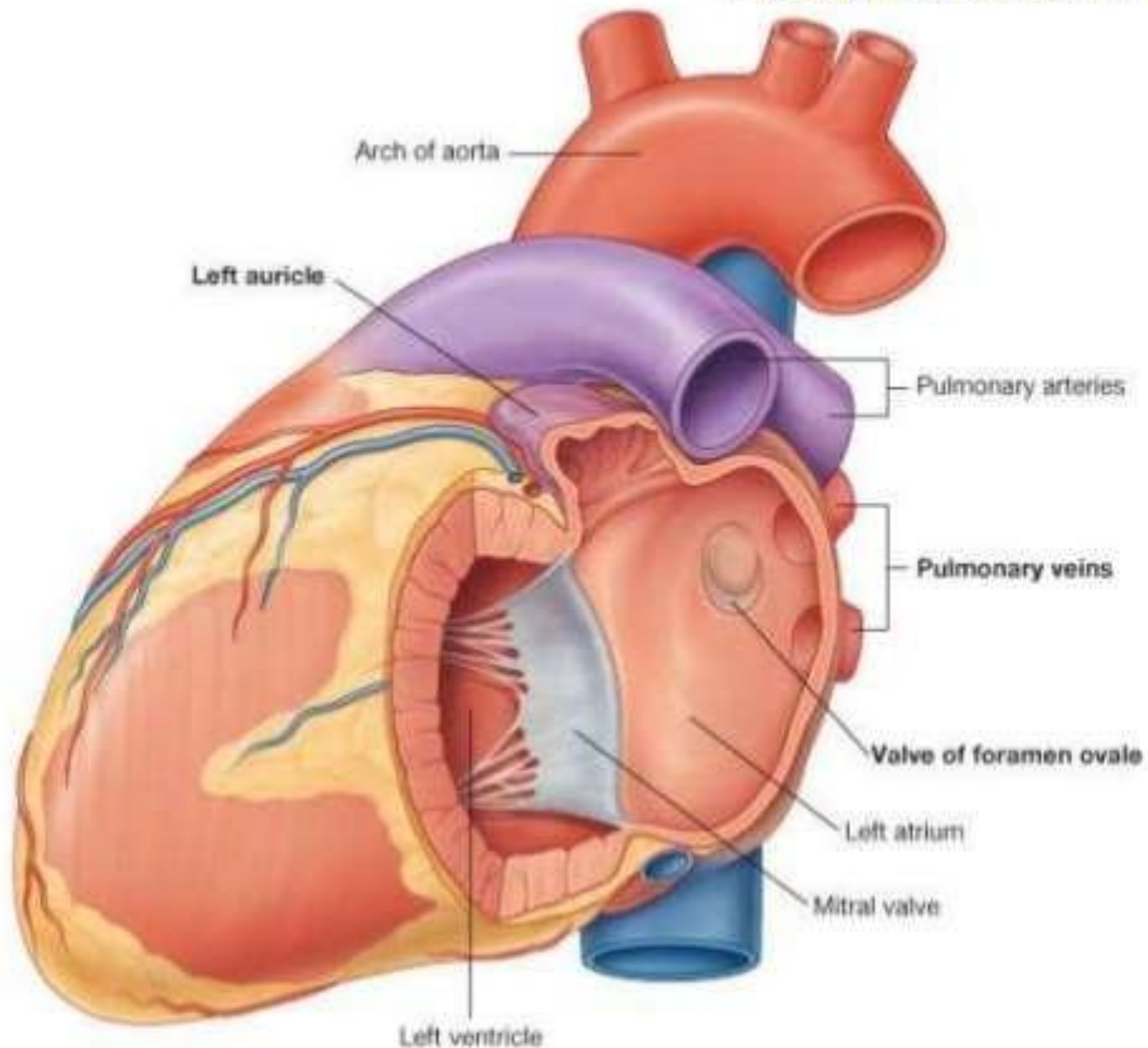


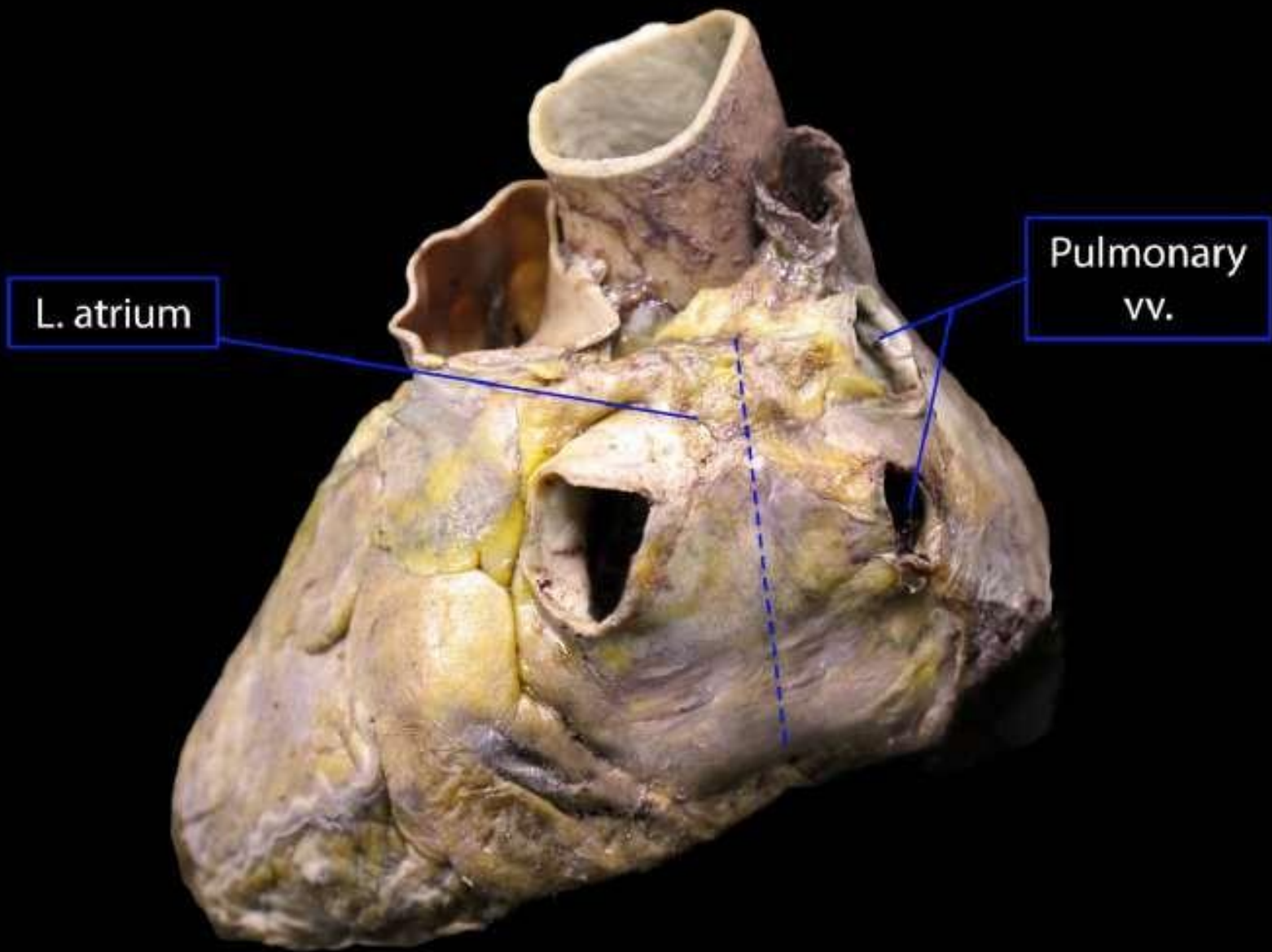
## Lt atrium

- The left atrium receives oxygenated blood from the **four pulmonary veins**, and pumps it through the left atrioventricular orifice (guarded by the **mitral valve**) into the left ventricle.
- In the anatomical position, the left atrium forms the **posterior border (base)** of the heart.
- The **left auricle** extends from the superior aspect of the chamber, overlapping the root of the pulmonary trunk.
- The interior surface of the left atrium can be divided into two parts, each with a distinct embryological origin:
- **Inflow portion** – receives blood from the pulmonary veins. Its internal surface is **smooth** and it is derived from the pulmonary veins themselves.
- **Outflow portion** – located anteriorly, and includes the left auricle. It is lined by **pectinate muscles**, and is derived from the embryonic atrium.



# Left atrium

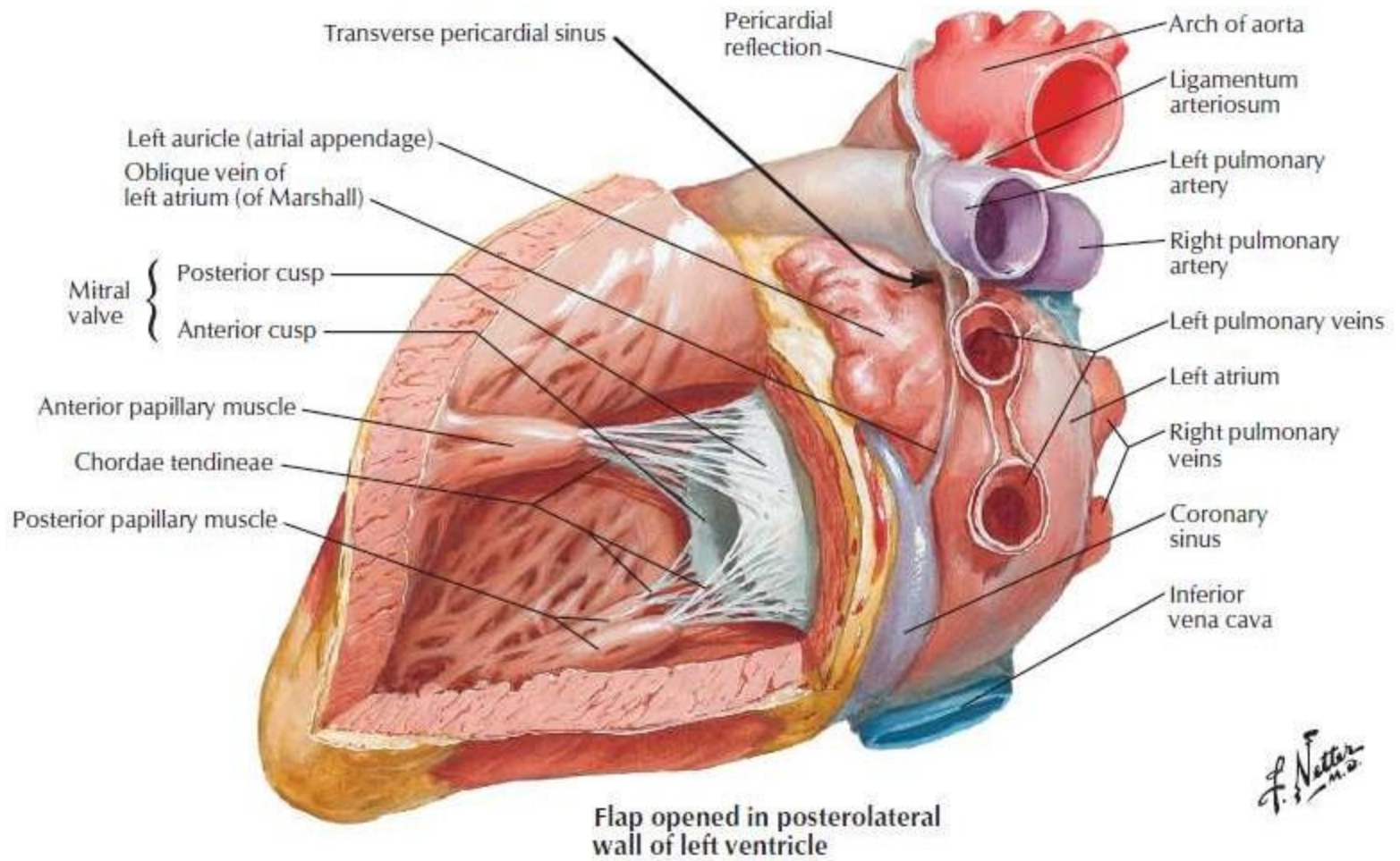




L. atrium

Pulmonary  
vv.

Heart, posteroinferior







## Opening of Lt atrium

- Openings in the left atrium are as follows:
- A. Openings of **4 pulmonary veins** in its posterior wall, 2 on every side. They have no valves.
- B. Number of small **openings of venae cordis minimae**.
- C. **Left atrioventricular orifice**. It is guarded by the mitral valve





## Rt ventricle

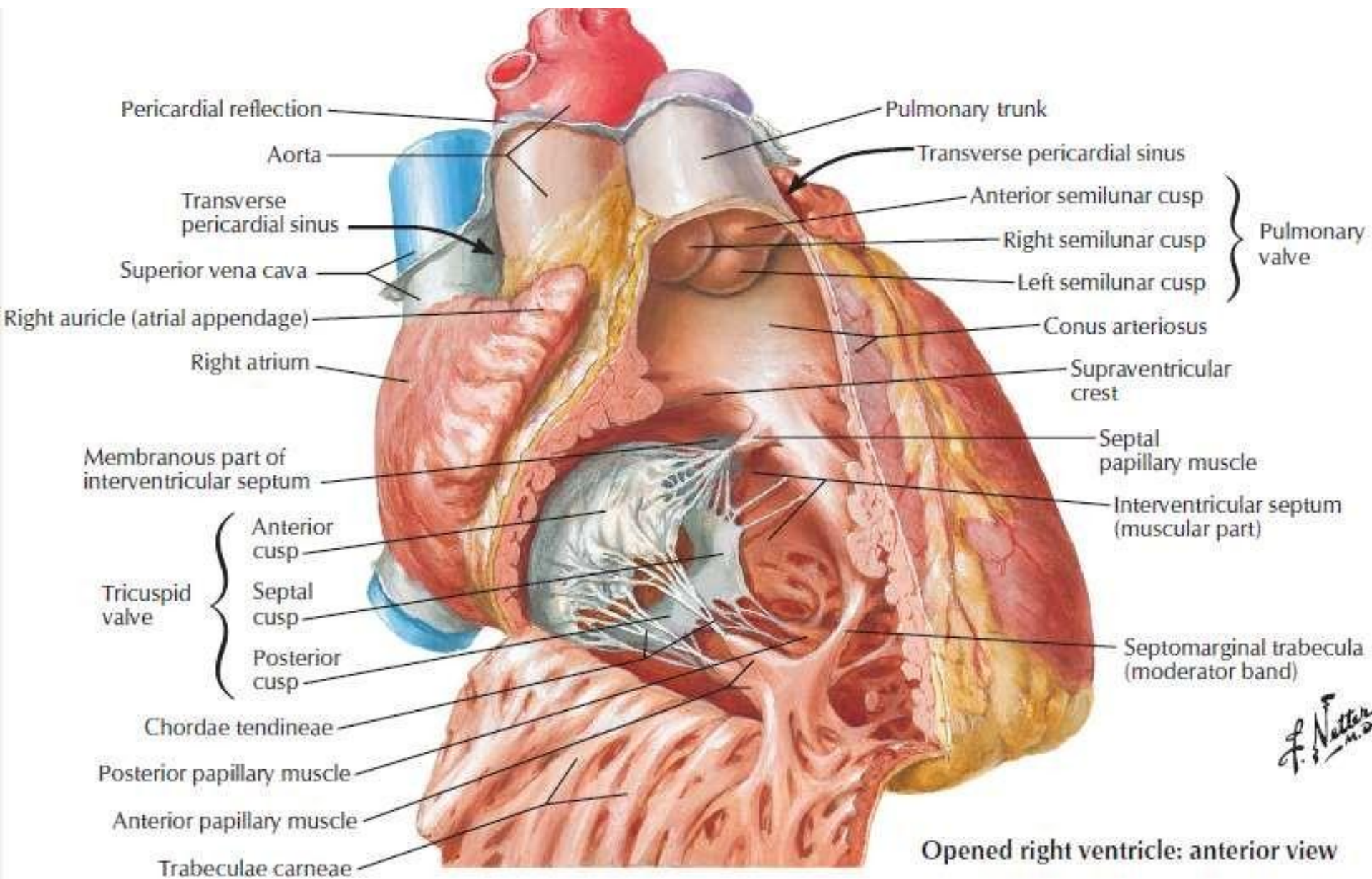
- The right ventricle receives deoxygenated blood from the right atrium, and pumps it through the pulmonary orifice (guarded by the pulmonary valve), into the **pulmonary artery**.
- It is triangular in shape, and forms the majority of the **anterior** border of the heart.
- The right ventricle can be divided into an inflow and outflow portion, which are separated by a muscular ridge known as the **supraventricular crest**.





- The interior of the right ventricle is covered by a series of irregular muscular elevations, called **trabeculae carnae**. They give the ventricle a 'sponge-like' and is of three main types:
- Their apices are attached to fibrous cords (**chordae tendineae**), which are in turn attached to the three **tricuspid valve** cusps.
- pillars of trabeculae carnae. The **papillary muscles** projected inwards.





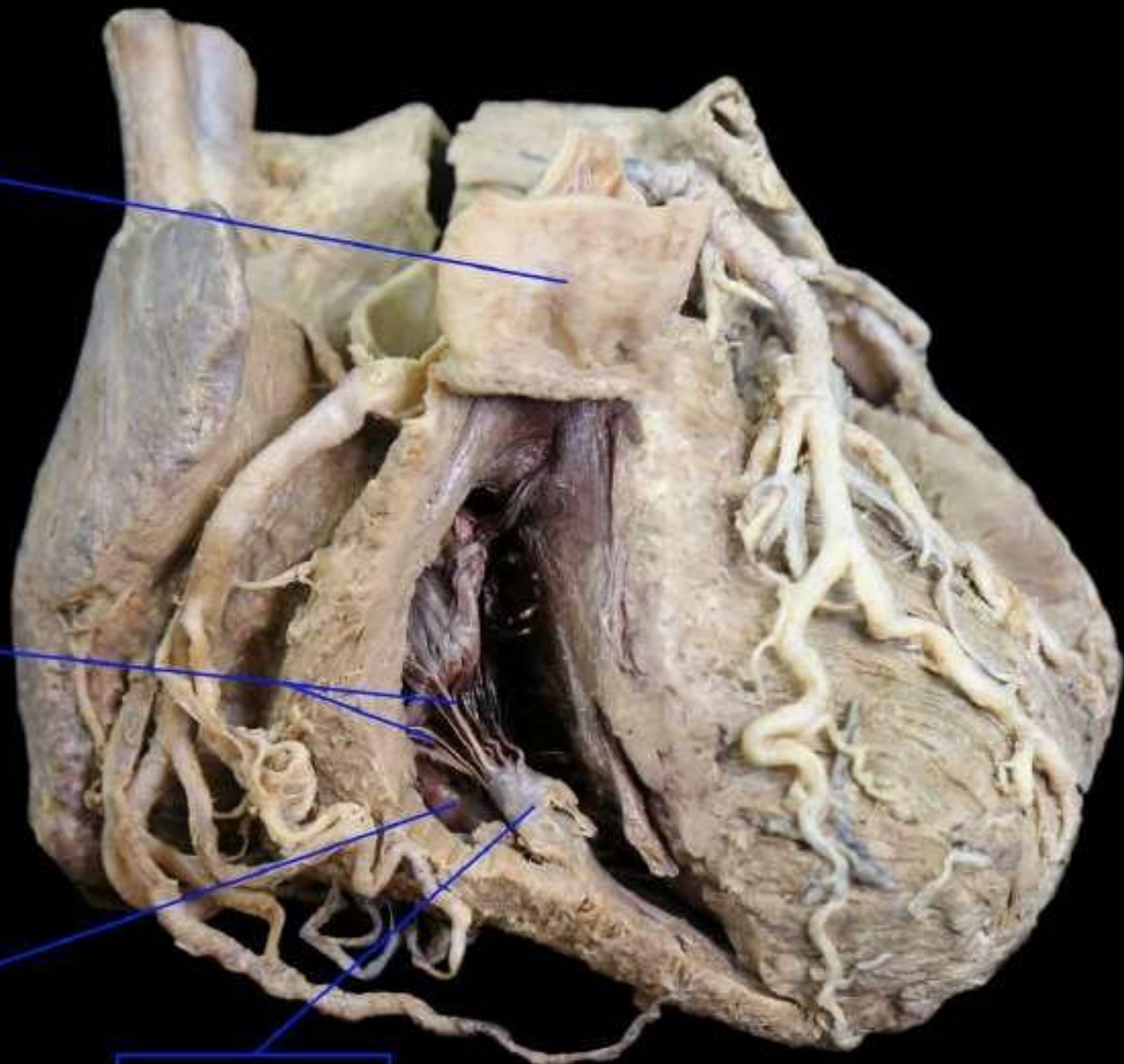
Opened right ventricle: anterior view

Pulmonary trunk

Chordae tendineae

Trabeculae carneae

Papillary m.



Right ventricle, internal anterior

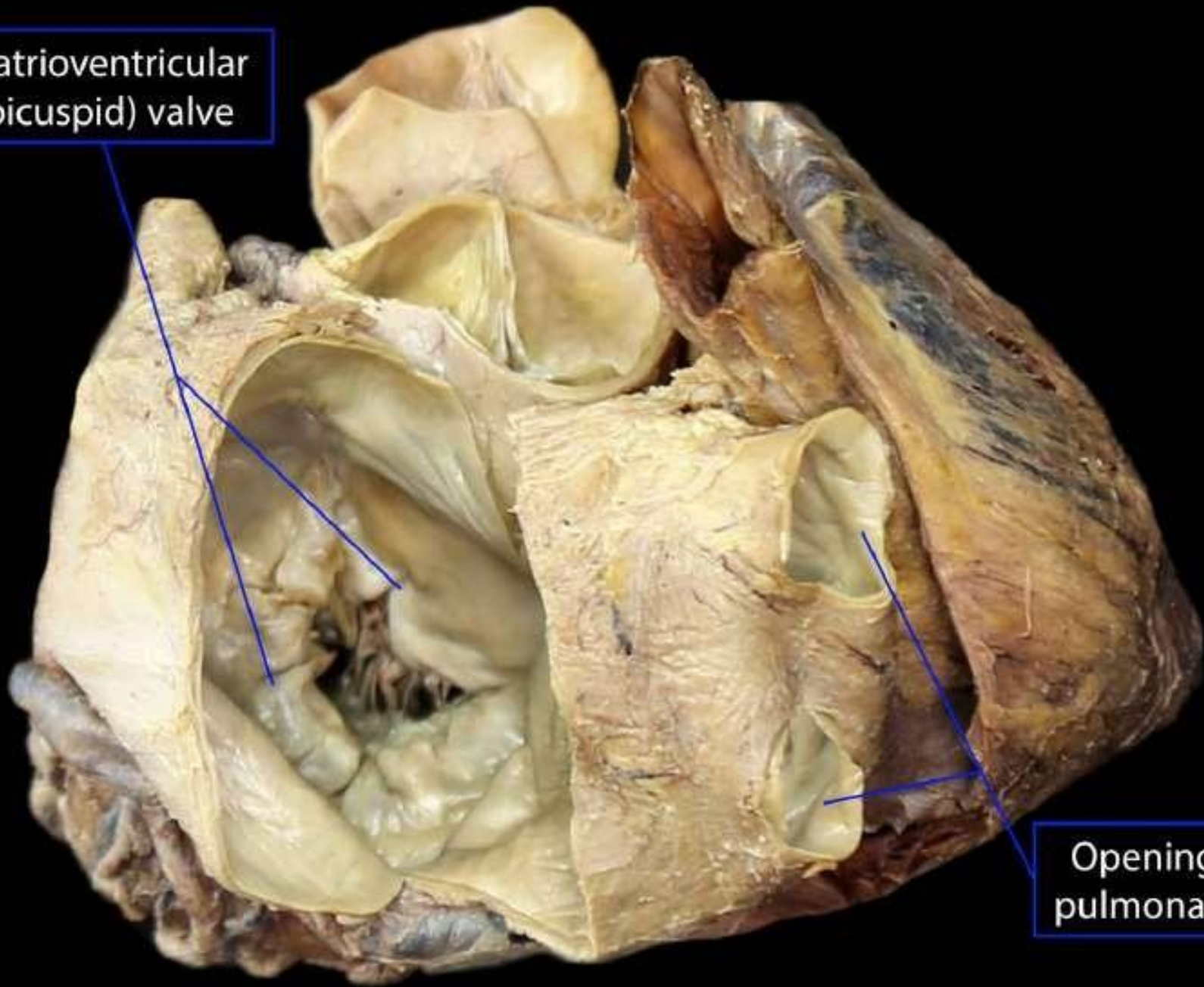
L. atrioventricular  
(bicuspid) valve

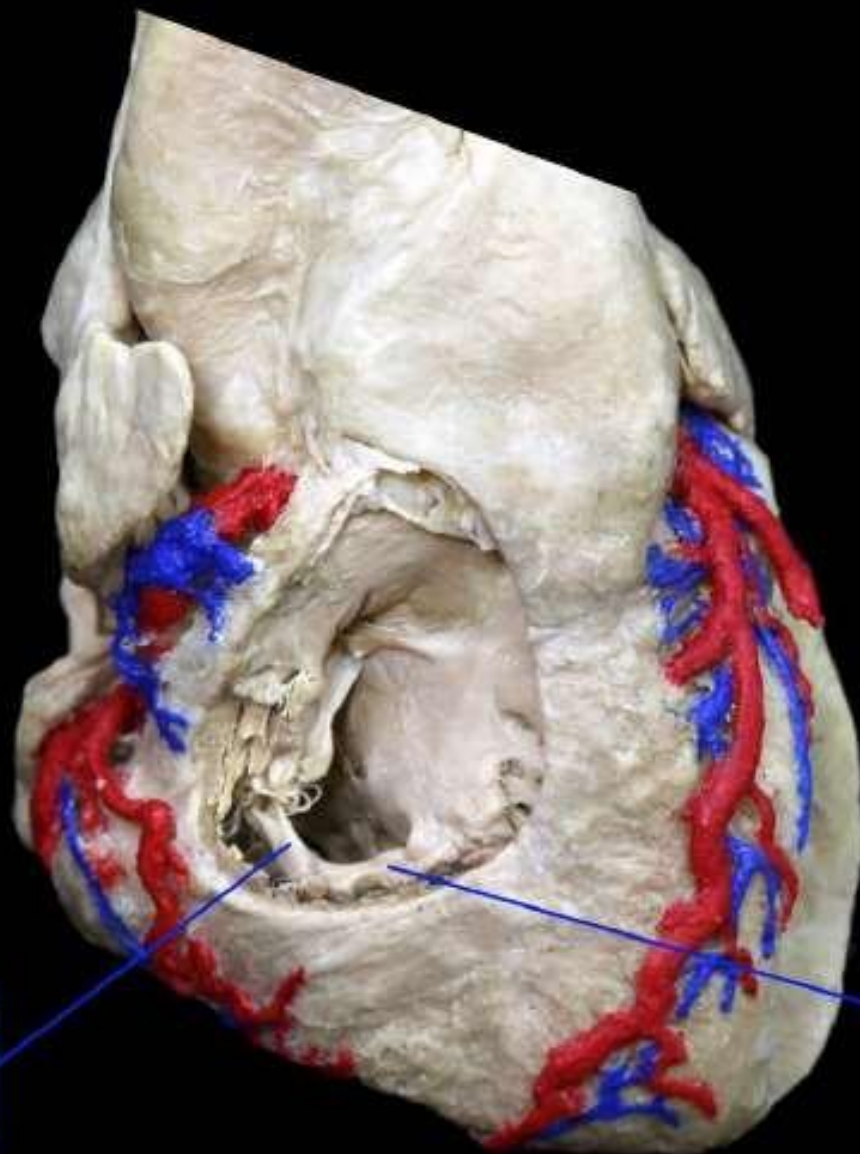
Openings of  
pulmonary vv.

Left atrium, internal posterior

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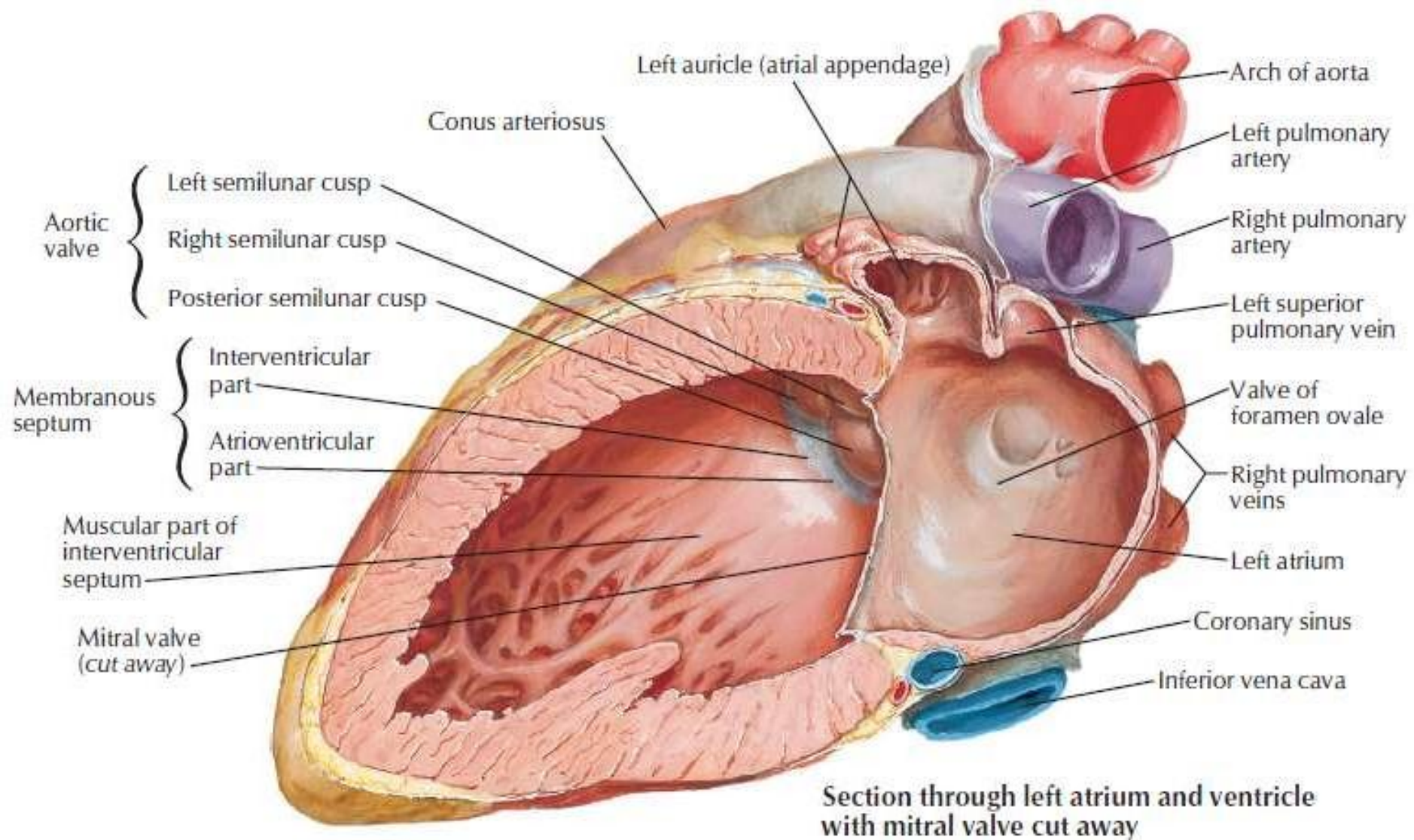
Anterior  
papillary m.

Septomarginal  
trabecula

Right ventricle, internal anterior

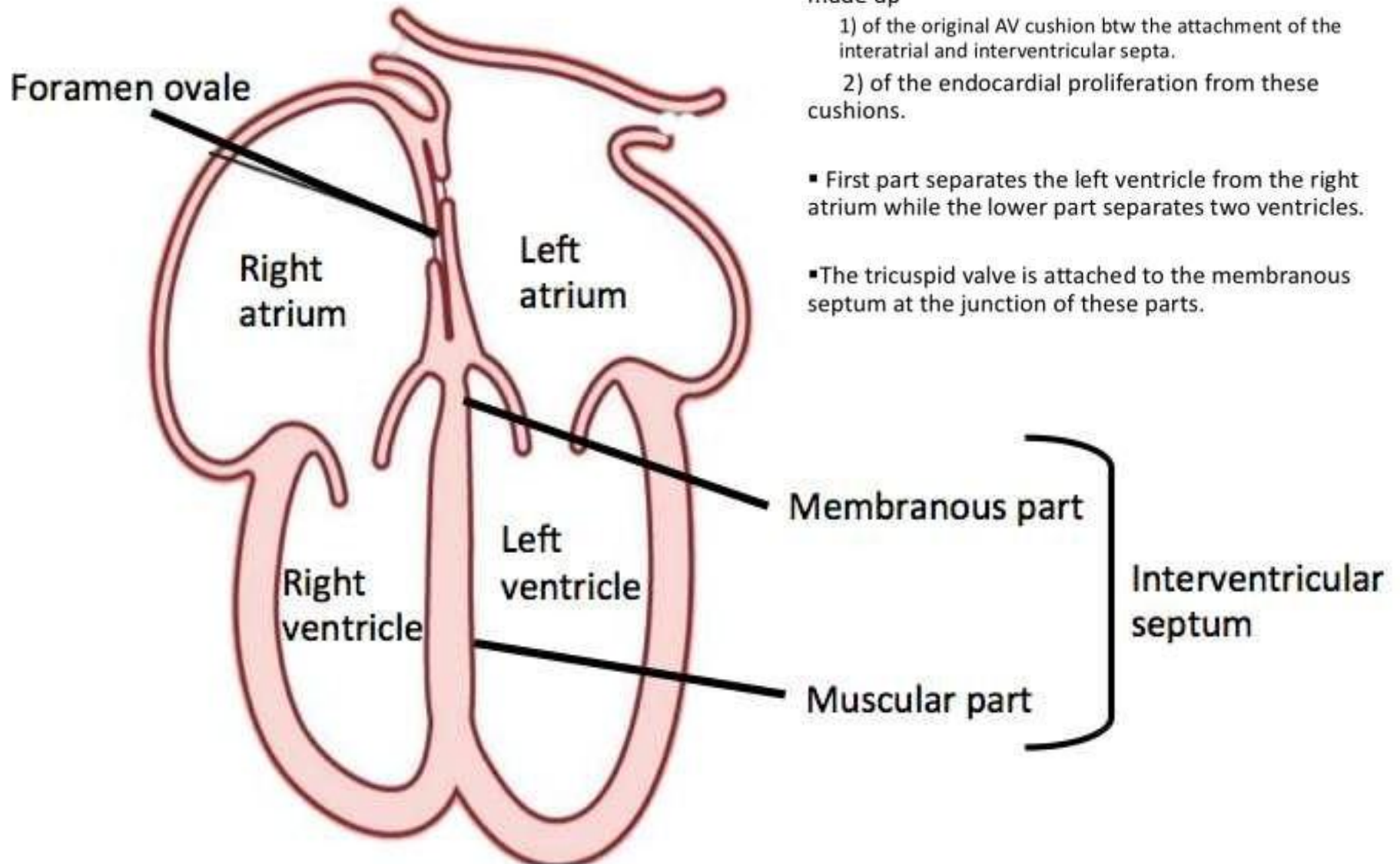
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## Interventricular septum



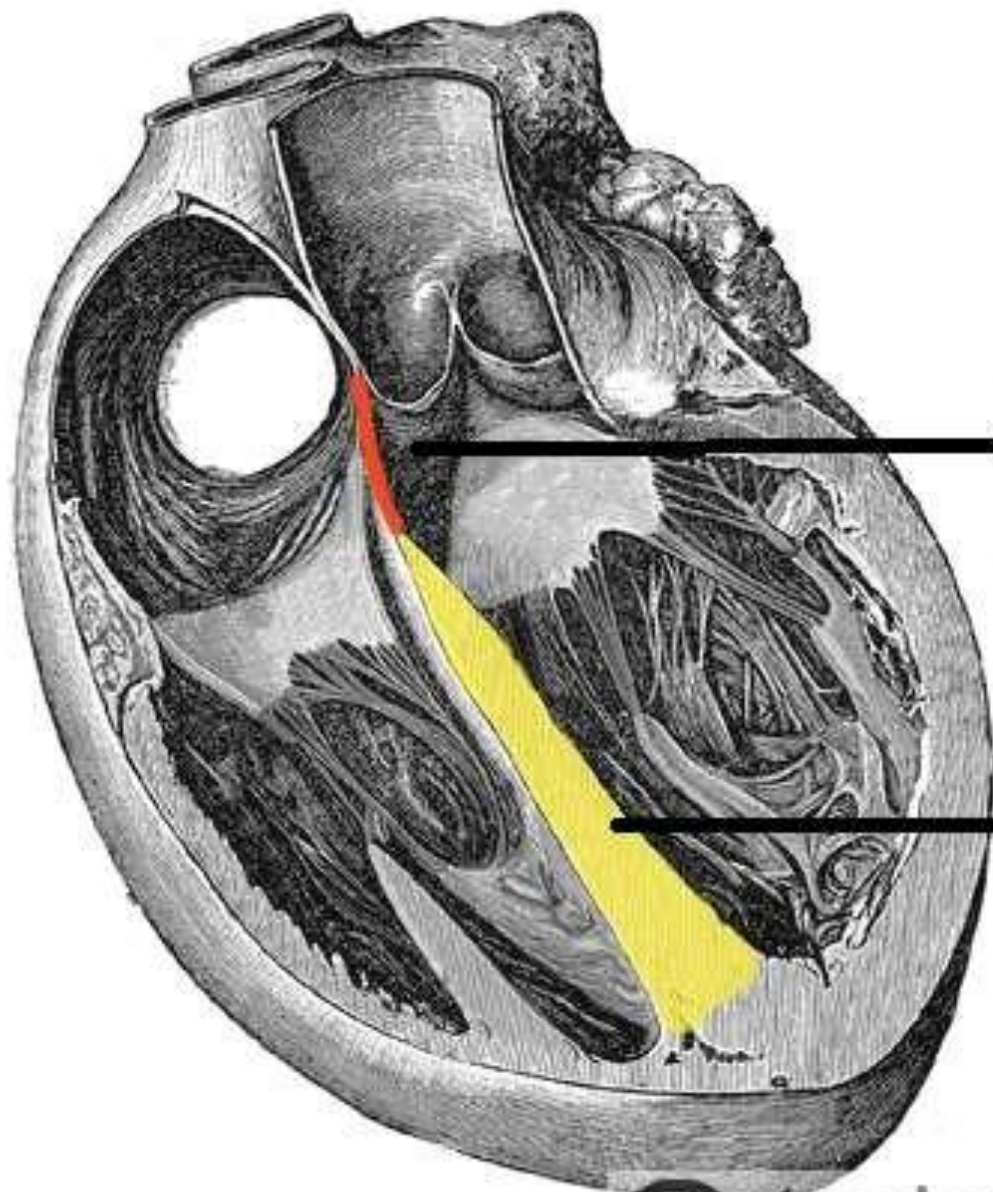
- The membranous part of the interventricular septum is made up

- 1) of the original AV cushion btw the attachment of the interatrial and interventricular septa.

- 2) of the endocardial proliferation from these cushions.

- First part separates the left ventricle from the right atrium while the lower part separates two ventricles.

- The tricuspid valve is attached to the membranous septum at the junction of these parts.



Membranous part of  
the interventricular  
septum

Muscular part of  
the interventricular  
septum



teachmeanatomy

The #1 Applied Human Anatomy Site on the Web.



## Moderator Band (Septomarginal trabeculum)

- It is thick muscular ridge extending from ventricular septum to the base of the anterior papillary muscle, across the ventricular cavity.
- It conveys the right branch of the atrioventricular bundle (bundle of His), a part of conducting system of the heart.
- It prevents the over distension of right ventricle





## Lt ventricle

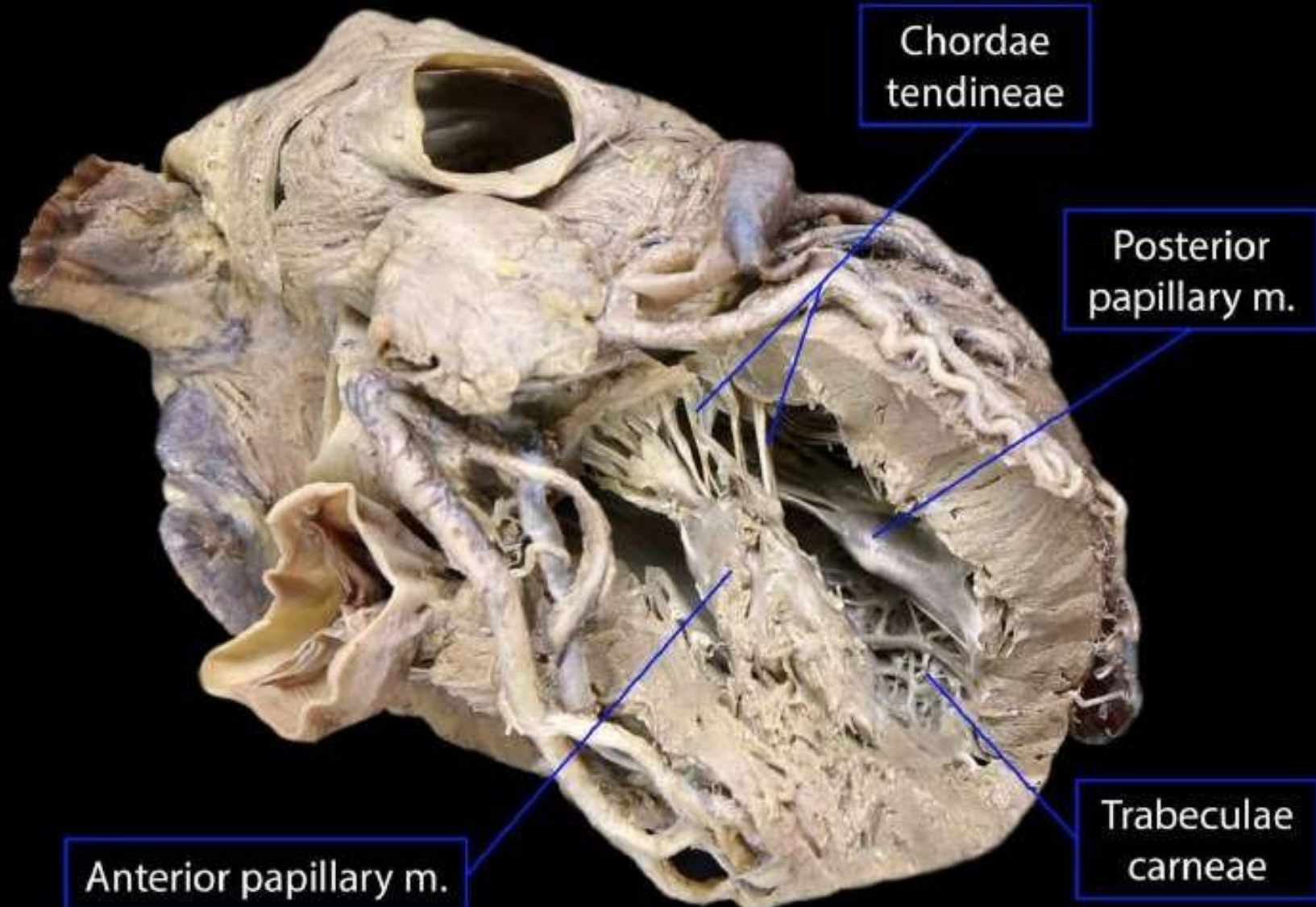
- The left ventricle receives oxygenated blood from the left atrium, and pumps it through the aortic orifice (guarded by the aortic valve) into the **aorta**.

In the anatomical position, the left ventricle forms the apex of the heart, as well as the left and diaphragmatic borders. The left ventricle creates the

- (a) Apex of the heart,
- (b) Small part of the sternocostal surface,
- (c) Majority of the (left 2/3rd) diaphragmatic surface,
- (d) The majority of the left border of the heart.

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Anterior papillary m.

Chordae tendineae

Posterior papillary m.

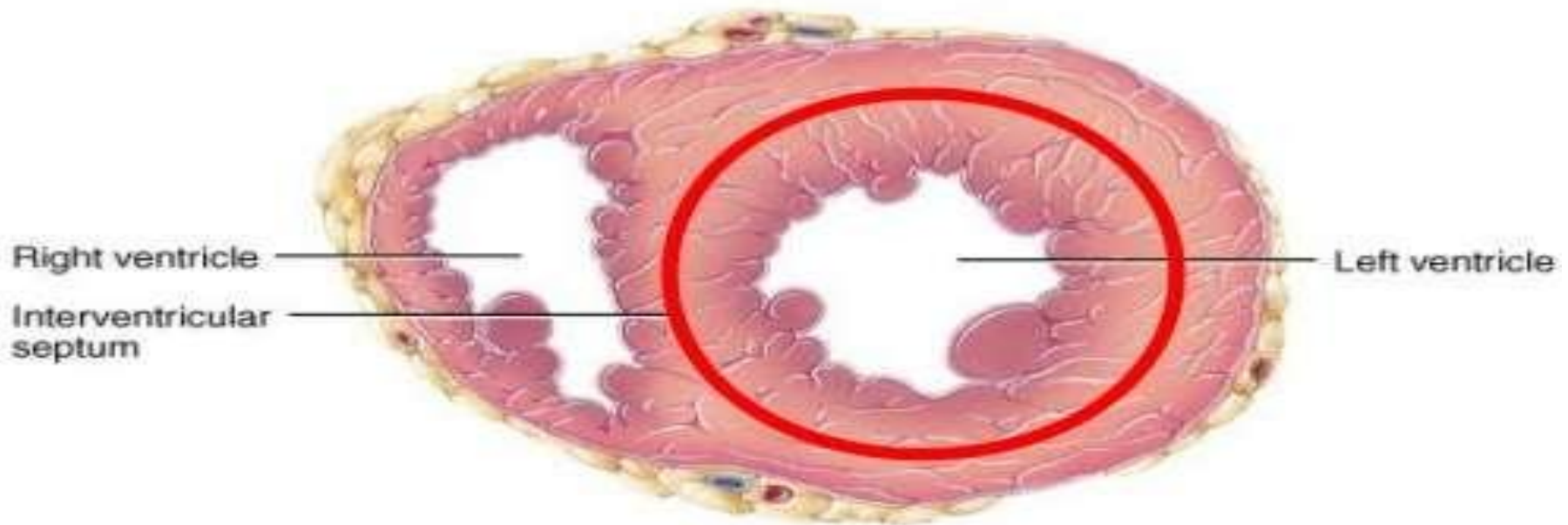
Trabeculae carneae

Left ventricle, internal left superolateral



# Thickness of Cardiac Walls

POSTERIOR



ANTERIOR



## Opening of Lt ventricle

- The openings in the left ventricle are as follows:
- A. Left atrioventricular orifice.
- B. Aortic orifice





# Dextrocardia

- Sometimes the heart is malpositioned with apex on the right side.
- This condition is named dextrocardia.
- It might be related to complete reversal of thoracic and abdominal viscera, a condition named situs inversus

