



كلية المستقبل الجامعة  
قسم تقنيات التخدير

# Anatomy

المرحلة الاولى

2022-2023

## The Thoracic Cavity

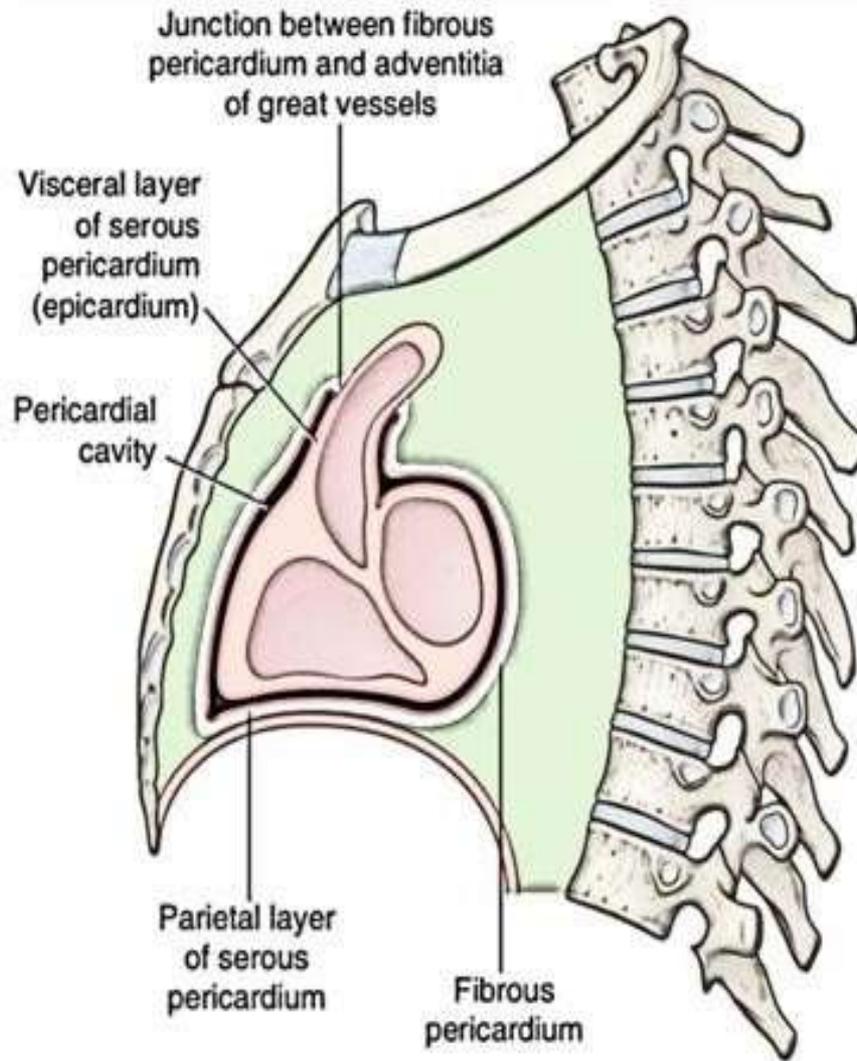
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# The Thoracic Cavity L3

## Pericardium (figures 2.13 and 2.14)

The pericardium is a fibrous sac that encloses **the heart** and the roots of **the great vessels**. The pericardium lies within the middle mediastinum, **posterior to the body of the sternum** and **the 2nd to the 6<sup>th</sup> costal cartilages**. Nerve supply is by the phrenic nerve.



Pericardium  
figure 2.13b

# Pericardium

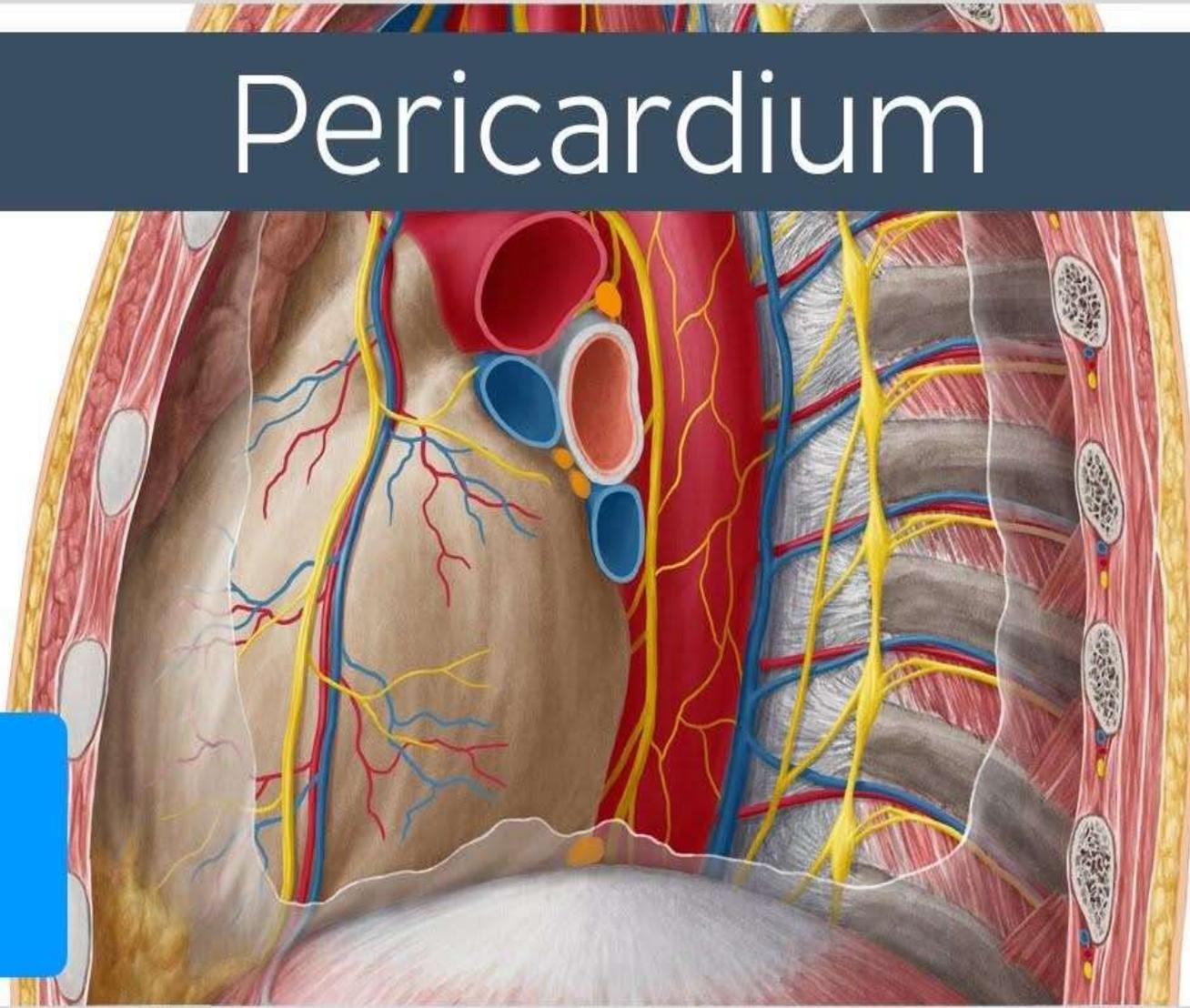


Figure  
2.14

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## Heart (2.15)

The heart is a hollow muscular organ that is **pyramid shaped** and lies within the pericardium in the mediastinum. It is connected **at its base** to the **great blood vessels** and lies free within the Pericardium. The heart has three surfaces: sterno costal (**anterior**), diaphragmatic (**inferior**), and a base (**posterior**). It also has an **apex**, which is directed downward, forward, and to the left.

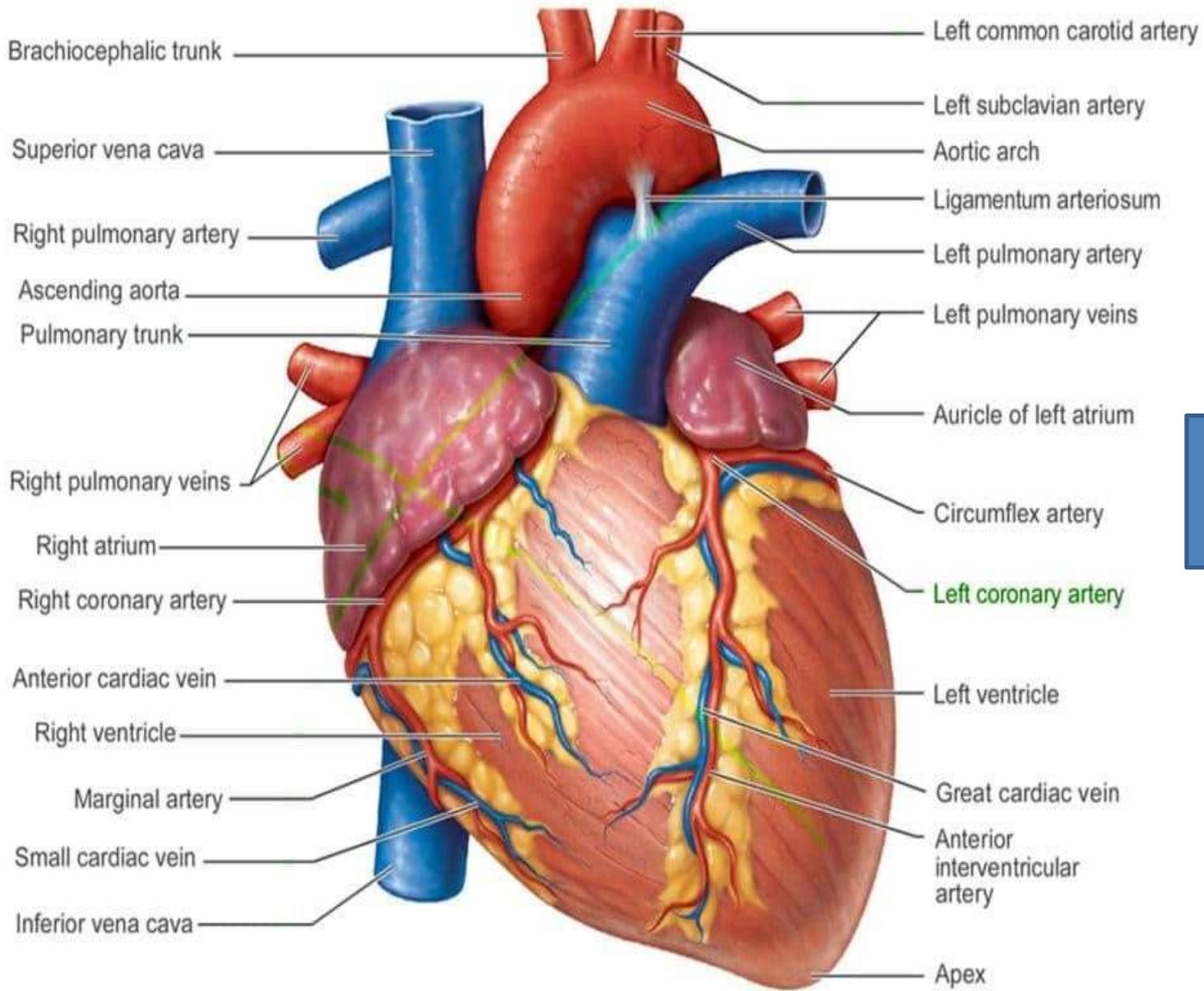


Figure 2.15

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## Chambers of the Heart figure (2.16)

The heart is divided by **vertical septa** into **four** chambers: the **right and left atria** and the **right and left ventricles**. The walls of the heart are composed of **cardiac muscle called the myocardium and** covered with **pericardium** and the **epicardium**; and lined internally with a layer of **endothelium called the endocardium**.

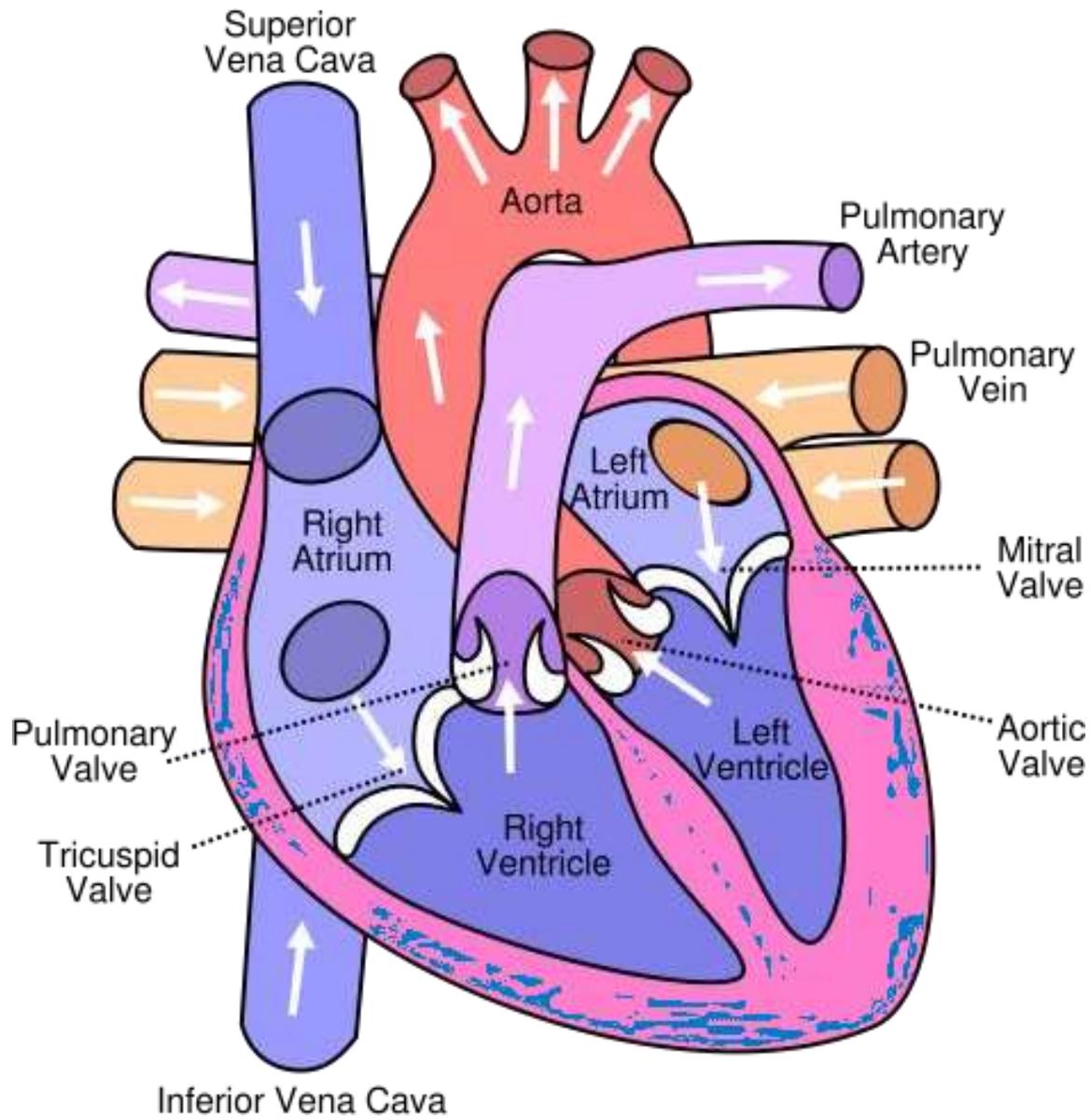


Figure 2.16

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## Right Atrium(2.16 and 2.17)

The **right atrium** consists of a main cavity and a small outpouching called the **auricle**.

The right atrium receives 1. the **superior vena cava** which open into the upper part of the right atrium, it returns the blood to the heart from **the upper half of the body**.

2. The **inferior vena cava** opens into the lower part of the right atrium. It returns the blood to the heart from the lower half of the body.

3. The **coronary sinus** drains most of the blood from the heart wall .

The **right atrioventricular orifice** lies anterior to the inferior vena caval opening and is guarded by the **tricuspid valve**.

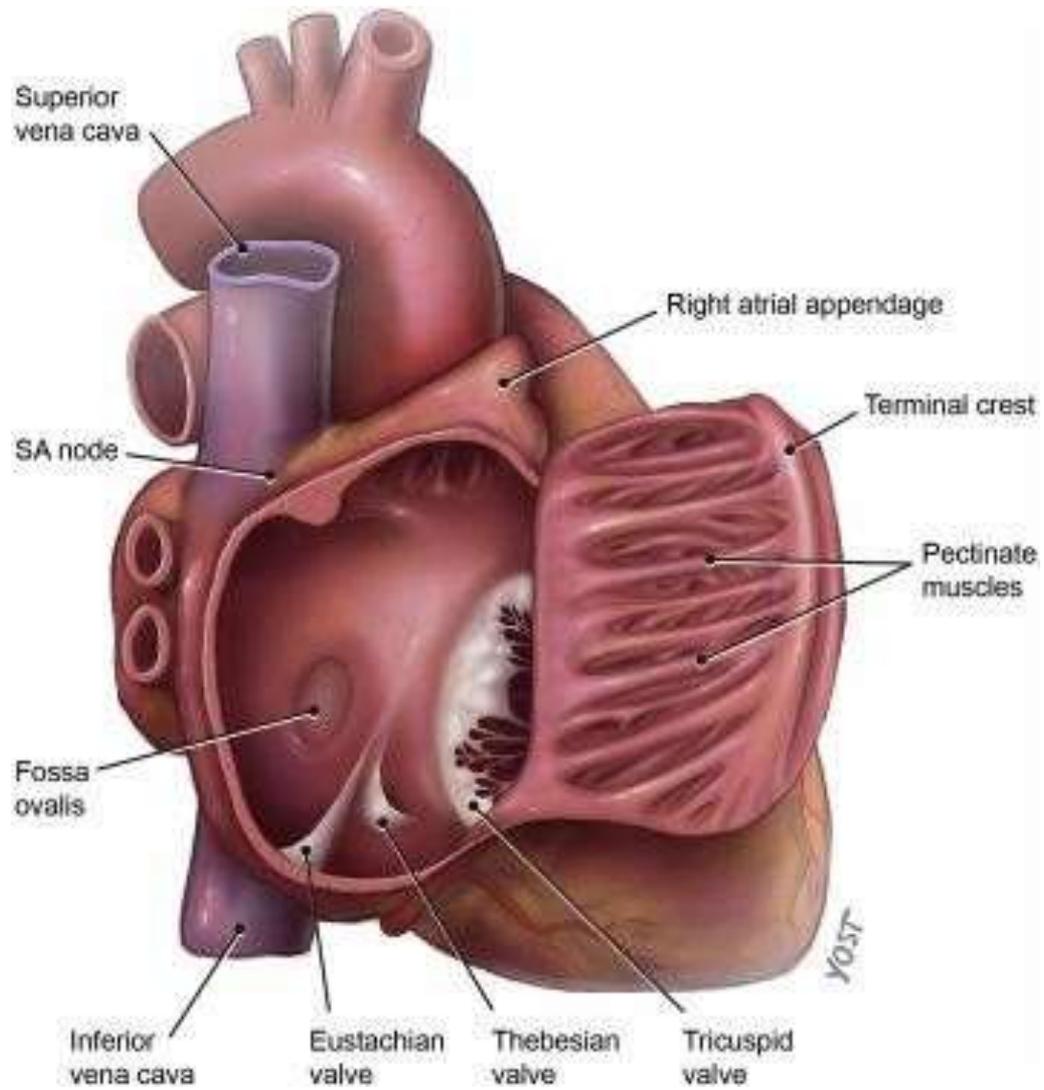


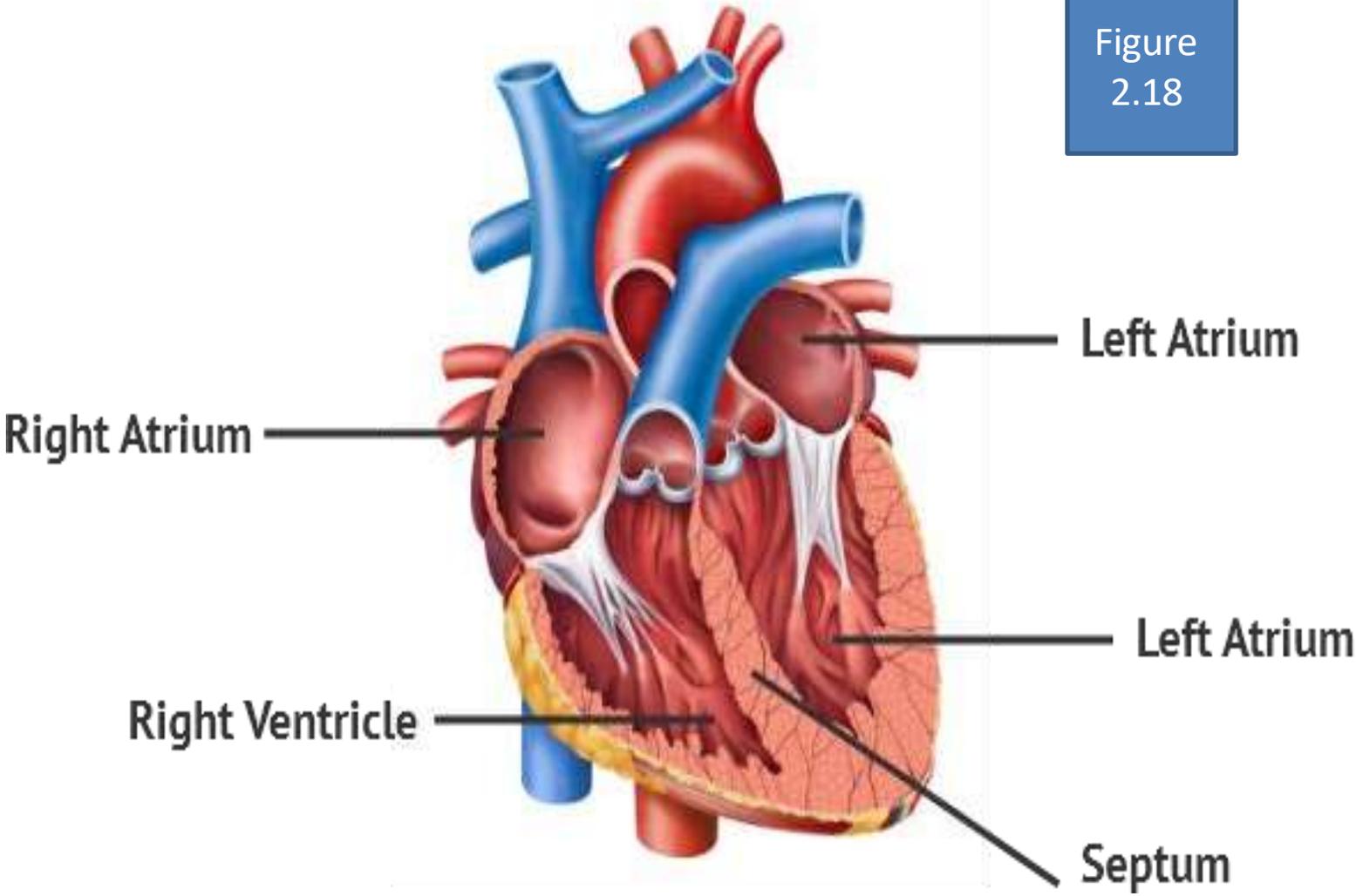
Figure 2.17  
The right  
atrium

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## Right Ventricle( figure 2.18)

The right ventricle communicates with the right atrium through the **atrioventricular orifice** and with the pulmonary trunk through the **pulmonary orifice** (see Fig.2.18 ) Near the pulmonary orifice, the cavity of the right ventricle becomes funnel shaped and referred to as the **infundibulum**.

Figure  
2.18



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The **tricuspid valve** guards the atrioventricular orifice (Figs.2.19 ) and consists of three cusps : **anterior, septal**, and **inferior** (posterior) cusps. The bases of the cusps are attached to the fibrous ring of the skeleton of the heart, whereas their free edges are attached to the **chordae tendineae**. The chordae tendineae connect the cusps to the **papillary muscles**, the papillary muscles are inward projections from the ventricular wall.

# Top View of Tricuspid Valve

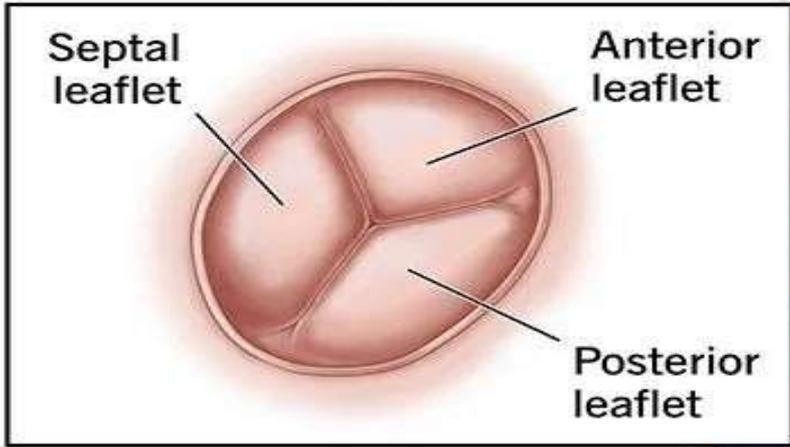
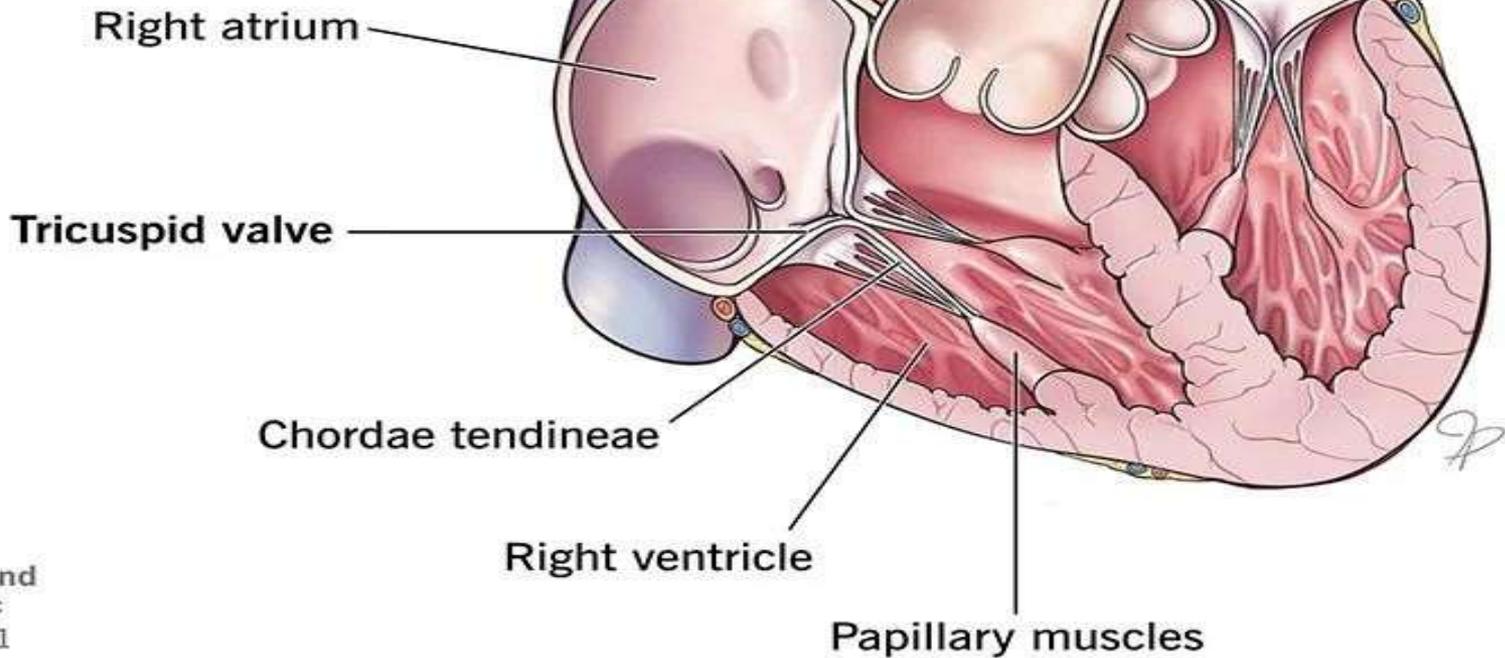


Figure 2.19

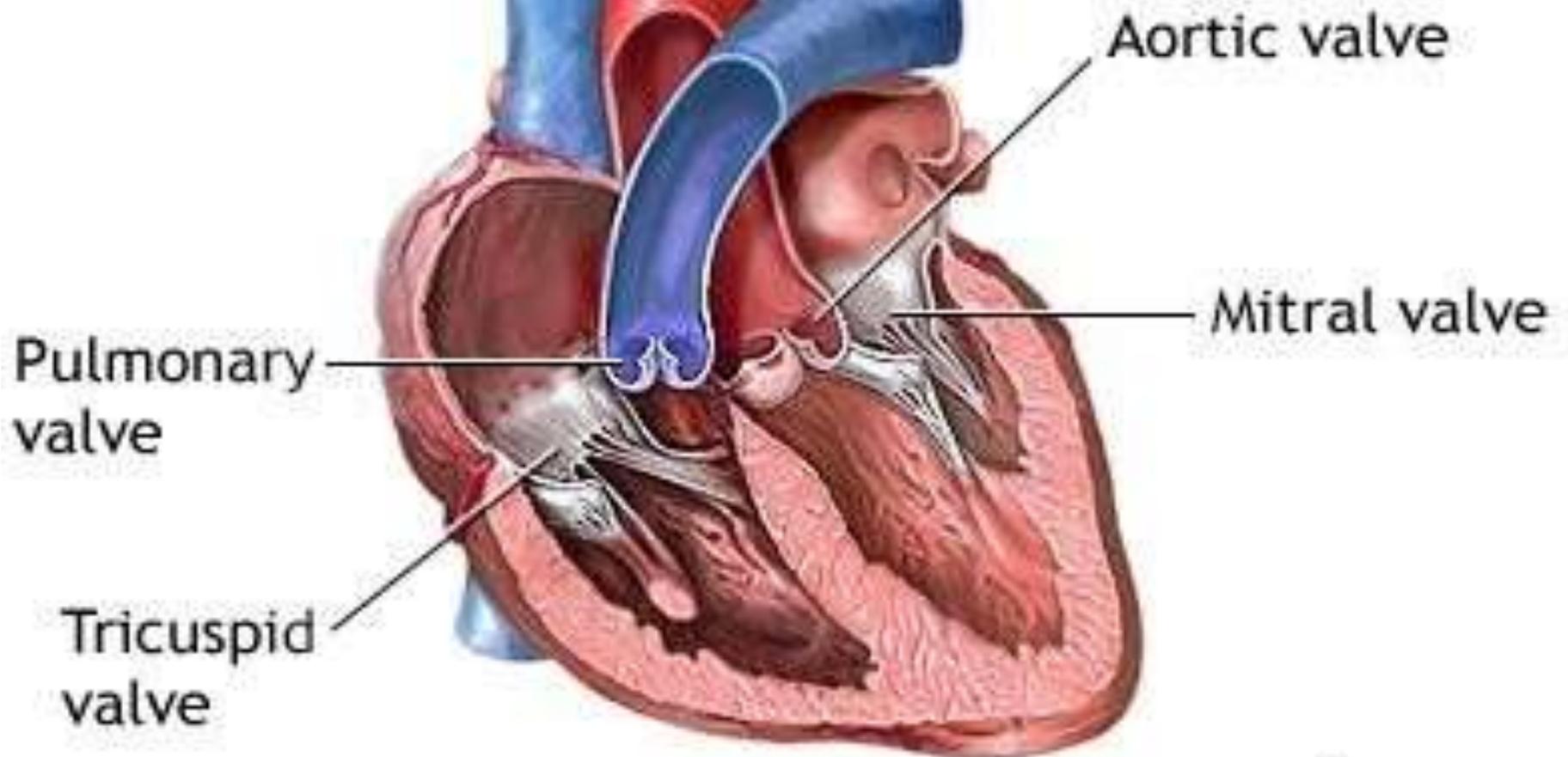


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The **pulmonary valve** guards the pulmonary orifice

(Fig.2.20 ) and consists of three semilunar cusps the curved lower margins and sides of each cusp are attached to the p. arterial wall. The open mouths of the cusps are directed upward into the pulmonary trunk. The attachments of the sides of the cusps to the arterial wall prevent the cusps from prolapsing into the ventricle.

Figure  
2.20



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## Left Atrium

Similar to the right atrium, the left atrium consists of a main cavity and a left auricle. The four pulmonary veins open through the posterior wall (Fig.2.21 ) and have no valves. The left atrioventricular orifice is guarded by the **mitral valve.**

A diagrammatic view of the posterior surface of the heart

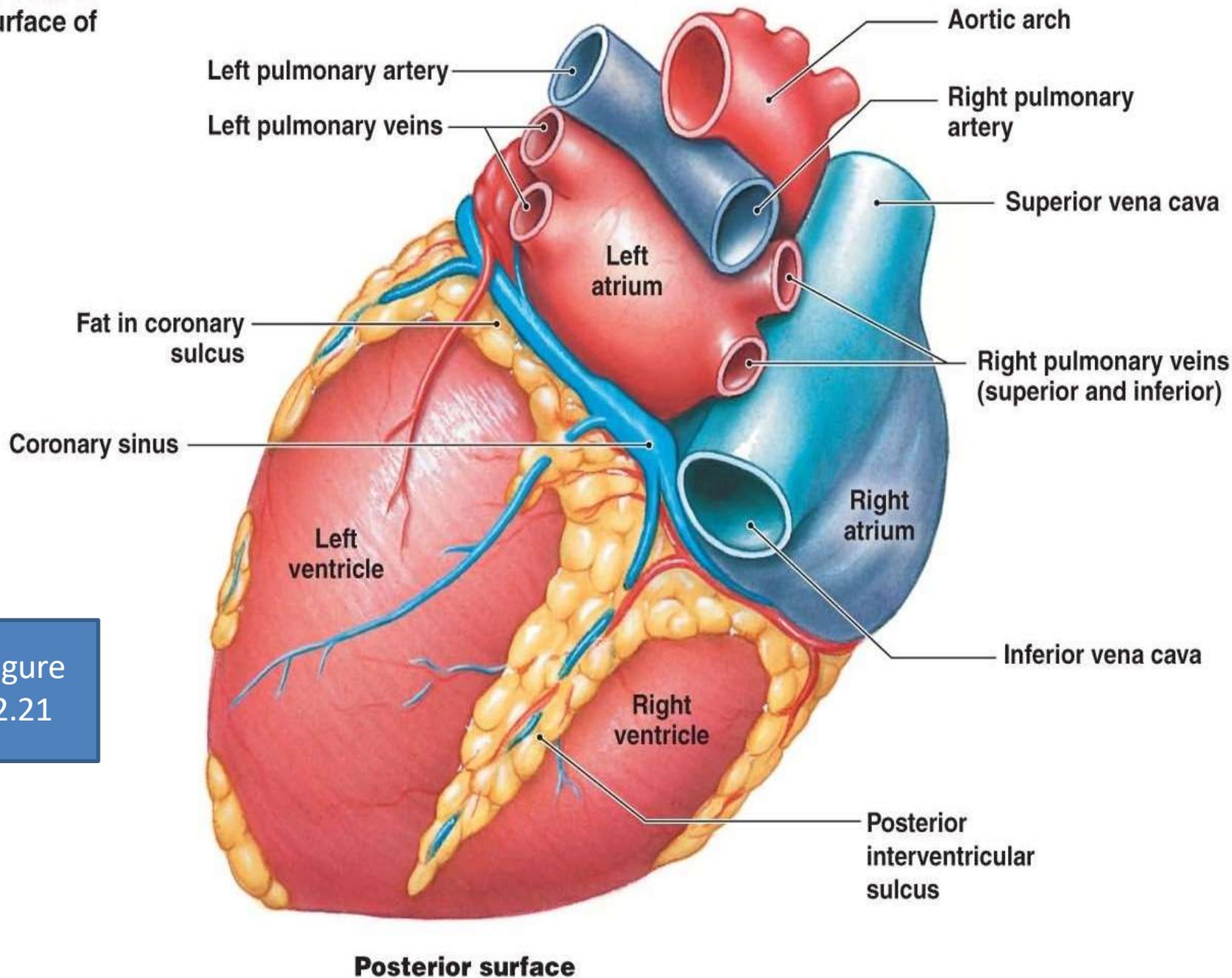


Figure 2.21

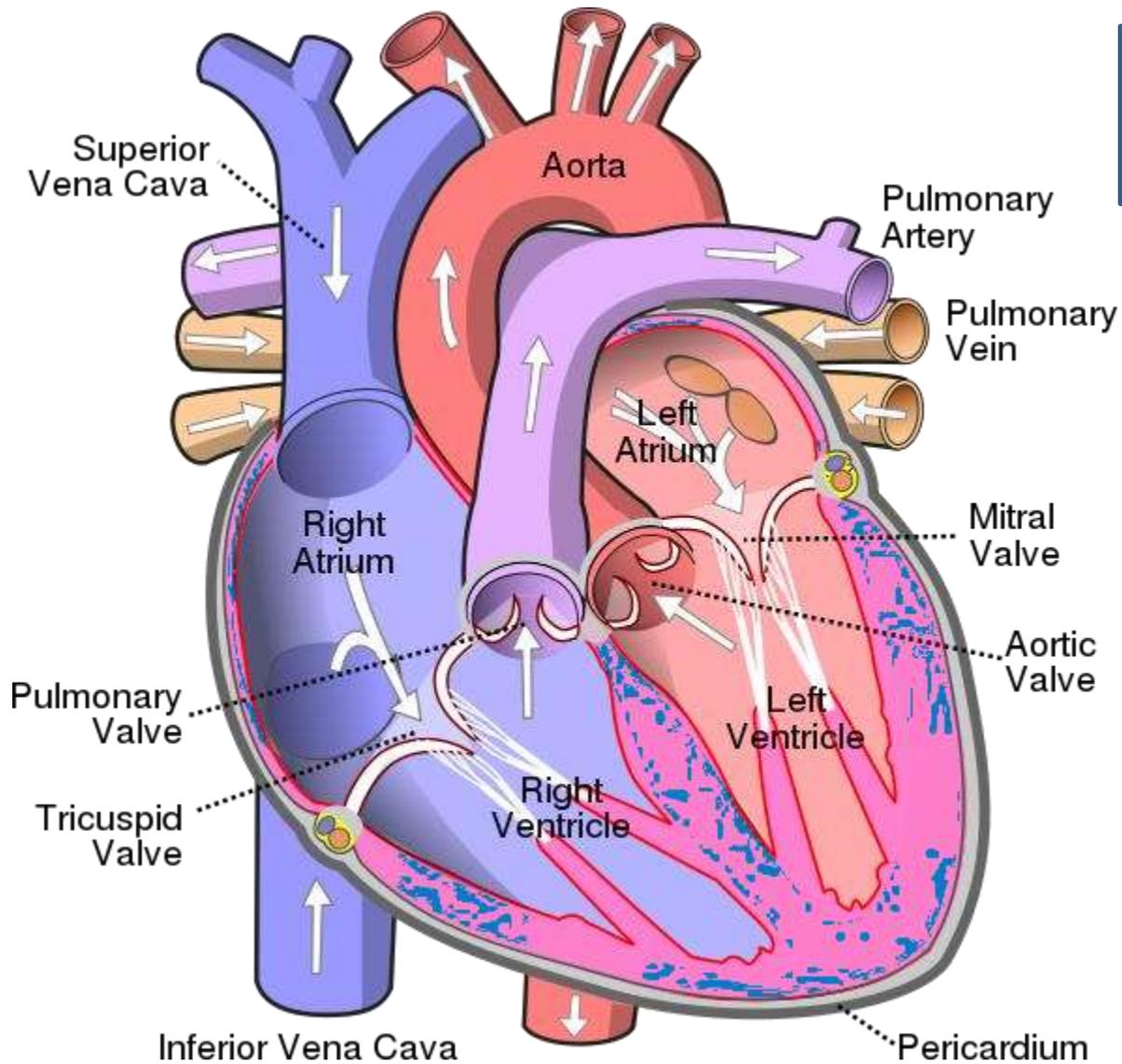
Posterior surface

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## Left Ventricle

The left ventricle communicates with the left atrium through the **atrioventricular orifice** and with the aorta through the **aortic orifice**. The walls of the left ventricle (Fig. 2.22) are three times thicker than those of the right ventricle

Figure 2.22



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There are **two large papillary muscles in the left ventricle**. The part of the ventricle below the aortic orifice is called the **aortic vestibule**.

## **The mitral valve**

**It** guards the atrioventricular orifice (Fig.2.22 ) It consists of two cusps, one anterior and one posterior.

The attachment of the chordae tendineae to the cusps and the papillary muscles is similar to that of the tricuspid valve.

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The **aortic valve** guards the aortic orifice and is precisely similar in structure to the pulmonary valve (Fig. 2.22 and 2.23).

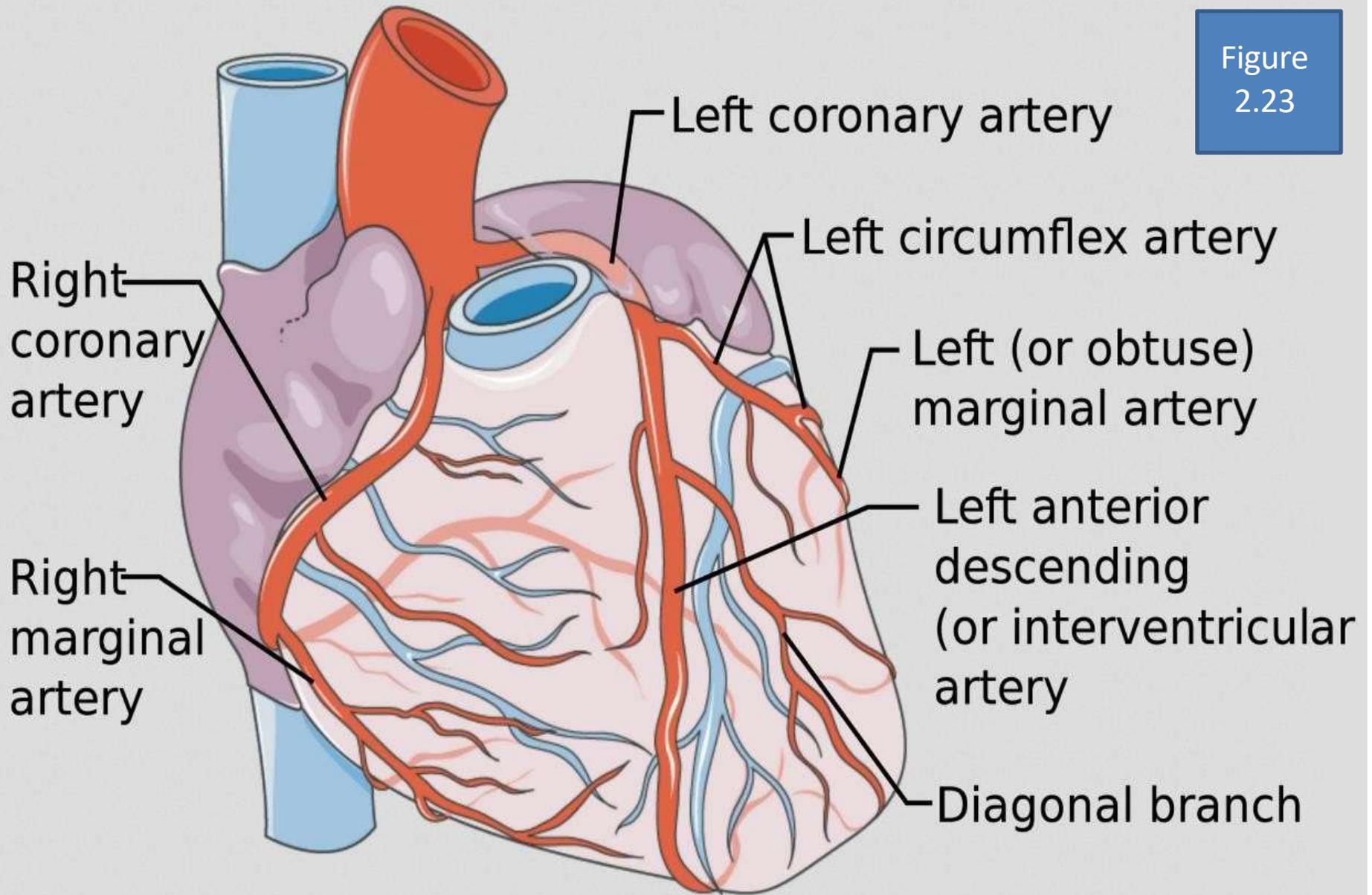
One cusp is situated on the anterior wall (right cusp) and two are located on the posterior wall (left and posterior cusps). Behind each cusp, the aortic wall bulges to form an **aortic sinus**. The anterior aortic sinus gives origin to the **right coronary artery**, and the left posterior sinus gives origin to the **left coronary artery**.

# The Thoracic Cavity L3

## The Arterial Supply of the Heart

The arterial supply of the heart is provided by the **right and left coronary arteries**, which arise from the **ascending aorta** immediately above the **aortic valve** (Fig.2.23 ). The coronary arteries and their major branches are distributed **over the surface of the heart** within subepicardial connective tissue.

Figure  
2.23



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**The right coronary artery** supplies all of the right ventricle the variable part of the poster third of the intraventricular septum, the right atrium and part of the left atrium, and the sinoatrial node and the atrioventricular node and bundle. The LBB also receives small branches.

**The left coronary artery** supplies most of the left ventricle, the anterior two thirds of the ventricular septum, most of the left atrium, the RBB, and the LBB.

# The Thoracic Cavity L3

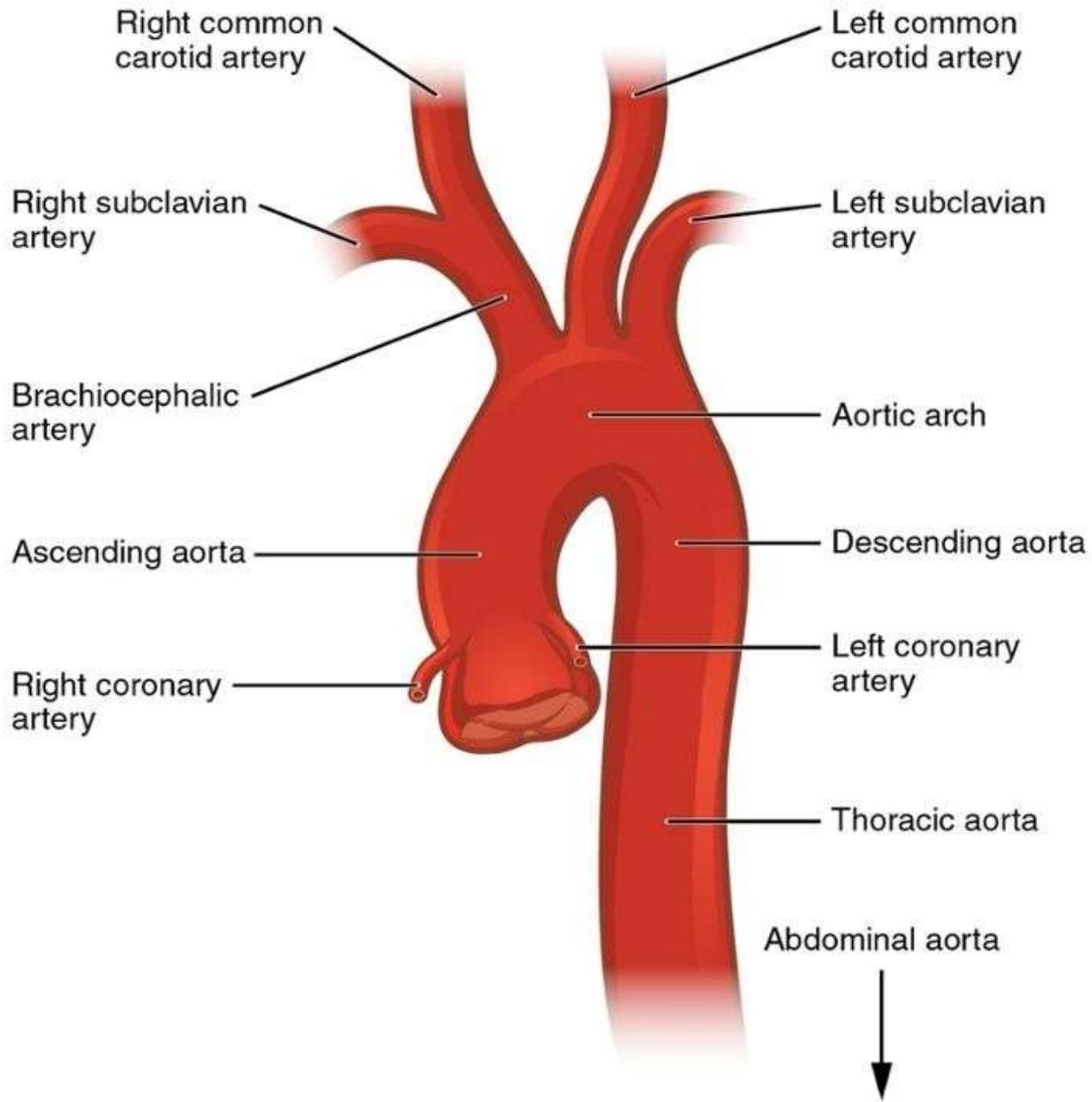
## Large Arteries of the Thorax

### Aorta

The aorta is the main arterial trunk in the thorax , it convey blood from the left ventricle of the heart to the tissues of the body. It is divided into the following parts: **ascending aorta, arch of the aorta, descending thoracic aorta, and abdominal aorta.**

#### 1. Ascending Aorta

The ascending aorta begins at the base of the left ventricle and runs upward behind the right half of the sternum at the level of the sternal angle, where it becomes continuous with the arch of the aorta (Fig. 2.24).



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## 2. Arch of the Aorta

The arch of the aorta is a continuation of the ascending aorta (Fig. 2.24). It lies behind the manubrium sterni, its main direction is backward. It then passes downward to the left of the trachea and, at the level of the sternal angle, becomes continuous with the descending aorta.

### Branches of the arch:

**a. The brachiocephalic artery** , **b. The left common carotid artery** arises from the convex surface of the aortic arch.

# The Thoracic Cavity L3

**c. The left subclavian artery** arises from the aortic arch behind the left common carotid artery (Figs. 2.24 It arches over the apex of the left lung.

## **3. Descending Thoracic Aorta**

The descending thoracic aorta lies in the posterior mediastinum and begins as a continuation of the arch of the aorta opposite the sternal angle.

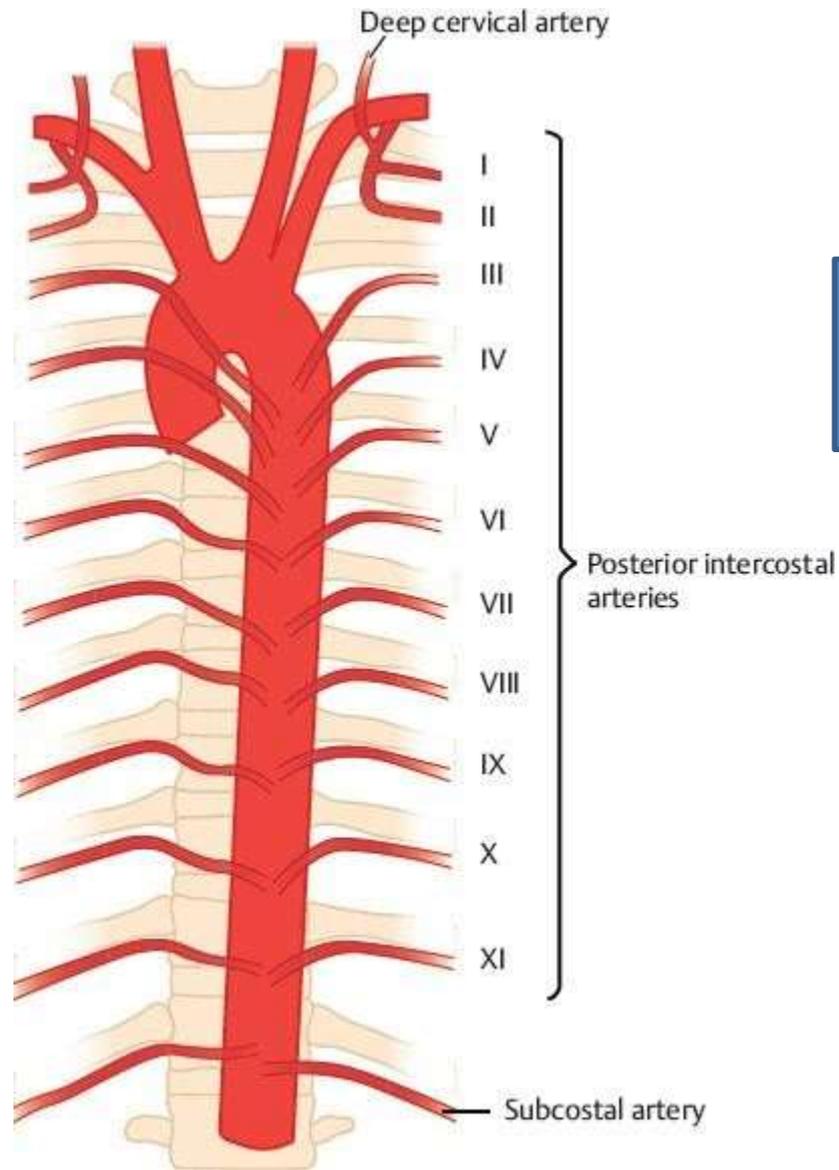


Figure  
2.25

# The Thoracic Cavity L3

Branches figure (2.25). **Posterior intercostal arteries** are given off to the lower nine intercostal spaces on each side (Fig.2.25). **Subcostal arteries** are given off on each side and run along the lower border of the 12th rib to enter the abdominal wall.

**Pericardial, esophageal, and bronchial arteries** are small branches that are distributed to these organs.

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## Pulmonary Trunk

The pulmonary trunk conveys deoxygenated blood from the right ventricle of the heart to the lungs. It leaves the **upper part of the right ventricle** and runs upward, backward, and to the left (Fig. 2.26). It is about 5 cm long and terminates in the concavity of the aortic arch by dividing into **right and left pulmonary** arteries .

Figure 2.26a  
Pulmonary trunk

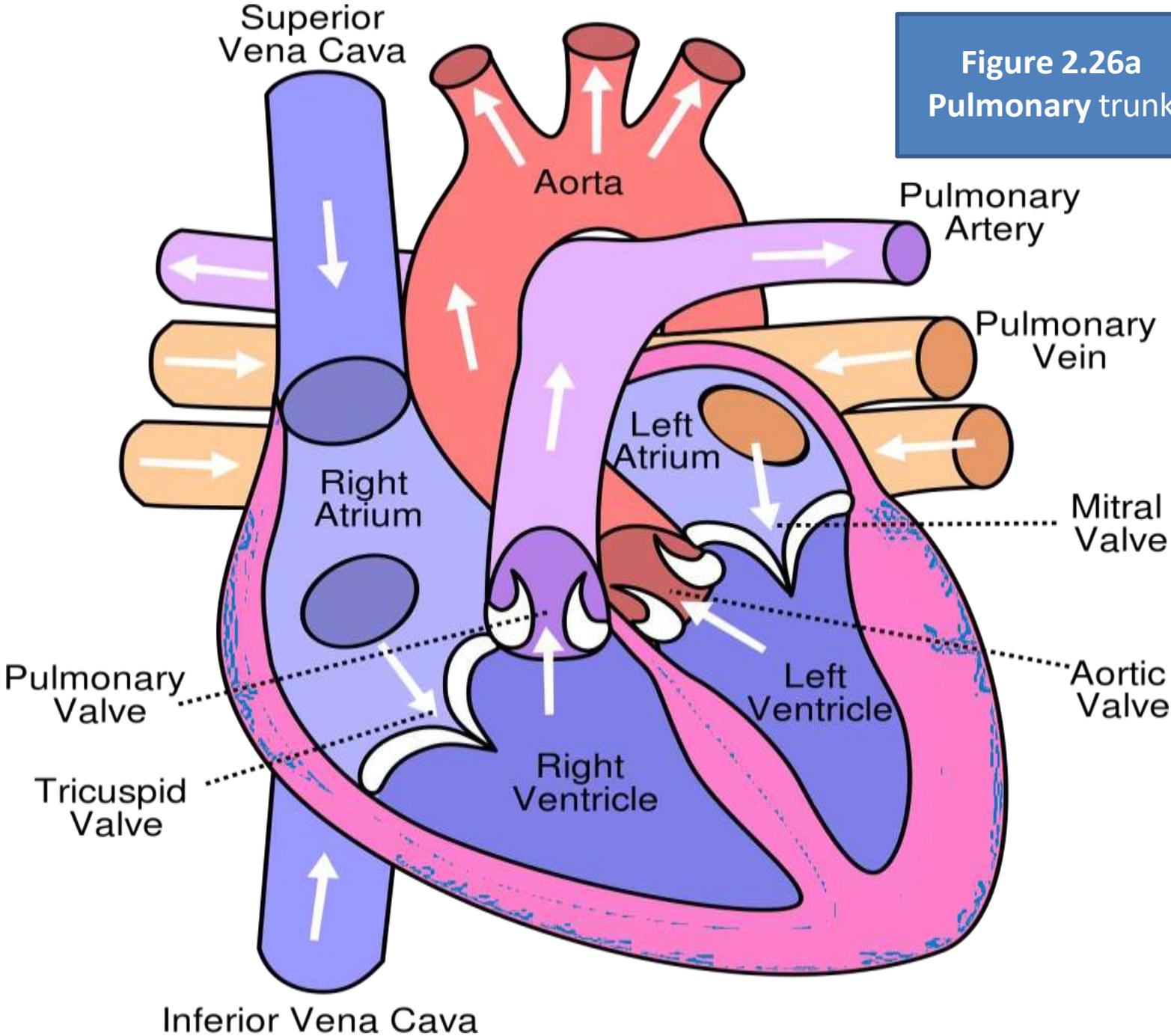
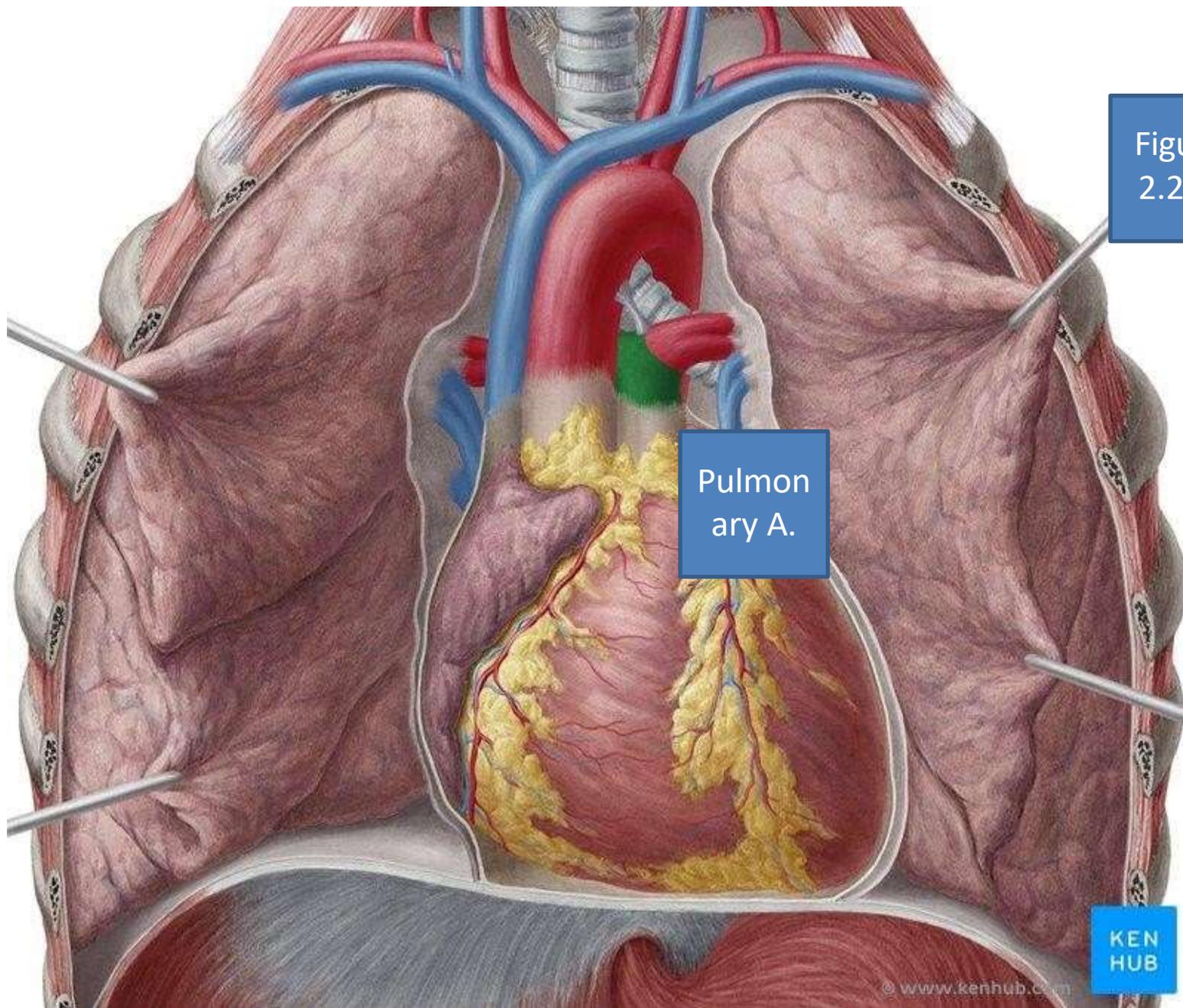


Figure  
2.26b

Pulmon  
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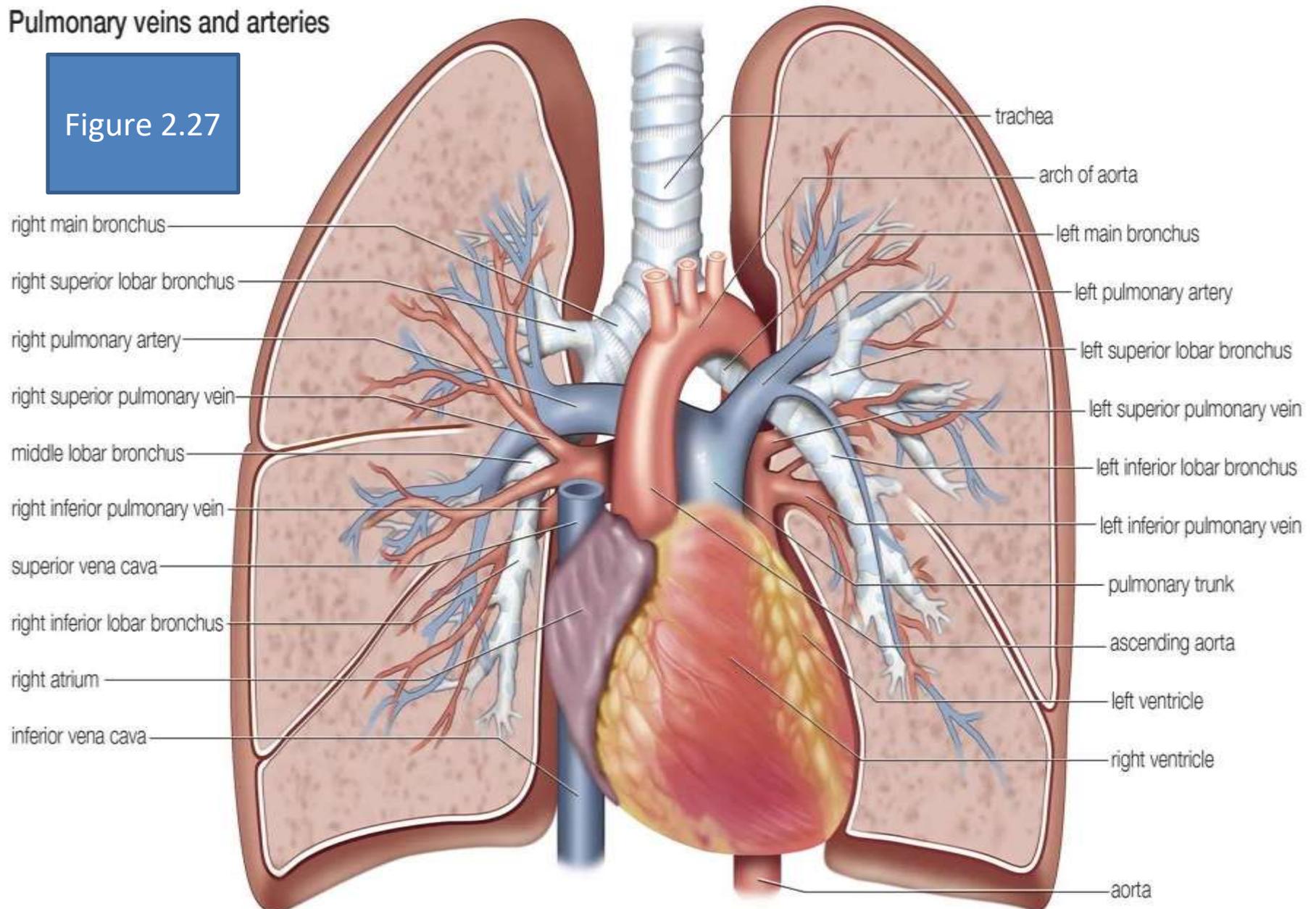
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The **right pulmonary artery** runs to the right behind the ascending aorta and superior vena cava to enter the root of the right lung (Figs.2.27).

The **left pulmonary artery** runs to the left in front of the descending aorta to enter the root of the left lung.

## Pulmonary veins and arteries

Figure 2.27



# The Thoracic Cavity L3

## Esophagus

The esophagus is a tubular structure about 25 cm long that is continuous above with the laryngeal part of the pharynx opposite the sixth cervical vertebra. It passes through the diaphragm at the level of the 10th thoracic vertebra to join the stomach (figure 2.28) . In the neck, the esophagus lies in front of the vertebral column.

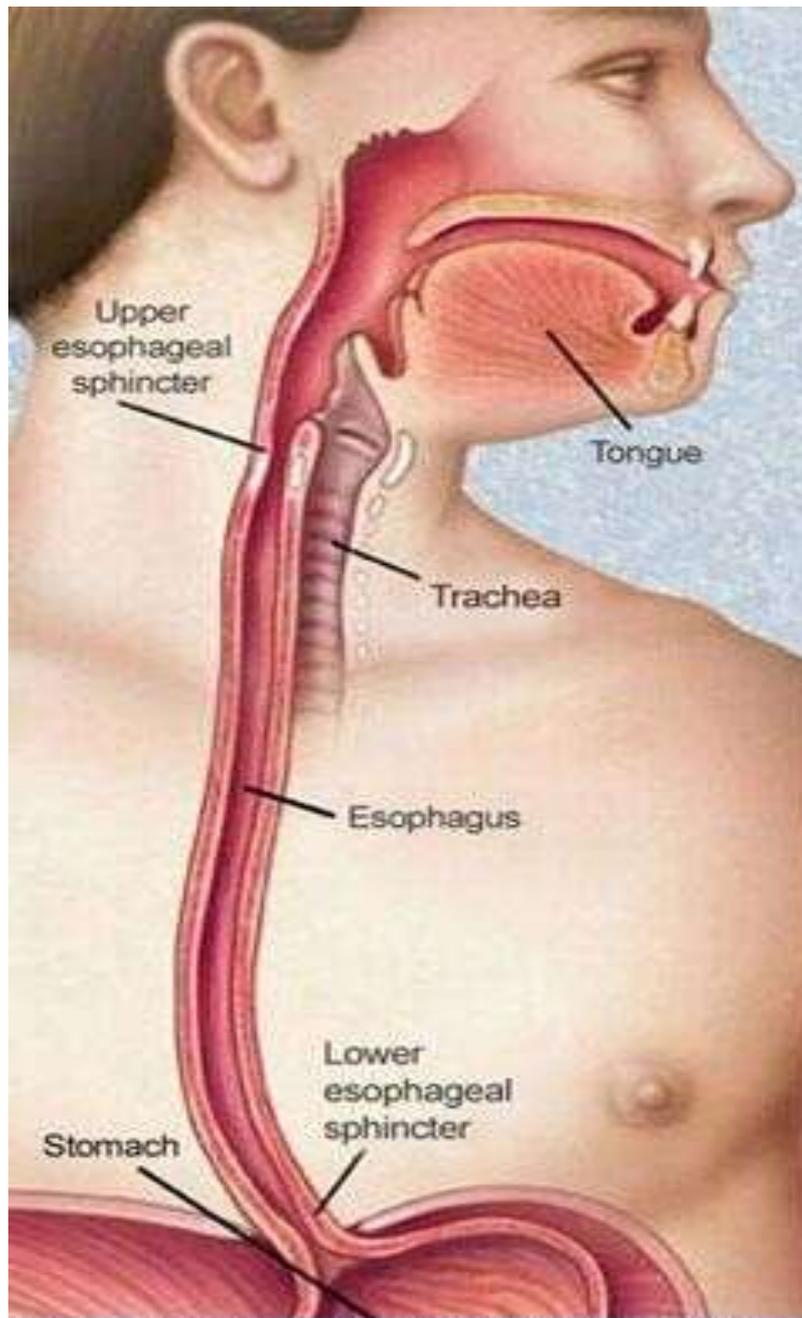


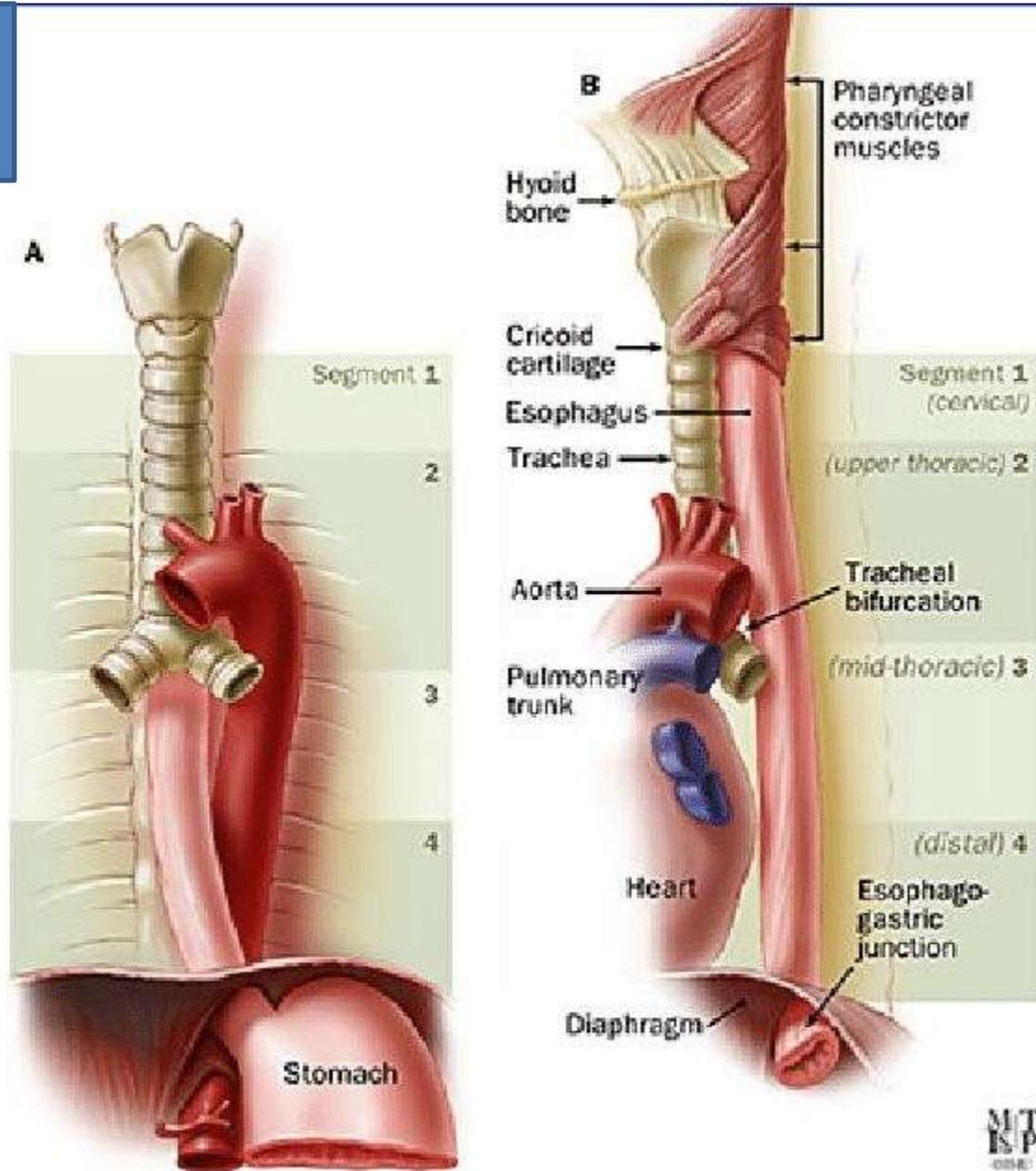
Figure 2.28  
oesophagus

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laterally, it is related to the lobes of the thyroid gland; and anteriorly, it is in contact with the trachea and the recurrent laryngeal nerves.

In the thorax, it passes downward and to the left through the **superior and then the posterior mediastinum**. At the level of the sternal angle, the aortic arch pushes the esophagus over to the midline figure 2.29)

Figure 2.29



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## Nerves of the thorax

The **right vagus nerve** descends in the thorax then it passes **behind** the root of the right lung and assists in the formation of the **pulmonary plexus**.

On leaving the plexus, the vagus passes onto the posterior surface of the esophagus and takes part in the formation of the **esophageal plexus**. It then passes through the esophageal opening of the diaphragm behind the esophagus to reach the posterior surface of the stomach.(figure 2.30)

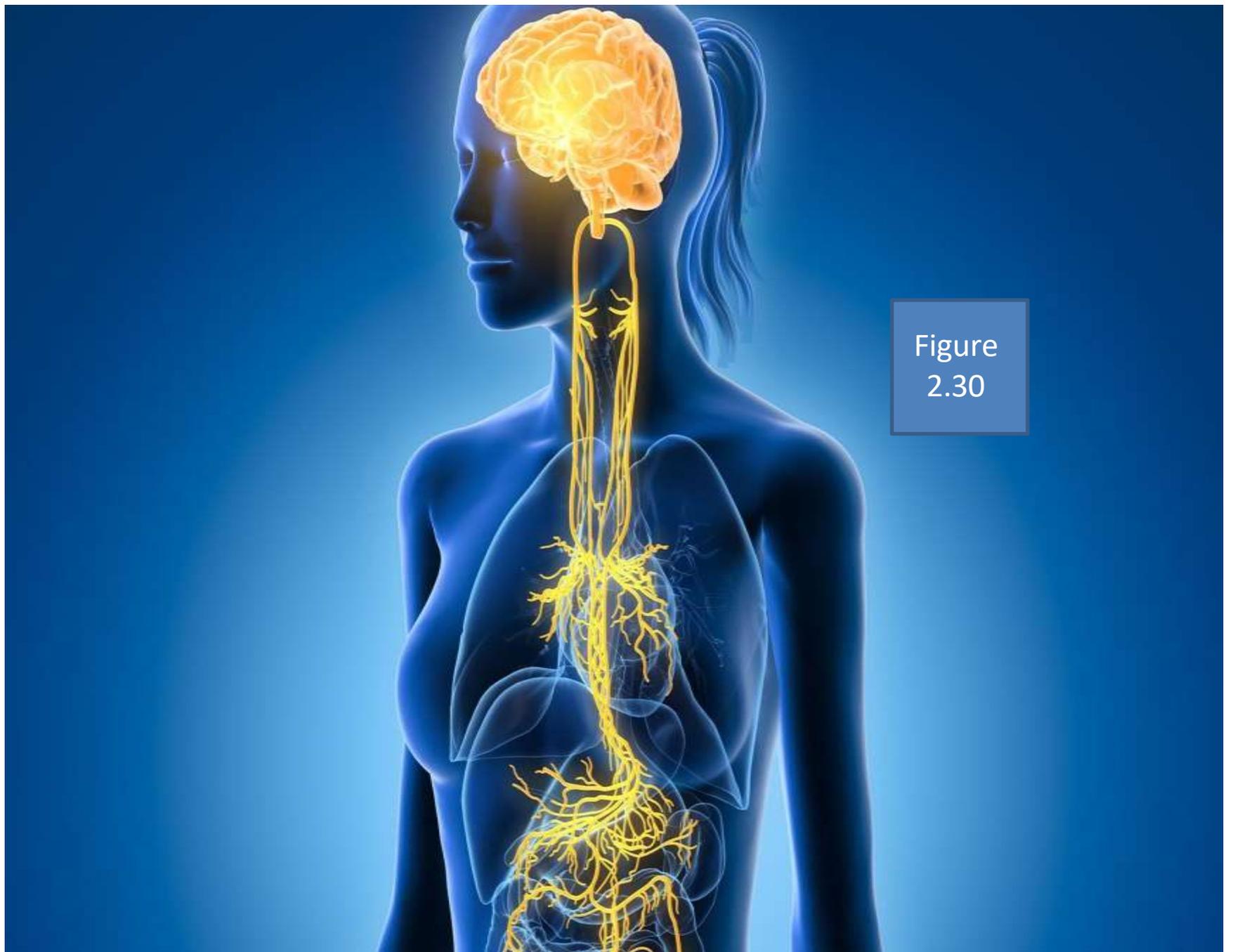


Figure  
2.30

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**The left vagus nerve** descends in the thorax between the left common carotid and the left subclavian arteries. It then crosses the left side of the aortic arch. The vagus then turns backward **behind** the root of the left lung. **Then** the vagus passes onto the anterior surface of the esophagus and takes part in the formation of the **esophageal plexus**. It then passes through the esophageal opening in the diaphragm in front of the esophagus to reach the anterior surface of the stomach (figure 2.31).

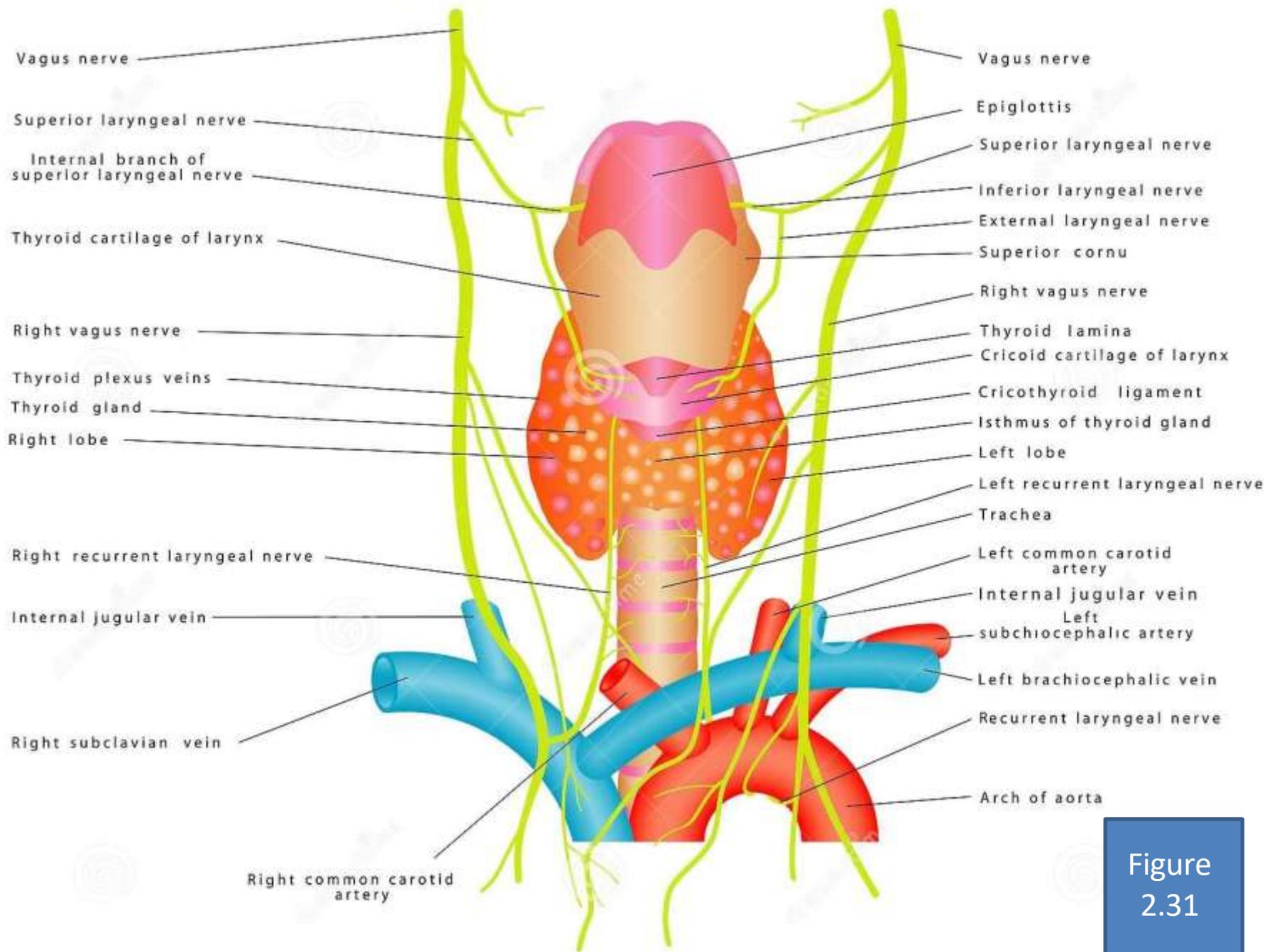


Figure  
2.31