

# Department of Anatomy and Histology



**School of Medicine**



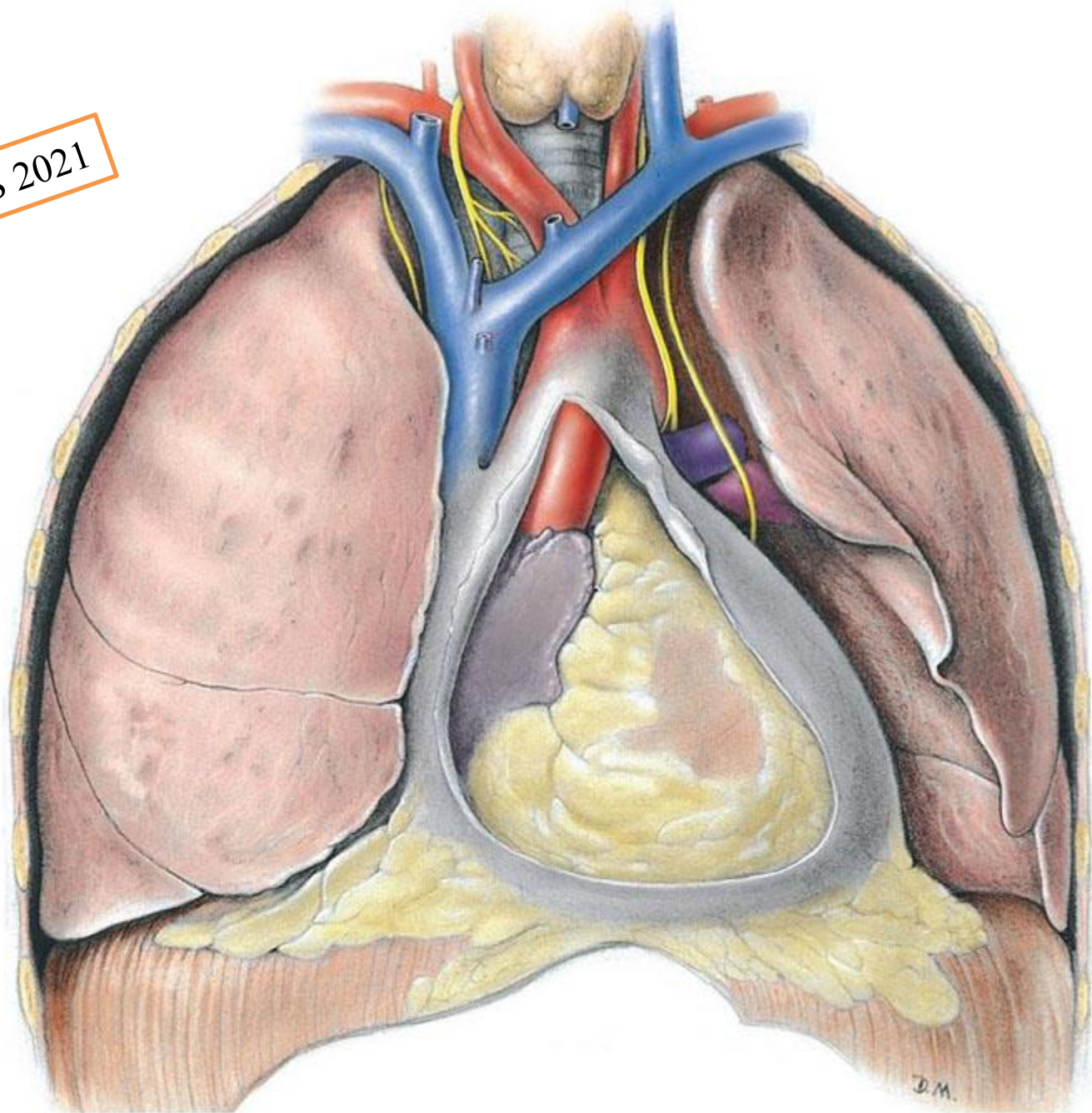
**The University of Jordan**

Cardiovascular system  
For 3rd-year-medical students

# Objectives

- ❖ *Recognize and understand the main parts of mediastina and their boundaries*
- ❖ *To discuss and explain the contents of the superior mediastinum*
- ❖ *To get familiar with other none vascular structures in the superior mediastinum*
- ❖ *To have a good grasp of knowledge about the great veins of the superior mediastinum; relations, surface anatomy and their clinical correlations*
  - ❖ *To **Comprehend the** anatomy of the Arch of the aorta, its branches relations and clinical correlations*

CVS 2021



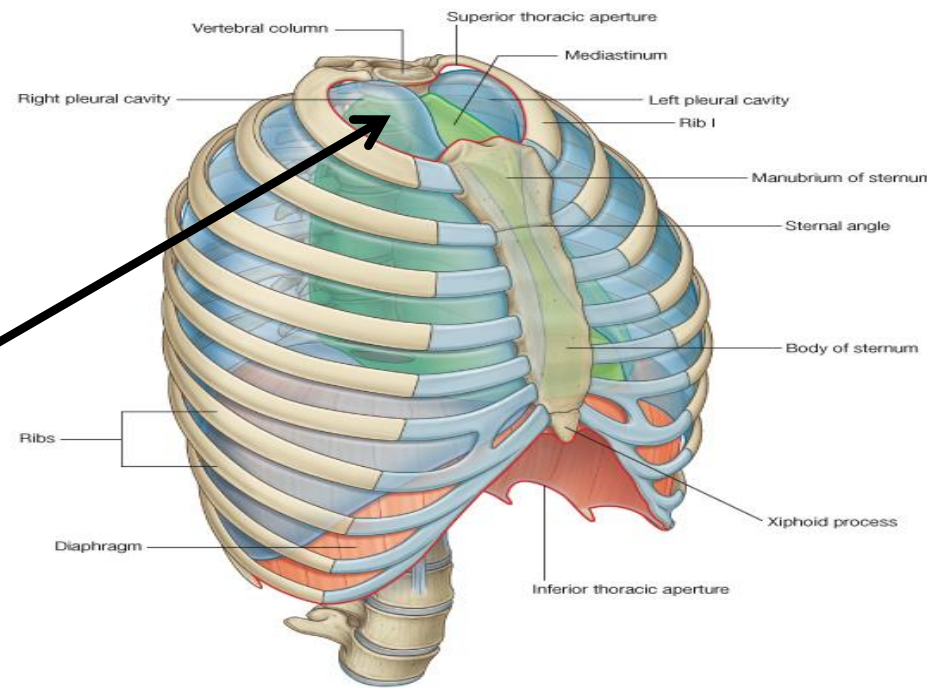
# CHEST CAVITY

The chest cavity is bounded by the chest wall and below by the diaphragm

It extends upward into the root of the neck about one fingerbreadth

above the clavicle on each side

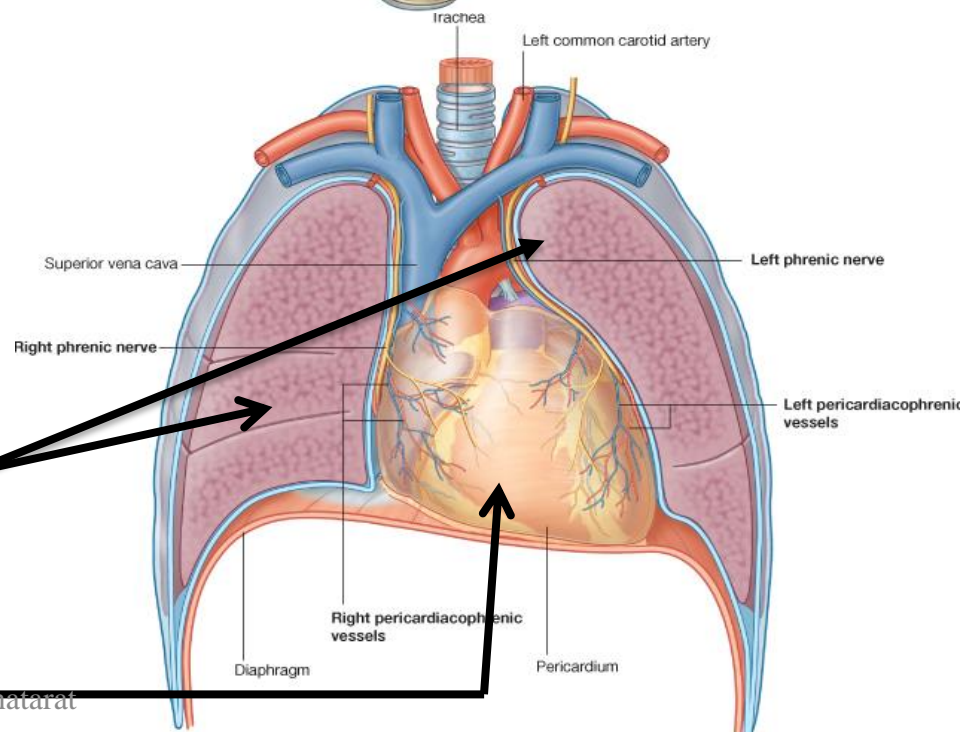
The diaphragm, separates the chest from the abdominal viscera



The chest cavity can be divided into

**MEDIAN PARTITION CALLED THE MEDIASTINUM**

**LATERALLY PLACED PLEURAE AND LUNGS**

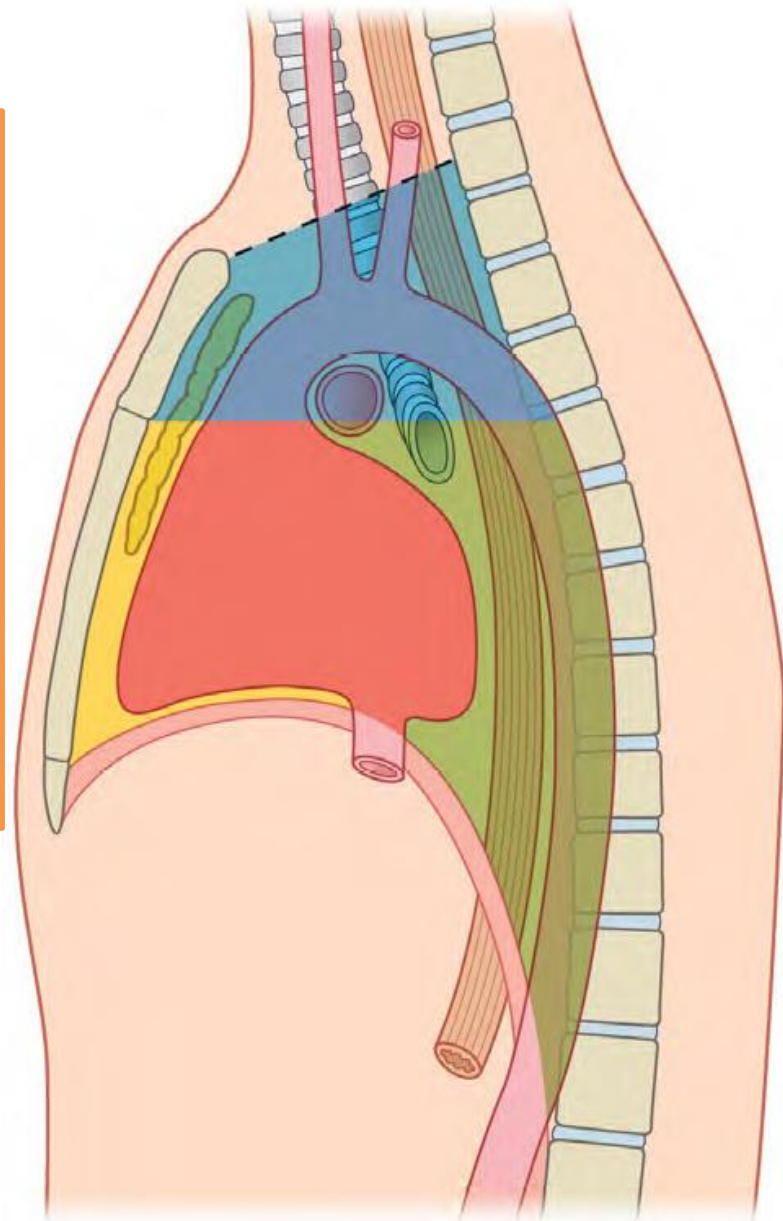




# MEDIASTINUM

- The term mediastinum is commonly applied to the region between the two pleural sacs bounded anteriorly by the sternum and posteriorly by the thoracic vertebral column and extending vertically from the thoracic inlet to the diaphragm.
- For descriptive purposes, this region is arbitrarily divided into superior and inferior mediastina, and the latter is subdivided into anterior, middle and posterior parts.
- The plane of division into superior and inferior mediastina crosses the manubriosternal joint and the lower surface of the fourth thoracic vertebra

Gary's Anatomy



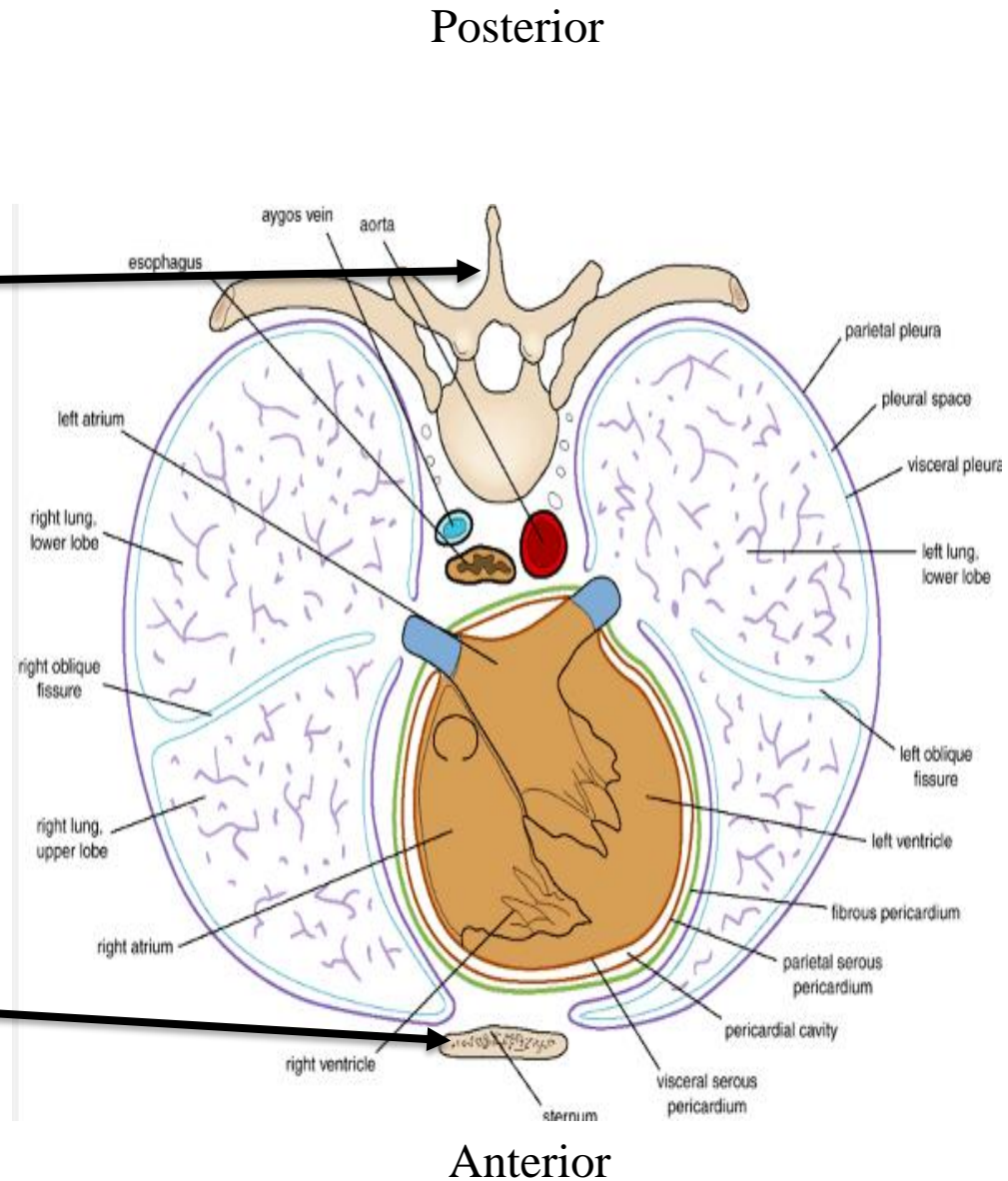




**The Mediastinum extends**

***Posteriorly: to the vertebral column***

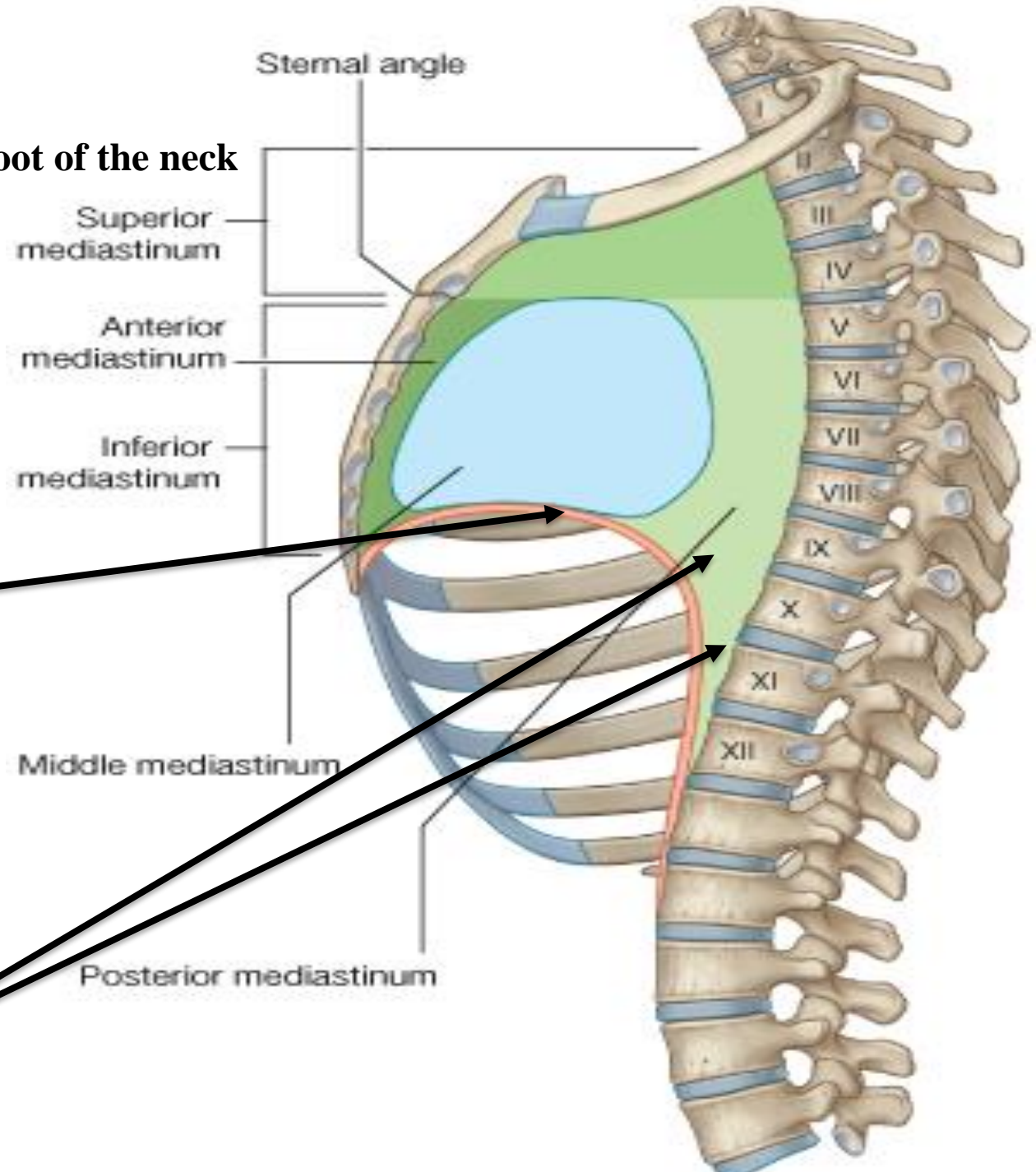
***Anteriorly: to the sternum***



***Superiorly:***  
to the thoracic outlet and the root of the neck

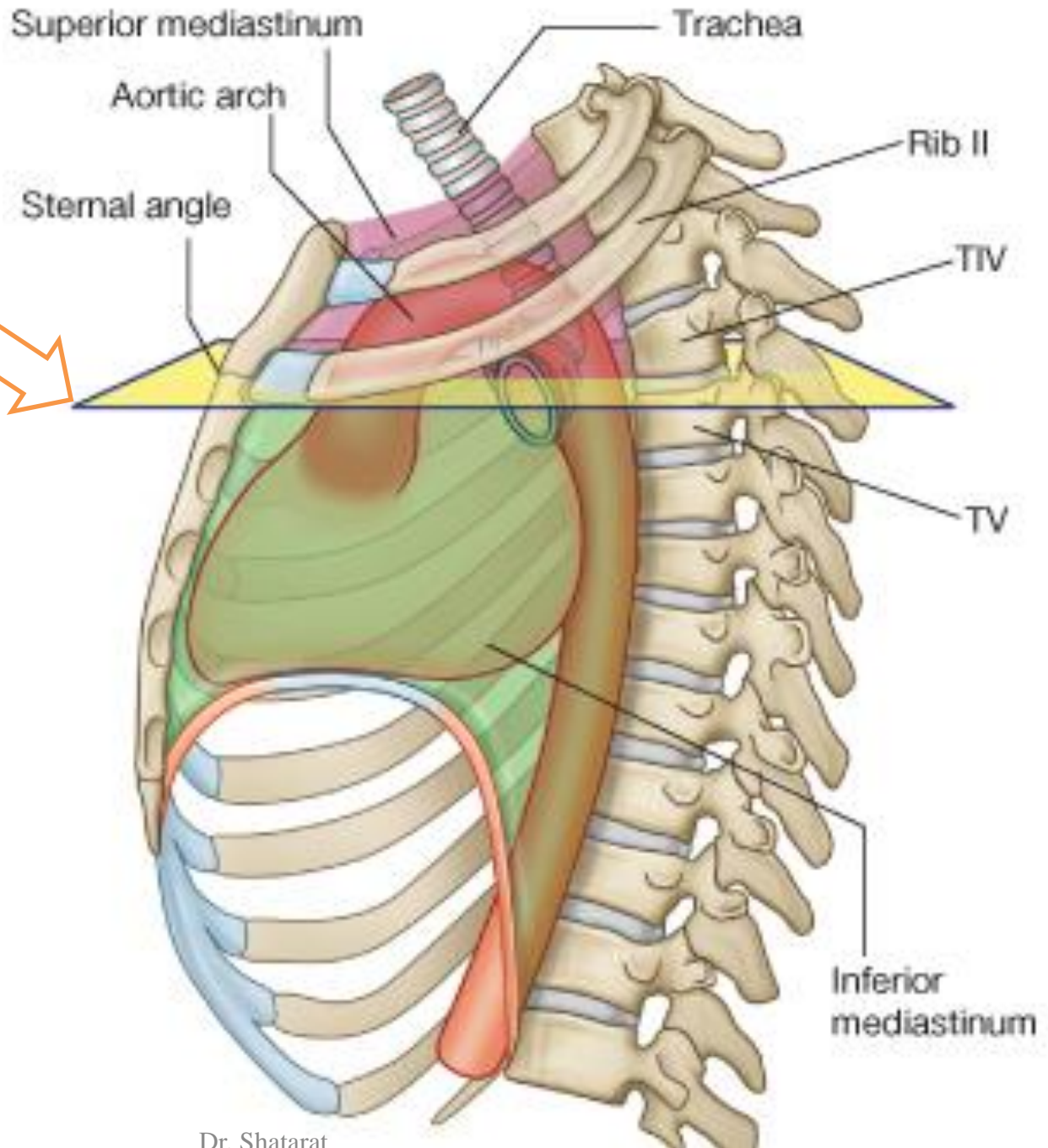
***Inferiorly:*** to the diaphragm

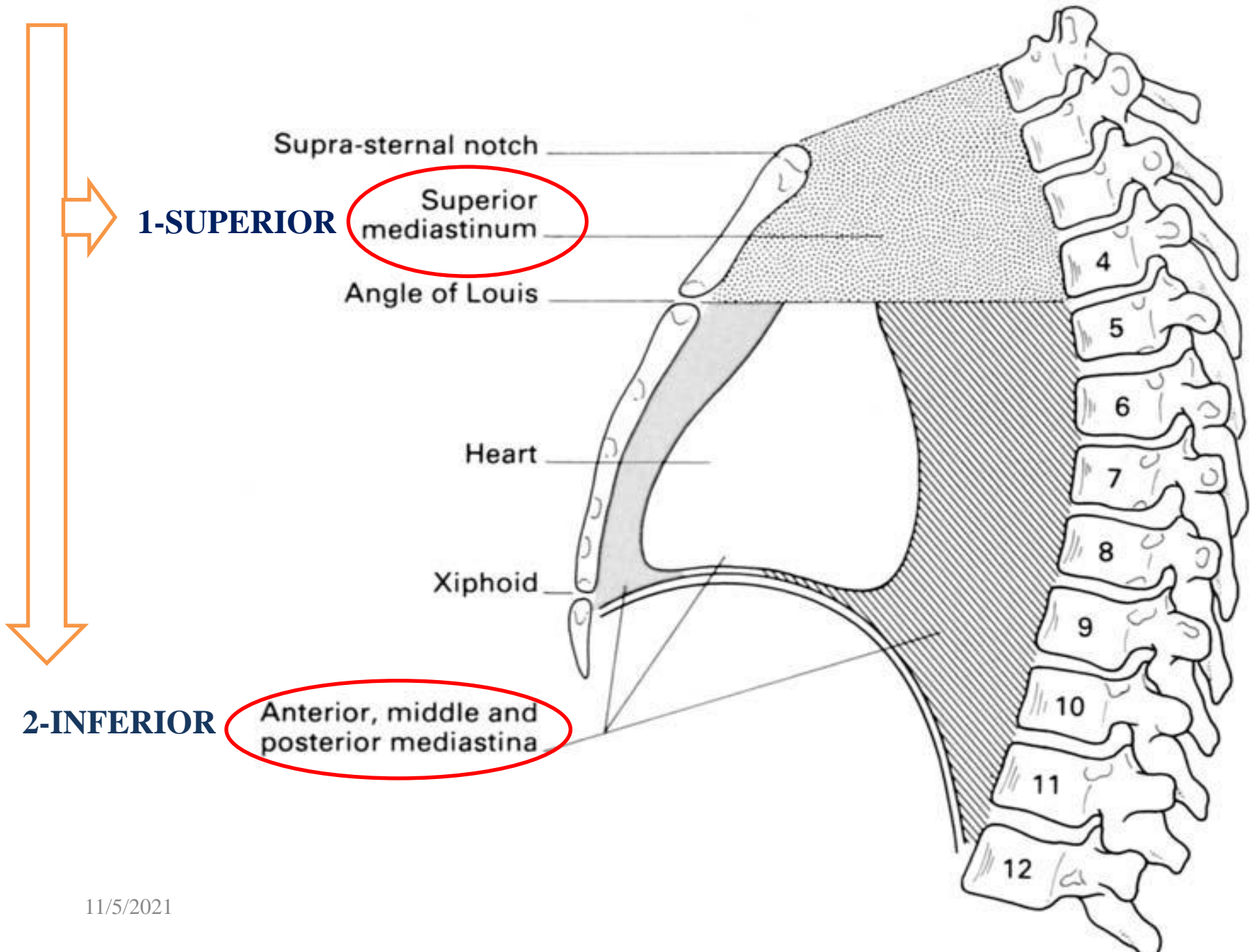
Note:  
The diaphragm is a dome shaped structure which means that the floor of the mediastinum is somehow not at the same level at all sites. It is getting deeper posteriorly





**An imaginary plane passing from the sternal angle anteriorly (angle of Louis) to the lower border of the body of the fourth thoracic vertebra posteriorly divides the mediastinum into:**





# THE INFERIOR MEDIASTINUM is further subdivided into:

## 1-THE MIDDLE MEDIASTINUM

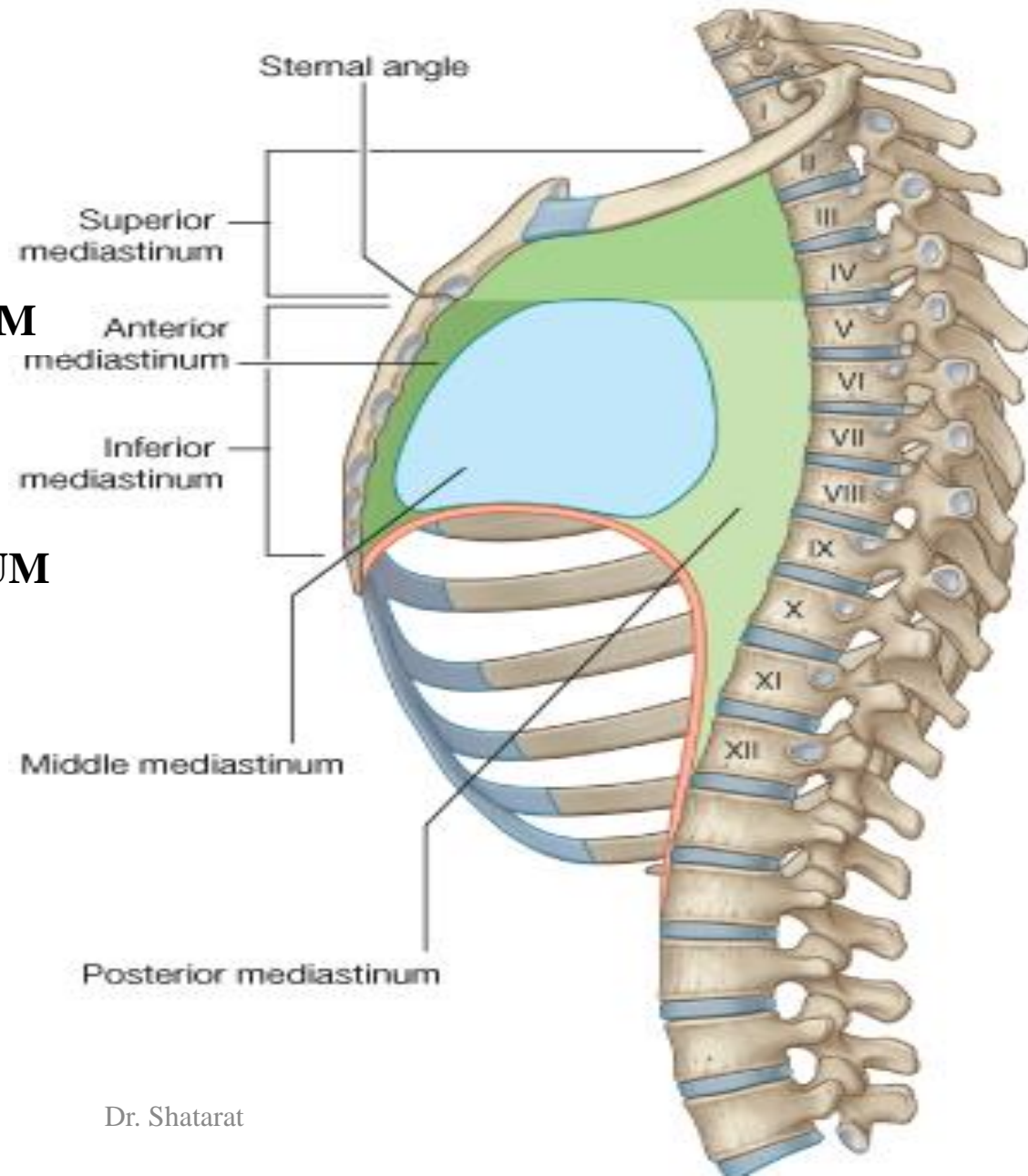
consists of  
the pericardium and heart

## 2-THE ANTERIOR MEDIASTINUM

is a space between the  
pericardium and the sternum

## 3-THE POSTERIOR MEDIASTINUM

lies between  
THE PERICARDIUM  
And  
THE VERTEBRAL  
COLUMN





What is the sternal angle?

# The sternal angle (angle of Louis)

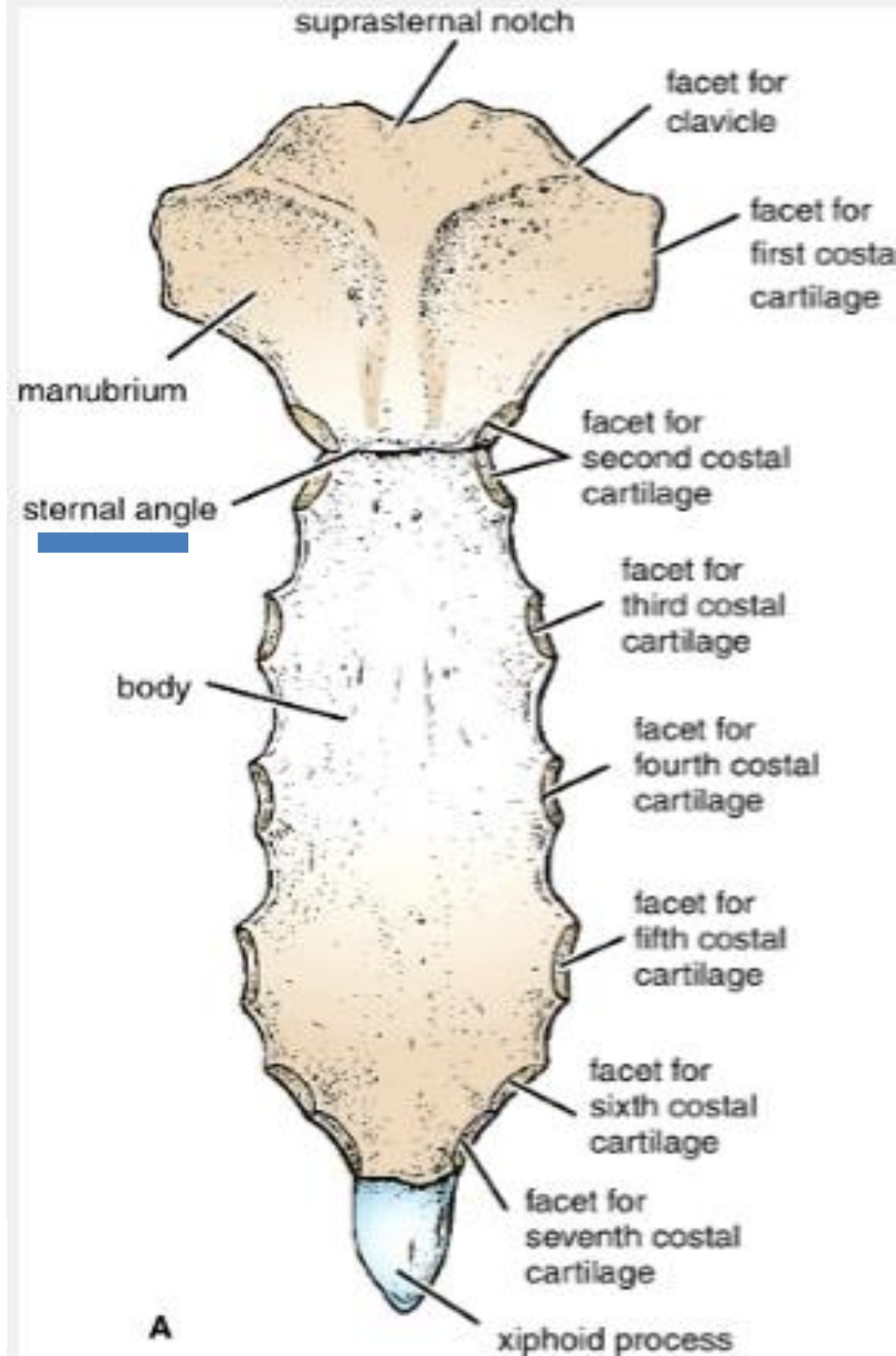
formed by the articulation of the manubrium with the body of the sternum

Can be recognized by the presence of a transverse ridge on the anterior aspect of the sternum

The transverse ridge lies at the level of the **second costal cartilage**



The point from which all costal cartilages and ribs are counted



Do you know how to count ribs?

A- Find the **suprasternal notch**

B- From the suprasternal notch, go down slowly until you reach **a transverse ridge** on the anterior aspect of the sternum

C- Once you have found the transverse ridge move your finger laterally and you will find the **second costal cartilage**

D- From the second costal cartilage start to count ribs  
***downwards and postero-laterally***

Note;  
If you would count downwards only, you will ended up counting  
The true ribs only.

# THE SUPERIOR MEDIASTINUM





1-Boundaries

THE SUPERIOR MEDIASTINUM

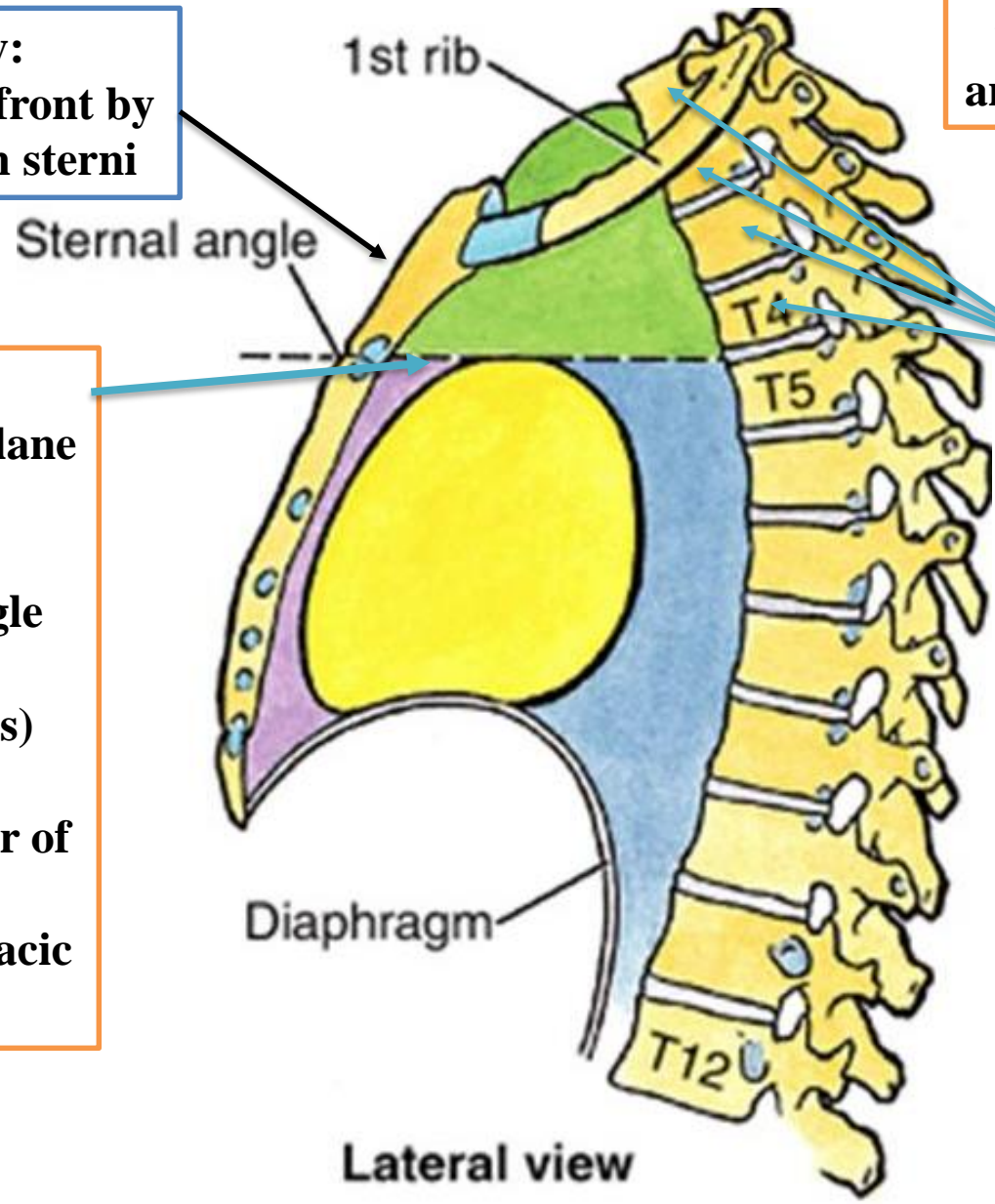
*Superiorly:*  
to the thoracic outlet  
and the root of the neck

**Anteriorly:**  
It is bounded in front by  
the manubrium sterni

**Posteriorly:**  
It is bounded  
behind by  
the first four  
thoracic vertebrae

**Inferiorly:**  
An imaginary plane  
passing  
from  
the sternal angle  
anteriorly  
(angle of Louis)  
to  
the lower border of  
the body of  
the fourth thoracic  
vertebra

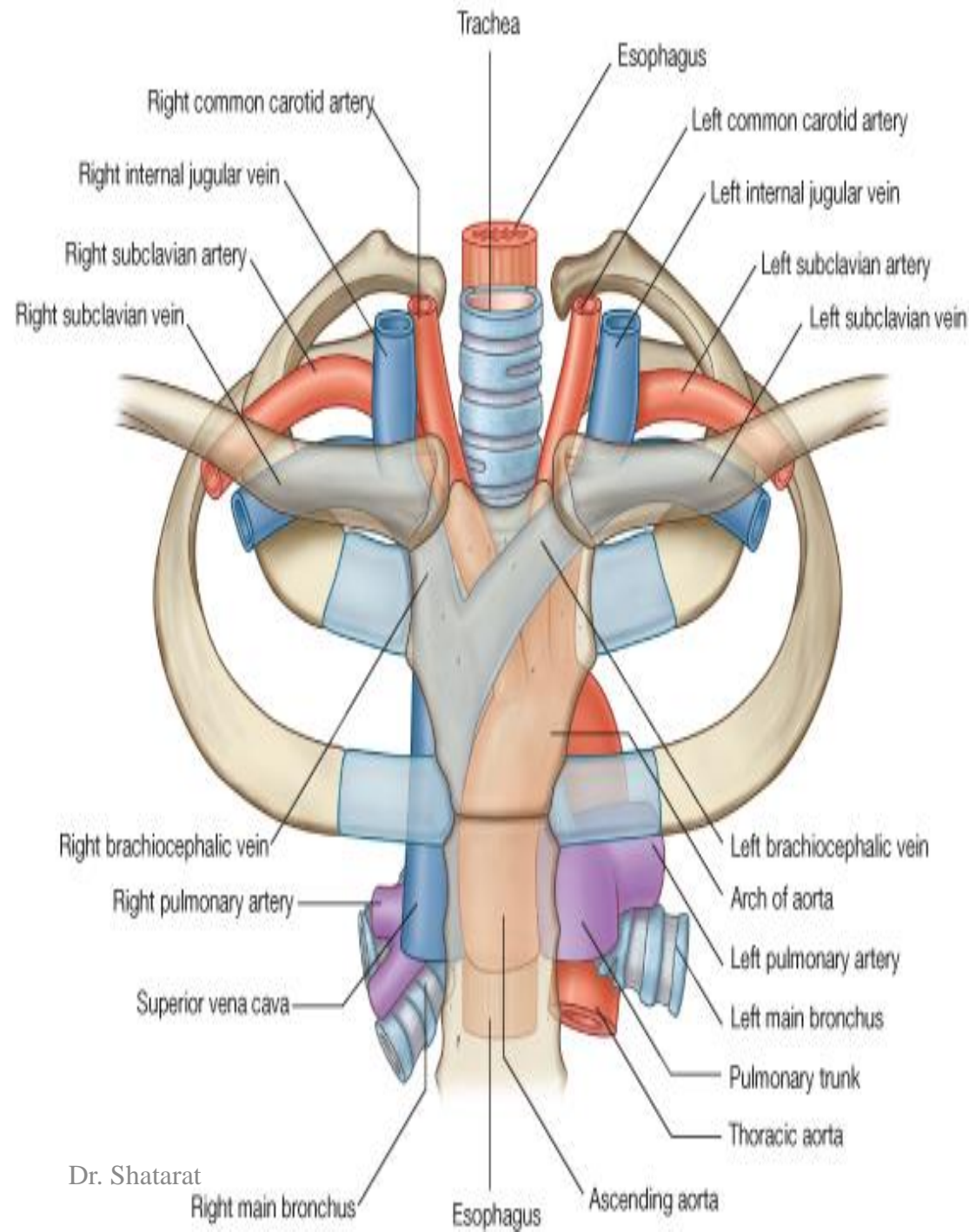
On each side:  
mediastinal pleura



Lateral view

## 2-Contents from anterior to posterior

- (a) **Remnant of THYMUS**
- (b) **LARGE VEINS**
- (c) **LARGE ARTERIES**
- (d) **TRACHEA**
- (e) **ESOPHAGUS**
- (f) **THORACIC DUCT**
- (g) **SYMPATHETIC TRUNKS**



6-THORACIC DUCT

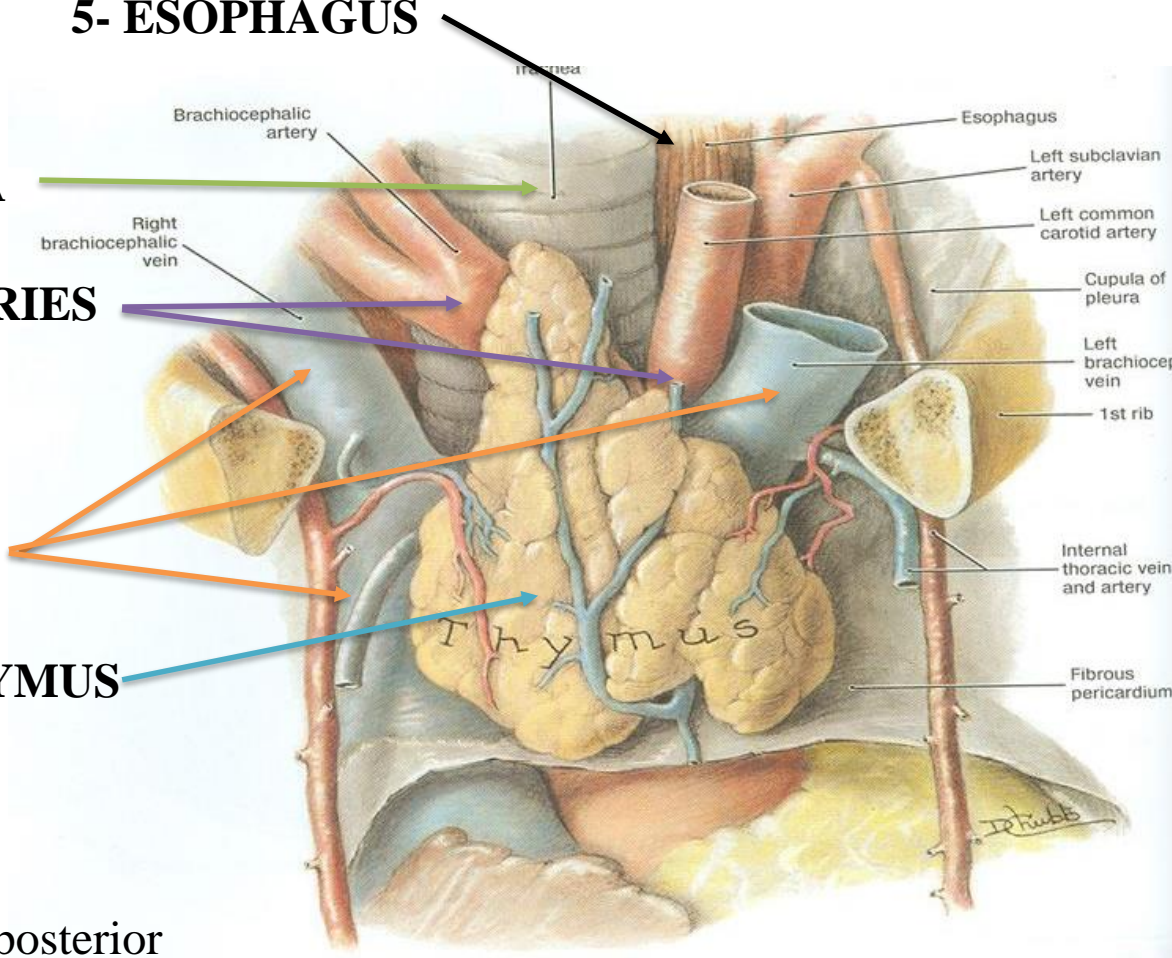
5- ESOPHAGUS

4-TRACHEA

3-LARGE ARTERIES

2-LARGE VEINS

1-Remnant of THYMUS



From anterior to posterior



# **GREAT VEINS OF THE SUPERIOR MEDIASTINUM**

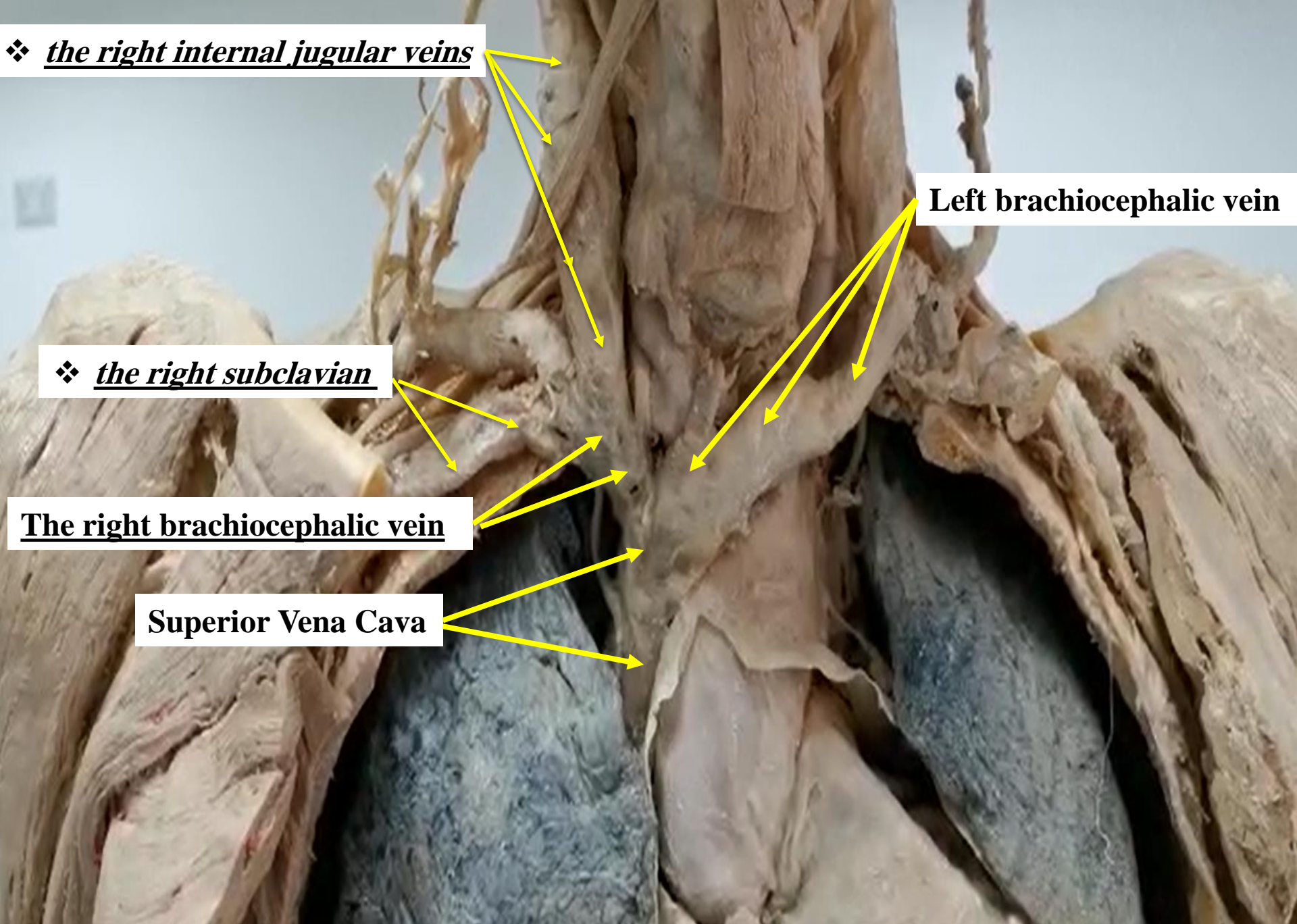
❖ the right internal jugular veins

Left brachiocephalic vein

❖ the right subclavian

The right brachiocephalic vein

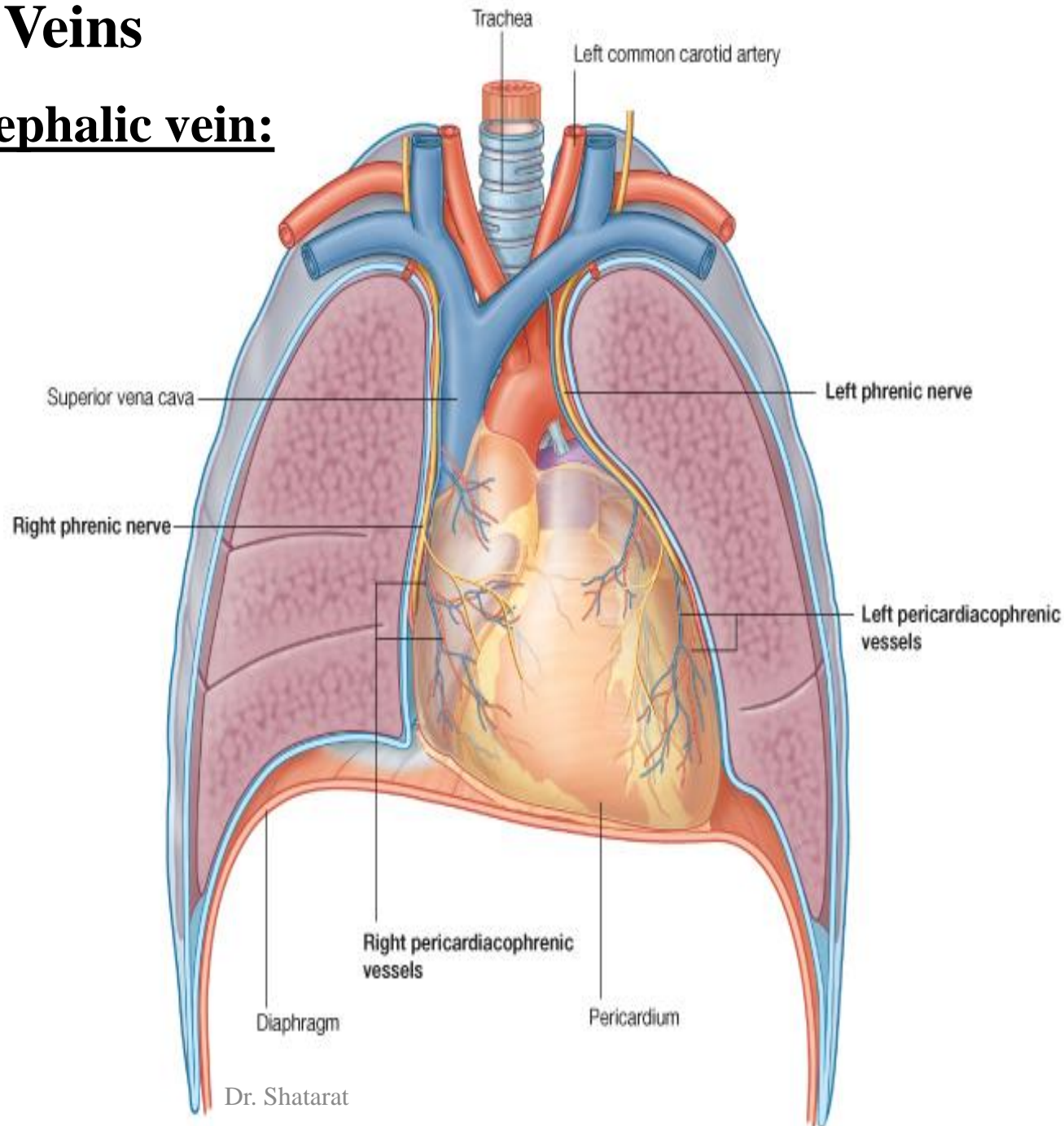
Superior Vena Cava



# 1-Brachiocephalic Veins

## A-The right brachiocephalic vein:

- ❖ formed by the union of the right subclavian and the right internal jugular veins
- ❖ Begins posterior to the medial end of the right clavicle
- ❖ it is shorter than the left one and more vertical



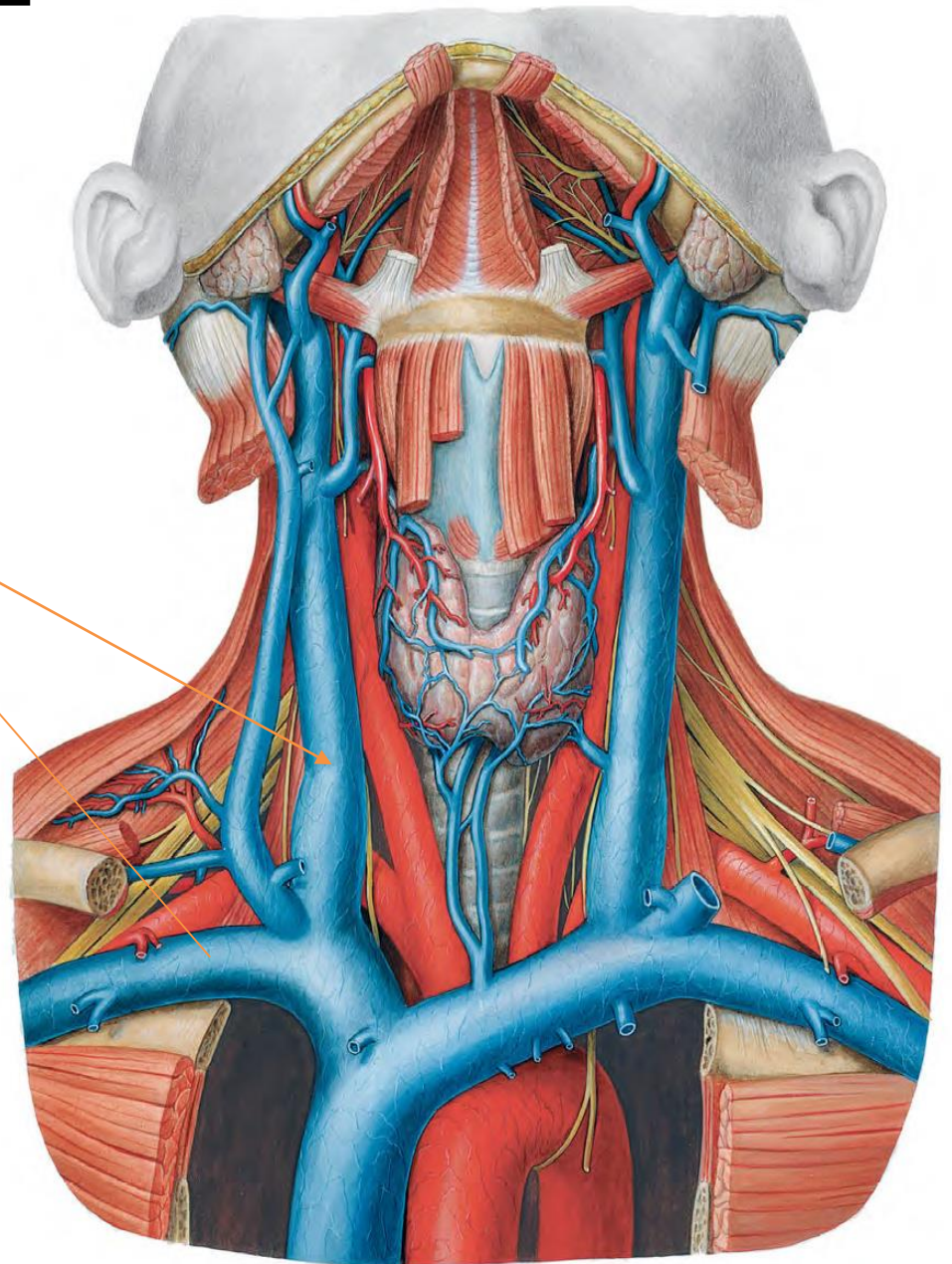


# A-The right brachiocephalic vein:

- ❖ formed by the union of the right subclavian and the right internal jugular veins

## the right venous angle

- ❖ Begins posterior to the medial end (sternal end) of the right clavicle
- ❖ it is shorter than the left one and more vertical) do you know why?



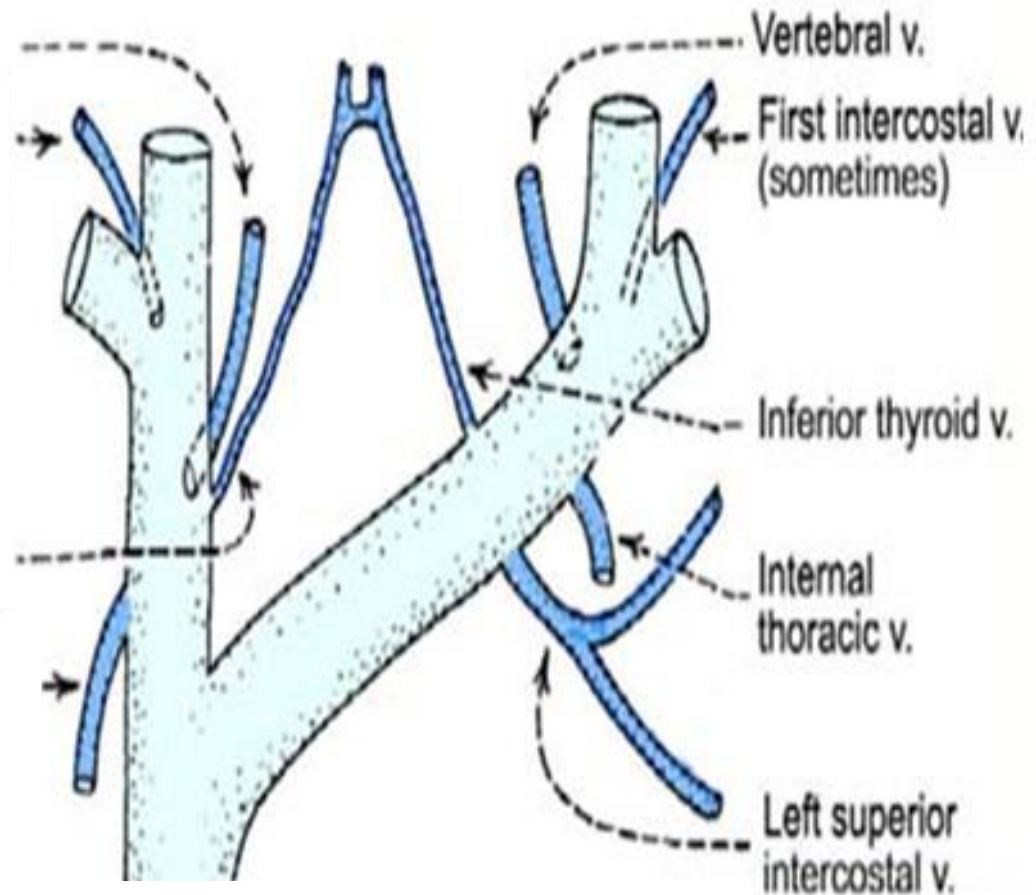


❖ *The right vertebral vein*

❖ *First posterior intercostal vein*

**The inferior thyroid vein**

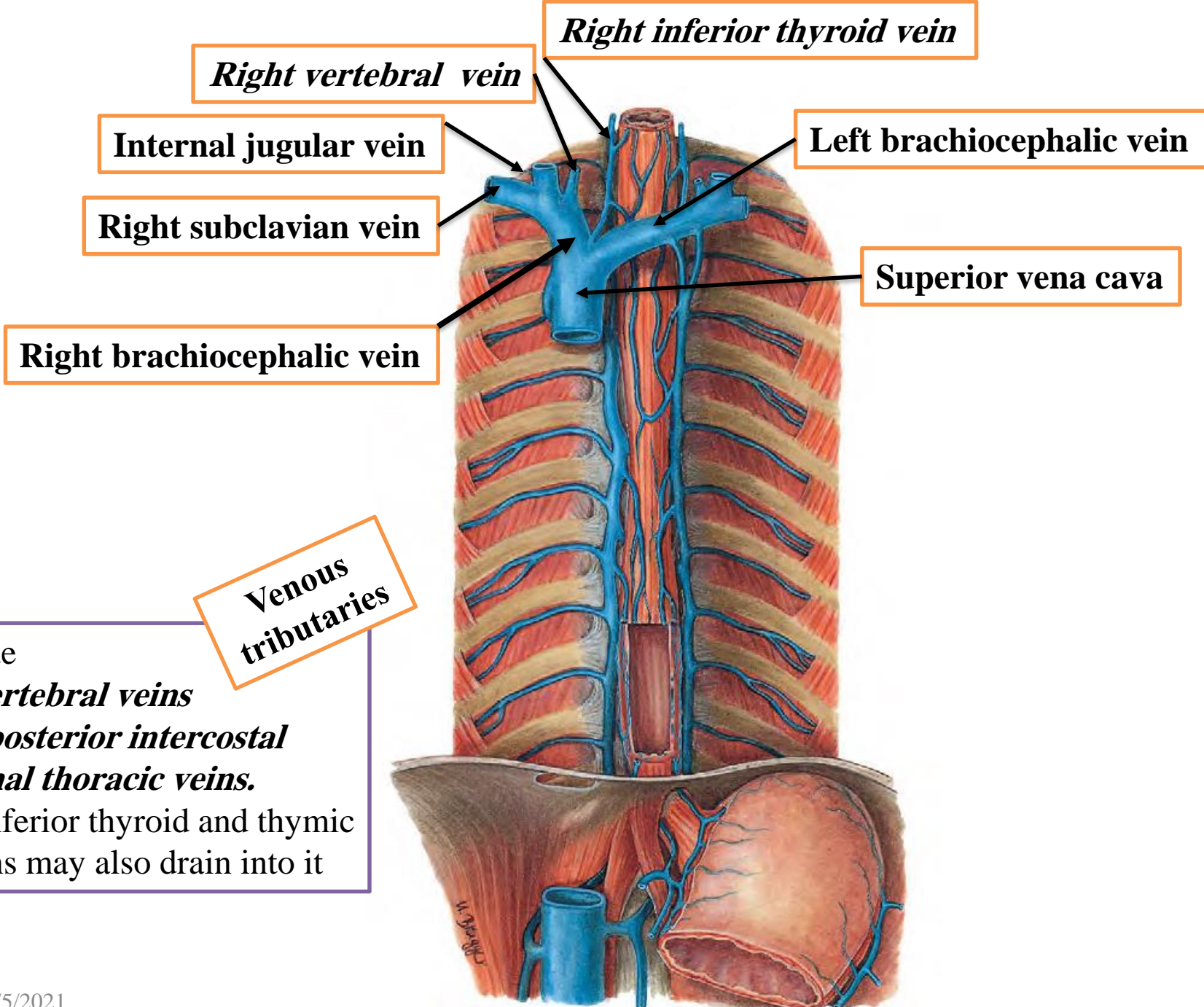
❖ *Internal thoracic veins*



**Venous tributaries of the right brachiocephalic vein**

Include

- ❖ *The right vertebral vein*
- ❖ *First posterior intercostal*
- ❖ *Internal thoracic veins*
- ❖ **The inferior thyroid and thymic veins may also drain into it**



*Right inferior thyroid vein*

*Right vertebral vein*

*Internal jugular vein*

*Left brachiocephalic vein*

*Right subclavian vein*

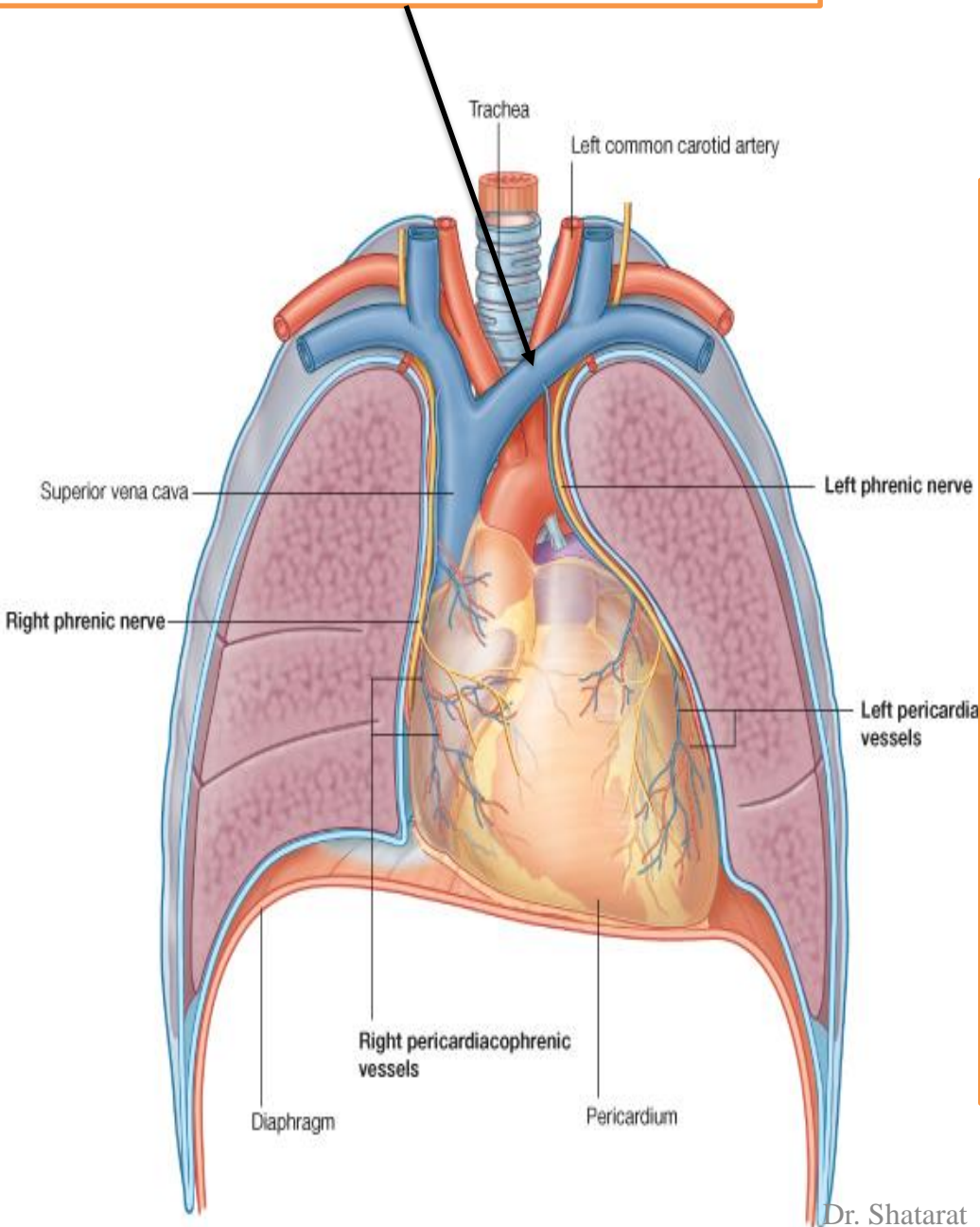
*Superior vena cava*

*Right brachiocephalic vein*

**Venous tributaries**

Include  
*the vertebral veins*  
*first posterior intercostal*  
*internal thoracic veins.*  
The inferior thyroid and thymic  
veins may also drain into it

## B-The left brachiocephalic vein:



Is formed by the union of **the LEFT subclavian** and **the LEFT internal jugular veins**

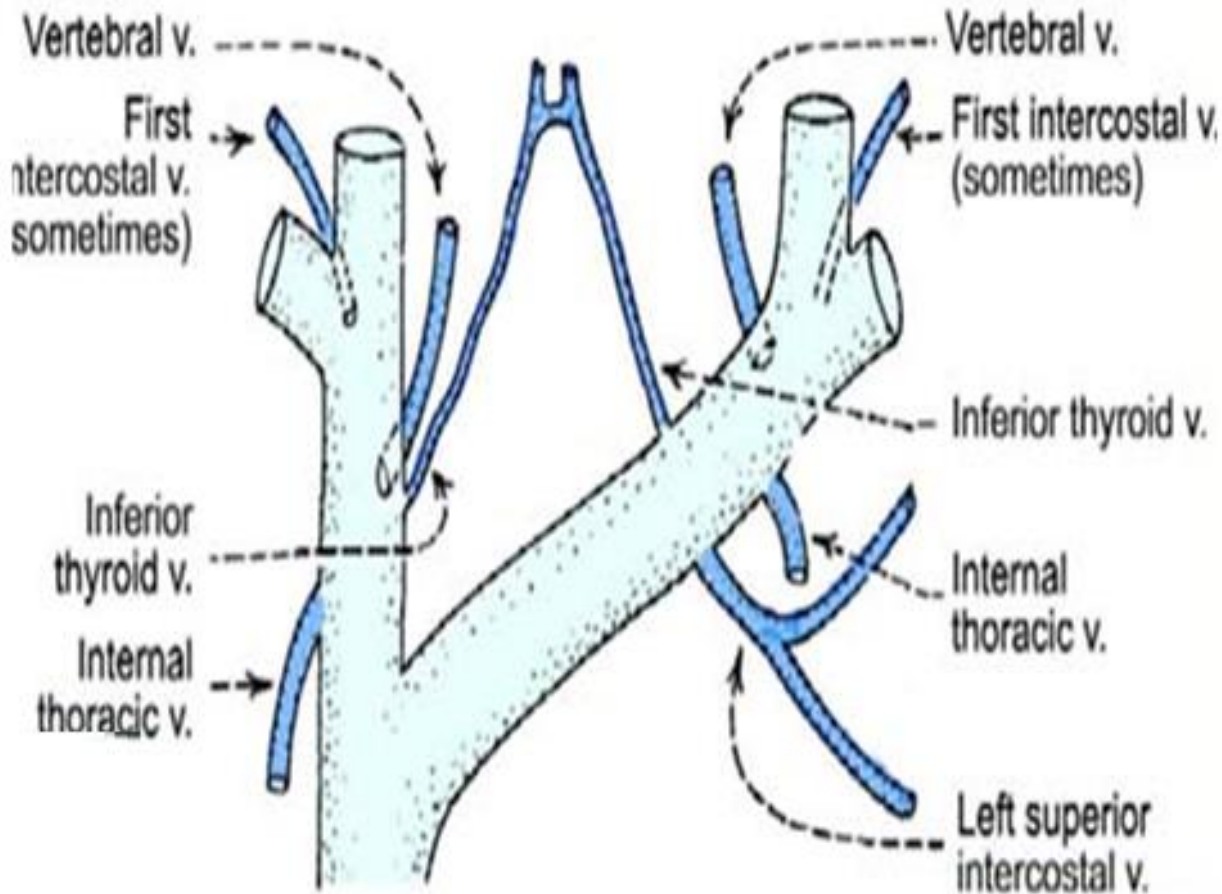
the left “venous angle”

receives lymph from the thoracic duct

- ❖ Begins posterior to the medial end of the left clavicle
- ❖ **It passes obliquely and it is longer than the right one) why?**
- ❖ It joins the right brachiocephalic vein to form

**THE SUPERIOR VENA CAVA**

# Venous tributaries of the left brachiocephalic vein



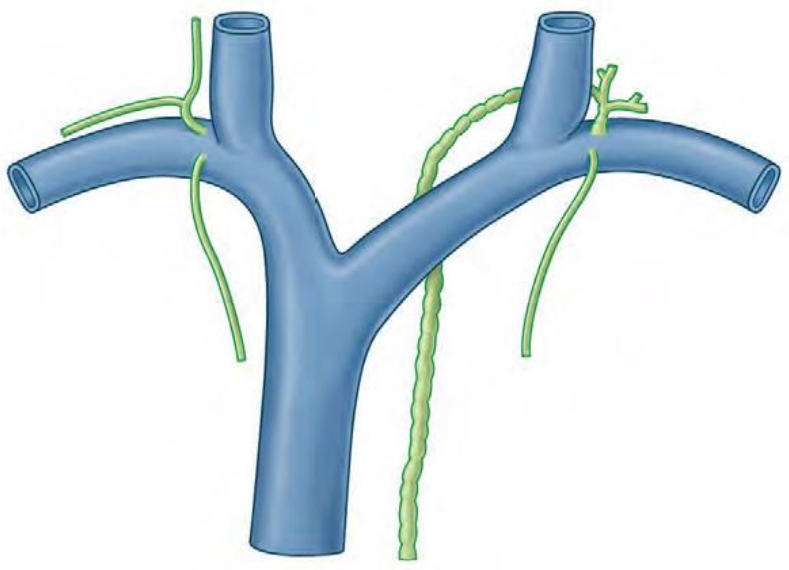
- Include
- ***Left vertebral vein***
  - ***First posterior intercostal vein***
  - ***Left superior intercostal vein***
  - ***Inferior thyroid vein***
  - ***Internal thoracic veins***

It may also receive thymic and pericardial veins



The right venous angle  
receives the right lymphatic  
duct

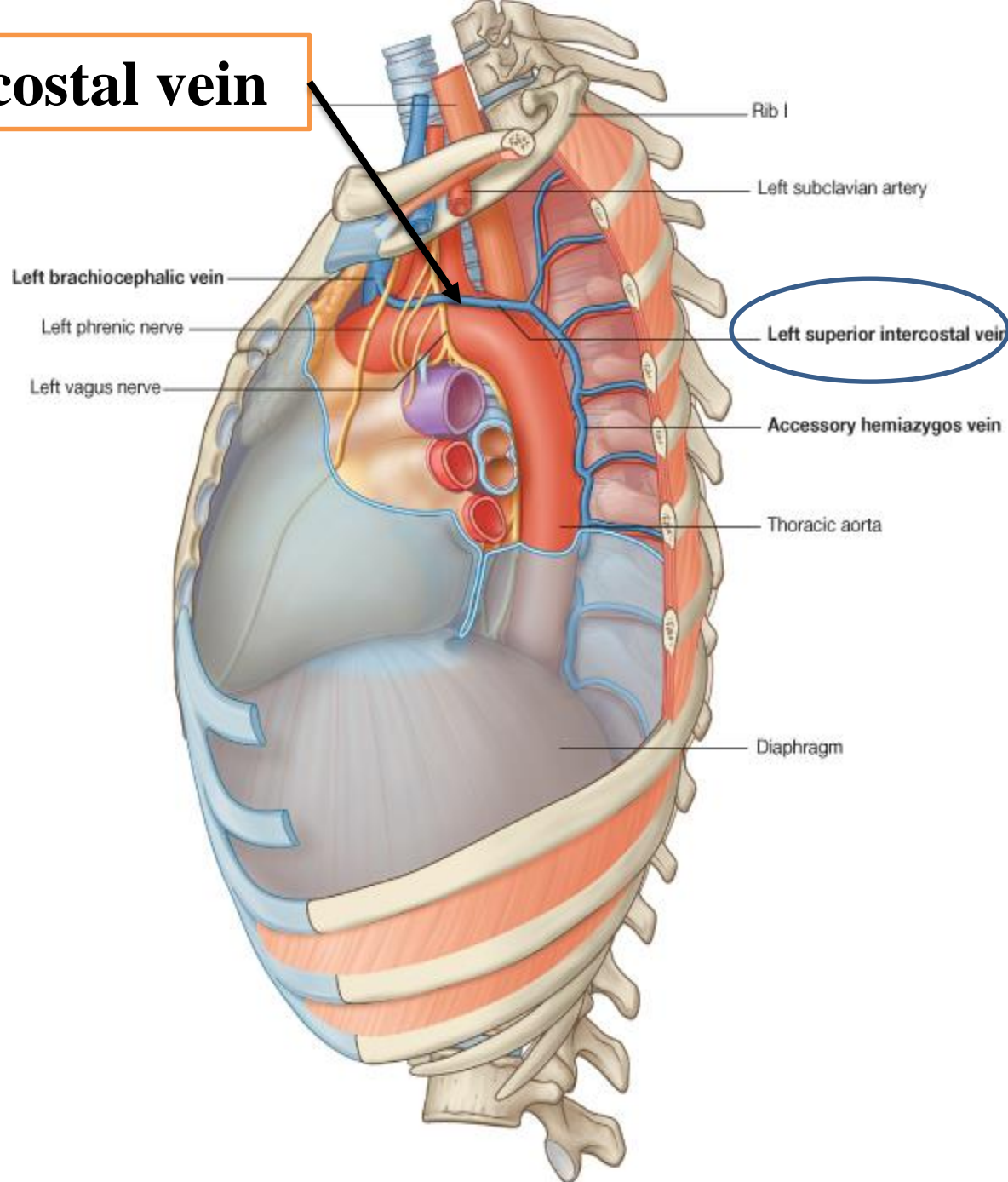
The left venous angle  
receives lymph from the thoracic  
duct

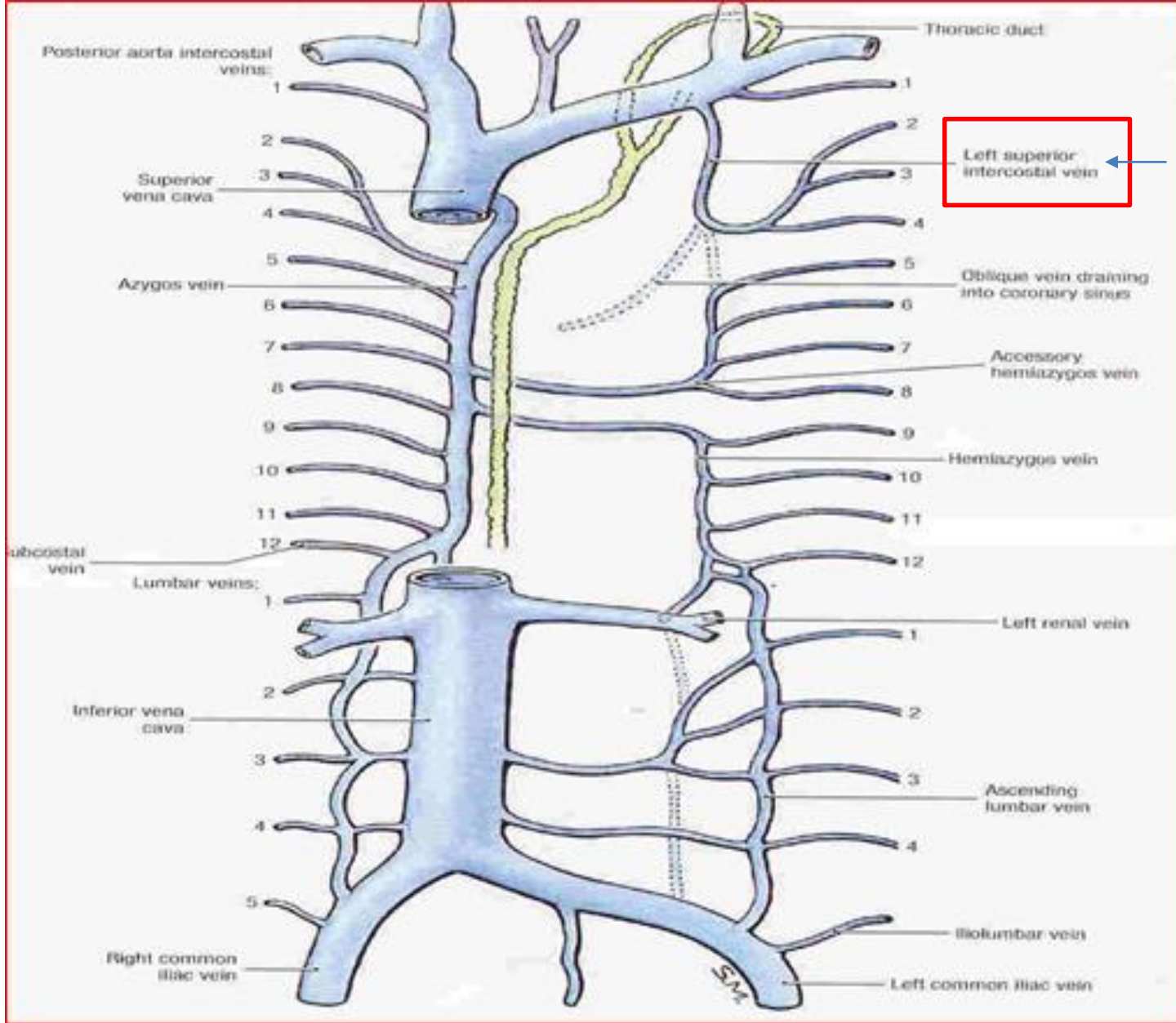


# The left superior intercostal vein

## It drains

- ❖ The second, third and sometimes the fourth posterior intercostal veins
- ❖ Usually, it drains the left bronchial veins
- ❖ Sometimes the left pericardiophrenic vein





The left **superior intercostal vein**

It drains

- ❖ The second, third and sometimes the fourth posterior intercostal veins



## Superior Vena Cava SVC

➤ Generally, it receives venous return from the upper half of the body, above the diaphragm, except the **lungs and heart**

➤ **It is valveless**

➤ It is a large-diameter (2.4 cm), but short (7 cm)

➤ It is formed by the union of *the two brachiocephalic veins* posterior to the lower edge of the right first (1) costal cartilage

➤ *pierces the pericardium at the level of the second (2) costal cartilage*

➤ Terminates at the lower edge of the right third (3) costal cartilage, where it joins the right atrium

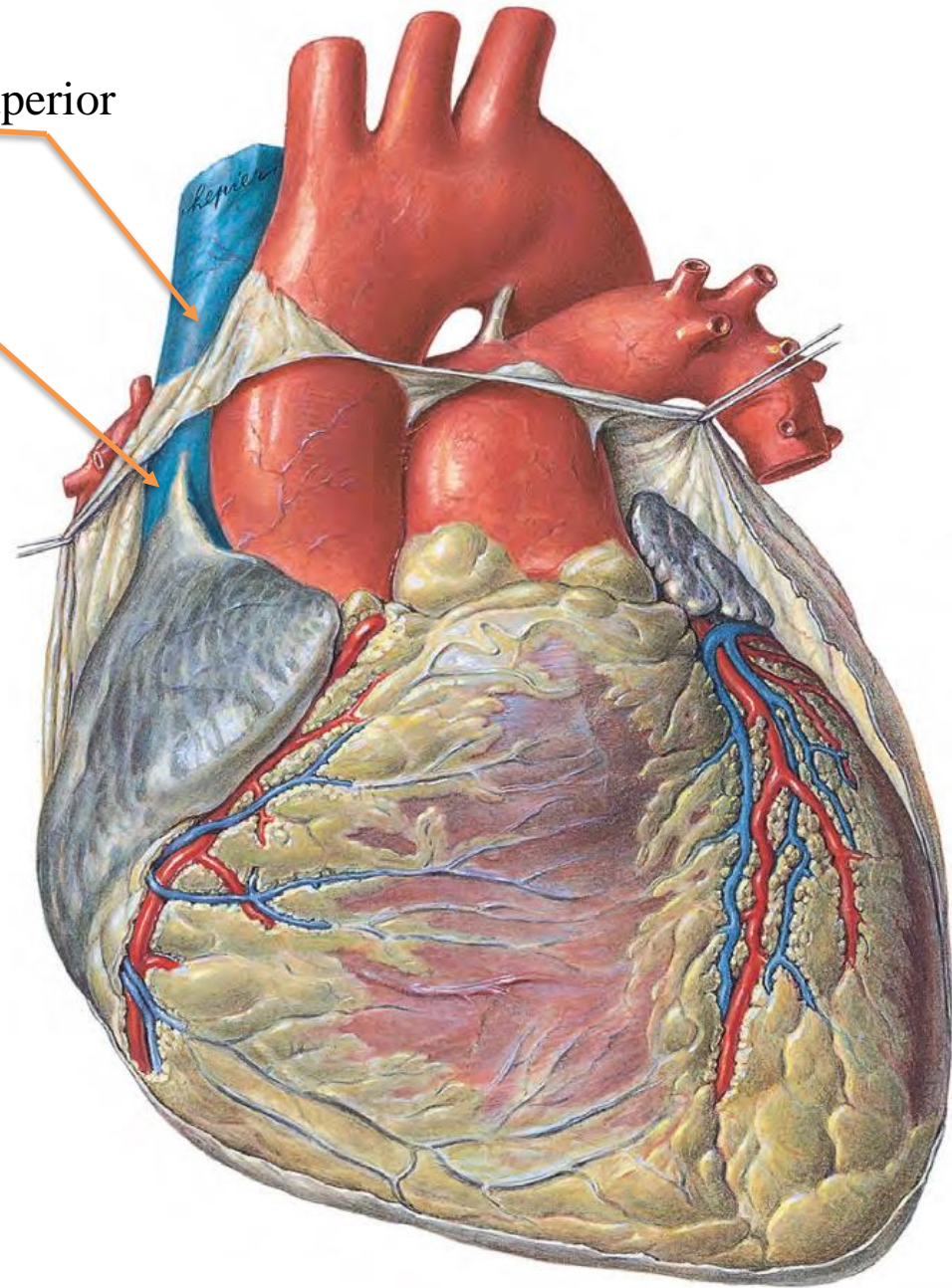
SVC, Remember 1, 2 and 3

11/5/2021





- Its upper half is located within the superior mediastinum
- While its lower half of the superior vena cava is within the pericardial sac and is therefore contained in the middle mediastinum



- The **vena azygos** joins the posterior aspect of the superior vena cava just before it enters the pericardial sac and may also receive pericardial and mediastinal veins

The pericardial sac

Lateral view

