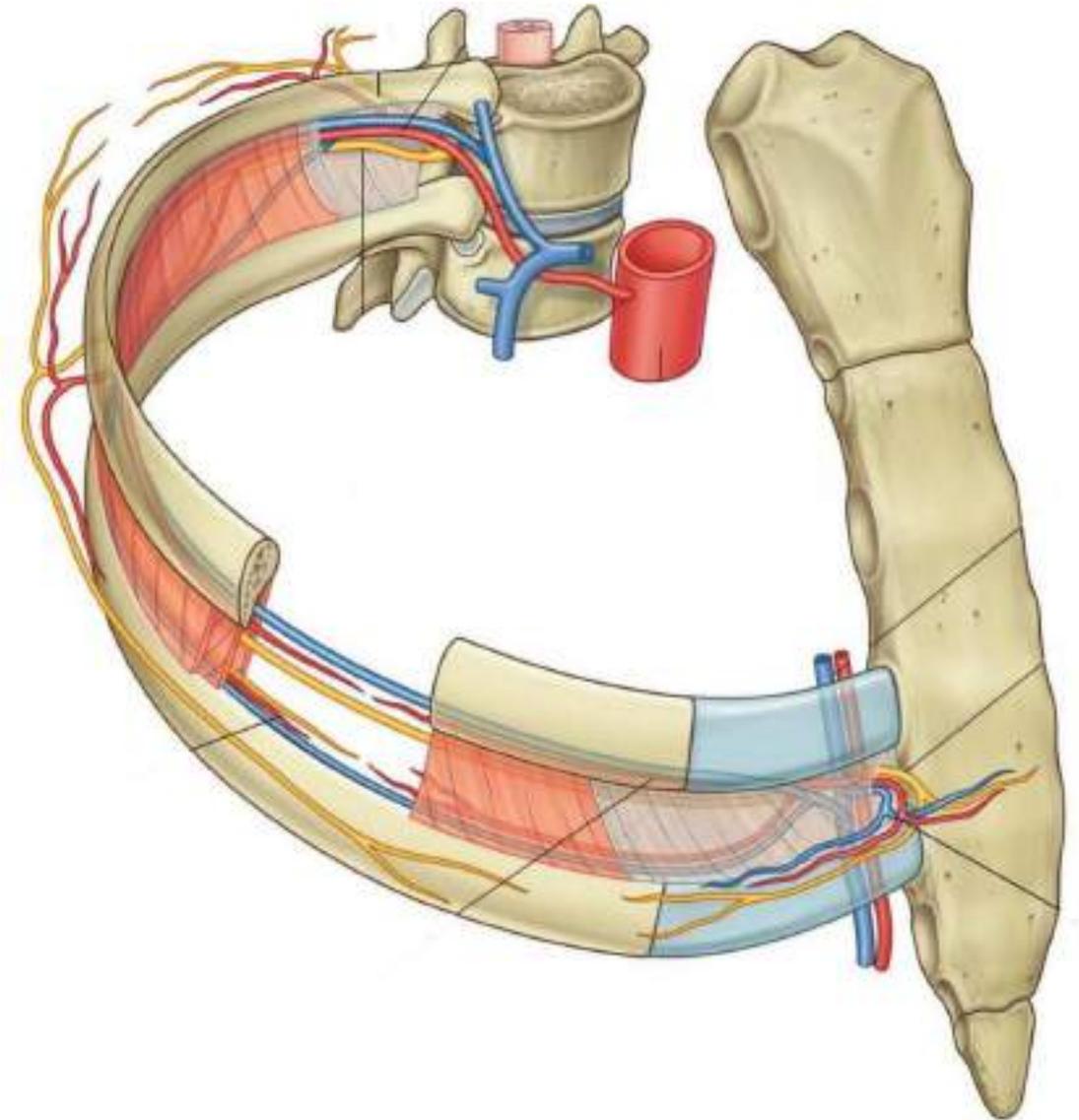


# THORACIC CAGE & INTERCOSTAL SPACES 2

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# INTERCOSTAL NERVES

# CLASSIFICATION

- 11 pairs divided into 2 groups

## 1- Typical intercostal nerves:-

- 2<sup>nd</sup> till 6<sup>th</sup> nerve
- as they run all their Course in the thoracic wall.

## 2- Atypical intercostal nerves :-

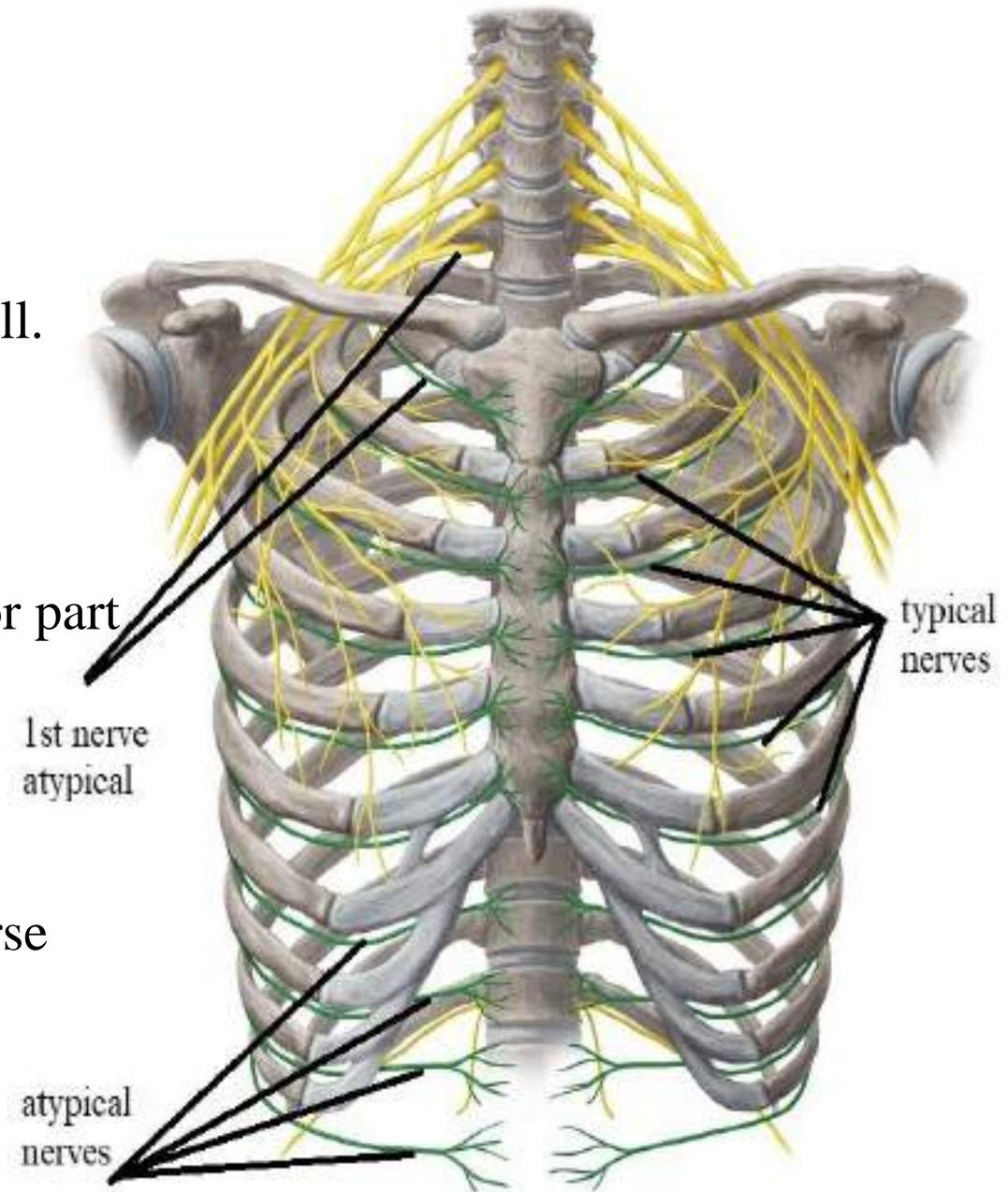
- 1<sup>st</sup> :- as most of its fibres ascend to join the brachial plexus.

Divides into a large superior and a small inferior part

The superior part joins the brachial plexus

The inferior part has no anterior or lateral cutaneous branches

- 7<sup>th</sup> till 11<sup>th</sup> nerve:- as they run part of their Course in thoracic wall & part in abdominal wall



# TYPICAL INTERCOSTAL NERVES

**O.:** ventral rami of thoracic nerves (2-6)

**C.& R. .:**

- Emerges from the intervertebral foramen
- In the posterior part of the space

Runs behind the sympathetic chain

( ) subcostalis , Parietal pleura (internally)  
& post. intercostal membrane (externally)

- In the costal groove

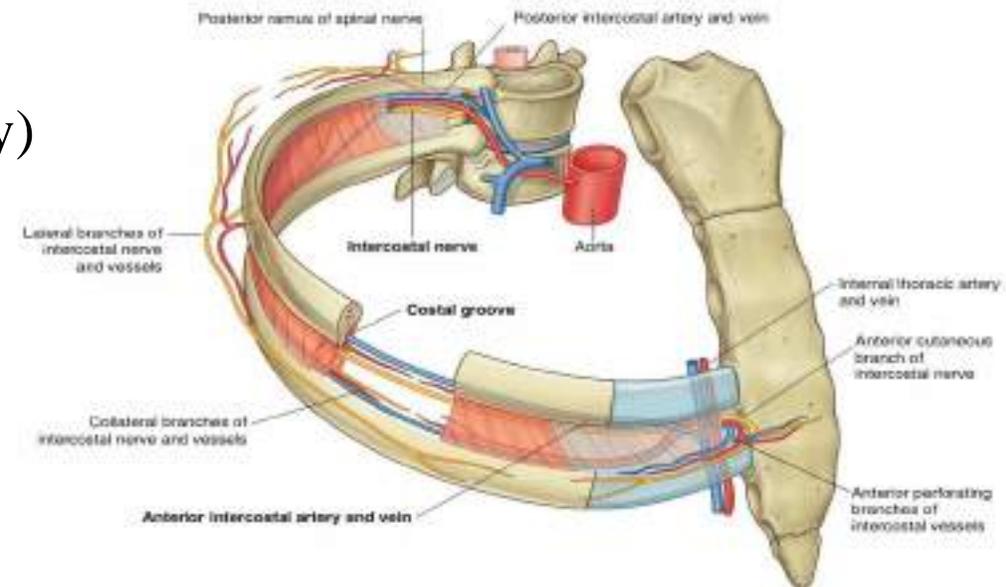
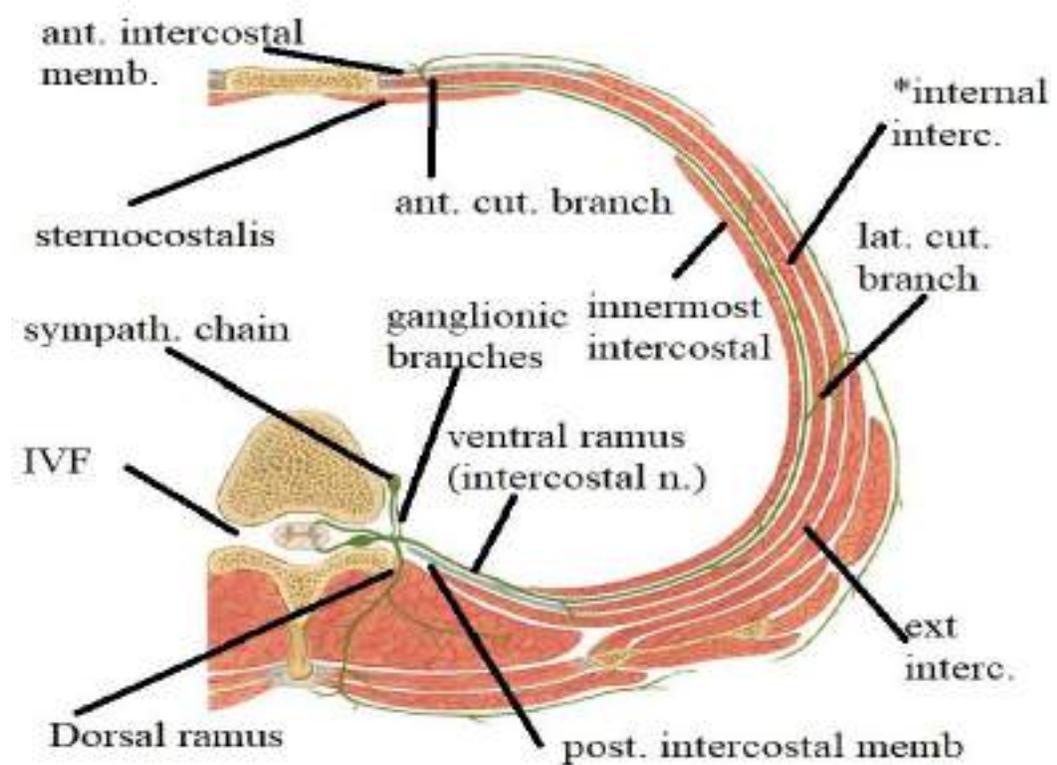
Runs below post. intercostal vessels (VAN)

( ) innermost intercostal , parietal pleura (internally)  
& internal intercostal (externally)

- In the anterior part of the space

Runs in front of internal thoracic vessels

( ) sternocostalis , parietal pleura (internally)  
& internal intercostal (externally)



# TYPICAL INTERCOSTAL NERVES

**End:-** 1 cm lateral to sternum as ant. cutaneous branch

**Branches :**

**Ganglionic branches**

each n. gives a **white ramus Communicans** (preganglionic) to, and receives a **grey ramus Communicans** (postganglionic) from the sympathetic chain.

**muscular branches:** to the intercostal muscles.

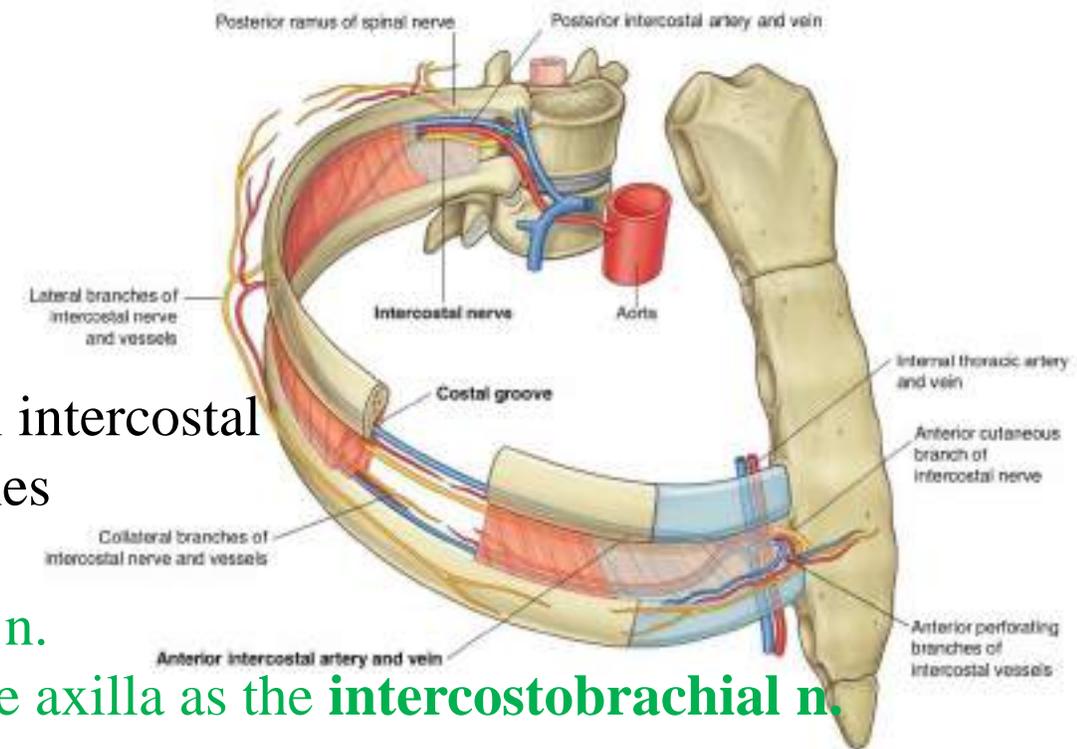
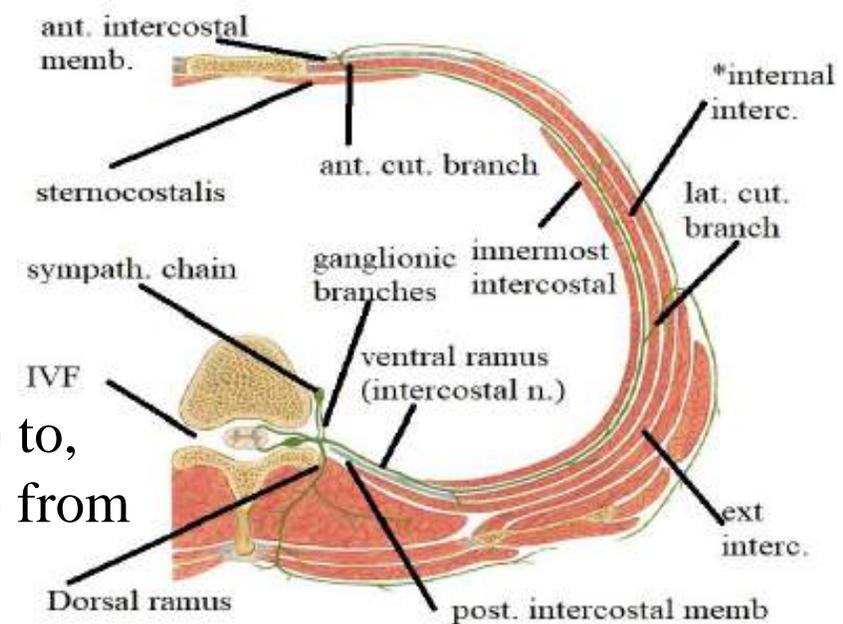
**Collateral branch :**

runs along the upper border of the rib below supplies the intercostal muscles.

**Lateral cutaneous branch :-**

in midaxillary line it pierces internal & external intercostal & serratus ant. to divide into ant. & post. branches to supply skin of lateral part of thoracic wall

**N.B:** the lat. cutaneous br. of the 2<sup>nd</sup> intercostal n. does not divide but passes laterally to supply the axilla as the **intercostobrachial n.**



# TYPICAL INTERCOSTAL NERVES

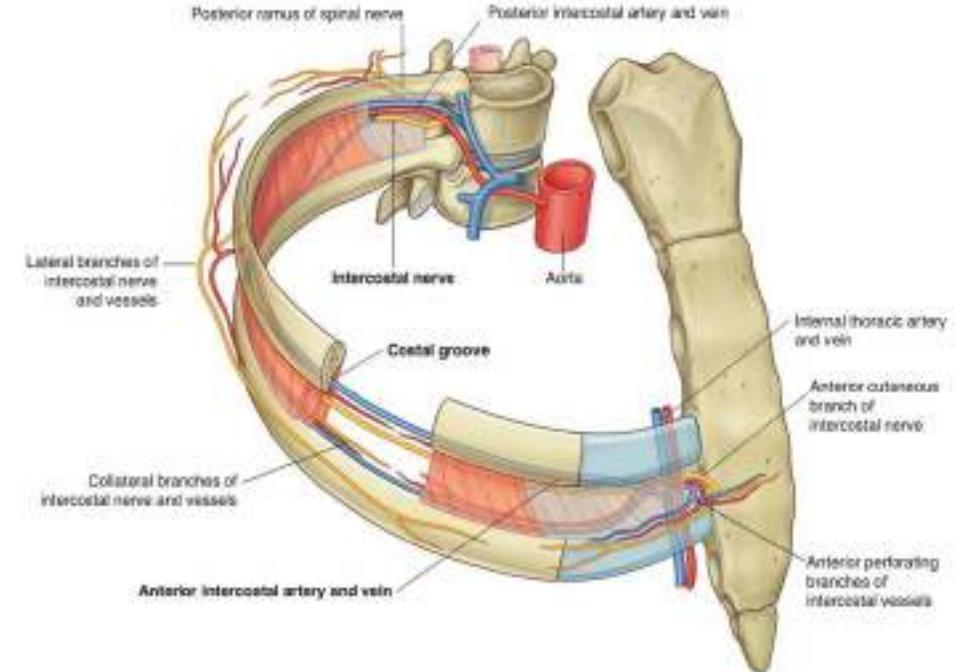
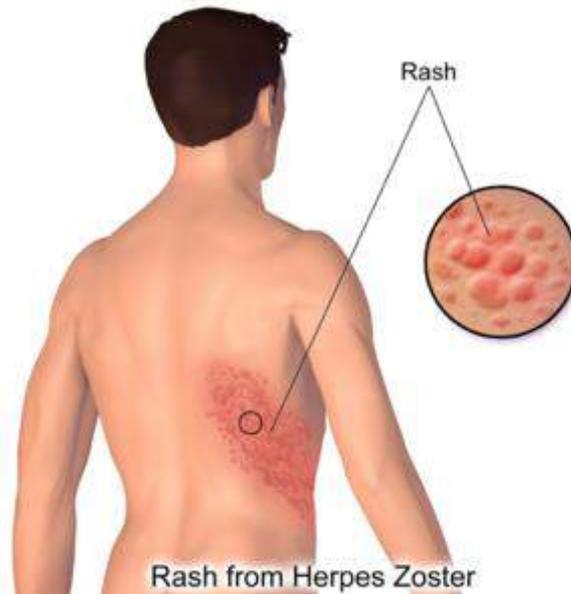
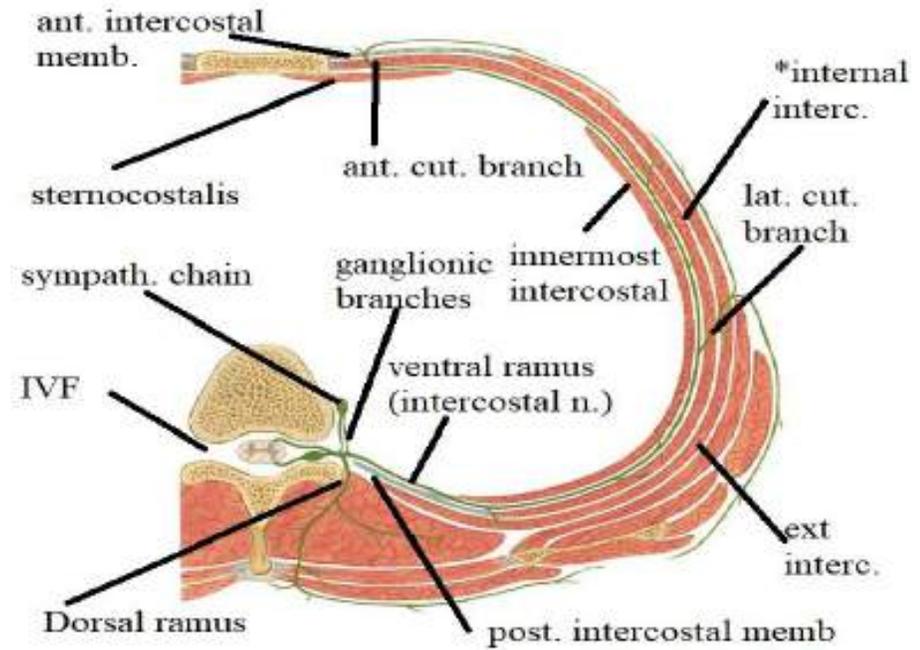
## Branches :

### Ant. cutaneous branch:

pierce internal intercostal , ant. intercostal membrane & pectoralis major to divide into med. & lat. Branches to supply skin of ant. part of thoracic wall

### Pleural branches

### Meningeal branches





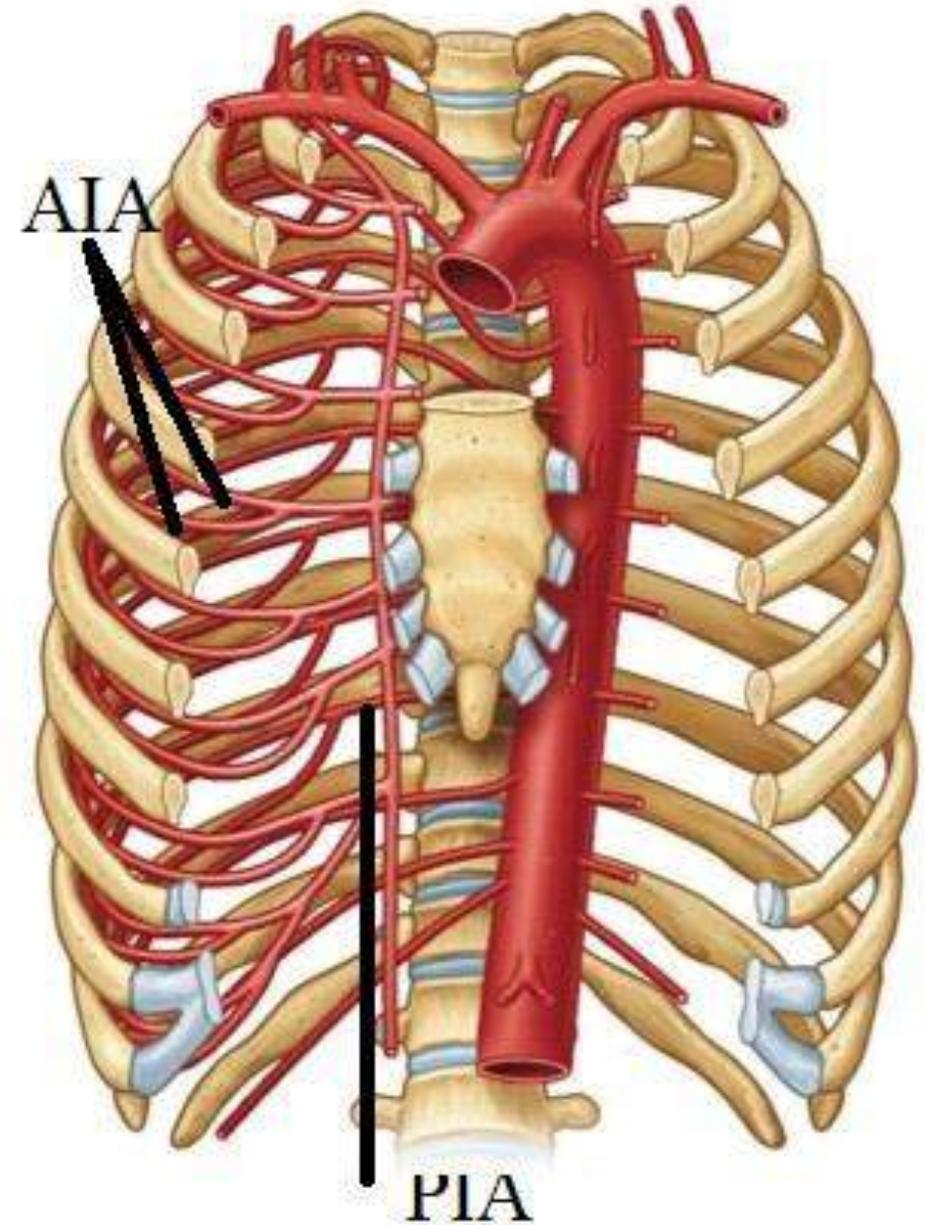
# INTERCOSTAL ARTERIES

# CLASSIFICATION

2 sets of arteries:-

- 1- posterior intercostal artery
- 2- two anterior intercostal arteries.

These arteries anastomose with each other



# INTERNAL THORACIC (MAMMARY) ARTERY

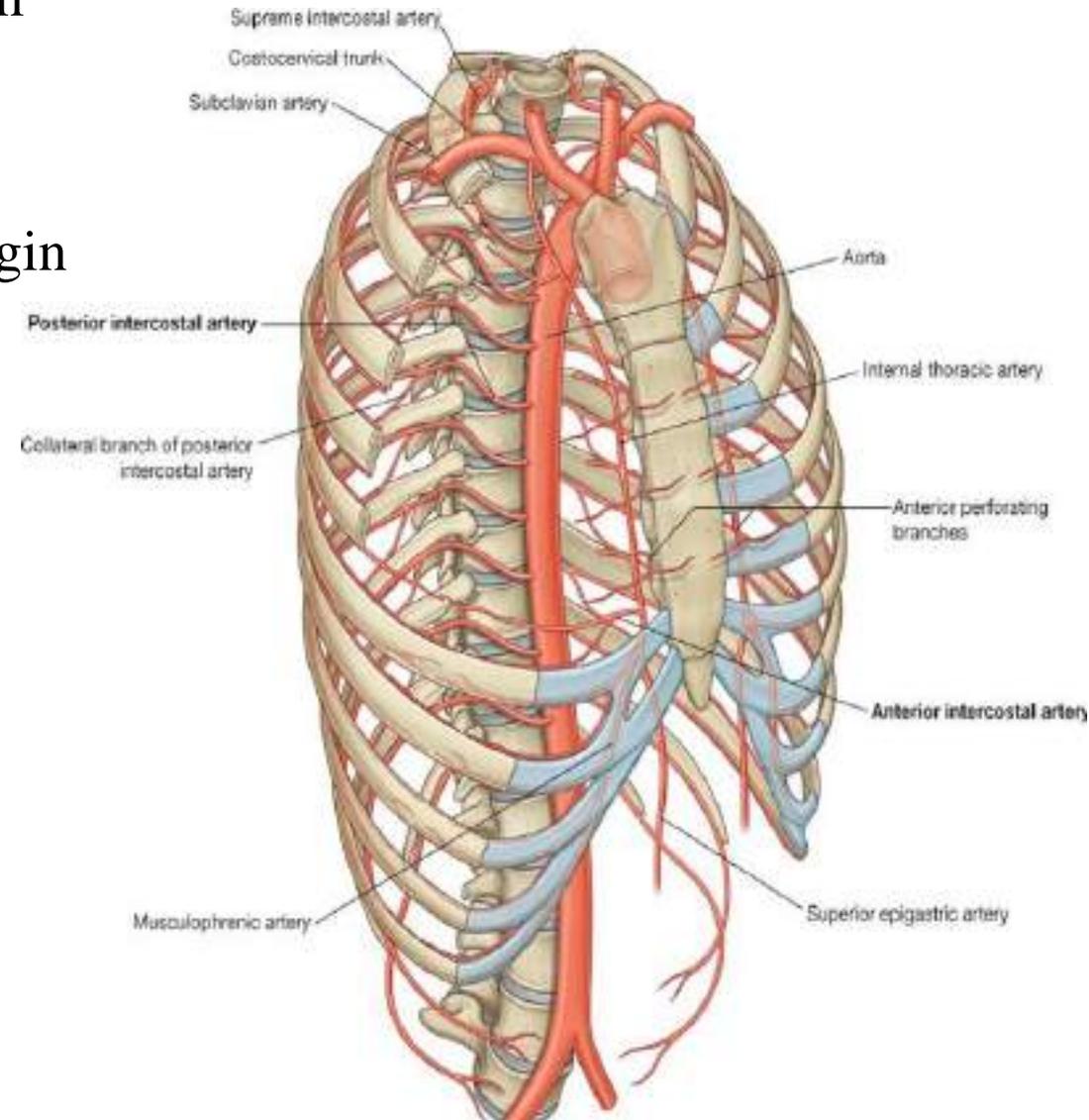
**O.:-** 1st part of subclavian artery

**C.:-** descends vertically 1 cm lateral to sternum

**End:** in 6th intercostal space by dividing into

1-superior epigastric artery enter rectus sheath

2-musculophrenic artery runs along costal margin



# ANTERIOR INTERCOSTAL ARTERIES

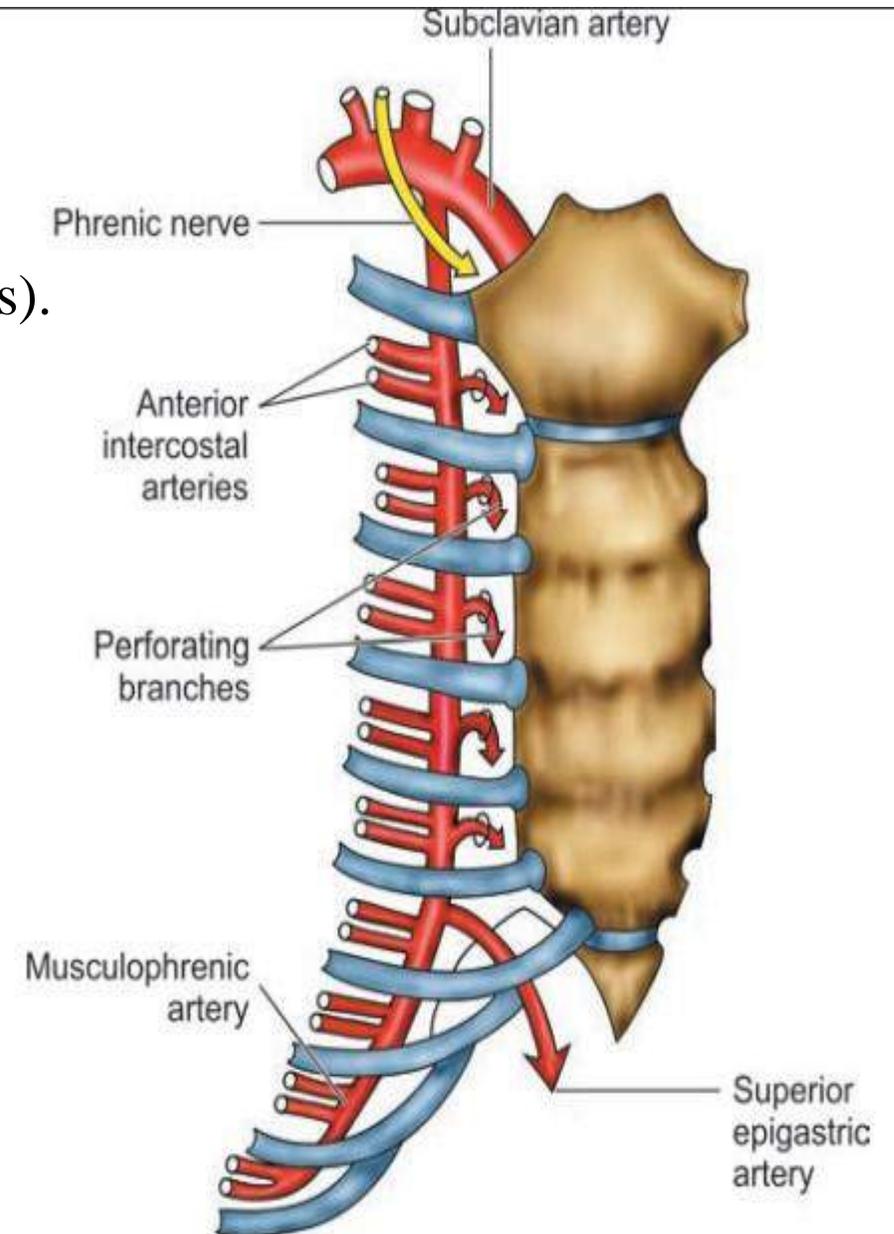
## Number:

there are 2 ant. intercostal arteries  
in each of the upper 9 intercostal spaces  
(no ant intercostal arteries in the 10<sup>th</sup> & 11<sup>th</sup> spaces).

**O.:-** upper 6 from internal thoracic artery  
lower 3 from musculophrenic artery

**C.-** run on margins of the space

**END:-** anastomosis with corresponding  
post. intercostal art & its collateral branch



# POSTERIOR INTERCOSTAL ARTERIES

**Number:** there is one posterior intercostal artery in each of the 11 intercostal spaces.

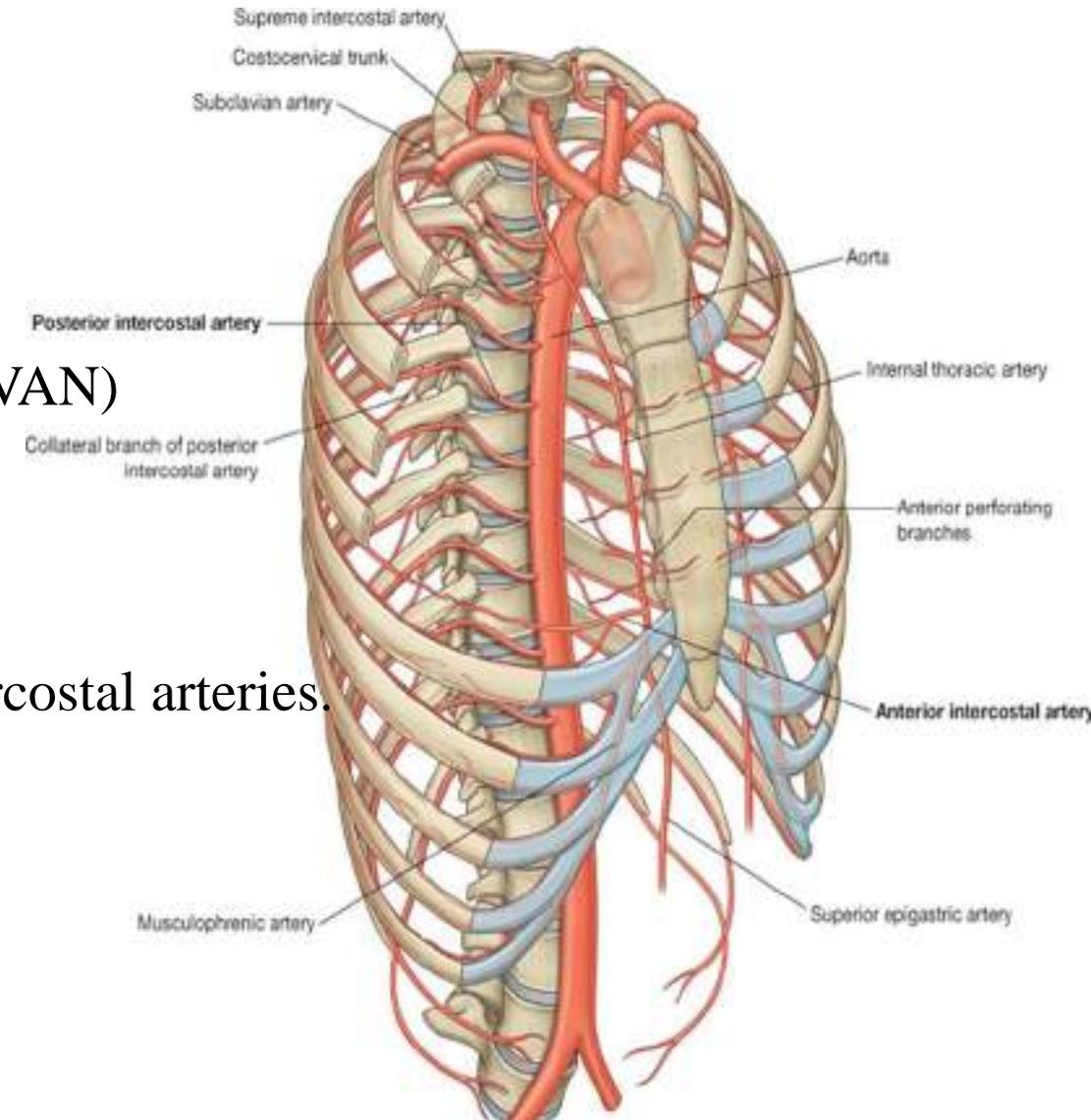
**O.:-**

1<sup>st</sup> & 2<sup>nd</sup> arise from superior intercostal art.  
from Costocervical trunk  
from 2<sup>nd</sup> part of subclavian art.

3<sup>rd</sup> till 11<sup>th</sup> from descending thoracic aorta

**C.:-** follow the course of the intercostal nerve (VAN)  
gives a Collateral branch which runs  
along the upper border of the rib below.

**END:-** the post-intercostal & its Collateral br.  
end by anastomosing with the 2<sup>ant</sup>- intercostal arteries.





# INTERCOSTAL VEINS

# ANTERIOR INTERCOSTAL VEINS

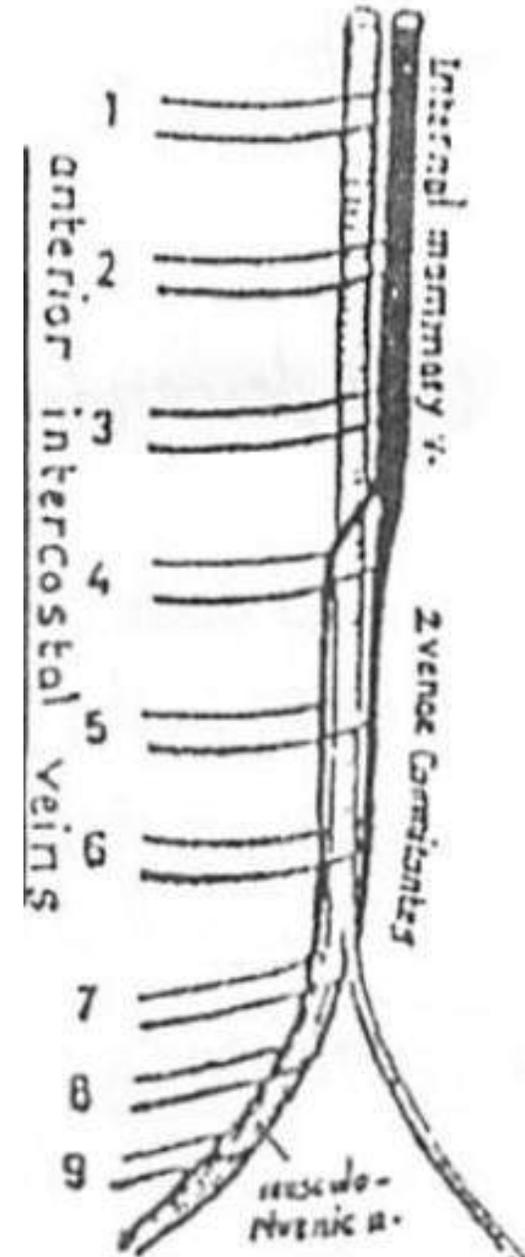
- Correspond to the arteries there are 2 veins in each space.

Veins of the 9<sup>th</sup>, 8<sup>th</sup> & 7<sup>th</sup> spaces: end in venae comitantes of the musculophrenic a.

Veins of the 6<sup>th</sup>, 5<sup>th</sup> & 4<sup>th</sup> spaces: end in venae comitantes of the internal mammary a.

Veins of the 3<sup>rd</sup>, 2<sup>nd</sup> & 1<sup>st</sup> spaces: end in internal mammary v.

**N.B:** the venae comitantes of the int. mammary artery unite opposite the 3<sup>rd</sup> intercostal space to form the internal mammary v. Which ends in the brachiocephalic v.



# POSTERIOR INTERCOSTAL VEINS

- there are 11 post. intercostal veins on each side (one in each space).
- they have different arrangement on both sides:

## On Rt. side

1<sup>st</sup> end in **rt brachiocephalic v.**

2<sup>nd</sup> & 3<sup>rd</sup> & 4<sup>th</sup> unite to form **rt superior intercostal vein** that ends in **arch of azygos vein**

5<sup>th</sup> to 11<sup>th</sup> end in **azygos vein**

## On Lt. side :

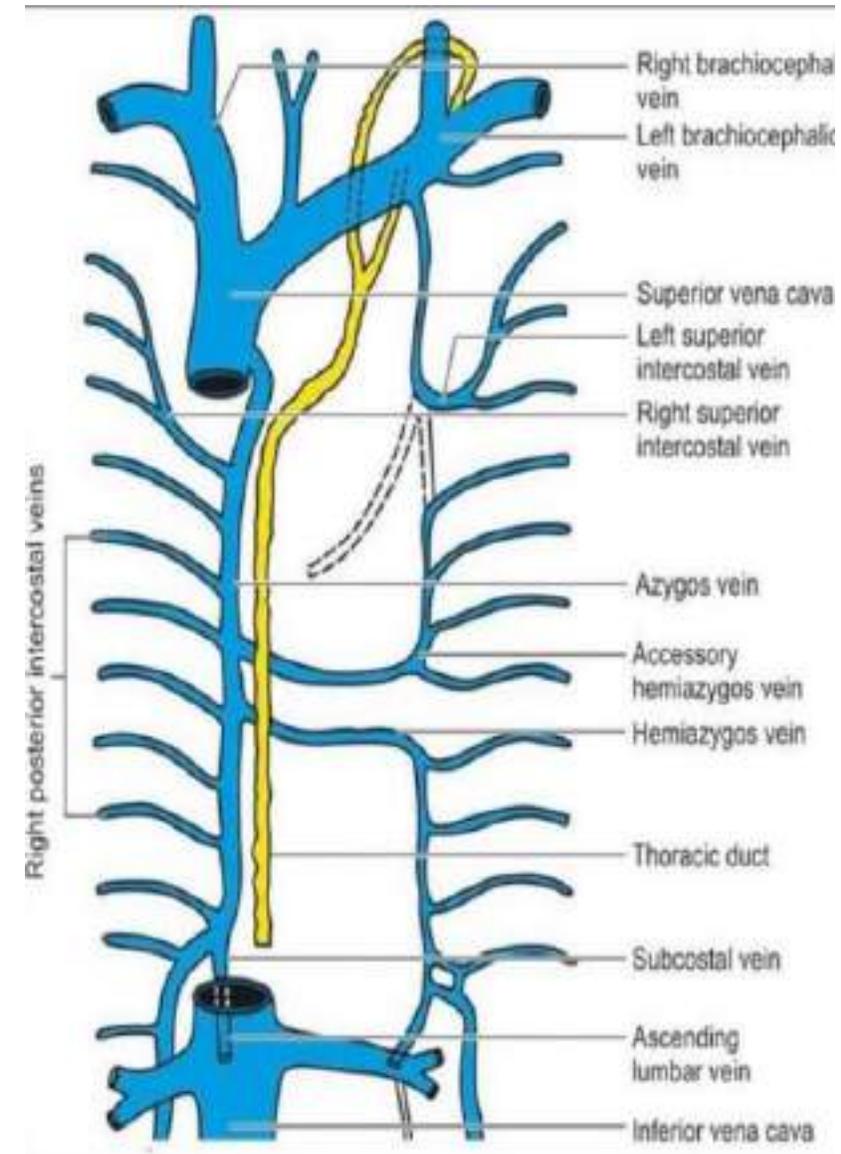
1<sup>st</sup> end in **lt brachiocephalic v**

2<sup>nd</sup> & 3<sup>rd</sup> & 4<sup>th</sup> unite to form **lt superior intercostal vein**

That ends in **lt Brachiocephalic vein**

5<sup>th</sup> to 8<sup>th</sup> end in **superior hemizygous** that end in **azygos**

9<sup>th</sup> to 11<sup>th</sup> end in **inferior hemizygous** that end in **azygos v.**



# AZYGOS VEIN

**O.:-**From the back of the inferior vena cava.

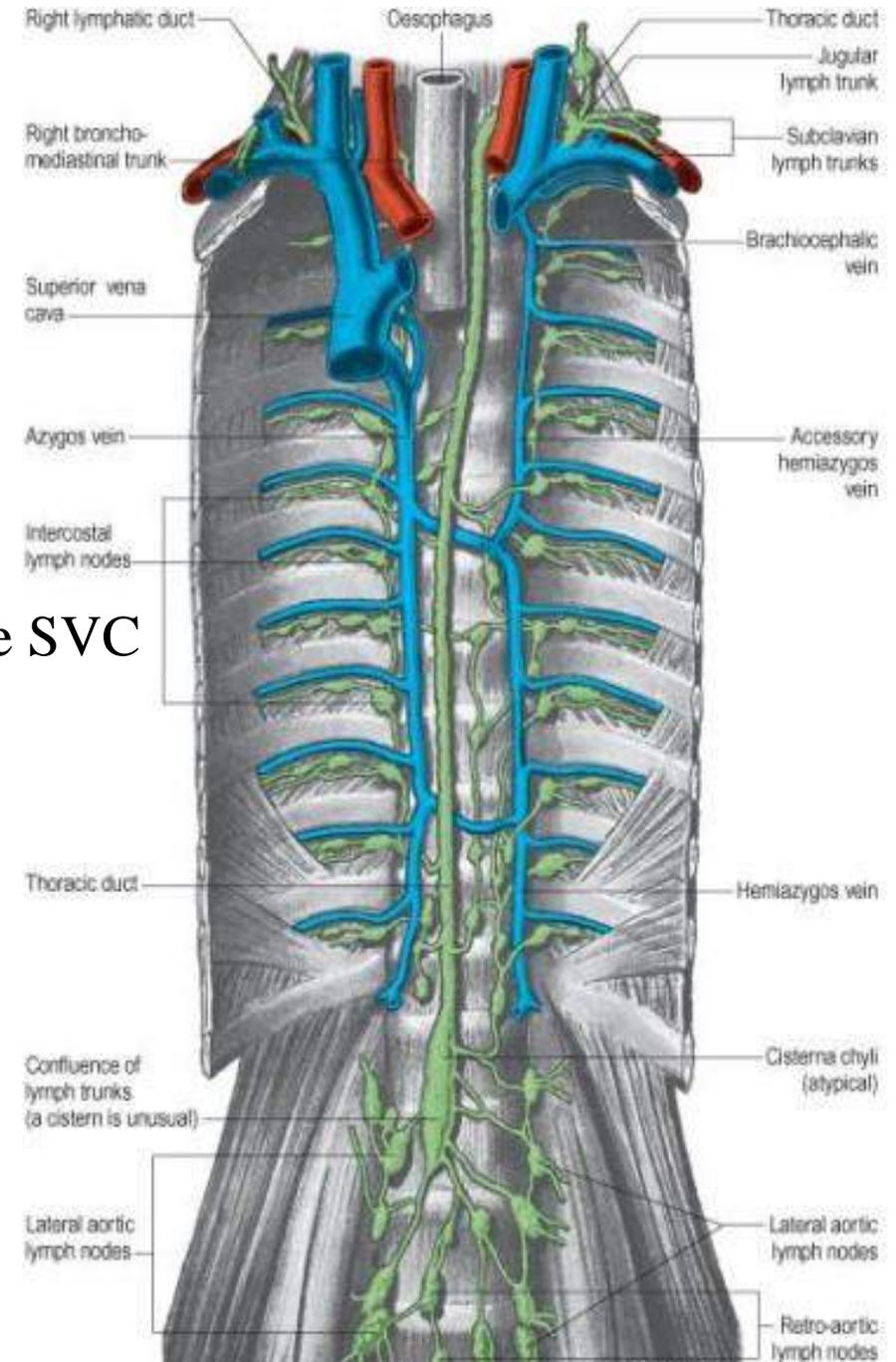
OR the union of the right subcostal and right ascending lumbar veins.

**C.:-**

- It ascends in the posterior mediastinum, close to the right sides of the lower 8 thoracic vertebrae
- It arches over the root of the right lung to end in the SVC

- **Tributaries**

- ✓The rt posterior intercostal veins,
- ✓The vertebral venous plexuses that drain the back, vertebrae, and structures in the vertebral canal.
- ✓The mediastinal,
- ✓Esophageal, and
- ✓Bronchial veins

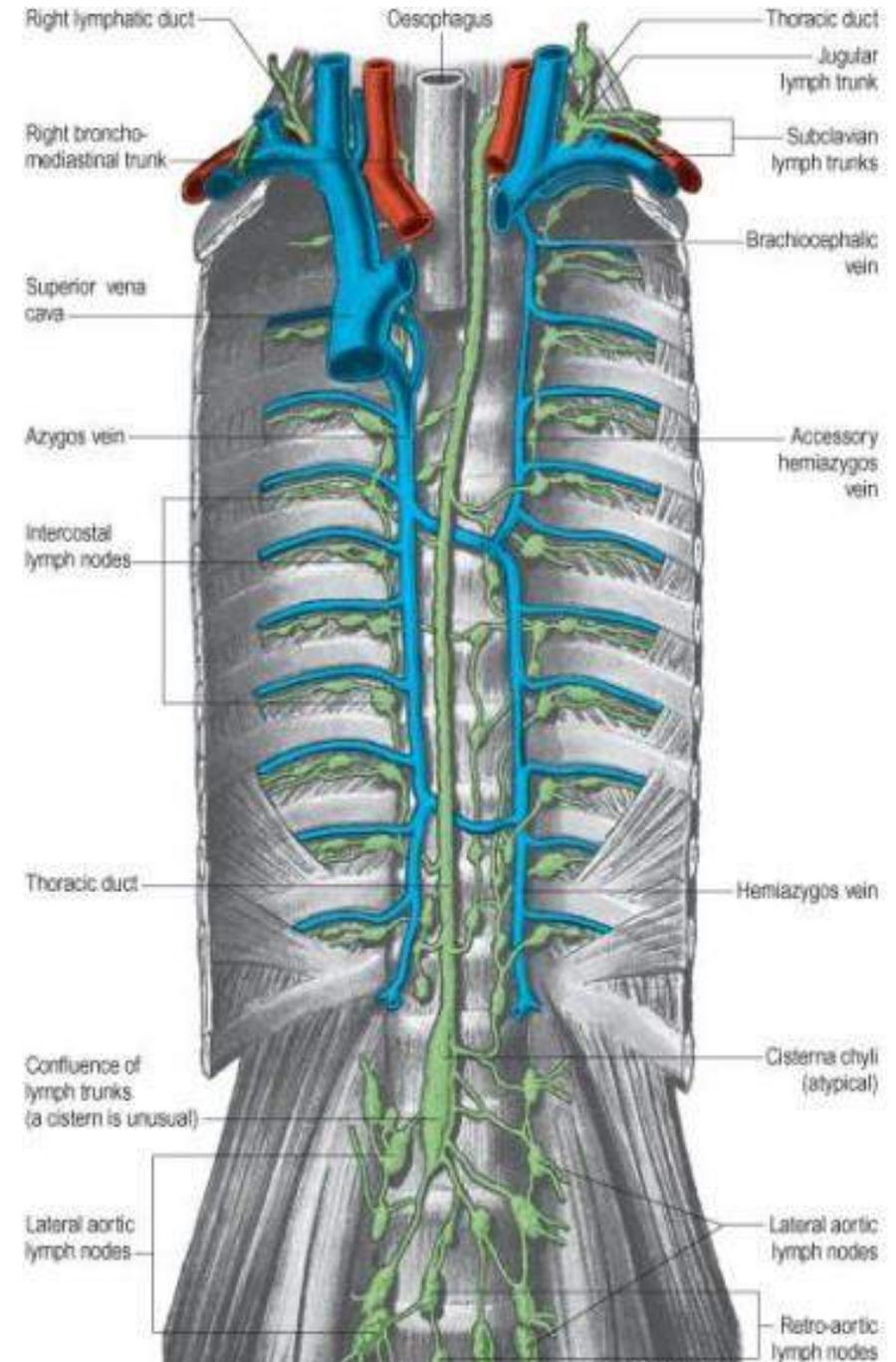


# HEMIZYGOS VEIN

**O.:-** the union of the left subcostal and left ascending lumbar veins.

**C.:-**

- It ascends in the posterior mediastinum, close to the left sides of the lower 4 thoracic vertebrae
- It crosses to the right opposite T9 Vertebra to end in the azygos vein
- **Tributaries**
  - ✓The lt 9<sup>th</sup> -11<sup>th</sup> posterior intercostal veins,
  - ✓The mediastinal veins
  - ✓Esophageal veins



# ACCESSORY HEMIZYGOUS VEIN

**O.:-** at the medial end of the 4th or 5th intercostal space

**C.:-** and descends on the left side of vertebral column from T5 through T8.

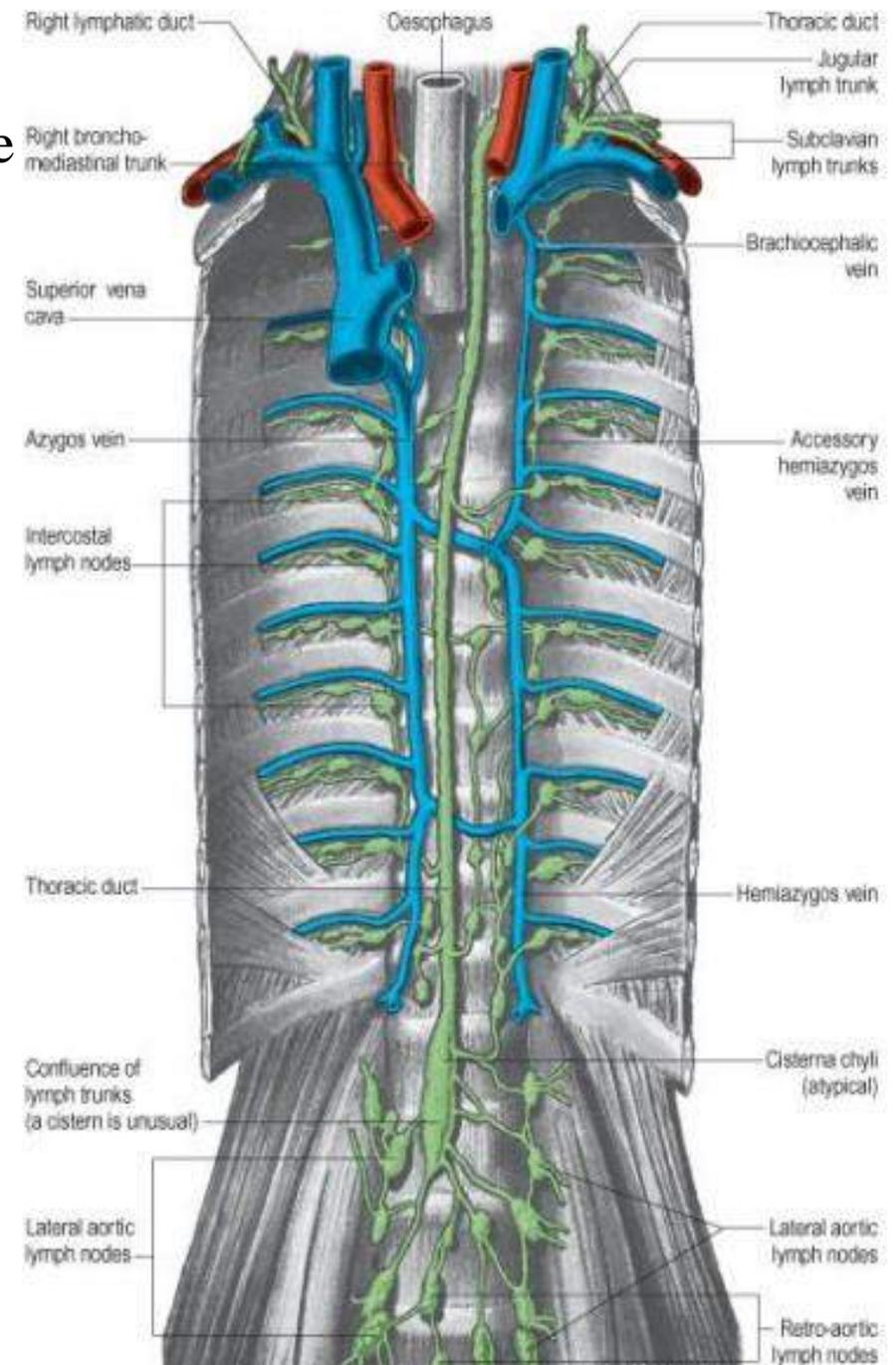
It crosses to the right opposite T8 vertebra to end in the azygos vein

- **Tributaries**

✓ veins in the lt 5th-8th intercostal spaces and

✓ sometimes the left bronchial veins

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**THANQ**