

ANATOMY

MD1

ANATOMY

- THE BASICS
- HEAD
- NEUROANATOMY
- NECK
- THORAX
- BACK
- UPPER LIMB
- LOWER LIMB
- ABDOMEN
- PELVIS

ANATOMY

THORAX

THORAX

AREAS

- Superior Mediastinum
- Anterior Mediastinum
- Middle Mediastinum
- Posterior Mediastinum

BONES

- Ribs
- Sternum
- Thoracic Spine

MUSCLES

- Thoracic Cage
- Diaphragm

ORGANS

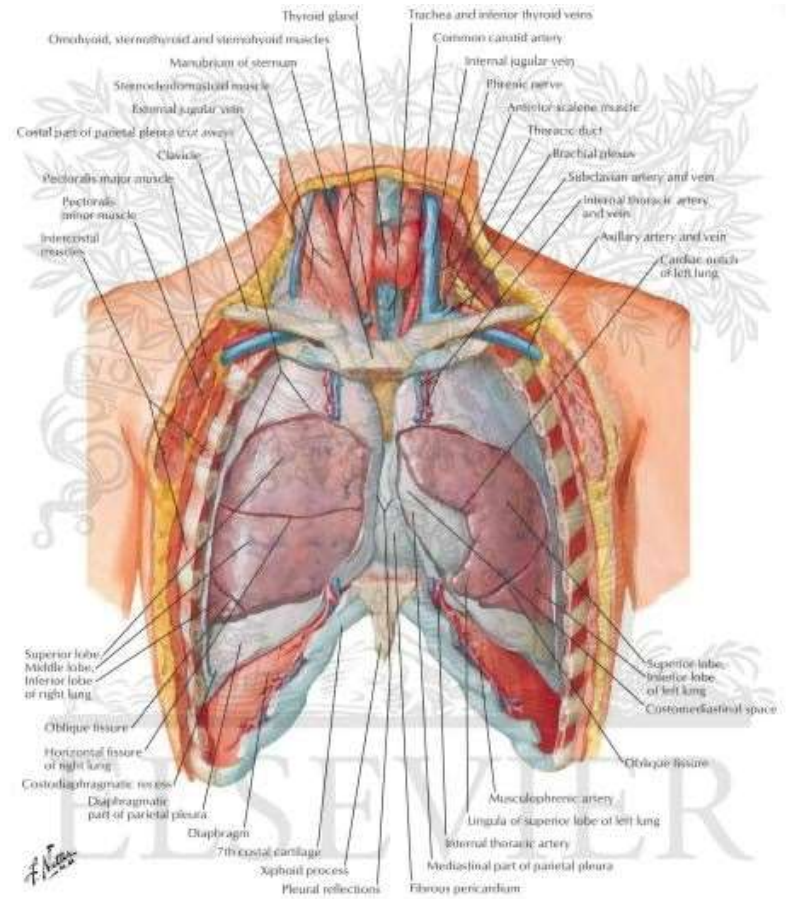
- Thymus Gland
- Mammary Glands
- Heart
- Lungs
- Tracheobronchial Tree
- Pleurae

VASCULATURE

- Aorta
- Superior Vena Cava

THORAX

Overview



AREAS OF THORAX

AREAS

SUPERIOR MEDIASTINUM

ANTERIOR MEDIASTINUM

MIDDLE MEDIASTINUM

POSTERIOR MEDIASTINUM

AREAS OF THORAX

Superior Mediastinum

Borders

Contents

Great Vessels

Arch of Aorta

Superior Vena Cava

Nerves

Vagus Nerve

Phrenic Nerve

Other Nerves

Other Structures in the Superior Mediastinum

Thymus

Trachea

Oesophagus

Thoracic duct

Muscles

Superior Mediastinum

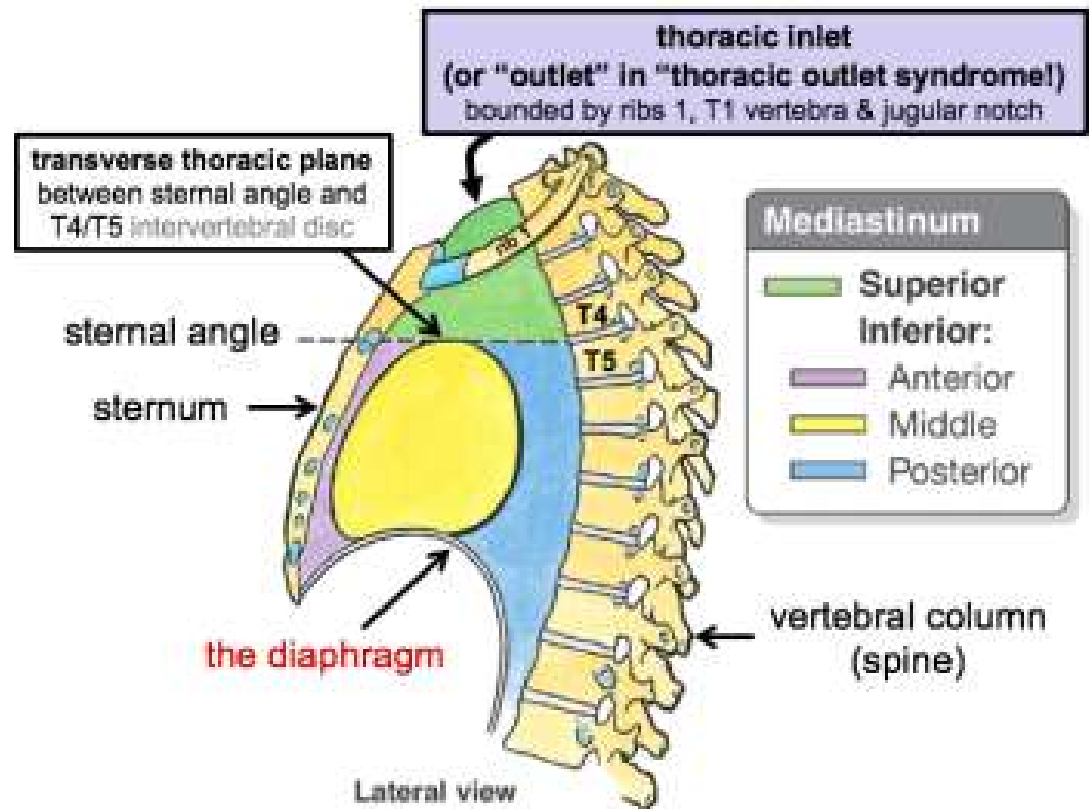
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- **Superior mediastinum** – extends upwards, terminating at the superior thoracic aperture.
- **Inferior mediastinum** – extends downwards, terminating at the diaphragm. It is further subdivided into the anterior mediastinum, middle mediastinum and posterior mediastinum.

Thorax

Mediastinum



SUPERIOR MEDIASTINUM

Borders

The superior mediastinum is bordered by the following thoracic structures:

Superior – Thoracic inlet.

Inferior – Continuous with the inferior mediastinum at the level of the sternal angle.

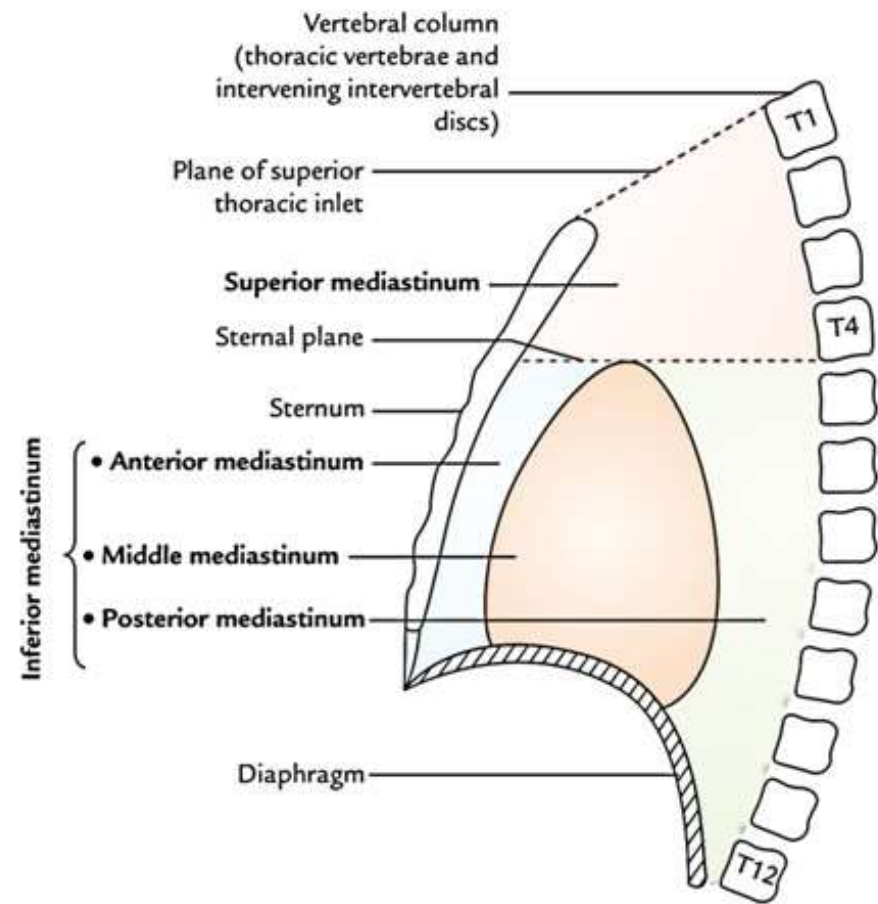
Anterior – Manubrium of the sternum.

Posterior – Vertebral bodies of T1-4.

Lateral – Pleurae of the lungs.

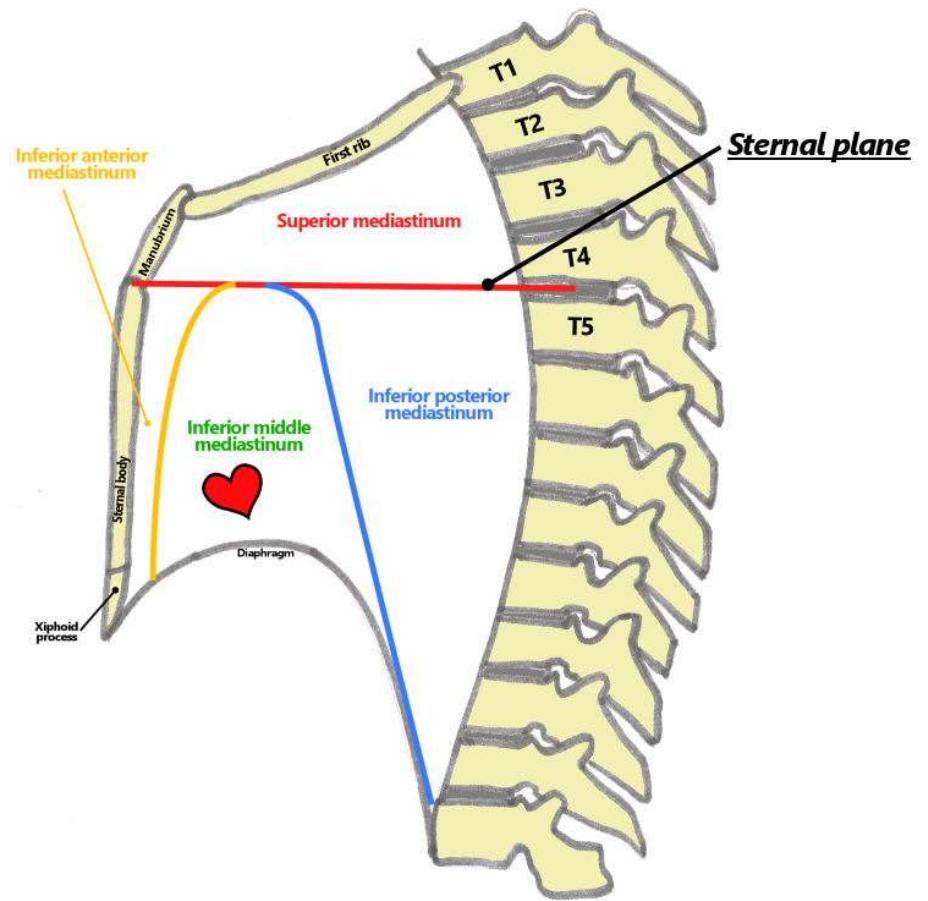
Thorax

Borders of Superior Mediastinum



Superior Mediastinum

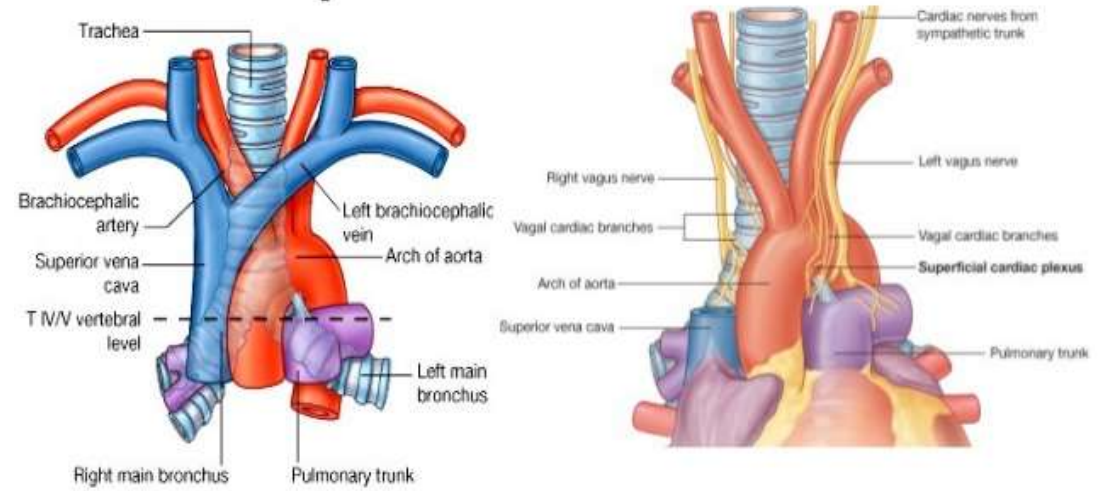
Borders



THORAX

Superior Mediastinum

Superior Mediastinum



SUPERIOR MEDIASTINUM

Contents

The superior mediastinum contains Nerves, Vessels and respiratory structures passing from the adjacent regions of the neck and abdomen (via the inferior mediastinum).

- **Great Vessels**
- **Nerves**
- **Glands**

SUPERIOR MEDIASTINUM

Contents

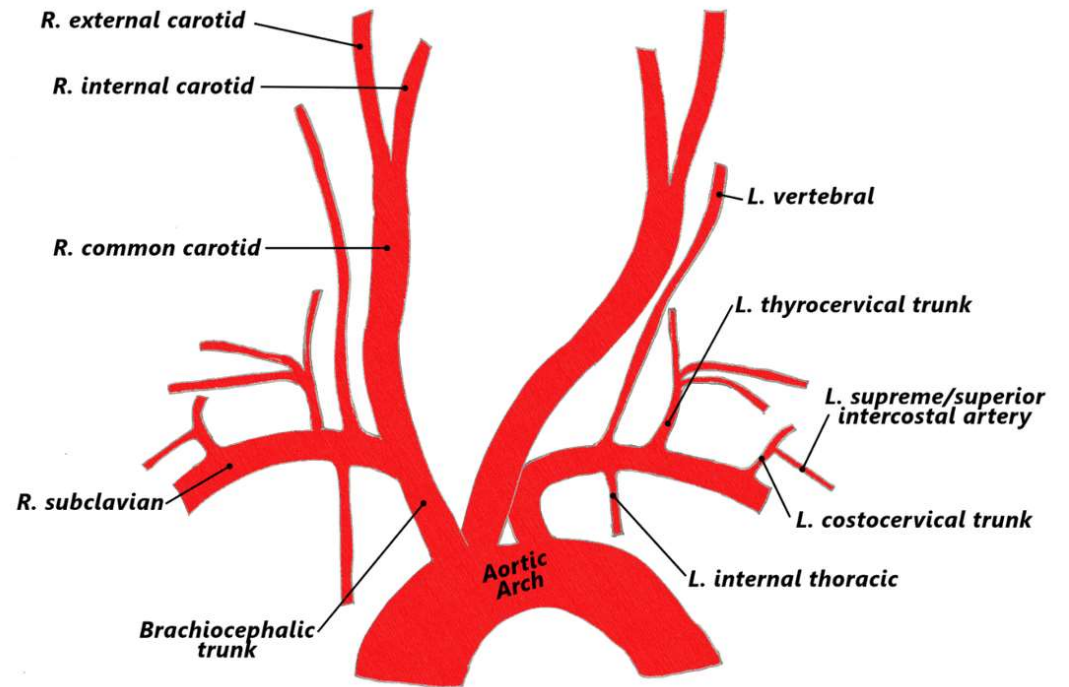
Arch of Aorta

The three major branches of the aortic arch arise within the superior mediastinum:

- **Brachiocephalic artery** – supplying the right side of the head & neck and the right upper limb.
- **Left Common carotid artery** – to the left side of the head & neck.
- **Left Subclavian artery** – to the left upper limb.

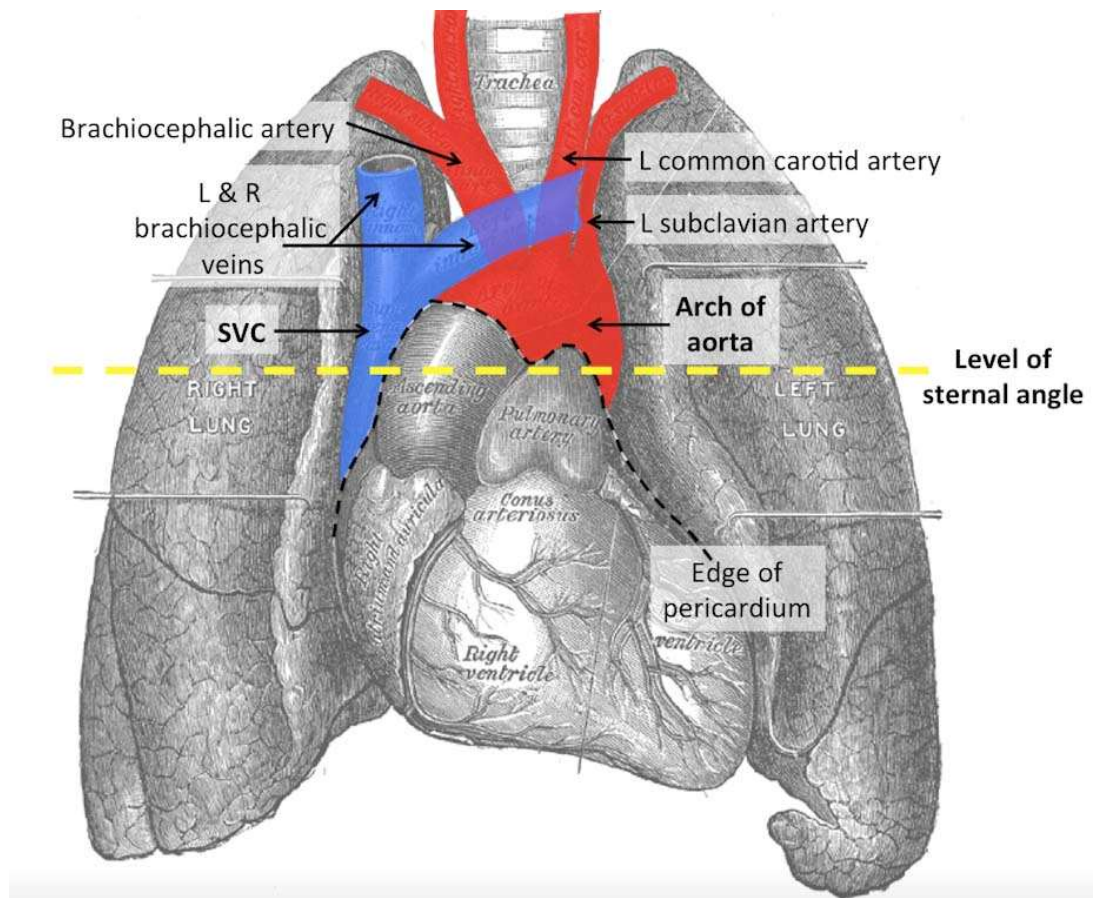
Superior Mediastinum

Arch Of Aorta



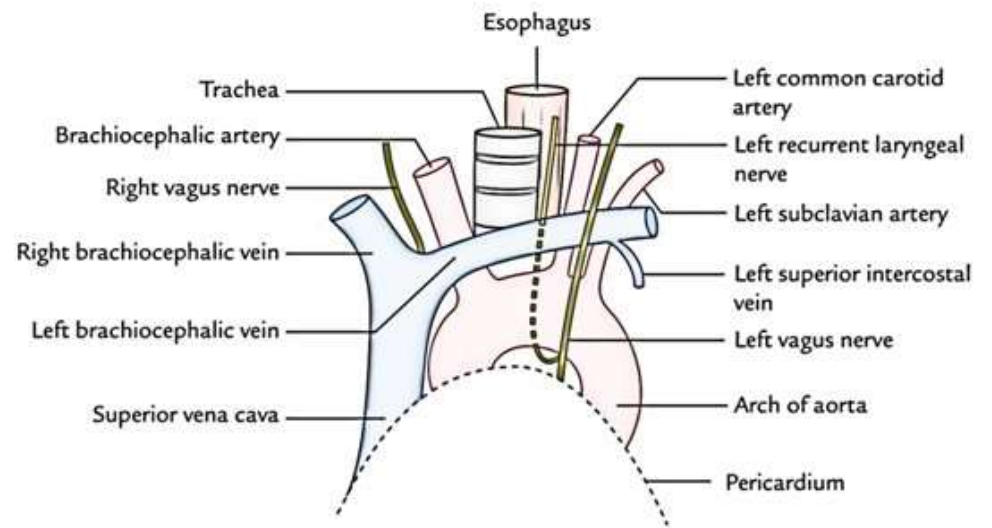
Thorax

Contents of Superior Mediastinum



Thorax

Superior Mediastinum



Superior Mediastinum

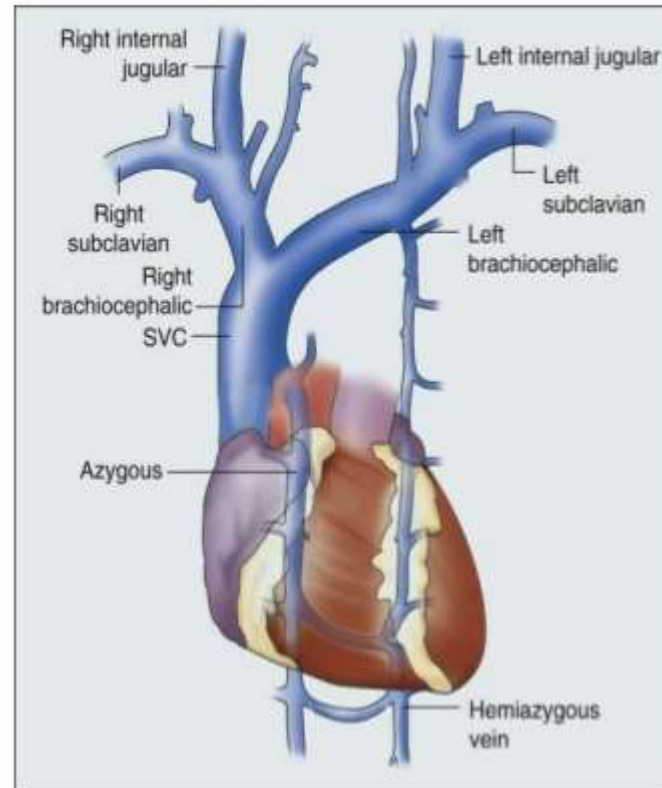
Superior Vena Cava

- The following tributaries of the superior vena cava are located within the superior mediastinum:
- **Brachiocephalic veins** – draining blood from the upper body.
- **Left superior intercostal vein** – collects blood from the left 2nd and 3rd intercostal vein. It drains into the left brachiocephalic vein.
- **Supreme intercostal vein** – drains the vein from first intercostal space directly into the brachiocephalic veins.
- **Azygos vein** – receiving blood from the right posterior intercostal veins. The left intercostal veins drain first into the hemiazygos and accessory hemiazygos veins before joining the azygos vein around T7-T9.

SUPERIOR MEDIASTINUM

Superior Vena Cava

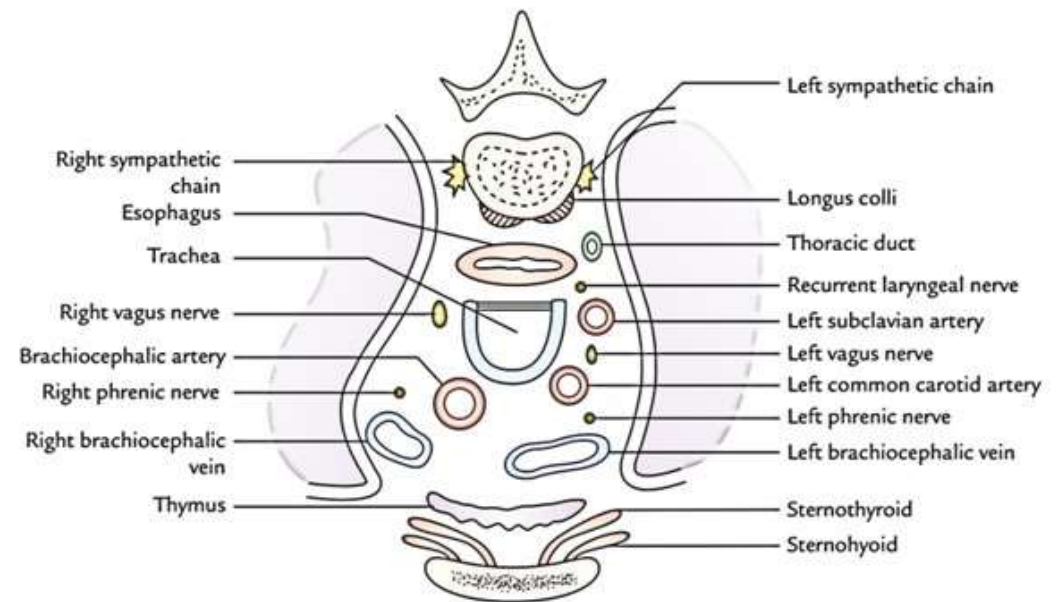
Anatomy



- Thin walled.
- Low pressure vessel.
- Drainage of venous blood from upper half of body.
- 7cm in length.
- 20-22mm in diameter.

Thorax

Contents Of Superior Mediastinum





Superior Mediastinum

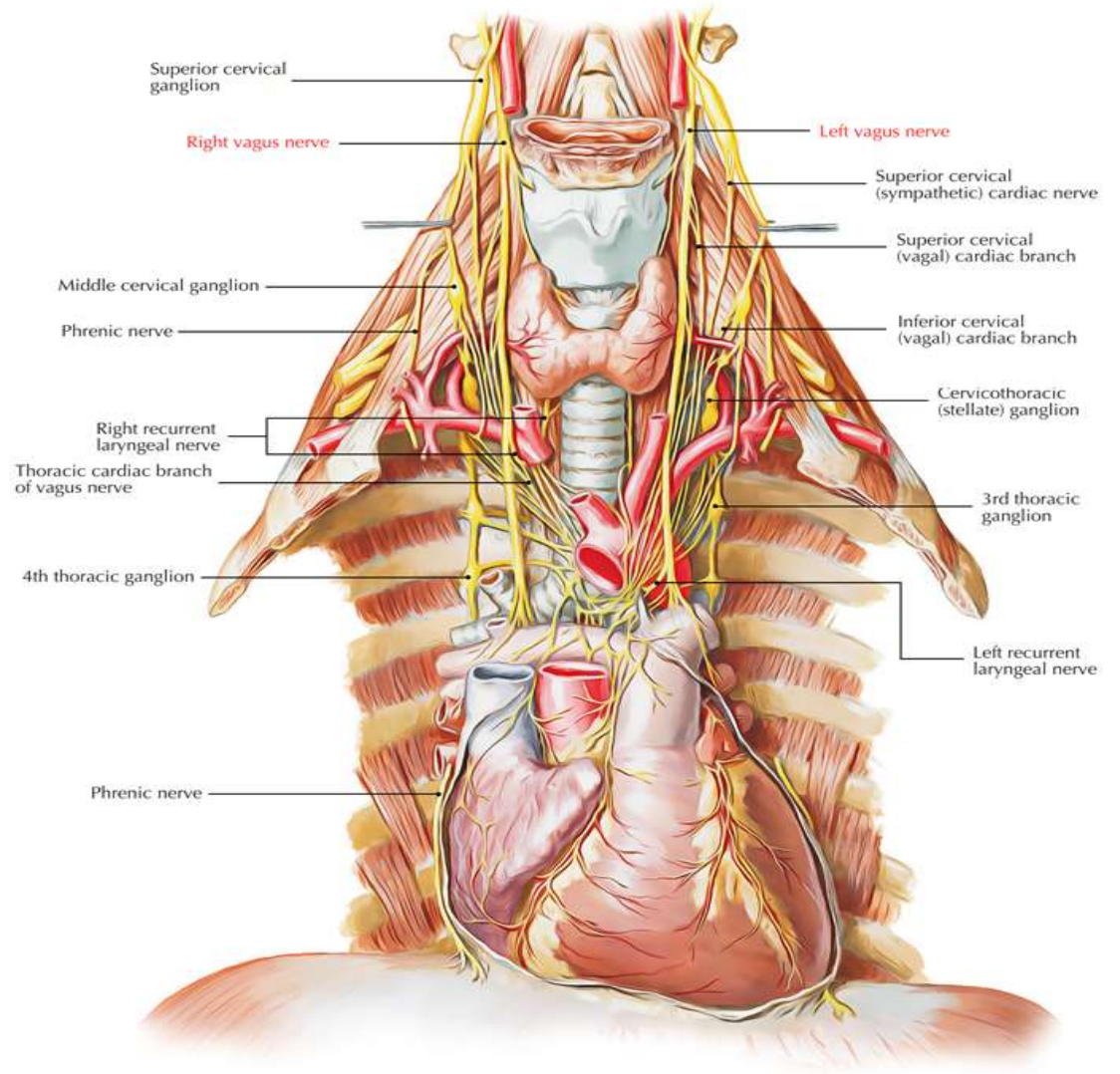
Nerves

Vagus Nerve

- In the superior mediastinum, the Vagus nerve has two distinctive paths:
- **Right Vagus nerve** – runs parallel to the trachea and passes posteriorly to the superior vena cava and the right primary bronchus.
- **Left Vagus nerve** – enters the superior mediastinum between the left common carotid and the left subclavian arteries. It descends anteriorly to the aortic arch, before travelling posterior to the left bronchus.
- The **left recurrent laryngeal nerve** arises from the left Vagus nerve as it passes the aortic arch. It loops under the arch, to the left of **ligamentum arteriosum**, before continuing its journey to the larynx in the tracheal-oesophageal groove.

SUPERIOR MEDIASTINUM

Vagus Nerve in Thorax





Superior Mediastinum

Phrenic Nerve

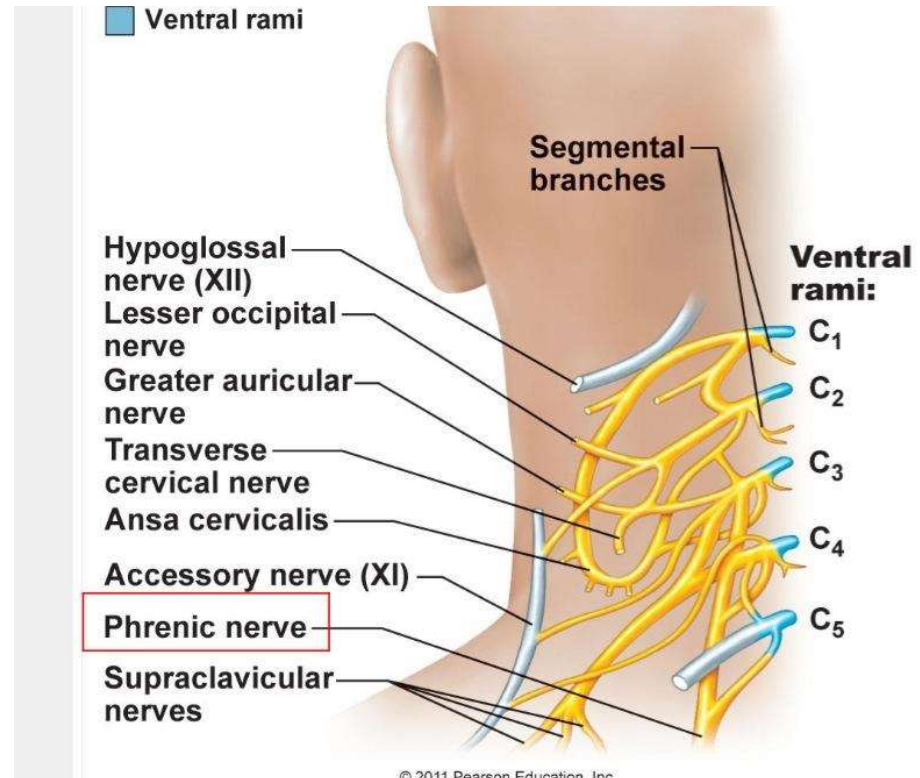
- From the anterior surface of the **anterior scalene** muscle, the phrenic nerves (roots C3, C4 and C5) enter the superior mediastinum lateral to the great vessels. They then descend anteriorly into the middle mediastinum, passing anteriorly to the **hilum** of the lungs.

Other Nerves

- **Cardiac nerves** – originate from the superior, middle and inferior cardiac ganglion and form the **superficial and deep cardiac plexuses** in the superior mediastinum. The superior plexus sits between the aortic arch and right pulmonary vein. The deep plexus lies on the surface of the trachea at the point of bifurcation.
- **Sympathetic trunk** – runs bilaterally to the vertebral bodies along the entire length of the vertebral column.

SUPERIOR MEDIASTINUM

Phrenic Nerve



Phrenic I
supplies
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muscle ca
breathing

Superior Mediastinum

Other Structures in the Superior Mediastinum

Thymus

- The thymus gland is the most anterior structure within the superior mediastinum. It sits flush against the posterior surface of the sternum and extends into the anterior mediastinum (Fig 4) and can often reach into the neck.

Trachea

- The trachea bifurcates into the primary bronchi posterior to the ascending aorta at the level of the sternal angle.

Oesophagus

- The oesophagus ascends towards the pharynx, which it joins at the level of C6.

Thoracic duct

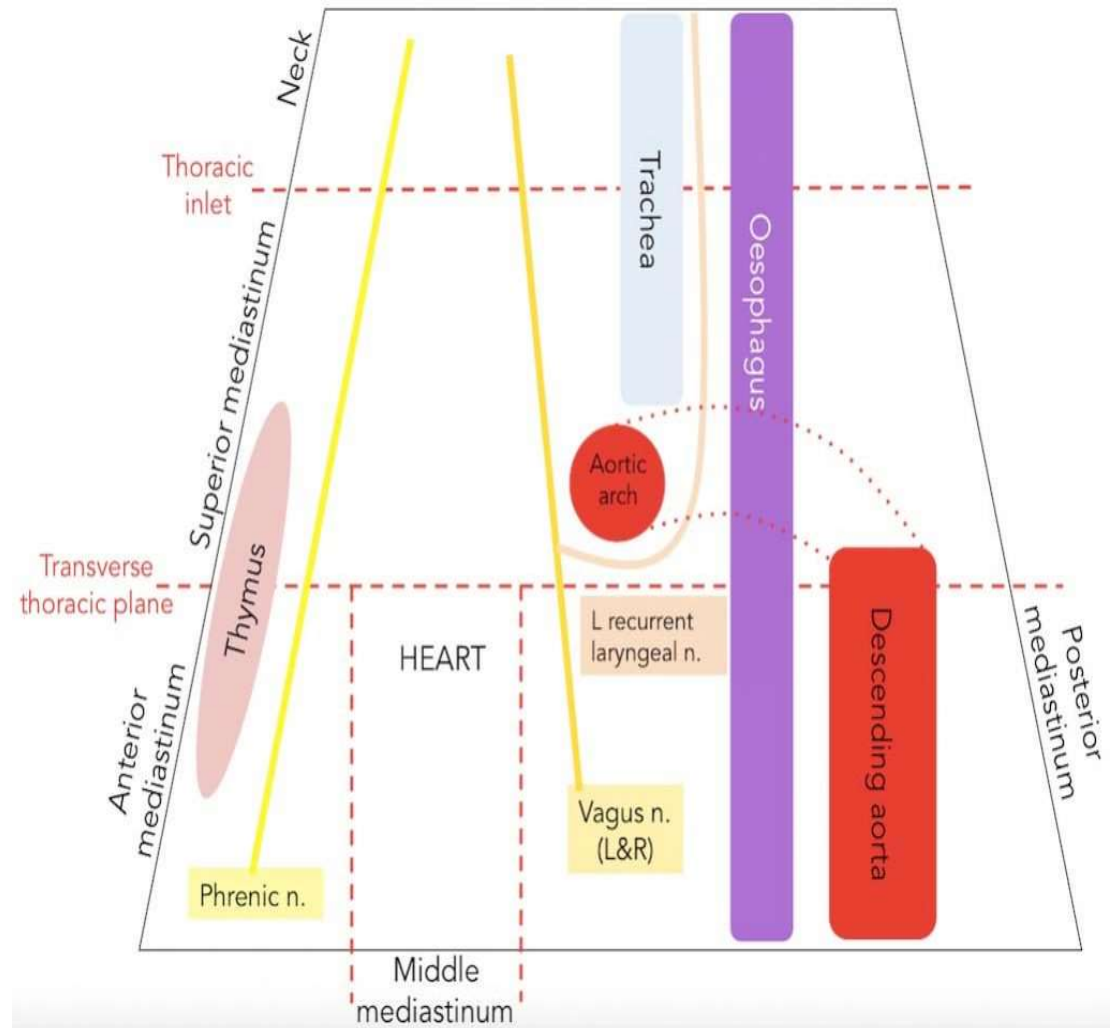
- In the superior mediastinum, the thoracic duct passes to the left of the oesophagus on its path to the junction of the left internal jugular and subclavian veins.

Muscles

- The sternohyoid and sternothyroid muscles originate from the posterior surface of the manubrium. They are part of the infrahyoid muscle group of the neck.
- The inferior aspect of the Longus Colli muscle also originates within the superior mediastinum.

Superior Mediastinum

Schematic Diagram



Mediastinum is divided into superior and inferior mediastinum at what level?

- A. C4
- B. C7
- C. T4
- D. L1

Which of the following vessels within the superior mediastinum drain blood from the Posterior Intercostals?

Brachiocephalic Veins

Left Superior intercostal

Supreme intercostal Vein

Azygous Vein

THORAX

Areas of Thorax

AREAS OF THORAX

ANTERIOR MEDIASTINUM

ANTERIOR MEDIASTINUM

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ANTERIOR MEDIASTINUM

Borders and Contents

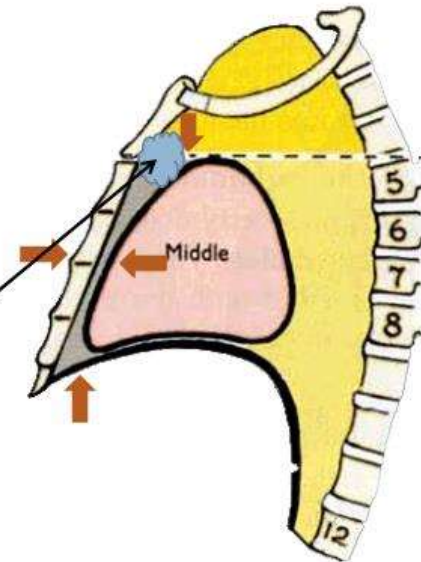
ANTERIOR MEDIASTINUM

BOUNDARIES:

- **Superior:** Horizontal plane
- **Inferior:** Diaphragm
- **Anterior:** Body & xiphoid process of sternum
- **Posterior:** Heart
- **Lateral:** Lungs & pleurae

CONTENTS:

- Thymus gland
- Lymph nodes



ANTERIOR MEDIASTINUM

Borders

- The anterior mediastinum is bordered by the following thoracic structures:
- **Lateral borders:** Mediastinal pleura (part of the parietal pleural membrane).
- **Anterior border:** Body of the sternum and the transversus thoracis muscles.
- **Posterior border:** Pericardium.
- **Roof:** Continuous with the superior mediastinum at the level of the sternal angle.
- **Floor:** Diaphragm.

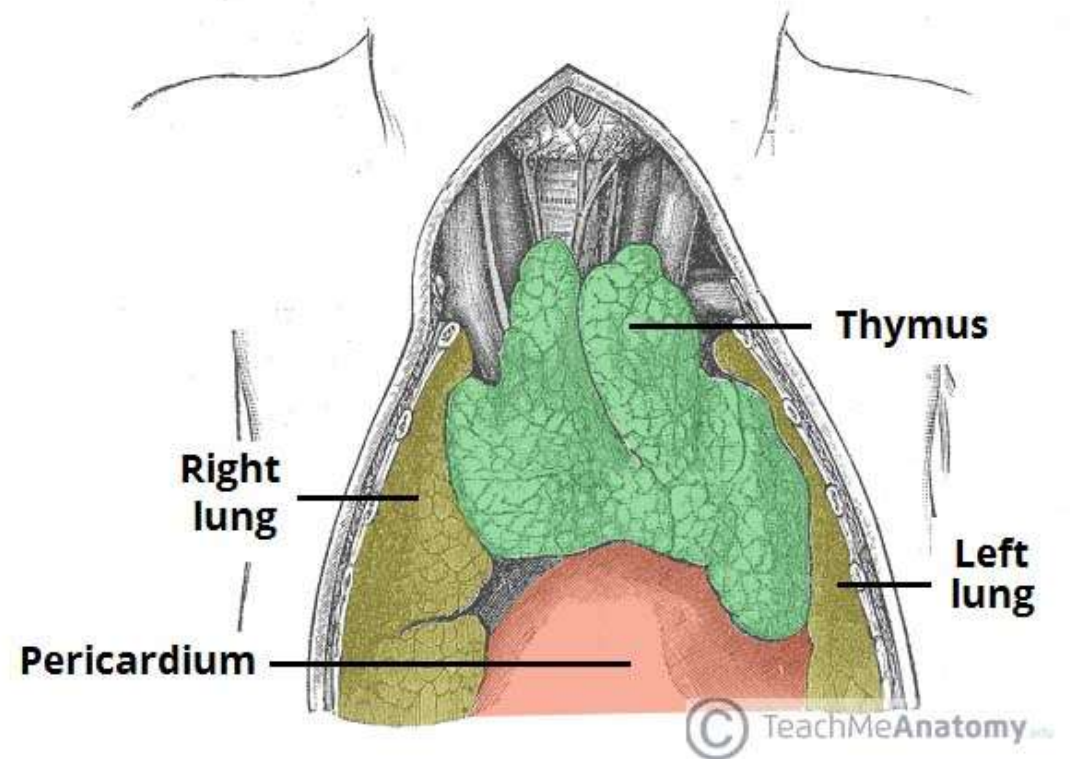
ANTERIOR MEDIASTINUM

Contents

- The anterior mediastinum contains no major structures. It accommodates loose connective tissue (including the **Sternopericardial Ligaments**, which tether the pericardium to the sternum), fat, some lymphatic vessels, lymph nodes and branches of the internal thoracic vessels.
- In infants and children, the [Thymus](#) extends inferiorly into the anterior mediastinum. However the thymus recedes during puberty and is mostly replaced by adipose tissue in the adult.

ANTERIOR MEDIASTINUM

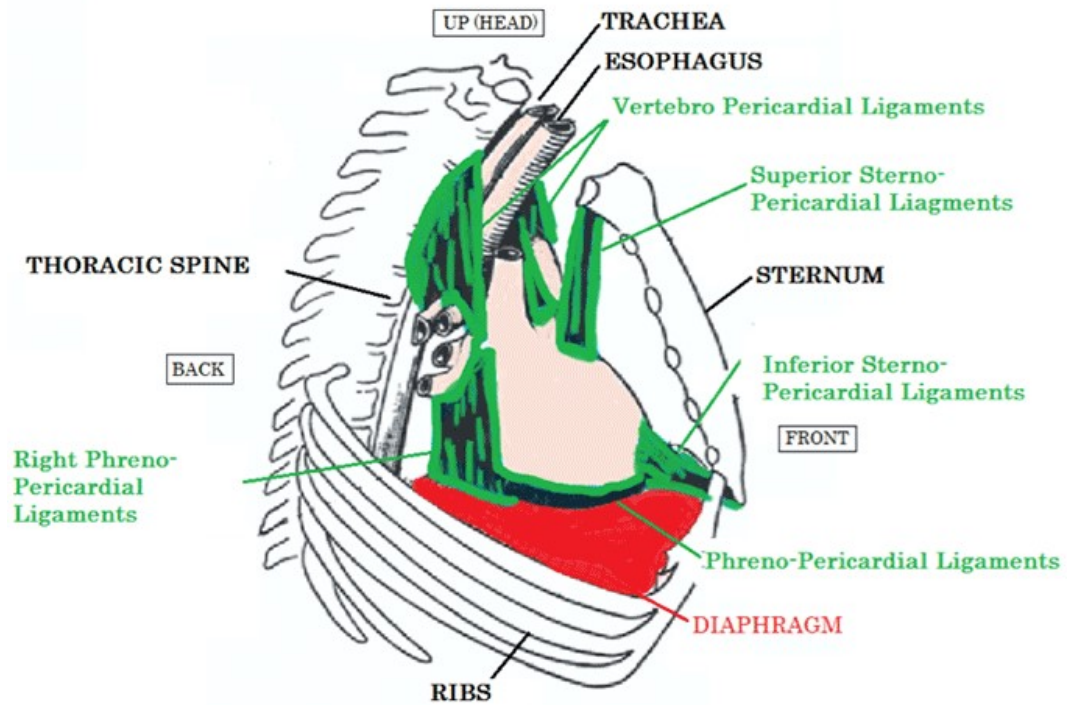
THYMUS



MEDIASTINUM

ANTERIOR MEDIASTINUM

LIGAMENTS OF THE PERICARDIUM: (Envelope of the heart) in the middle of your chest



Q 2

What is the Posterior Border of Anterior Mediastinum.

- A. Sternum
- B. Thoracic Vertebrae
- C. Diaphragm
- D. Pericardium

Q3

Which muscle forms the floor of the anterior mediastinum?

Rectus abdominus

External Intercostal

Diaphragm

External Oblique

Q

In adolescents, which organ can be found within the anterior mediastinum?

- A. Larynx
- B. Stomach
- C. Thymus
- D. Heart

THORAX

MIDDLE MEDIASTINUM

Borders

Contents

2.1 Organs

2.2 Vessels

2.3 Nerves

2.4 Lymphatics

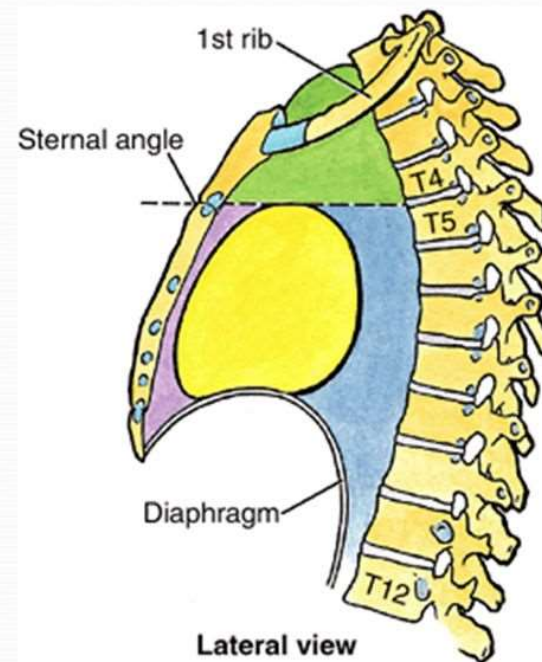
Middle Mediastinum

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MIDDLE MEDIASTINUM

Heart and Middle Mediastinum



- superior mediastinum: [Green]
- Inferior Mediastinum: Below the plane passing from Sternal Angle/Angle Luise
- Inferior mediastinum has 3 parts:
- Purple: anterior mediastinum;
- Yellow: middle mediastinum;
- Blue: posterior mediastinum

MIDDLE MEDIASTINUM

Borders

- The middle mediastinum is bordered by the following thoracic structures:

Anterior: Anterior margin of the pericardium.

Posterior: Posterior border of the pericardium.

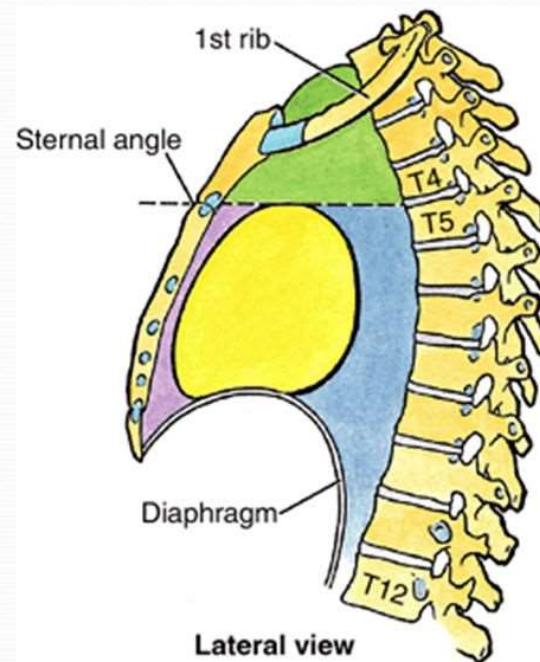
Laterally: Mediastinal pleura of the lungs.

Superiorly: Imaginary line extending between the sternal angle (the angle formed by the junction of the sternal body and manubrium) and the T4 vertebrae.

Inferiorly: Superior surface of the diaphragm.

MIDDLE MEDIASTINUM

Heart and Middle Mediastinum



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MIDDLE MEDIASTINUM

Contents

- The middle mediastinum is the largest subdivision of the inferior mediastinum. It contains several important organs, vessels, nerves and lymphatic structures.

Organs

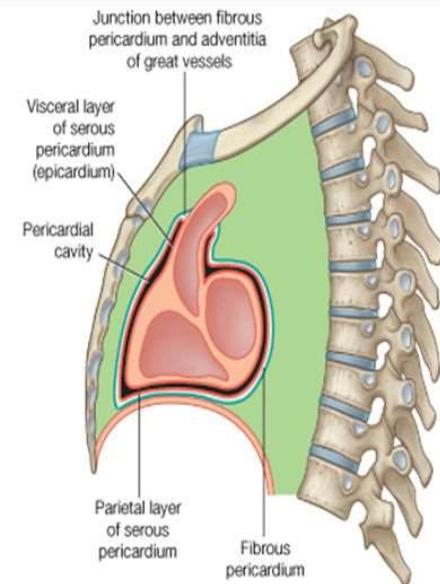
- The middle mediastinum contains the [heart](#), and its protective sheath, the [pericardium](#). It also contains the **Tracheal Bifurcation** and the left and right main bronchi.

MIDDLE MEDISTINUM

Content

Pericardium

- The **pericardium** is a fibroserous sac surrounding the heart and the roots of the great vessels.
- It consists of two components, the **fibrous** pericardium and the **serous** pericardium.



MIDDLE MEDIASTINUM

Nerves

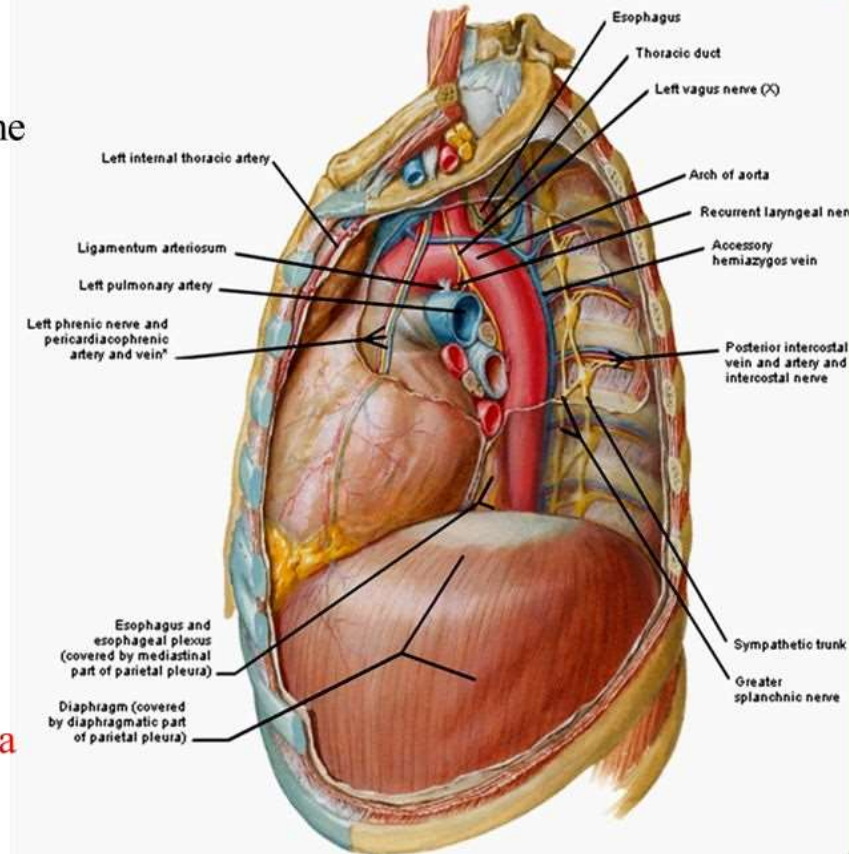
- The cardiac plexus and the phrenic nerves are both located within the middle mediastinum.
- **Cardiac plexus** – a network of nerves located at the base of the heart, containing sympathetic and parasympathetic fibres. The sympathetic nerves are derived from the T1-T4 segments of the spinal cord, and the parasympathetic innervation is supplied by the [vagus nerve](#). The plexus can be subdivided into superficial and deep components.
- **Phrenic nerves (left and right)** – mixed nerves that provides motor innervation to the diaphragm. They arise in the neck, and descend through the middle mediastinum to reach the diaphragm.

Middle Mediastinum

Contents

MIDDLE MEDIASTINUM (LATERAL VIEW)

- **Pericardium**
- **Heart**
- **Arteries:** Roots of the great vessels: aorta and pulmonary art.
- **Veins:** lower half of superior vena cava, terminations of inferior vena cava & pulmonary veins
- **Nerves:** Phrenic nerves
- **Bifurcation of trachea**
- **Lymph nodes**



Middle Mediastinum

Lymphatics

- The **tracheobronchial lymph nodes** are located within the middle mediastinum. They are a group of nodes associated with the trachea and bronchi of the respiratory tract – and are characteristically enlarged in certain lung pathologies. They form from the gathering of bronchial nodes within the **hila** of the lungs. Individual groups of nodes are connected via fine lymphatic channels.

THORAX

AREAS OF THORAX

AREAS OF THORAX

THE POSTERIOR MEDIASTINUM

POSTERIOR MEDIASTINUM

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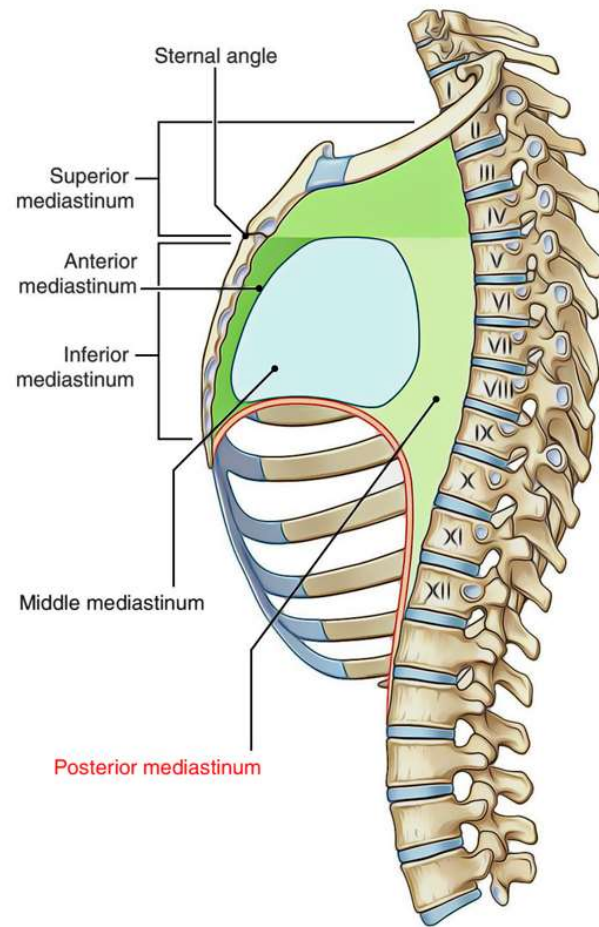
Posterior Mediastinum

Borders

- The posterior mediastinum is bordered by the following thoracic structures:
- **Lateral:** Mediastinal pleura (part of the parietal pleural membrane).
- **Anterior:** Pericardium.
- **Posterior:** T5-T12 vertebrae.
- **Roof:** Imaginary line extending between the sternal angle (the angle formed by the junction of the sternal body and manubrium) and the T4 vertebrae.
- **Floor:** Diaphragm.

Posterior Mediastinum

Borders



Posterior Mediastinum

Content

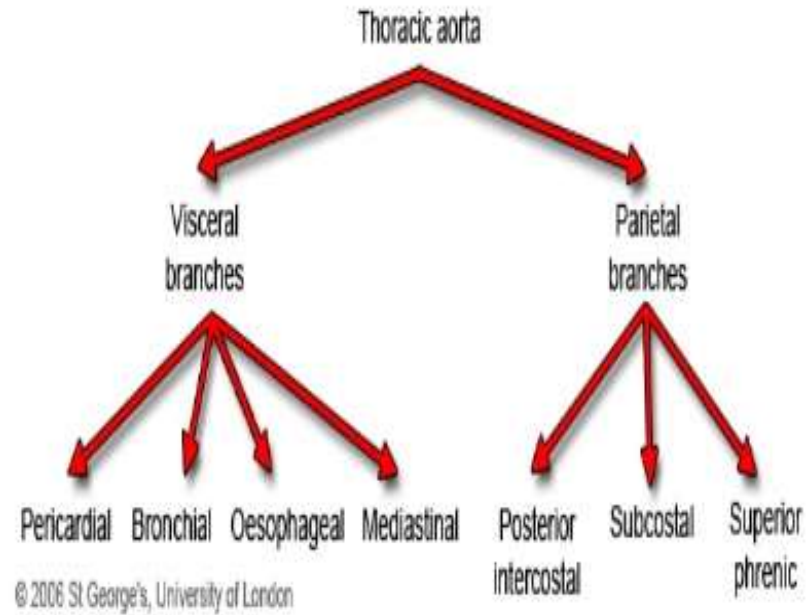
Thoracic Aorta

- The thoracic (descending) aorta is a continuation of the arch of the aorta, beginning at the lower edge of the T4 vertebra. It descends through the posterior mediastinum to the left of the vertebrae, becoming more medially located as it moves. At the inferior border of T12, the thoracic aorta becomes the abdominal aorta, and passes through the **aortic hiatus** of the diaphragm.
- A number of branches arise from the thoracic aorta in the posterior mediastinum. These tend to arise in three vascular planes; unpaired branches to viscera extend **anteriorly**, paired branches to viscera extend **laterally**, and paired segmental parietal branches extend mostly **posterolaterally**. The major branches are:

Posterior
mediastinum

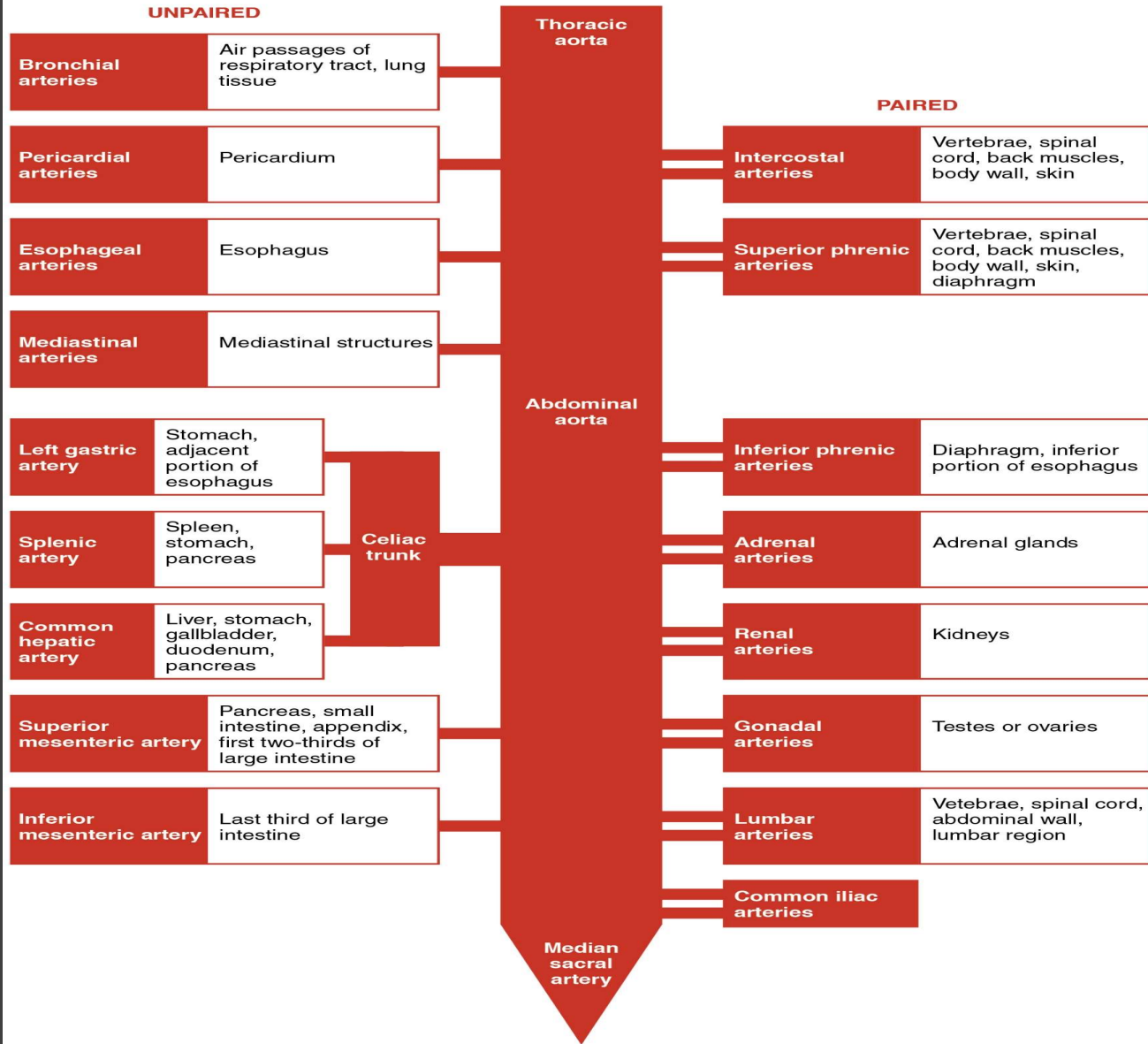
Thoracic Aorta

Branches of thoracic aorta



Posterior Mediastinum

Thoracic Aorta



Posterior Mediastinum

Content

Posterior intercostal arteries – Paired parietal branches. Nine such pairs branch from the posterior aspect of the aorta, supplying the intercostal spaces (except the first two). Pass posteriorly and laterally, in parallel with the ribs.

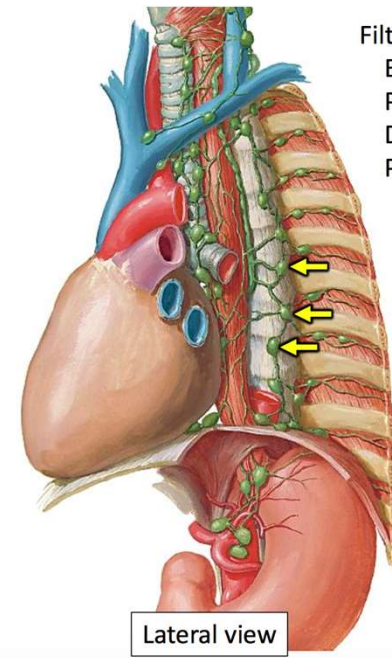
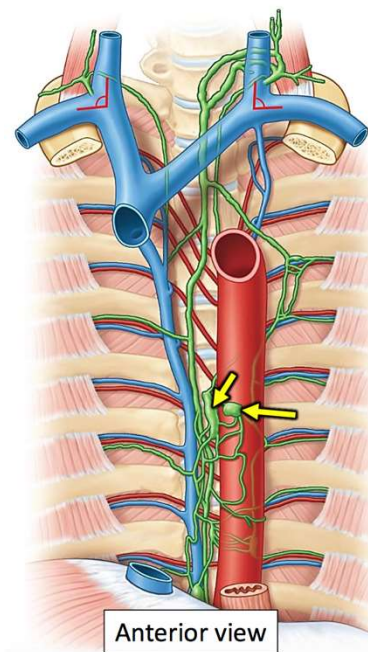
Bronchial Arteries – Paired visceral branches, usually one or two. The left bronchial arteries always arise directly from the thoracic aorta, while those on the right usually branch indirectly from a right posterior intercostal artery. They go on to supply the tracheobronchial tree.

Oesophageal Arteries – Unpaired visceral branches, arising from the anterior aspect of the aorta. In most individuals there are two, but there can be up to five. As the name suggests, these branches go on to supply the oesophagus.

Superior phrenic arteries – Arise from the anterior aspect of the thoracic aorta at the aortic hiatus, varying in number. They supply the superior aspect of the diaphragm.

Posterior Mediastinum

Content



Filters lymph from:
Esophagus
Posterior pericardium
Diaphragm
Posterior intercostal space

Left nodes drain to:
Thoracic duct

Right nodes drain to:
Right lymphatic duct

POSTERIOR MEDIASTINUM

Oesophagus

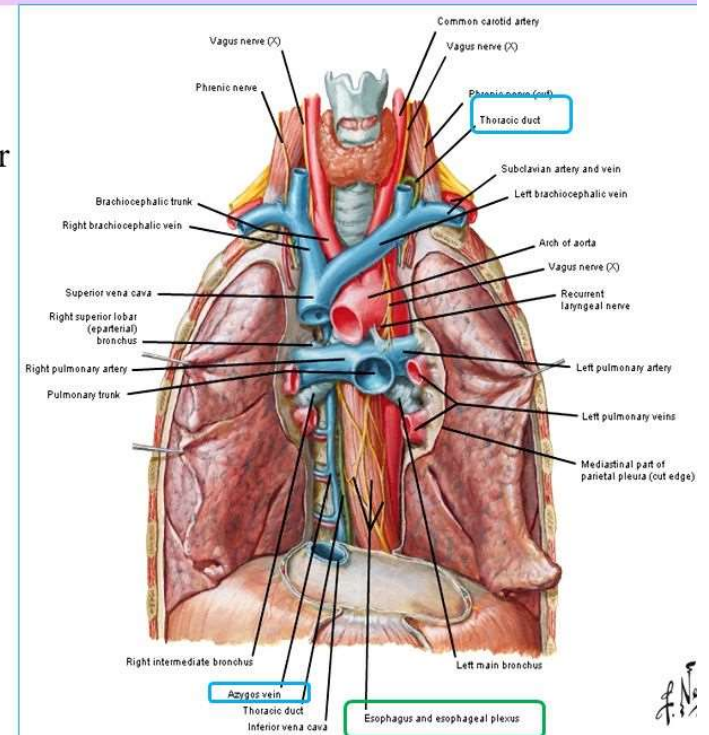
- The [oesophagus](#) is a muscular tube that connects the pharynx to the stomach; allowing swallowed food to pass into the digestive system. It passes into the posterior mediastinum from the superior mediastinum, descending posteriorly to the **arch of the aorta** and the heart. Whilst initially positioned to the right, the oesophagus deviates to the left as it moves downwards. It leaves the mediastinum via the **oesophageal hiatus** of the diaphragm at T10 Level.
- The **oesophageal plexus** is a network of nerves surrounding the oesophagus as it descends, comprising of branches from the **left and Right Vagus Nerves**. Immediately above the diaphragm, the fibres of the plexus converge to form the Anterior vagal trunk and Posterior vagal trunk, which travel along the surface of the oesophagus as it exits the thorax.

Posterior Mediastinum

Esophagus

POSTERIOR MEDIASTINUM

- Descending thoracic Aorta
- Esophagus: most anterior
- Thoracic duct
- Azygous vein
- Hemiazygous vein
- Vagus nerves
- Rt and Lt Sympathetic trunks and their brs: splanchnic nerves
- Lymph nodes



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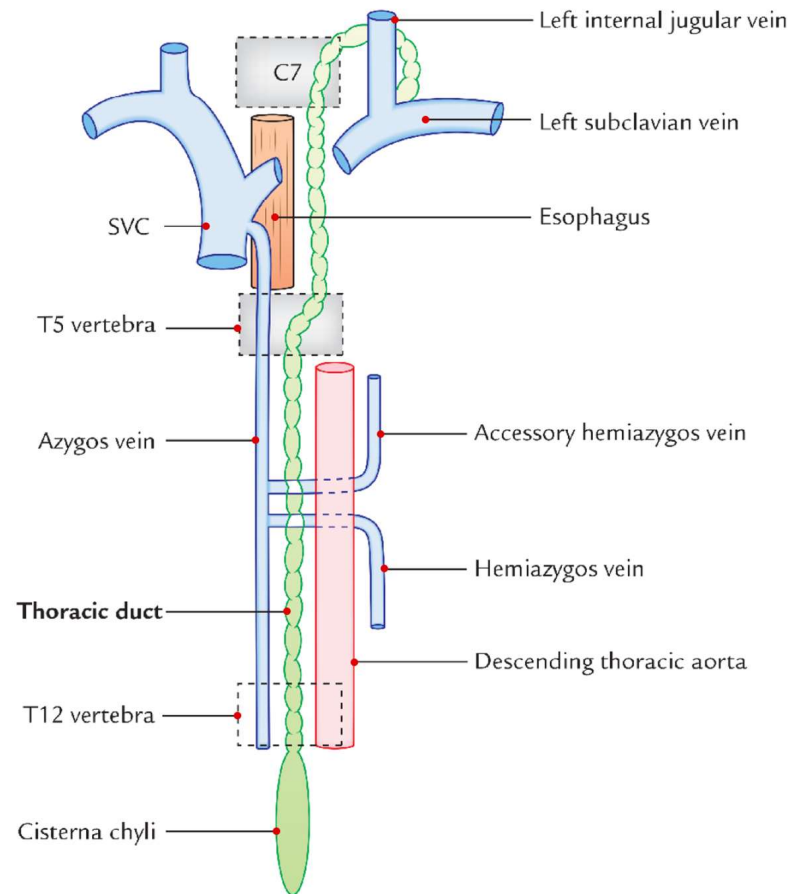
POSTERIOR MEDIASTINUM

Thoracic Duct

- The **thoracic duct** is the largest lymphatic vessel in the body, allowing return of lymph from most of the body (all but the right superior quadrant) into the venous system.
- The duct originates from the **cisterna chyli** in the abdomen, and enters the mediastinum through the **aortic hiatus**. It ascends to lie directly anterior to the T6-T12 vertebrae, before deviating left as it ascends into the superior mediastinum. While located in the posterior mediastinum, the thoracic duct receives lymphatic drainage from the intercostal spaces and neighbouring anatomical structures through a number of branches.

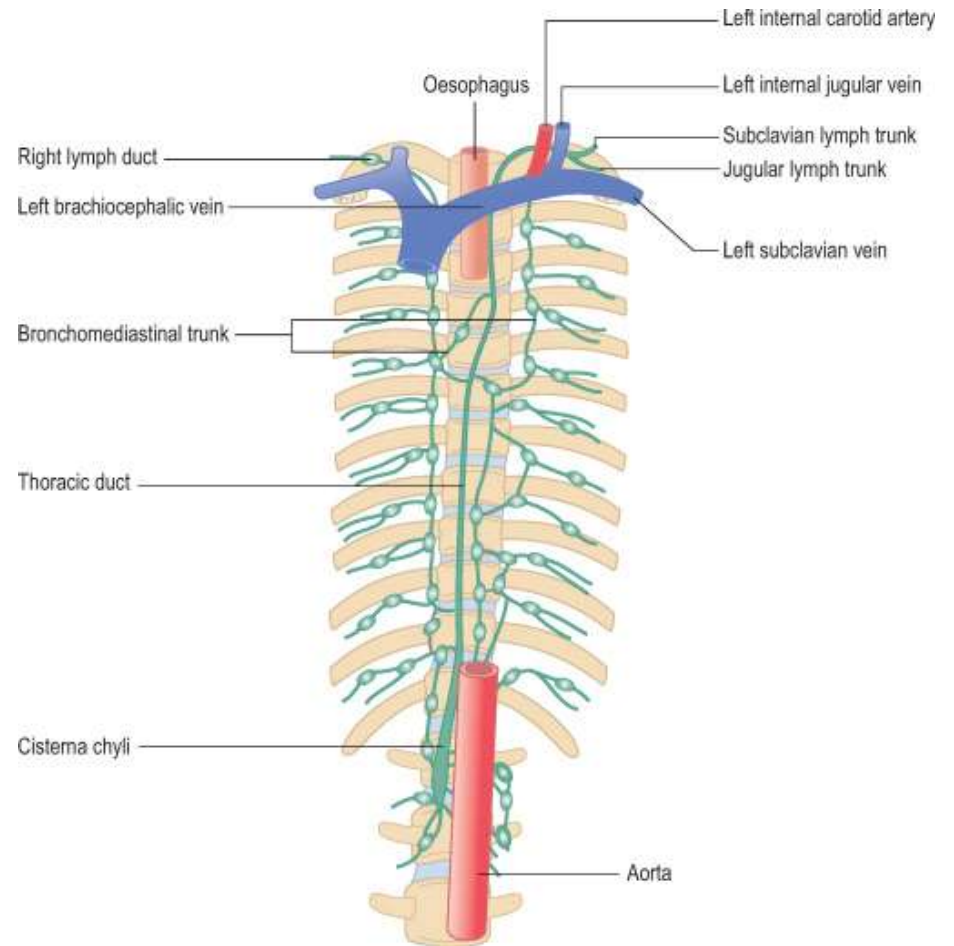
Posterior Mediastinum

Thoracic Duct



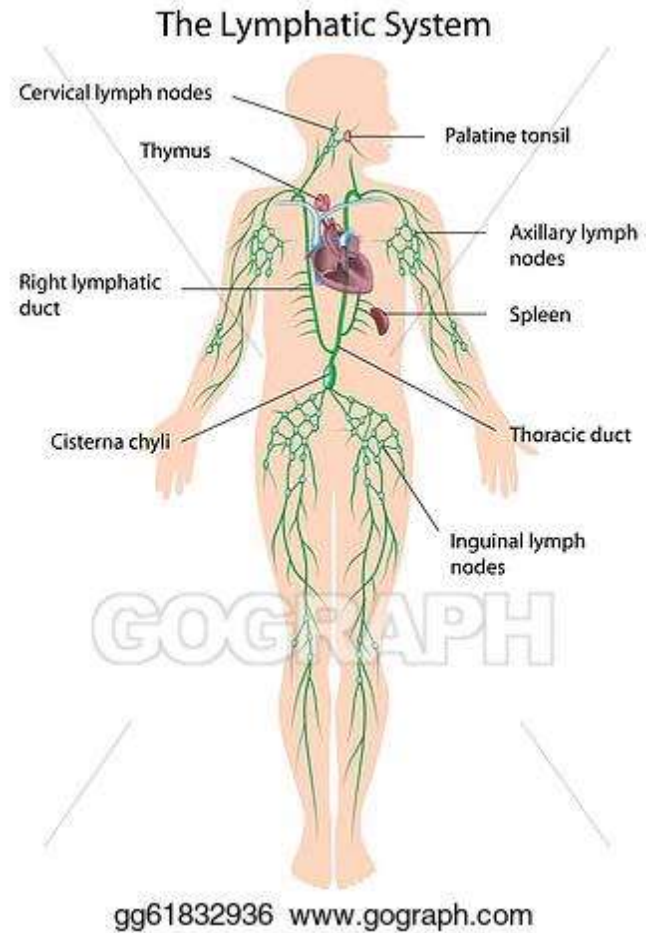
Posterior Medistinum

Thoracic Duct



Posterior Mediastinum

Thoracic Duct and lymphatics



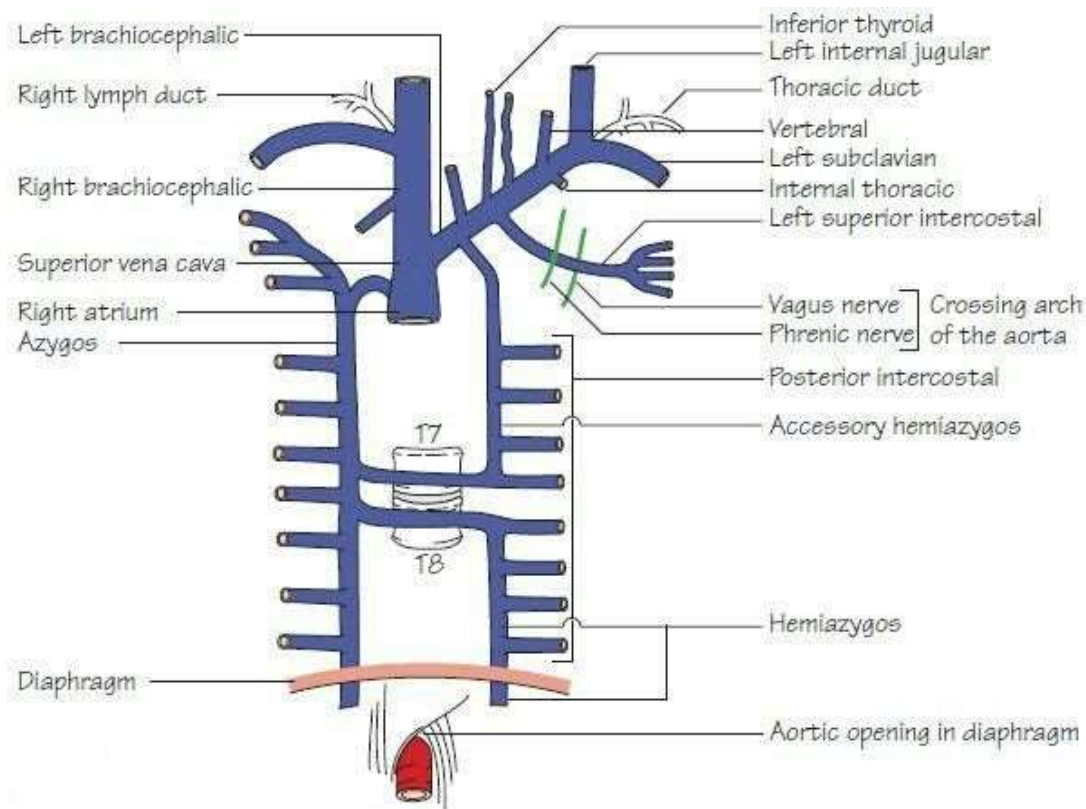
POSTERIOR MEDIASTINUM

Azygos System of Veins

- This venous network drains blood from the body walls and mediastinal viscera, and empties into the **superior vena cava**. It consists of three major veins:
- **Azygos vein** – Formed by the union of the right lumbar vein and the right subcostal vein. It enters the mediastinum via the aortic hiatus and drains into the superior vena cava.
- **Hemiazygos vein** – Formed by the union of the left lumbar vein and left subcostal vein. It enters the mediastinum through the left crus of the diaphragm, ascending on the left side. At the level of T8, it turns to the right and combines with the azygos vein.
- **Accessory hemiazygos vein** – Formed by the union of the fourth to eighth intercostal veins. It drains into the azygos vein at T7.

Posterior Mediastinum

Azygous System of Veins



POSTERIOR MEDIASTINUM

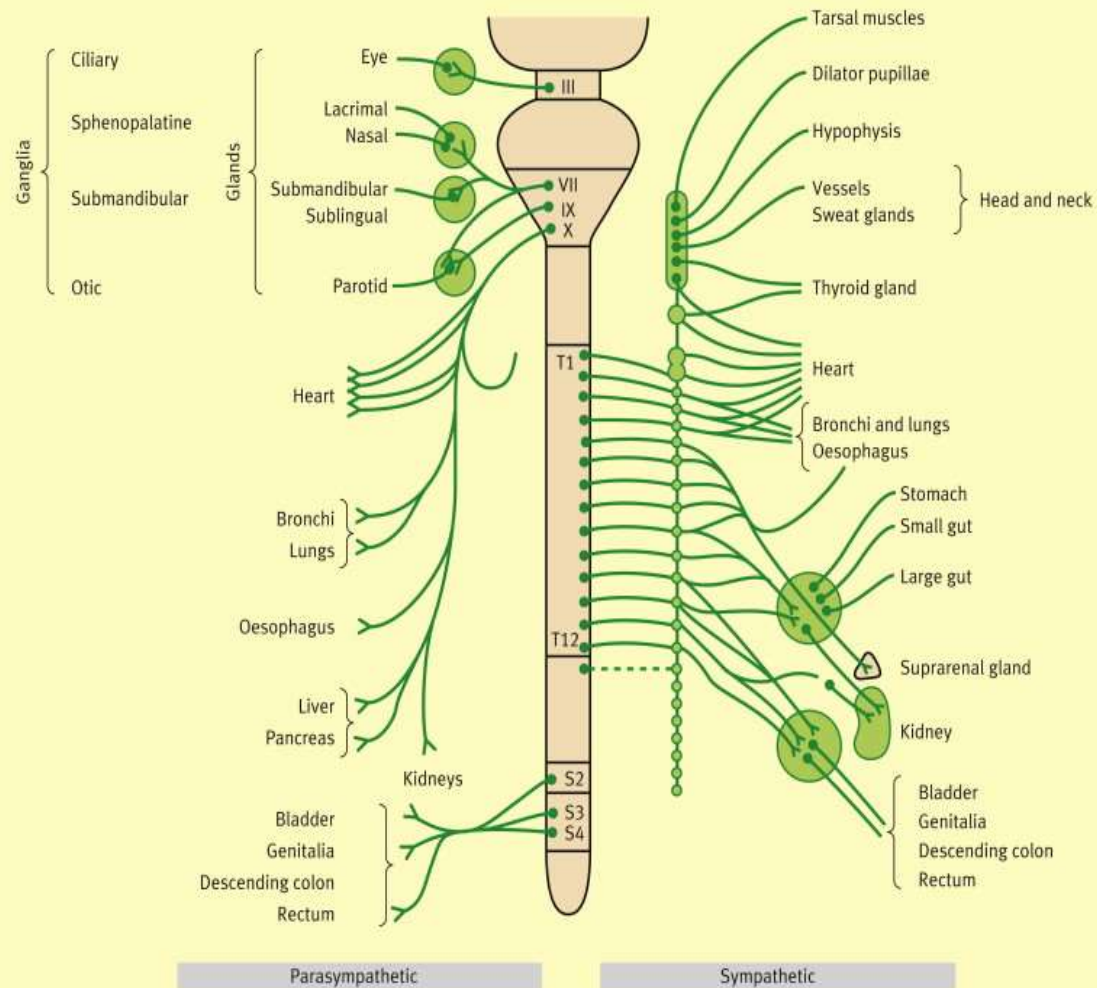
Sympathetic Trunks

- The sympathetic trunks are paired bundles of nerves that extend from the base of the skull to the coccyx. In the thoracic region, these nerve bundles are known as the **thoracic sympathetic trunks**. As they descend through the thorax, they lie within the posterior mediastinum.
- Arising from these trunks are the **lower thoracic splanchnic nerves** – they continue inferiorly to supply the viscera of the abdomen.

Posterior Mediastinum

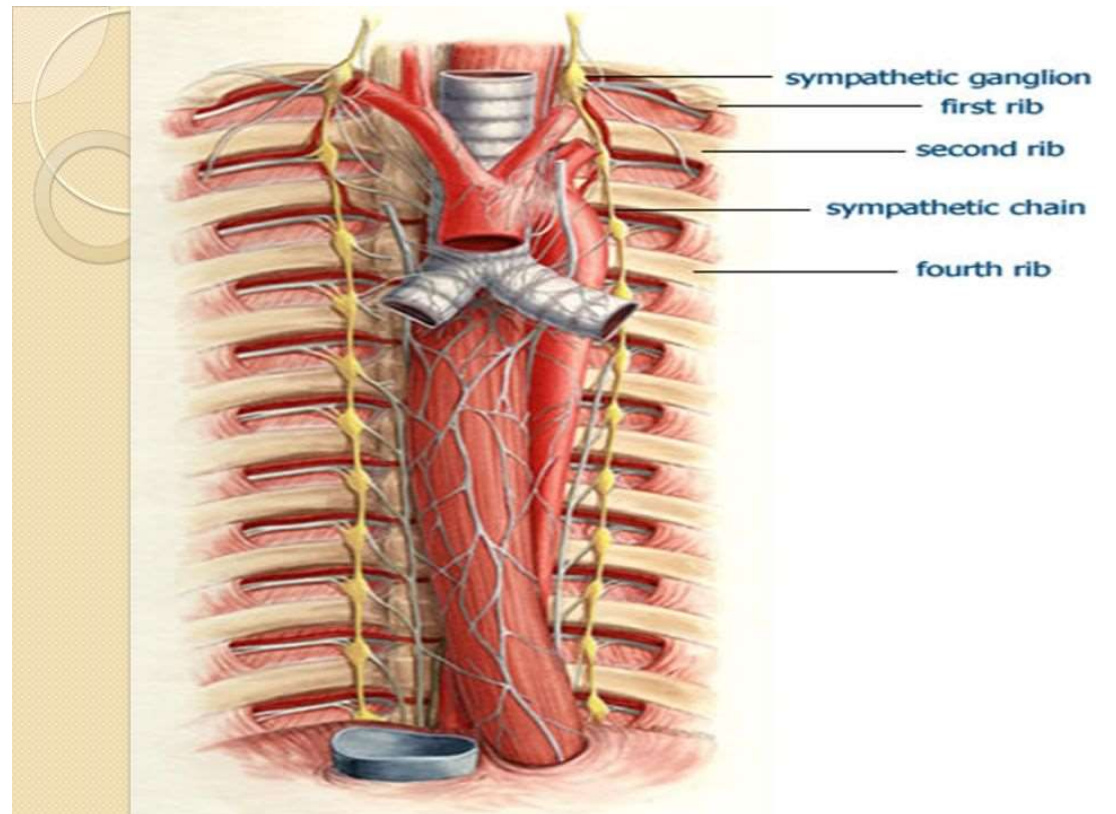
Sympathetic Chain

The autonomic nervous system



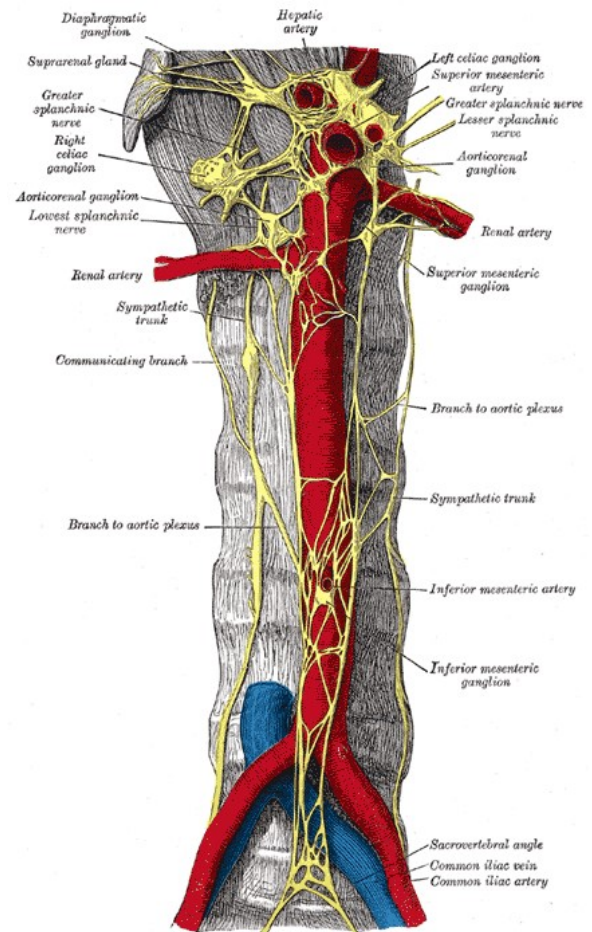
Posterior Mediastinum

Sympathetic Chain





Sympathetic Chain



Posterior Mediastinum

Sympathetic Chain

