



# G.I.T



Lecture: ESOPHAGUS & STOMACH ( 1 )

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If there is any mistake or suggestions please feel free to contact us:

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Both - Black

Male Notes - BLUE

Female Notes - GREEN

Explanation and additional notes - ORANGE

Very Important note - Red



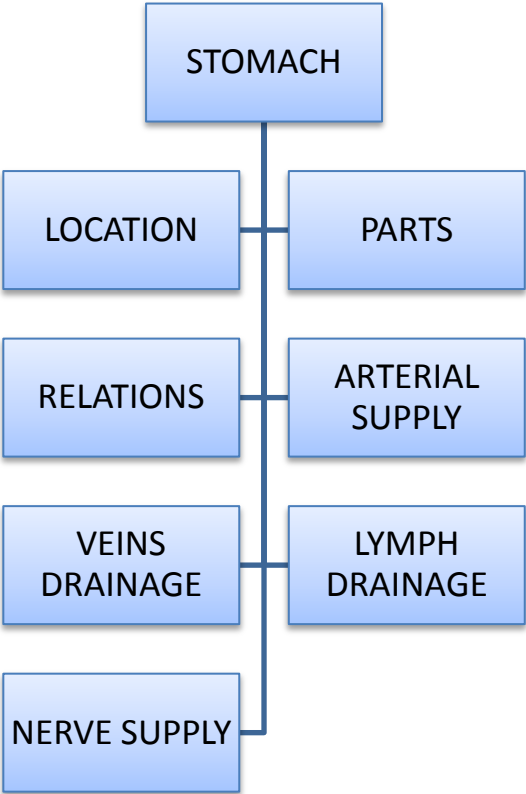
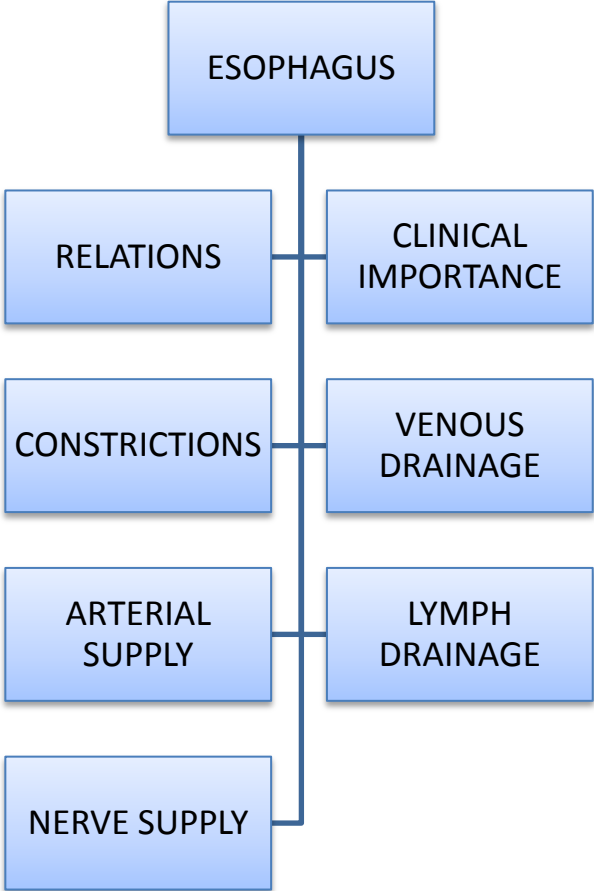
# Objectives:

By the end of this lecture the student should be able to:

- Describe the anatomy of the esophagus; extent, length, parts, strictures, relations, blood & nerve supply and lymphatic.
- Describe the anatomy of the stomach; location, shape, parts, relations, blood & nerve supply and lymphatic.
- Describe the anatomical clinical application for esophagus and stomach.



# MIND MAP





### **Introduction:**

The abdominal cavity is divided into 9 compartments: by:

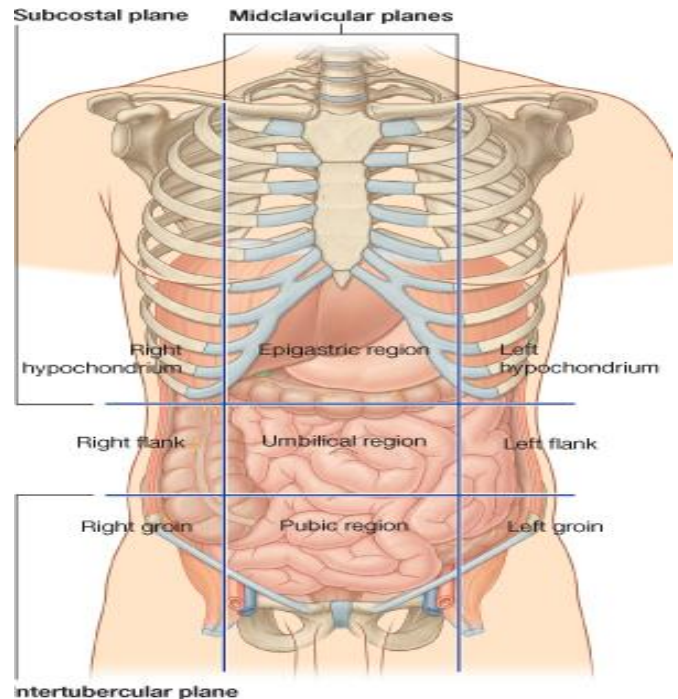
2 vertical and 2 horizontal planes.

### **Vertical planes:**

Right and left vertical lines (from midclavicular to midinguinal points).

### **Horizontal plane:**

Subcostal plane (L3) and intertubercular lines (L5).



### **Esophagus:**

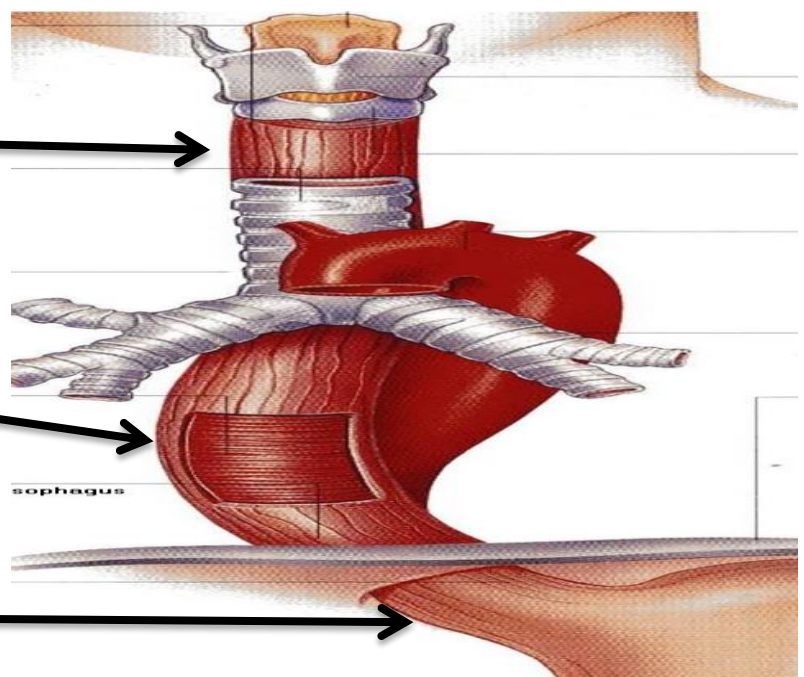
- It is a tubular structure about 10 inches, (25 cm) long.
- It begins as the continuation of the pharynx at the level of the 6<sup>th</sup> cervical vertebra.
- It pierces the diaphragm at the level of the 10<sup>th</sup> thoracic vertebra to join the stomach.

### **It is formed of 3 parts:**

• 1- Cervical.

• 2- Thoracic.

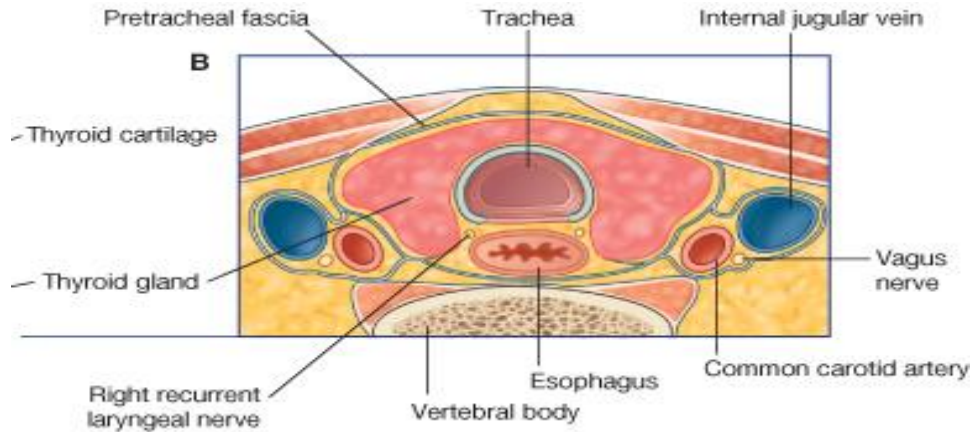
• 3- Abdominal.





## RELATIONS OF CERVICAL PART

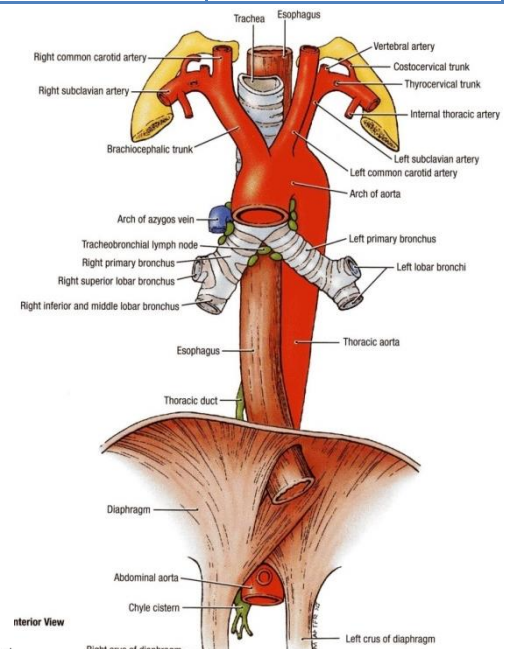
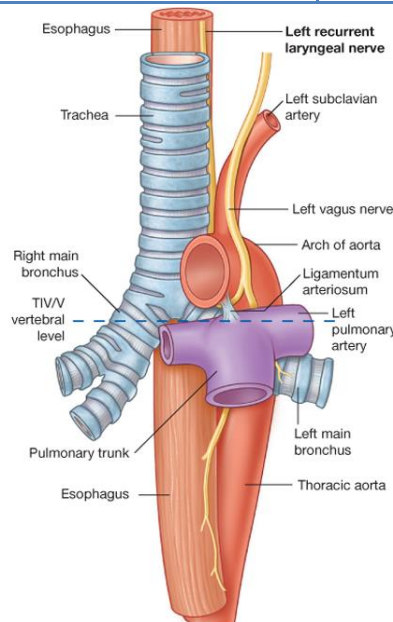
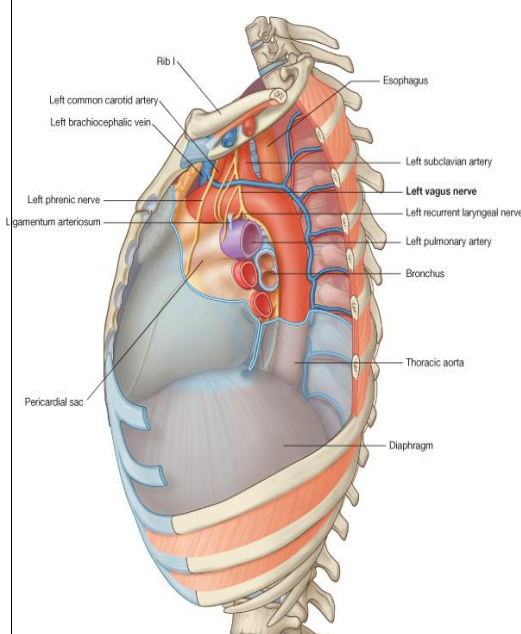
Anteriorly	Posteriorly	Laterally
Trachea. Recurrent laryngeal nerves. (Branch from vagus nerve.)	Cervical Vertebrae.	Lobes of thyroid gland.



### THORACIC PART:

- In the thorax, it passes downward and to the left through superior and then the posterior mediastinum.
- At the level of the sternal angle (2<sup>nd</sup> rib), the **aortic arch and the left main bronchus** pushes the esophagus again to the midline.

Anterior relations	Posterior relations	Later relations
<ol style="list-style-type: none"> <li>Trachea.</li> <li>Left recurrent laryngeal nerve.</li> <li>Left principal bronchus.</li> <li>Pericardium.</li> <li>Left atrium.</li> </ol>	<ol style="list-style-type: none"> <li>Bodies of the thoracic vertebrae.</li> <li>Thoracic duct.</li> <li>Azygos vein.</li> <li>Right posterior intercostal arteries.</li> <li>Descending thoracic aorta (at the lower end).</li> </ol>	<ul style="list-style-type: none"> <li><u>On the Right side:</u> <ol style="list-style-type: none"> <li>Mediastinal pleura.</li> <li>Terminal part of the azygos vein.</li> </ol> </li> <li><u>On the Left side:</u> <ol style="list-style-type: none"> <li>Mediastinal pleura.</li> <li>Left subclavian artery.</li> <li>Aortic arch.</li> <li>Thoracic duct.</li> </ol> </li> </ul>





In the abdomen, the esophagus descends for 1.3 cm and joins the stomach.

Anteriorly, it is related to the **left lobe** of the liver.

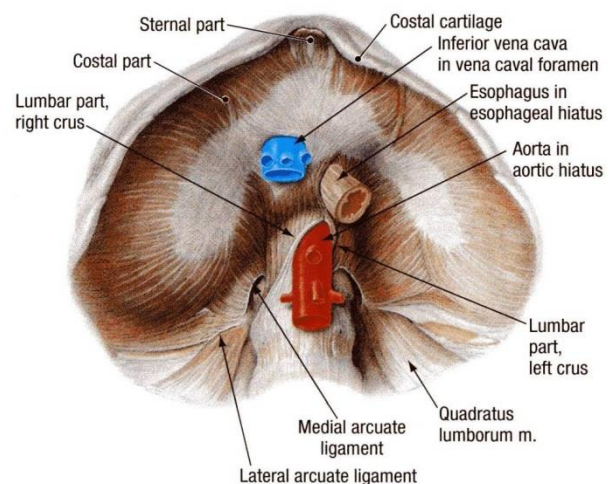
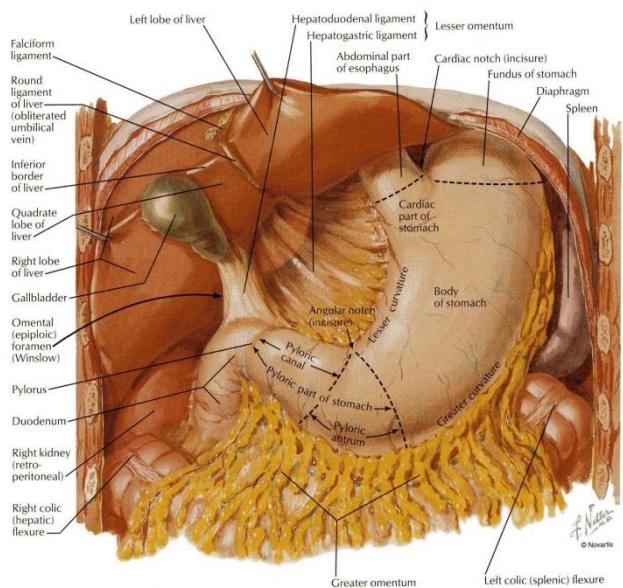
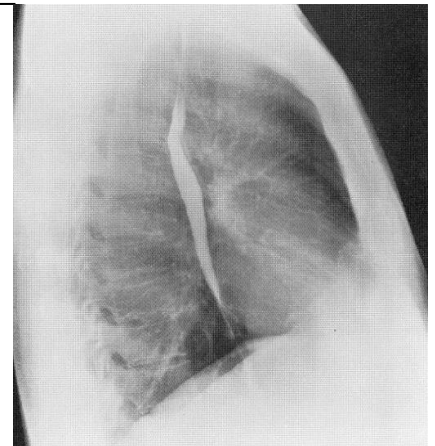
Posteriorly, it is related to the **left crus** of the diaphragm.

- Fibers from the **right crus** of the diaphragm form a **sling** around the esophagus.
- At the opening of the diaphragm, the esophagus is accompanied by:
  - The two vagi
  - **Branches of the left gastric vessels**
  - Lymphatic vessels.

### CLINICAL IMPORTANCE

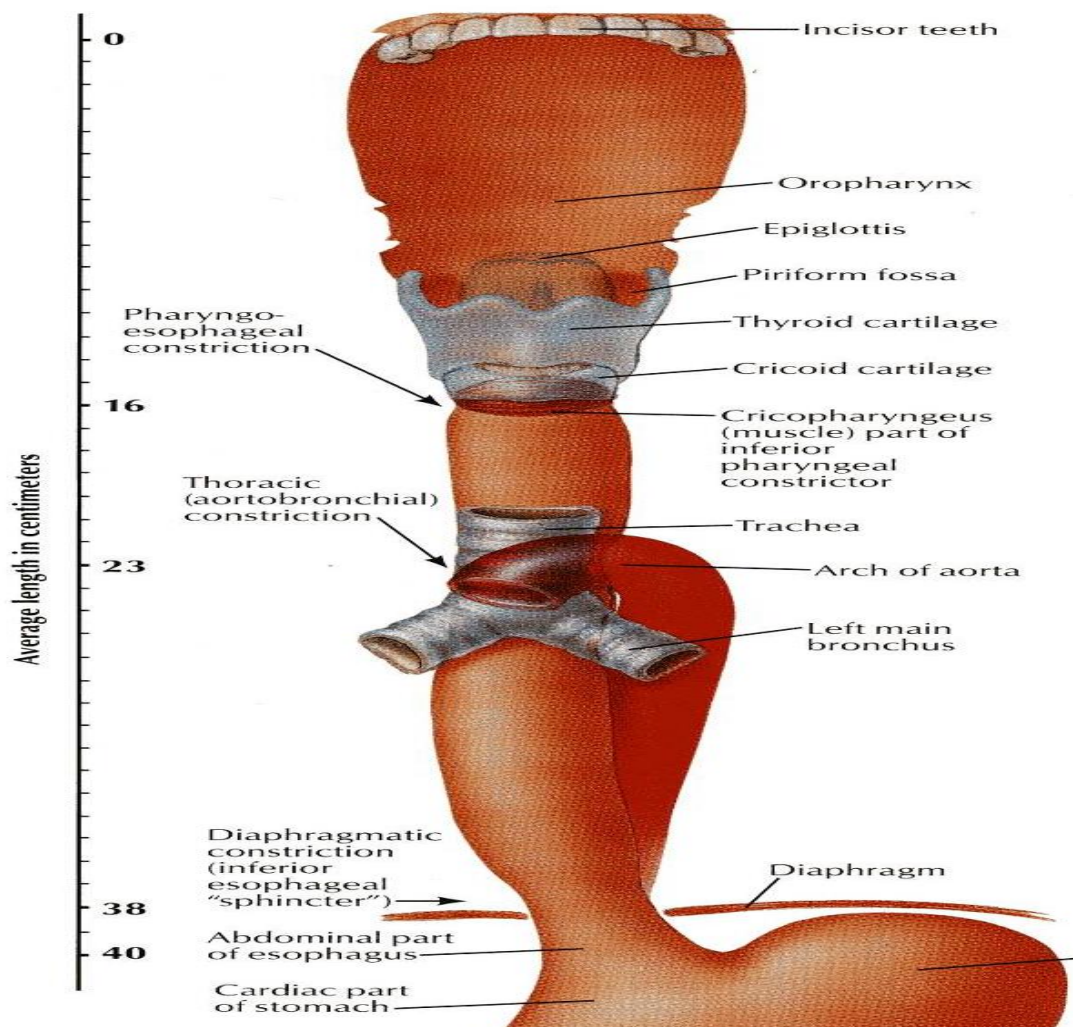
#### ESOPHAGUS AND LEFT ATRIUM OF THE HEART:

- There is a close relationship between the left atrium of the heart and the esophagus.
- What is the clinical application?
- A **barium swallow** in the esophagus will help the physician to **assess the size of the left atrium (dilation)** as in case of a heart failure.



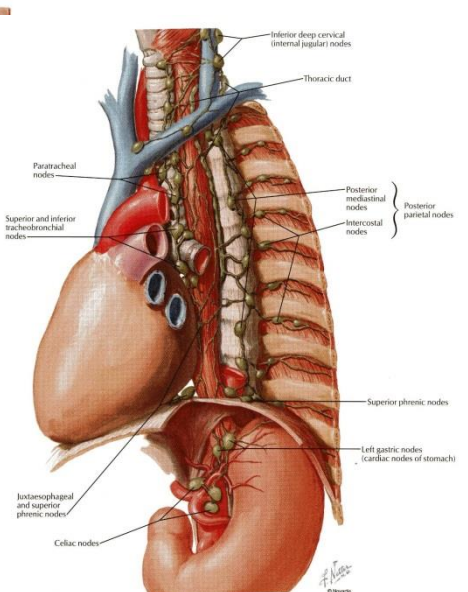
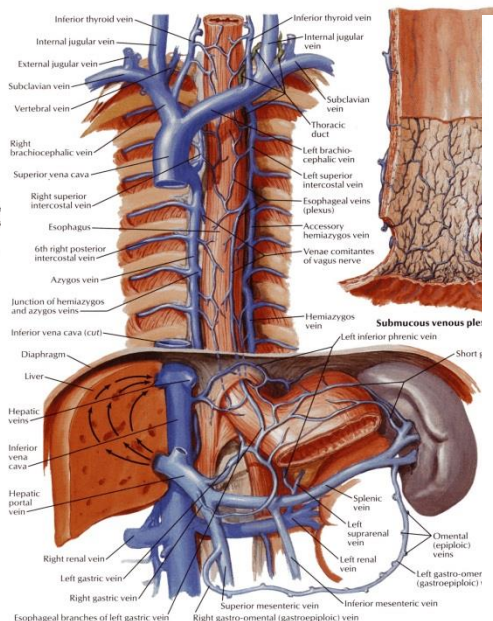
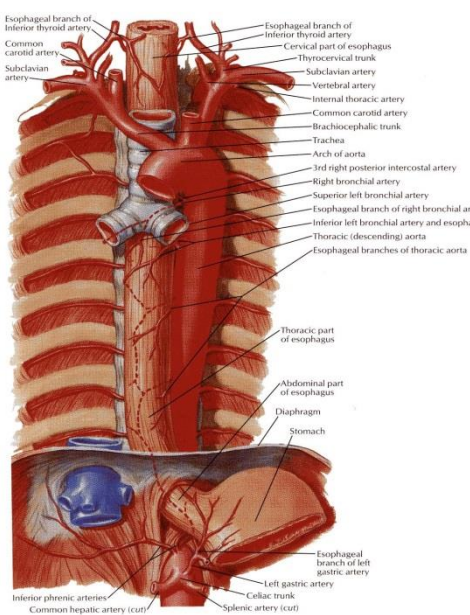


ESOPHAGEAL CONSTRICTIONS	ESOPHAGEAL STRICTURES
<ul style="list-style-type: none"><li>• The esophagus has 3 anatomic constrictions.</li><li>• The <b>first</b> is at the junction with the <b>pharynx</b>.</li><li>• The <b>second</b> is at the crossing with the <b>aortic arch</b> and the <b>left main bronchus</b>.</li><li>• The <b>third</b> is at the junction with the <b>stomach</b>.</li><li>• They have a considerable clinical importance.</li><li>• Why?</li></ul>	<ol style="list-style-type: none"><li>1. They may cause difficulties in passing an esophagoscope.</li><li>2. In case of swallowing of caustic liquids (mostly in children), this is where the burning is the worst and <b>strictures</b> develop.</li><li>3. The esophageal strictures are a common place of the development of <b>esophageal carcinoma</b>.</li></ol> <p>In this picture what is the importance of the scale?</p>





ARTERIAL SUPPLY	VENOUS DRAINAGE	LYMPH DRAINAGE
<ul style="list-style-type: none"> <li>• Upper third is supplied by the <b>inferior thyroid artery</b>.</li> <li>• The middle third by the <b>descending thoracic aorta</b>.</li> <li>• The lower third by the <b>left gastric artery</b>.</li> </ul>	<ul style="list-style-type: none"> <li>• The upper third drains in into the <b>inferior thyroid veins</b>.</li> <li>• The middle third into the <b>azygos veins</b>.</li> <li>• The lower third into the <b>left gastric vein</b>. The left gastric vein is a tributary of the portal vein</li> </ul>	<ul style="list-style-type: none"> <li>• The upper third is drained in the <b>deep cervical nodes</b>.</li> <li>• The middle third is drained into the <b>superior and inferior mediastinal nodes</b>.</li> <li>• The lower third is drained in the <b>celiac lymph nodes</b> in the abdomen.</li> </ul>

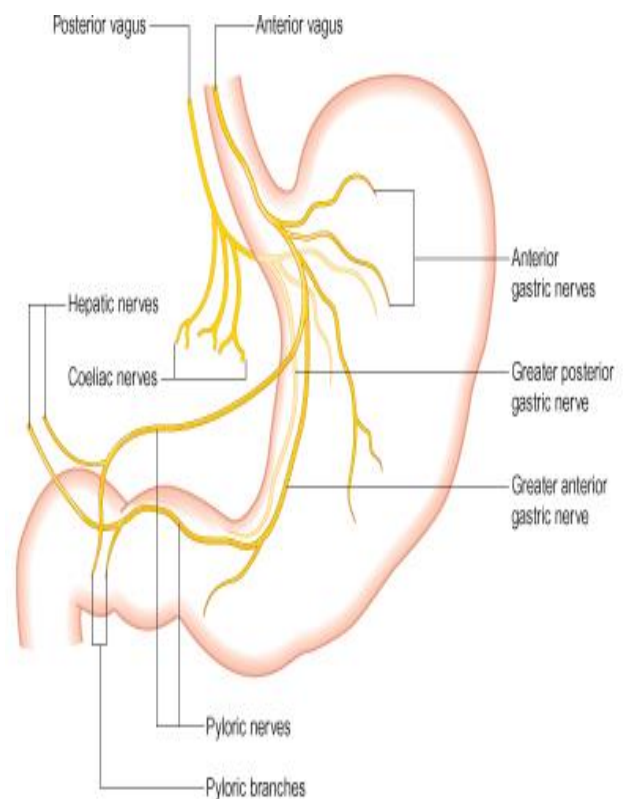






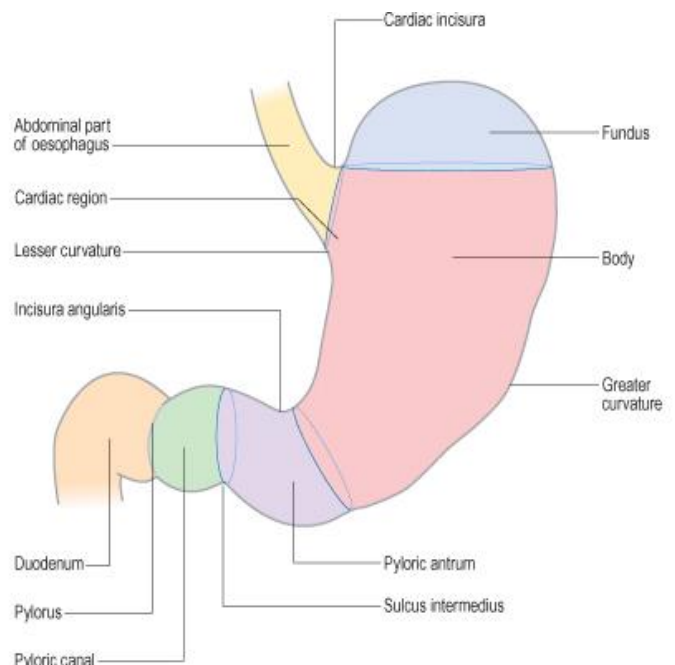
## NERVE SUPPLY

- It is supplied by sympathetic fibers from the **sympathetic trunks**.
- The parasympathetic supply comes from the **vagus nerves**.
- Inferior to the roots of the lungs, the vagus nerves join the sympathetic nerves to form the **esophageal plexus**.
- The **left vagus lies anterior** to the esophagus.
- The **right vagus lies posterior** to it.



## Stomach:

- The stomach is the dilated part of the alimentary canal.
- It is located in the upper part of the abdomen.
- It extends from behind the left costal region to the epigastric and umbilical regions.
- Much of the stomach is protected by the lower ribs.
- It is roughly J-shaped.



### 2 Orifices

- Cardiac orifice
- Pyloric orifice

### 2 Borders

- Greater curvature
- Lesser curvature

### 2 Surfaces

- Anterior surface
- Posterior surface

### 3 Parts

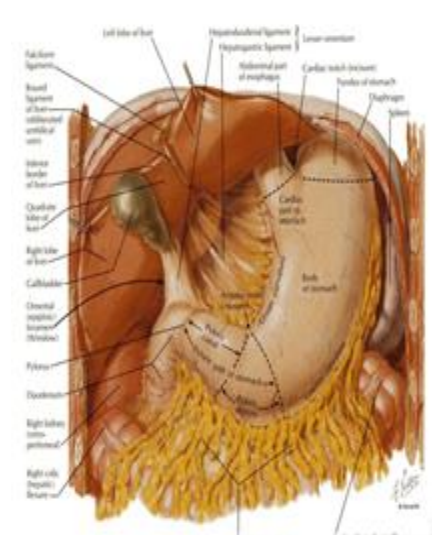
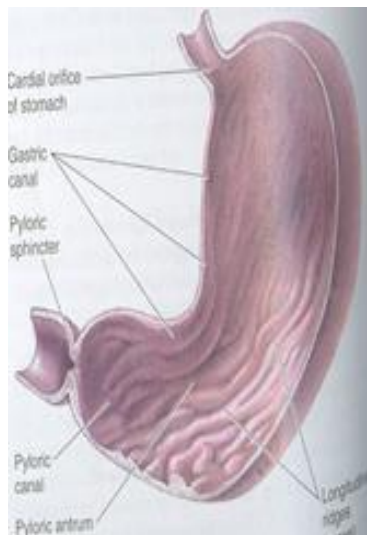
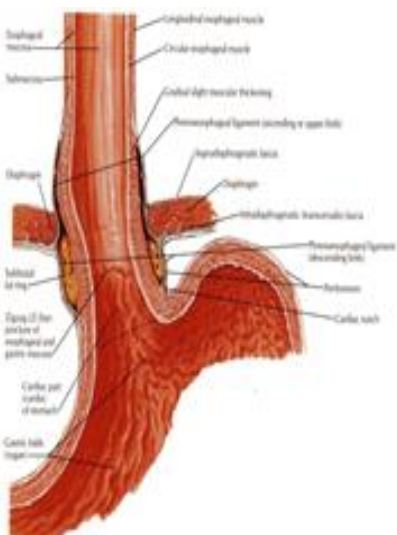
- Fundus
- Body
- Pylorus

### The pylorus is formed of 3 parts

- Pyloric antrum
- Pyloric canal
- Pyloric sphincter

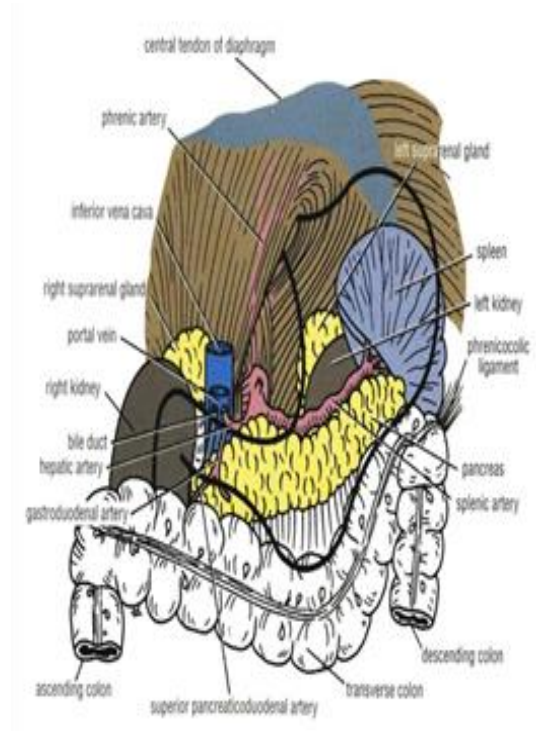
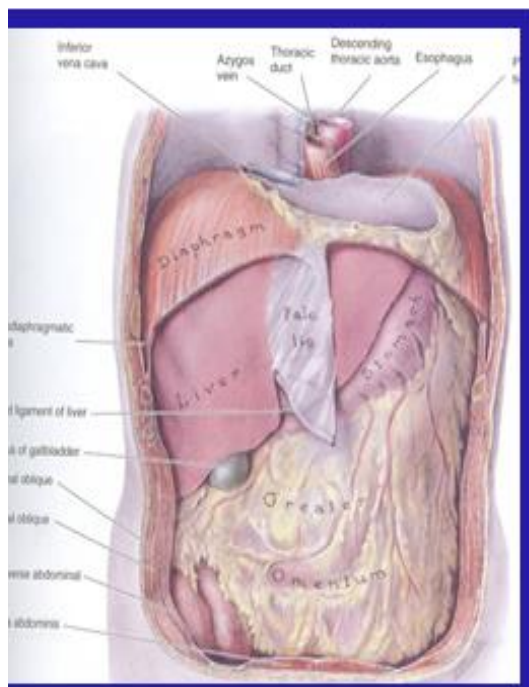


Parts	<b>CARDIAC ORIFICE</b>	<ul style="list-style-type: none"> <li>It is the site of the <b>gastro- esophageal sphincter</b>.</li> <li>It is a physiological but not an anatomical, sphincter.</li> <li>Consists of <b>circular layer</b> of smooth muscle (under vagal and hormonal control).</li> <li>Function:</li> <li>Prevents regurgitation (reflux)</li> </ul>
	<b>FUNDUS</b>	<ul style="list-style-type: none"> <li>Dome-shaped</li> <li>Located to the left of the cardiac orifice</li> <li>Usually full of gases.</li> </ul>
	<b>BODY</b>	<ul style="list-style-type: none"> <li>Extends from:             <ul style="list-style-type: none"> <li>The level of the fundus to</li> <li>The level of Incisura angularis</li> </ul> </li> <li><b>Incisura angularis:</b> a constant notch on the lesser curvature</li> </ul>
	<b>LESSER CURVATURE</b>	<ul style="list-style-type: none"> <li>Forms the right border of the stomach.</li> <li>Extends from the cardiac orifice to the pylorus.</li> <li>Attached to the liver by the <b>lesser omentum ( gastrohepatic ligament )</b>.</li> </ul>
	<b>GREATER CURVATURE</b>	<ul style="list-style-type: none"> <li>Forms the left border of the stomach.</li> <li>Extends from the cardiac orifice to the pylorus.</li> <li>Its upper part is attached to the spleen by <b>gastrosplenic ligament</b></li> <li>Its lower part is attached to the transverse colon by the <b>greater omentum</b>.</li> </ul>
	<b>PYLORIC ANTRUM AND PYLORUS</b>	<ul style="list-style-type: none"> <li>The <b>pyloric antrum</b> extends from Incisura angularis to the pylorus</li> <li>The <b>pylorus</b> is a tubular part of the stomach</li> <li>It lies in the <b>transpyloric plane ( L1 )</b></li> <li>It has a thick muscular end called <b>pyloric sphincter</b>.</li> </ul> <p>The cavity of the pylorus is the <b>pyloric canal</b>.</p>



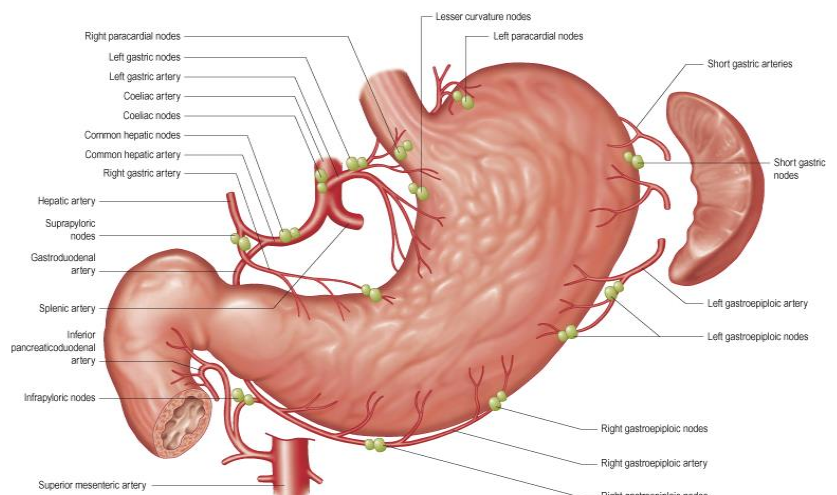
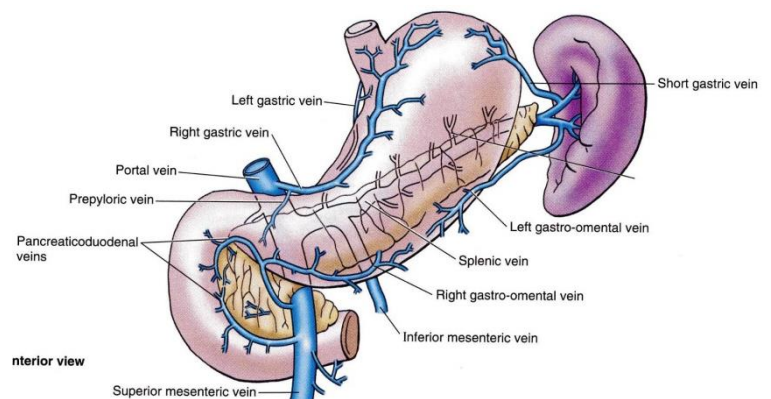
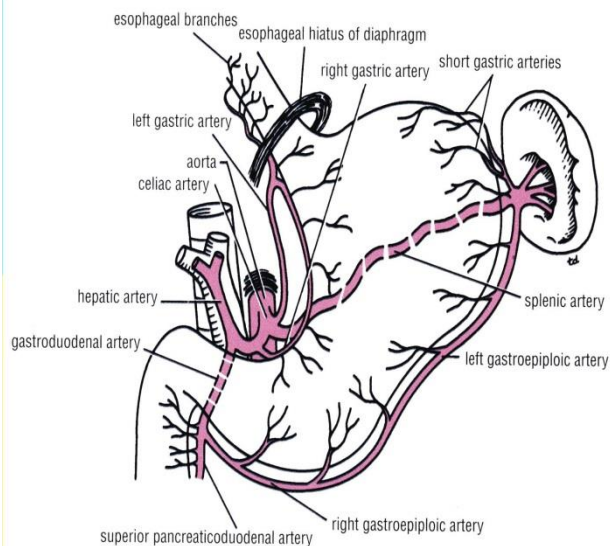


Relations	
Anterior relations	Posterior relations
<ol style="list-style-type: none"> <li>1. Anterior abdominal wall.</li> <li>2. Left costal margin.</li> <li>3. Left pleura &amp; lung.</li> <li>4. Diaphragm.</li> <li>5. Left lobe of the liver.</li> </ol>	<ol style="list-style-type: none"> <li>1. Lesser sac, (omental bursa).</li> <li>2. Left crus of the diaphragm.</li> <li>3. Left suprarenal gland.</li> <li>4. Part of left kidney.</li> <li>5. Spleen.</li> <li>6. Splenic artery.</li> <li>7. Pancreas.</li> <li>8. Transverse mesocolon.</li> <li>9. Transverse colon. (Not always)               <ul style="list-style-type: none"> <li>• All these structures form the stomach bed.</li> </ul> </li> </ol>





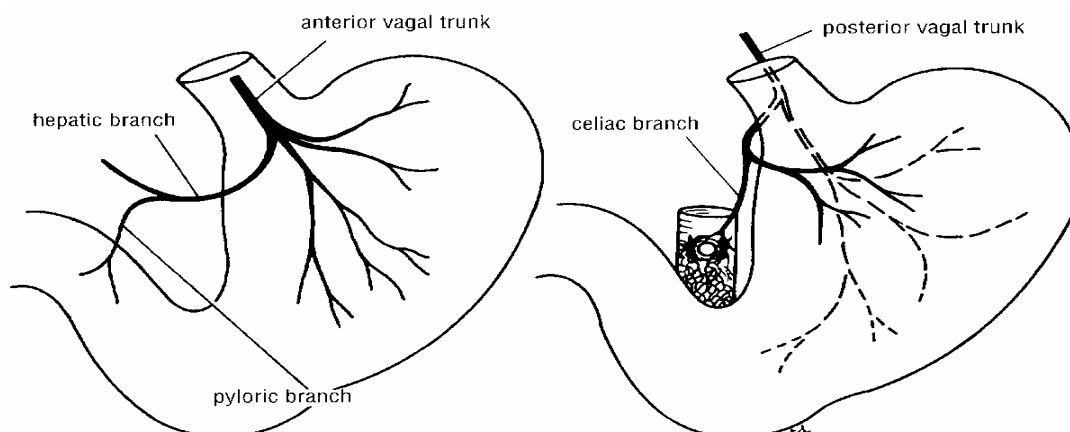
ARTERIES	VEINS	LYMPH DRAINAGE
<ul style="list-style-type: none"> <li>• <b>Left gastric artery:</b></li> <li>• It is a branch of <b>celiac artery</b>.               <ul style="list-style-type: none"> <li>• Ascends along the lesser curvature.</li> </ul> </li> <li>• <b>Right gastric artery</b> from the <b>hepatic artery</b> of the <b>celiac trunk</b>.               <ul style="list-style-type: none"> <li>– Runs to the left along the lesser curvature.</li> </ul> </li> <li>• <b>Short gastric arteries</b> – arise from the <b>splenic artery</b>.               <ul style="list-style-type: none"> <li>• Pass in the <b>gastrosplenic ligament</b> and supplying the <b>FUNDUS</b></li> </ul> </li> <li>• <b>Left gastroepiploic artery:</b> From <b>splenic artery</b> <ul style="list-style-type: none"> <li>– Pass in the <b>gastrosplenic ligament</b>.</li> </ul> </li> <li>• <b>Right gastroepiploic artery:</b> from the <b>gastrooduodenal artery</b> of <b>hepatic</b> .               <ul style="list-style-type: none"> <li>• Passes to the left along the greater curvature.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>All of them drain into the portal circulation.</b></li> <li>• The <b>right and left gastric veins</b> drain <b>directly</b> into the <b>portal vein</b>.</li> <li>• The <b>short gastric veins</b> and the <b>left gastroepiploic vein</b> join the <b>splenic vein</b>.</li> <li>• The <b>right gastroepiploic vein</b> drain in the <b>superior mesenteric vein</b>.</li> </ul>	<ul style="list-style-type: none"> <li>• The lymph vessels follow the arteries.</li> <li>• They <b>first</b> drain to the:               <ul style="list-style-type: none"> <li>– <b>Left and right gastric nodes</b></li> <li>– <b>Left and right gastroepiploic nodes</b> and the</li> <li>– <b>Short gastric nodes</b></li> </ul> </li> <li>• Ultimately, all the lymph from the stomach is collected at the <b>celiac nodes</b>.</li> </ul>





### NERVE SUPPLY:

- **Sympathetic fibers** are derived from the celiac plexus. (They are vasoconstrictors, antiperistaltic and carry pain sensation).
- **Parasympathetic fibers** from **both vagi**. (They are for motility & secretory).
- **Anterior vagal trunk:**
  - Formed from both vagi mainly from the **left** vagus
  - Supply the **anterior** surface of the stomach
  - Gives a **hepatic branch**, from which a branch to **the pylorus**.
- **Posterior vagal trunk:**
  - Formed from both vagi mainly from the **right** vagus
  - Supply the **posterior** surface of the stomach
  - Gives off a large branch to the celiac and the **superior mesenteric plexuses**.





## Questions:

1) The esophagus begins at the level of the:-

- |                    |                   |
|--------------------|-------------------|
| A- C <sub>6</sub>  | C- L <sub>1</sub> |
| B- T <sub>10</sub> | D-T <sub>12</sub> |

2) Which one of the following structures locate posterior to the cervical part of esophagus:

- |                               |                    |
|-------------------------------|--------------------|
| A- Lobes of the thyroid gland | C- Trachea         |
| B- Vertebral column           | D- laryngeal nerve |

3) Which one of the following structures locate anterior to the thoracic part of esophagus:

- |                                     |                     |
|-------------------------------------|---------------------|
| A- Bodies of the thoracic vertebrae | C- Trachea          |
| B- Thoracic duct                    | D- Descending aorta |

4) Fibers from which crus of the diaphragm form a sling around the esophagus:

- |             |              |
|-------------|--------------|
| A- Left     | C- Posterior |
| B- Anterior | D- Right     |

5) The first ESOPHAGEAL CONSTRICTIONS is at:

- |                                  |                         |
|----------------------------------|-------------------------|
| A- Pharyngeoesophageal junction  | C- L <sub>3</sub>       |
| B- The junction with the stomach | D- level of aortic arch |

6) Upper third of esophagus supplied by:

- |                            |                         |
|----------------------------|-------------------------|
| A- Thoracic aorta.         | C- Left gastric artery  |
| B- Inferior thyroid artery | D- right gastric artery |

7) The veins of middle third of esophagus drains into :

- |                           |                         |
|---------------------------|-------------------------|
| A- Inferior thyroid veins | C- Azygos veins.        |
| B- Left gastric vein      | D- Right gastric artery |



8) CARDIAC ORIFICE is:

- A- Physiological sphincter
- B- Anatomical sphincter
- C- All of them
- D- none of them

9) The lesser curvature of the stomach attached to the liver by:

- A- greater omentum
- B- lesser omentum
- C- gastrosplenic ligament
- D- none of them

10) The greater curvature of the stomach forms:

- A- Right border
- B- Anterior border
- C- Left border
- D- none of them

11) Which one of the following structures locate anterior to stomach:

- A- Left crus of diaphragm
- B- Spleen
- C- Pancreas
- D- Left costal margin

12) All of the stomach veins drain into:

- A- Portal circulation
- B- Systematic circulation
- C- none of them
- D- All of them

13) All the lymph from the stomach is collected at:

- A- Deep cervical nodes
- B- Celiac nodes
- C- superior mediastinal nodes
- D- inferior mediastinal nodes

14) Which one of the following is not esophageal constrictions:

- a- larynx junction
- b- pharynx junction
- c- crossing of aortic arch
- d- stomach junction

15) Which one of the following is not posterior to stomach:

- a- left kidney
- b- transverse mesocolon
- c- left pleura
- d- pancreas



Q	Answers
1	A
2	B
3	C
4	D
5	A
6	B
7	C
8	A
9	B
10	C
11	D
12	A
13	B
14	A
15	C

**GOOD LUCK**

**Anatomy Team Leaders:**

**Fahad AlShayhan & Eman AL-Bedia**