

# **THE ESOPHAGUS & STOMACH**

**Dr. Aiman Qais Afar**  
**Surgical Anatomist**

**College of Medicine / University of Mutah**  
**2021-2022**

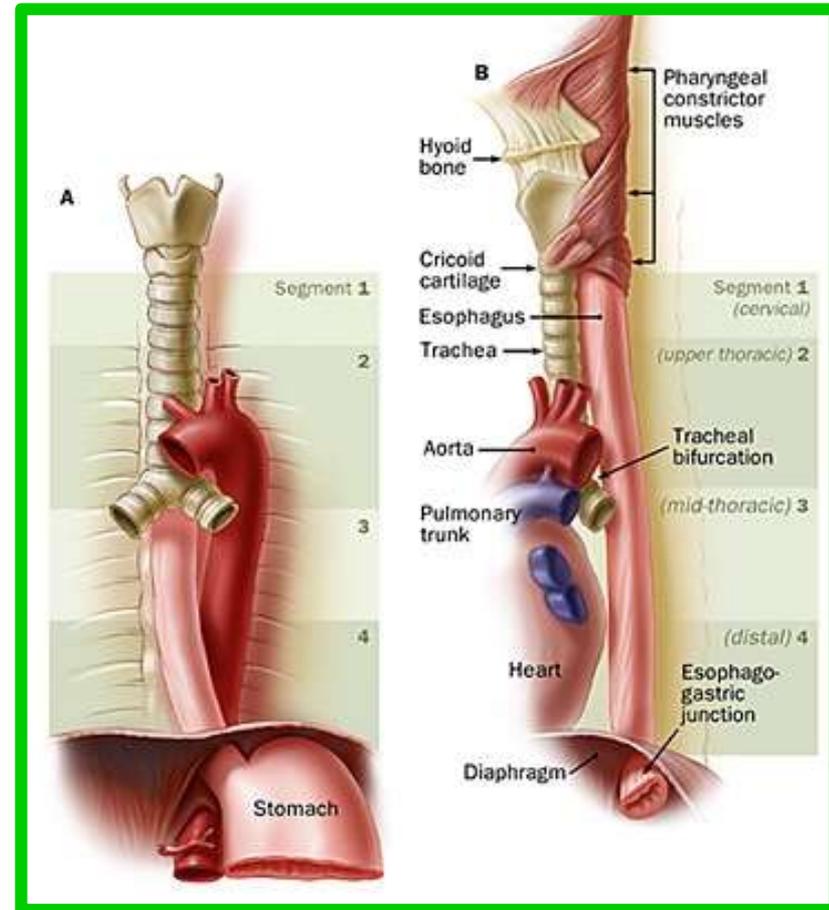
**Tuesday 5 April 2022**

# The Esophagus

❖ The esophagus is a muscular tube about **10 in. (25 cm) long**, with an average **diameter of 2 cm** that extending from the pharynx to the stomach

❖ It begins at the level of the **cricoid cartilage**, opposite the body of the **sixth cervical vertebra**.

❖ It passes through the diaphragm at the level of the **10th thoracic vertebra** to join the stomach at the level of the **7th left costal cartilage** and **T11 vertebra**



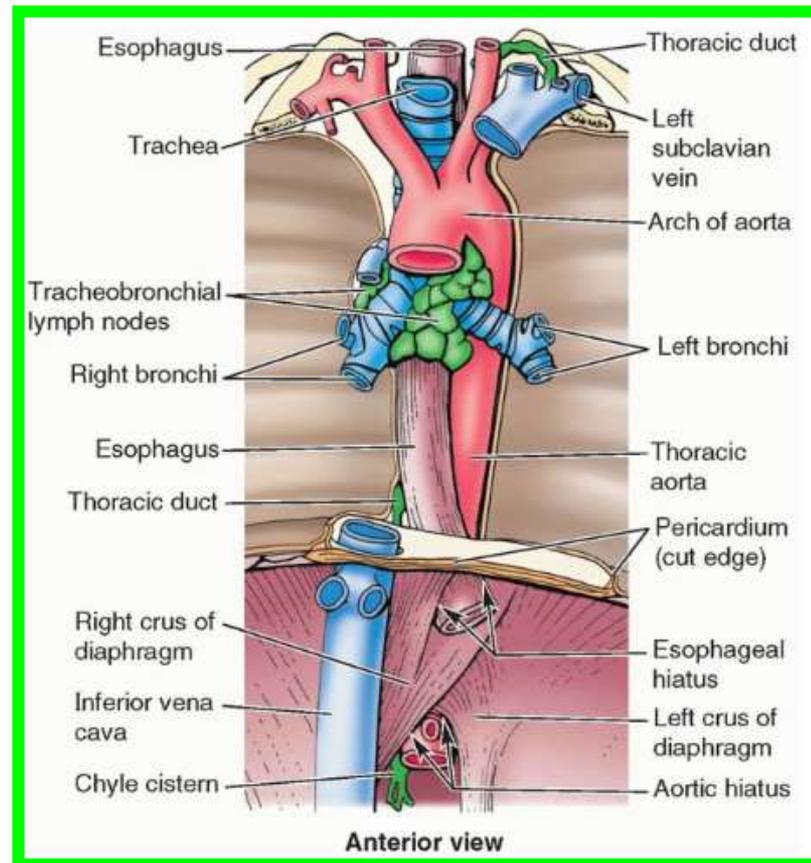
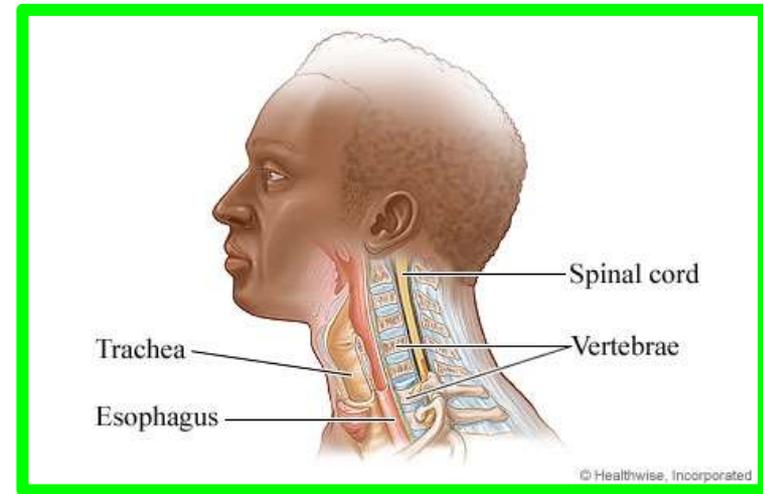
❖ It commences in the midline, but as it descends through the neck, it inclines to the left side

# The Esophagus

**In the neck**, the esophagus lies **in front of the vertebral column**; **laterally**, it is related to the **lobes of the thyroid gland**; **& 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**



# The Esophagus

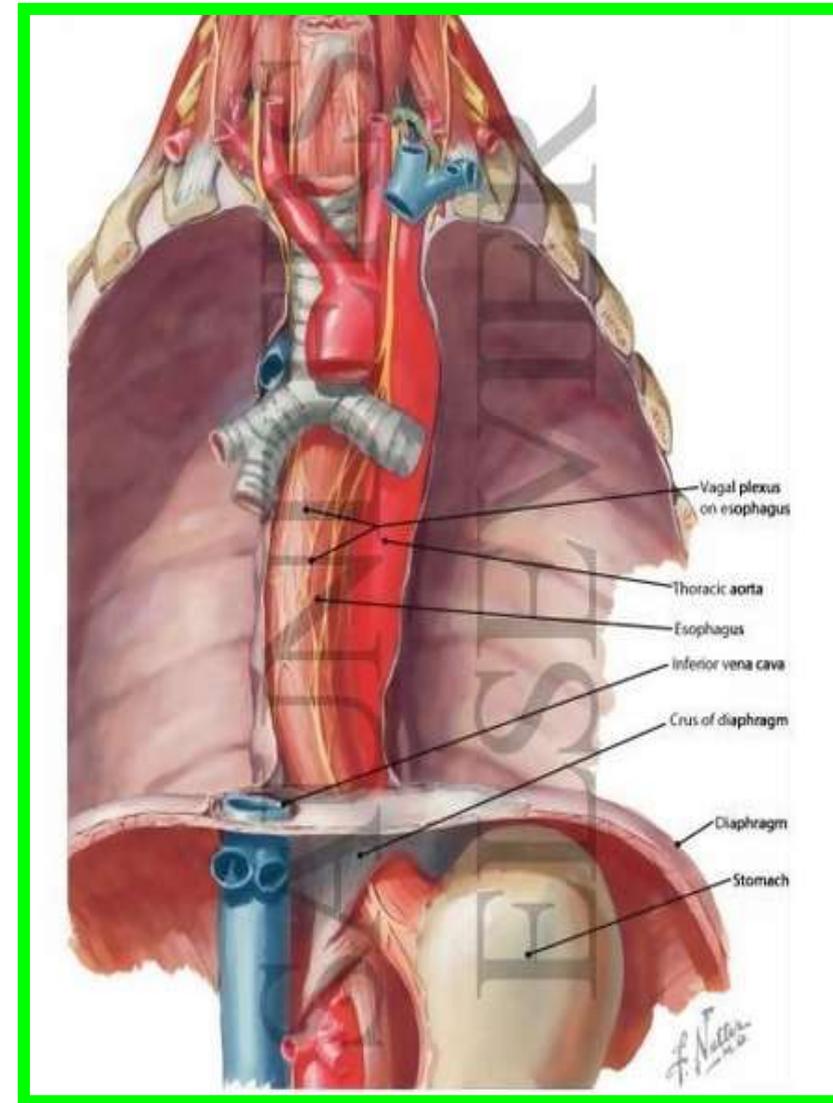
Dr. Aiman Qais Maathidy  
Tuesday 5 April 2022

■ ■ **Anteriorly:** The trachea and the left recurrent laryngeal nerve; the left principal bronchus, which constricts it; and the pericardium, which separates the esophagus from the left atrium

■ ■ **Posteriorly:** The bodies of the thoracic vertebrae; the thoracic duct; the azygos veins; the right posterior intercostal arteries; and, at its lower end, the descending thoracic aorta

■ ■ **Right side:** The mediastinal pleura and the terminal part of the azygos vein

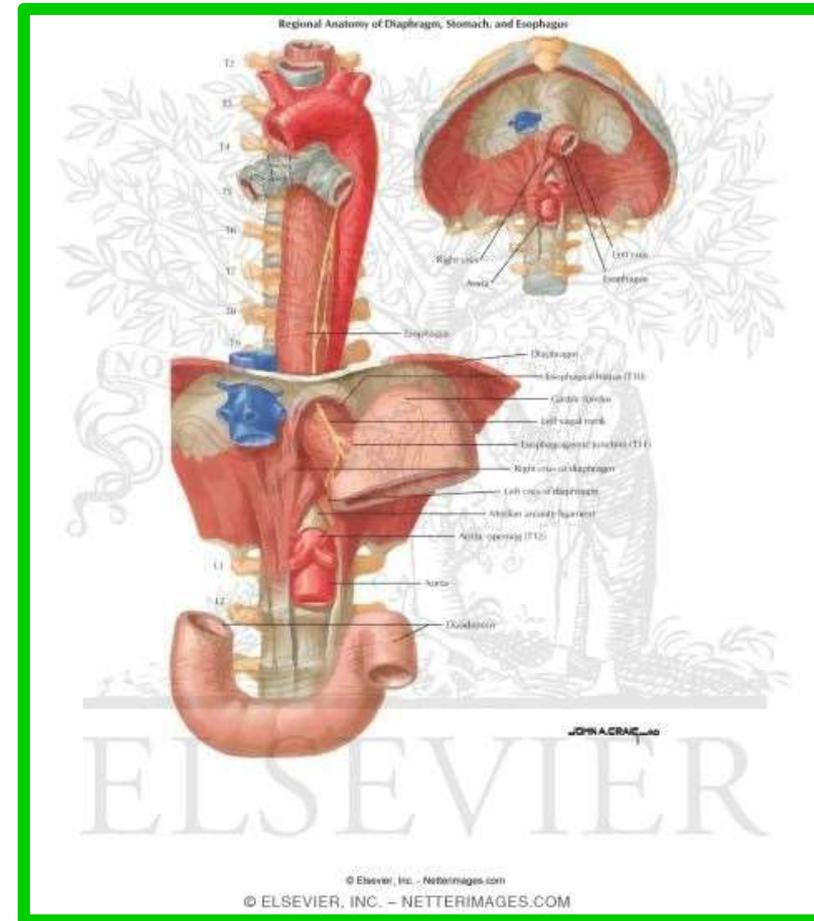
■ ■ **Left side:** The left subclavian artery, the aortic arch, the thoracic duct, and the mediastinal pleura



# The Esophagus

Inferiorly to the level of the roots of the lungs,

- ✓ The **left vagus** lies anterior to the esophagus, and the **right vagus** lies posterior.
- ✓ Fibers from **the right crus** of the diaphragm pass around the esophagus in the form of **a sling**.
- ✓ **At the opening in the diaphragm**, the esophagus is accompanied by the **two vagi**, branches of **the left gastric blood vessels**, and **lymphatic vessels**.

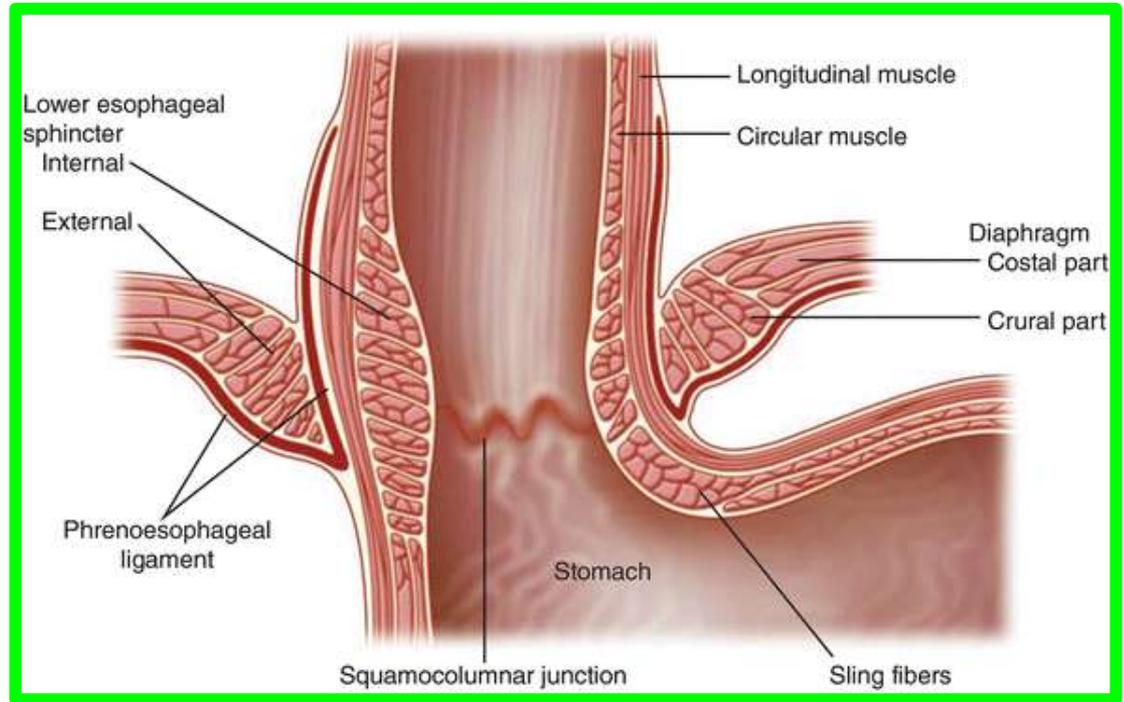


□ **In the abdomen**, the esophagus descends for about **0.5 in. (1.3 cm)** and then enters the stomach. It is related to **the left lobe of the liver anteriorly** and to **the left crus** of the diaphragm **posteriorly**.

# The Esophagus

Dr. Aiman Qais Maathidy  
Tuesday 5 April 2022

❖ **The esophagogastric junction** lies to the left of the **T11 vertebra** on the horizontal plane that passes through the **tip of the xiphoid process**.



❖ **Surgeons and endoscopists** designate **the Z-line** a jagged line where the mucosa abruptly changes from **esophageal to gastric mucosa**,

❖ Immediately superior to this junction, the diaphragmatic musculature forming **the esophageal hiatus** functions as a physiological inferior esophageal sphincter that contracts and relaxes.

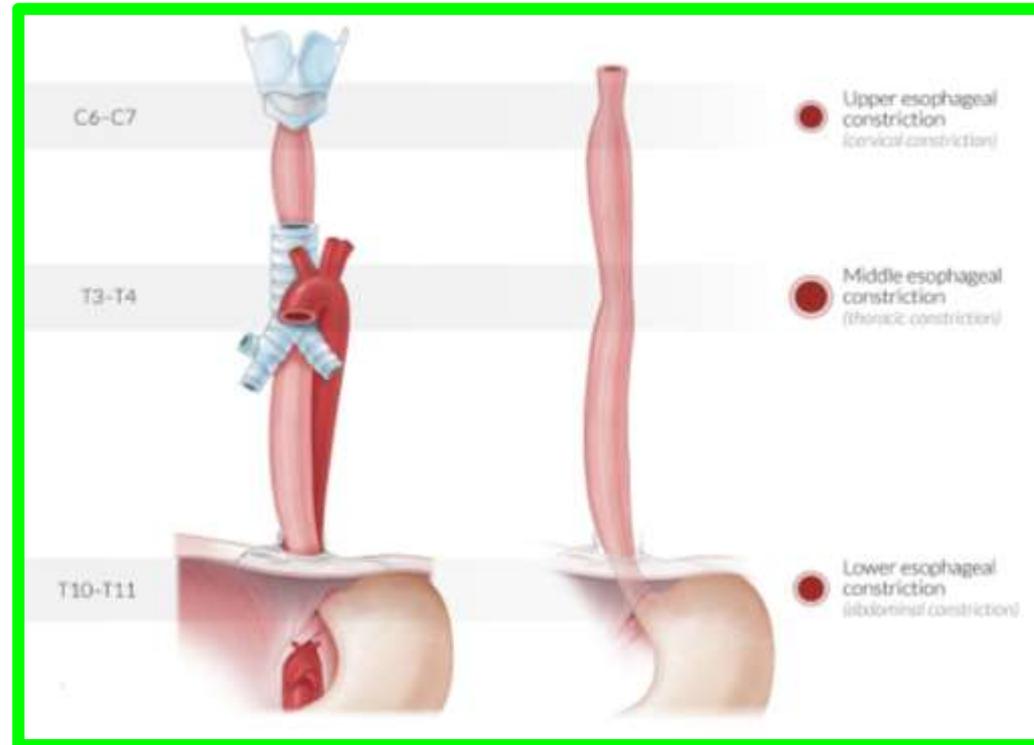
# The Esophagus

The esophagus may have three impressions, or “constrictions,”

❖ **Cervical constriction (upper esophageal sphincter):** at its beginning at the pharyngoesophageal junction, approximately 15 cm from the incisor teeth; caused by the cricopharyngeus muscle

❖ **Thoracic (broncho-aortic) constriction:** a compound constriction where it is first crossed by the arch of the aorta, 22.5 cm from the incisor teeth, and then where it is crossed by the left main bronchus, 27.5 cm from the incisor teeth; the former is seen in anteroposterior views, the latter in lateral views.

Dr. Aiman Qais Maathidy

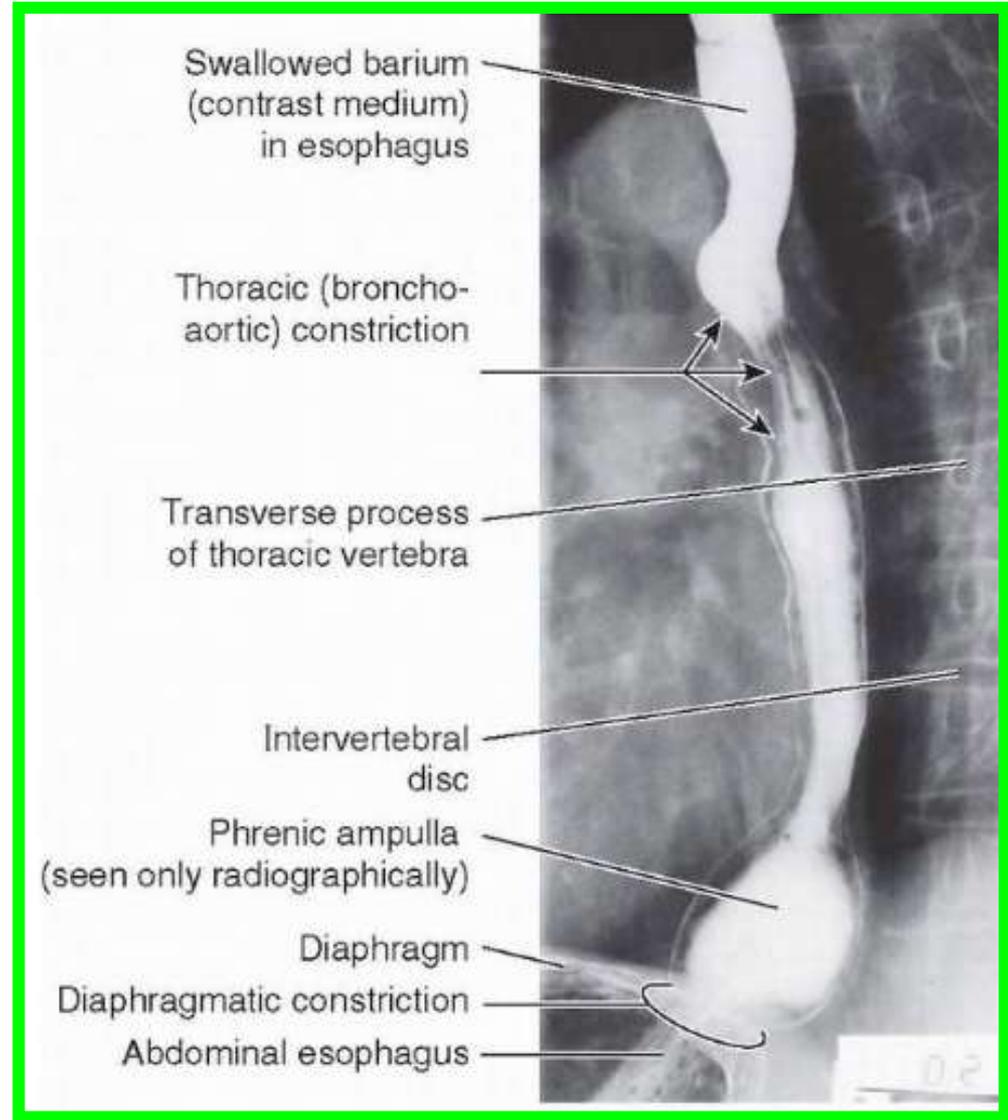


❖ **Diaphragmatic constriction:** where it passes through the esophageal hiatus of the diaphragm, approximately 40 cm from the incisor teeth

# The Esophagus

Radiograph of esophagus after swallowing barium meal. This left posterior oblique (LPO) view demonstrates two of the three normal “constrictions” (impressions) caused by **the arch of the aorta and left main bronchus**.

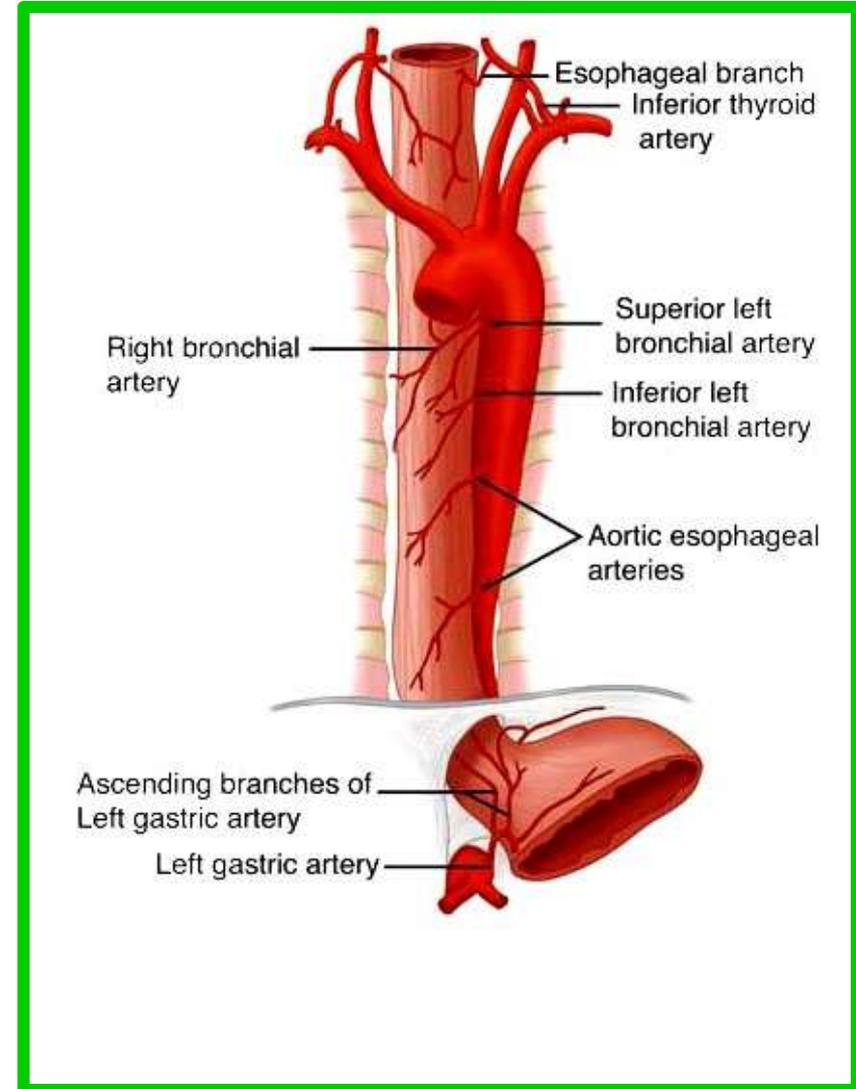
**The phrenic ampulla**, which is seen only radiographically, is the distensible part of the esophagus **superior to the diaphragm**.



# The Esophagus

## Blood Supply of the Esophagus

- ✓ The upper third of the esophagus is supplied by **the inferior thyroid artery**
- ✓ The middle third by branches from the **descending thoracic aorta**,
- ✓ The lower third by branches from the **left gastric artery**.

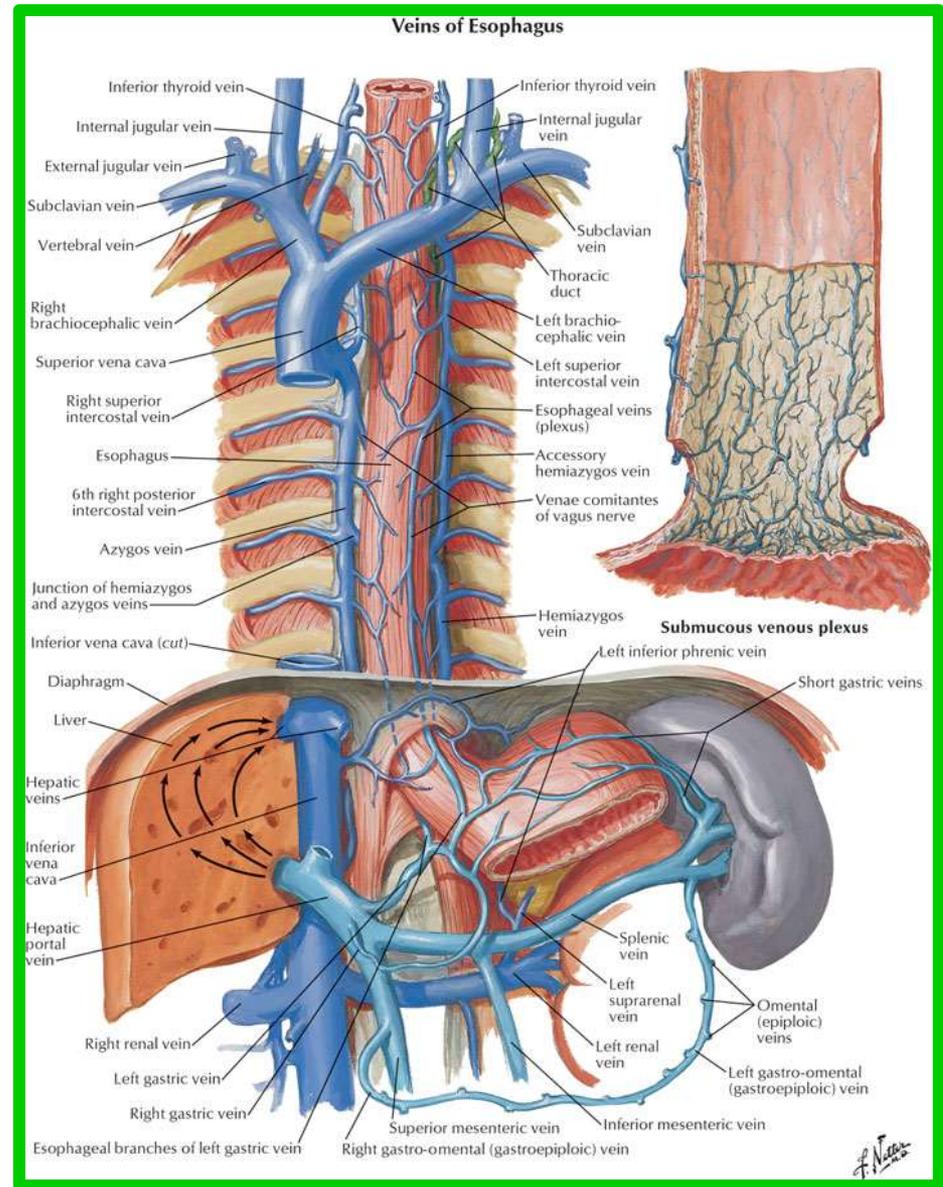


# The Esophagus

The veins from the upper third drain into the inferior thyroid veins,

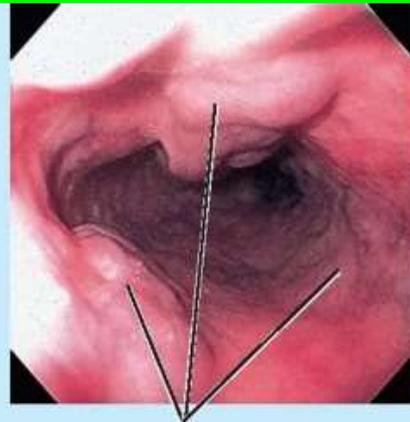
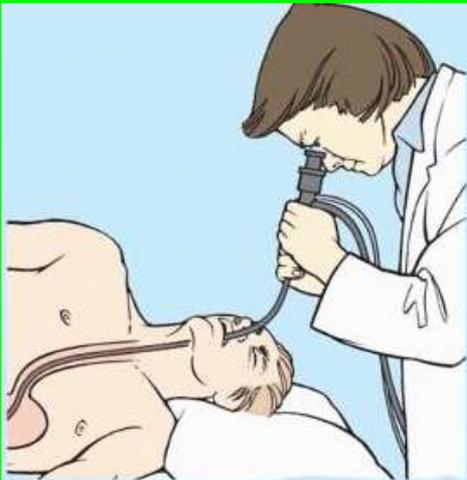
from the middle third into the azygos veins,

and from the lower third into the left gastric vein, a tributary of the portal vein



Because the submucosal veins of the inferior esophagus drain to both **the portal and systemic venous systems**, they constitute a **portosystemic anastomosis**. In portal hypertension (**an abnormally increased blood pressure in the portal venous system**), blood is unable to pass through the liver via the hepatic portal vein, causing a reversal of flow in the esophageal tributary., **forming esophageal varices**

These distended collateral channels may rupture and cause severe hemorrhage that is life-threatening and difficult to control surgically. **Esophageal varices** commonly develop in persons who have developed **alcoholic cirrhosis (fibrous scarring) of the liver**



View through esophagoscope of esophageal varices

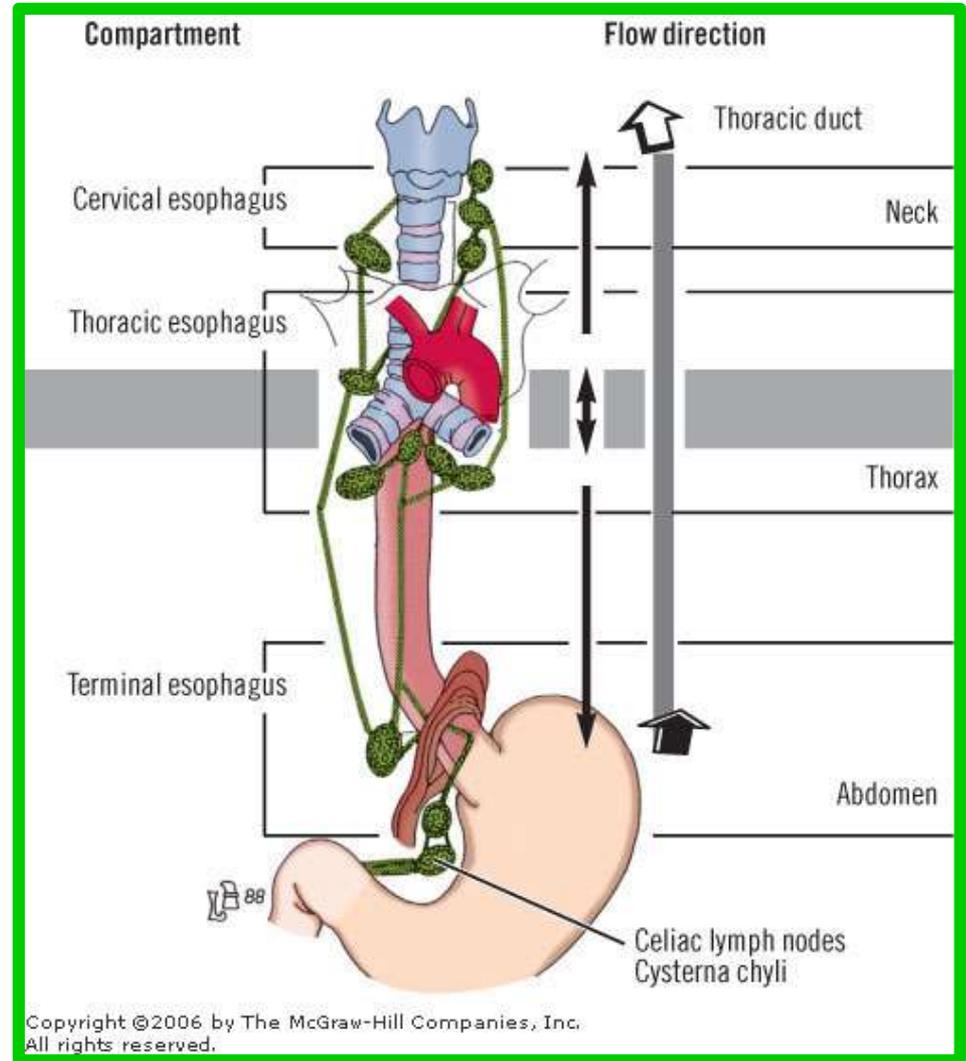
## Esophageal Varices

Dr. Aiman Qais Maathidy  
Tuesday 5 April 2022

# The Esophagus

## Lymph Drainage of the Esophagus

- ❑ Lymph vessels from the upper third of the esophagus drain into the deep cervical nodes,
- ❑ From the middle third into the superior and posterior mediastinal nodes,
- ❑ From the lower third into nodes along the left gastric blood vessels and the celiac nodes

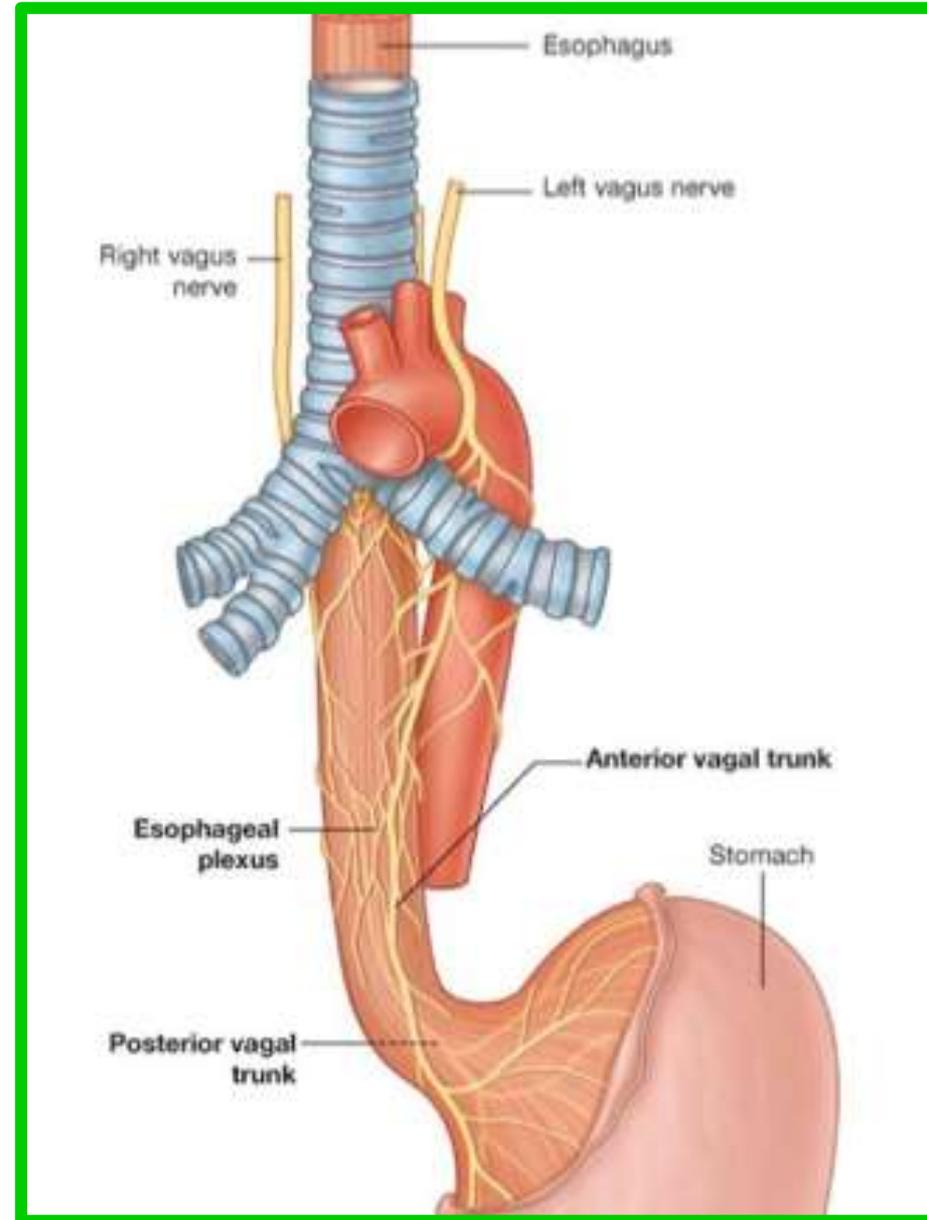


# The Esophagus

## Nerve Supply of the Esophagus

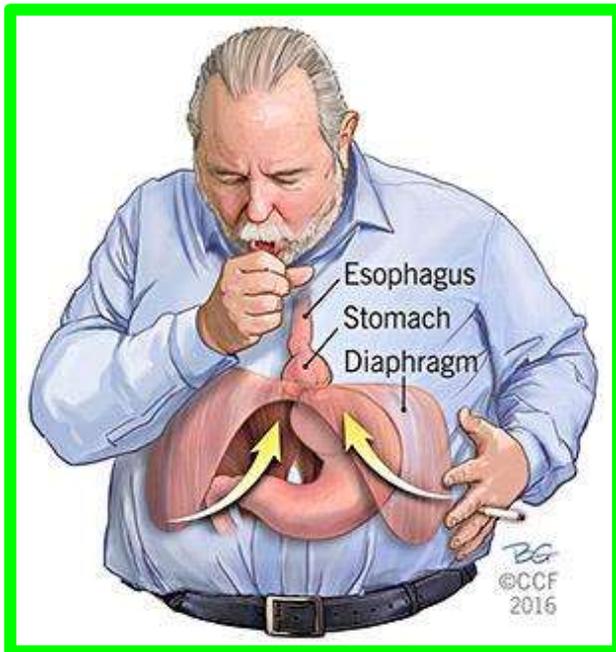
The esophagus is supplied by parasympathetic and sympathetic efferent and afferent fibers via **the vagi** and **sympathetic trunks**.

In the lower part of its thoracic course, the esophagus is surrounded by **the esophageal nerve plexus**

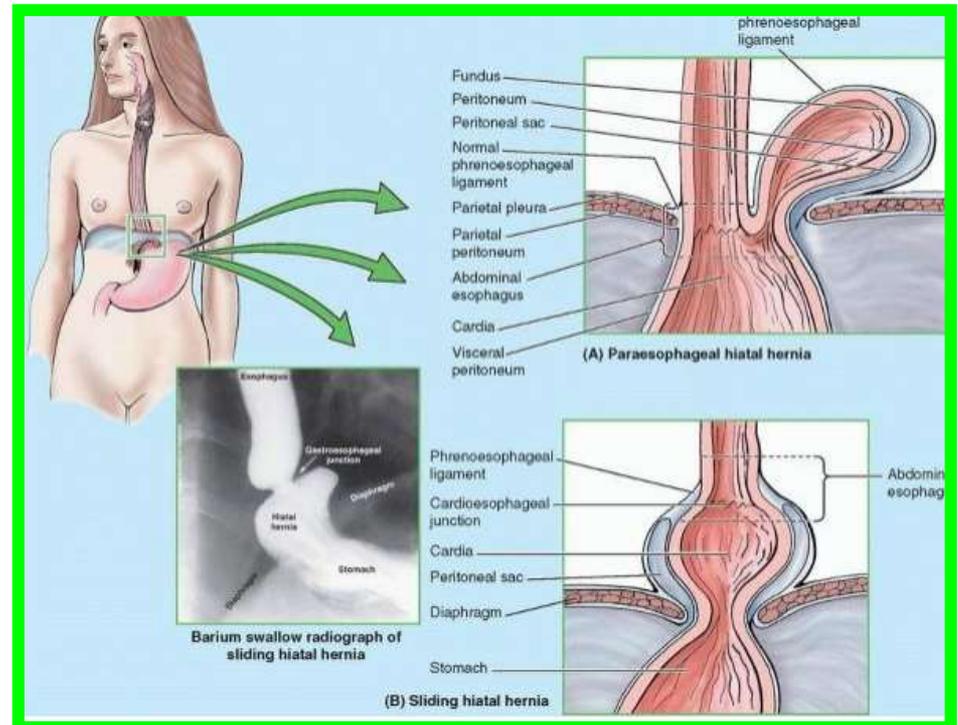


**A hiatal (hiatus) hernia** is a protrusion of part of the stomach into the mediastinum through the esophageal hiatus of the diaphragm. The hernias occur most often in people after middle age, possibly because of **weakening of the muscular part of the diaphragm** and **widening of the esophageal hiatus**.

the two main types are: **paraesophageal hiatal hernia** and **sliding hiatal hernia**

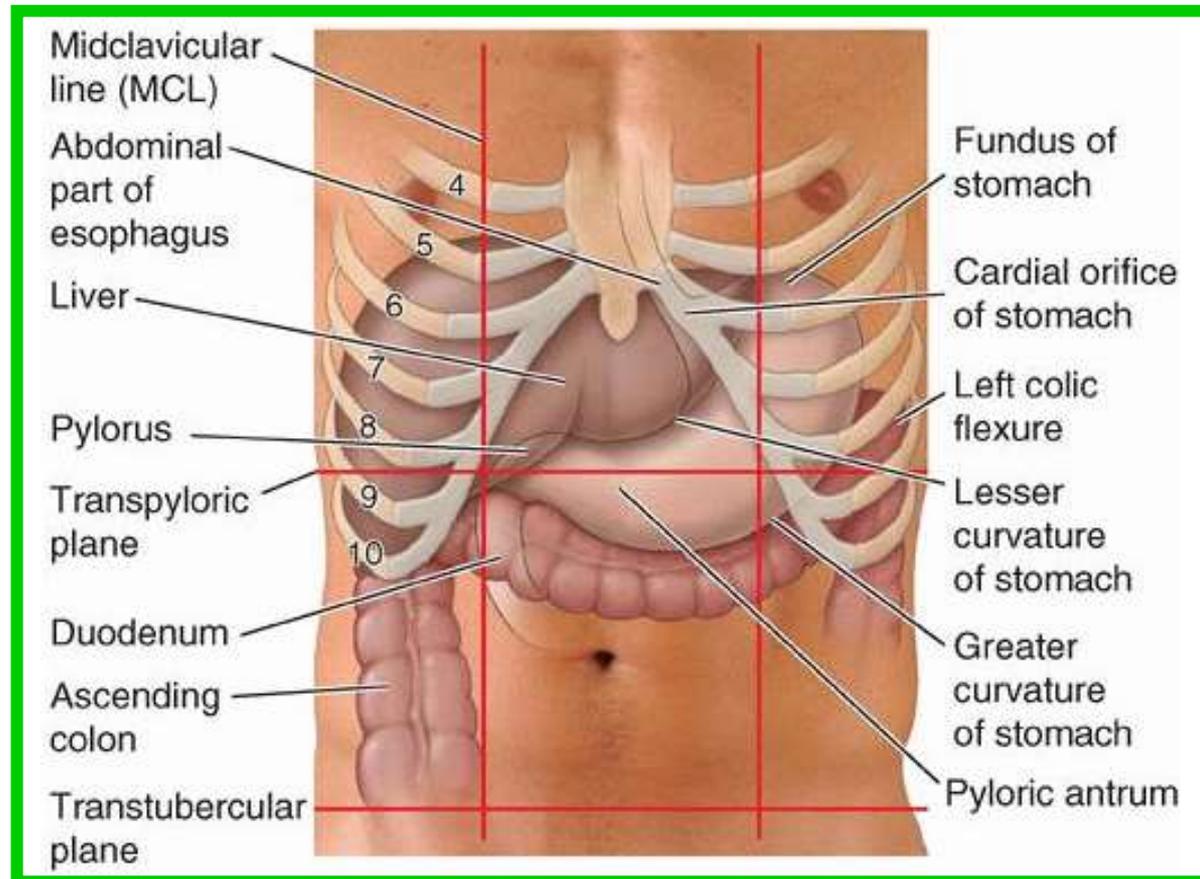


Dr. Aiman Qais Maathidy  
Tuesday 5 April 2022



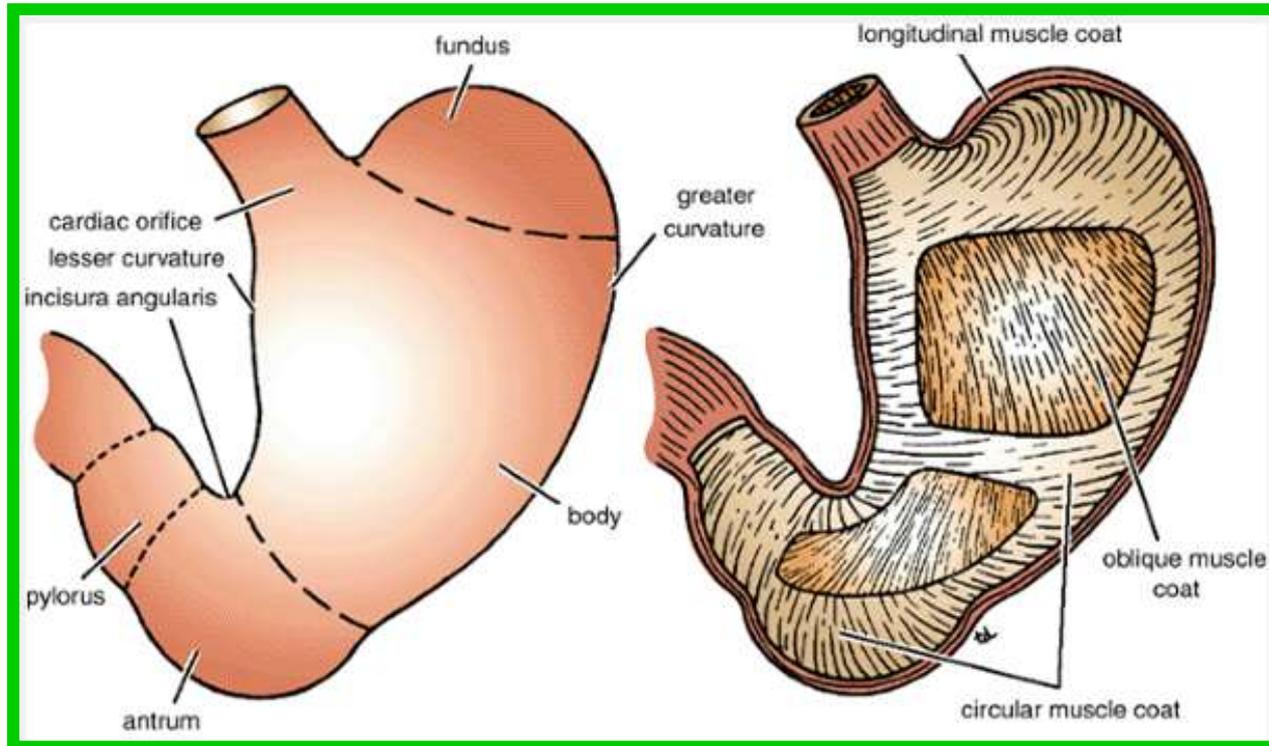
- ❖ The stomach is the **dilated portion** of the alimentary canal
- ❖ It has a capacity of about **1500 mL**
- ❖ It stores food & mixes the food with gastric secretions, and it controls the rate of delivery of **the chyme** to the small intestine

❖ The stomach is situated in the upper part of the abdomen, extending from beneath **the left costal margin region** into **the epigastric and umbilical regions**



# Stomach

It is **roughly J-shaped** and has two openings, the **cardiac** and **pyloric orifices**;  
two curvatures, the **greater** and **lesser curvatures**; and two surfaces, **an anterior** and **a posterior surface**.

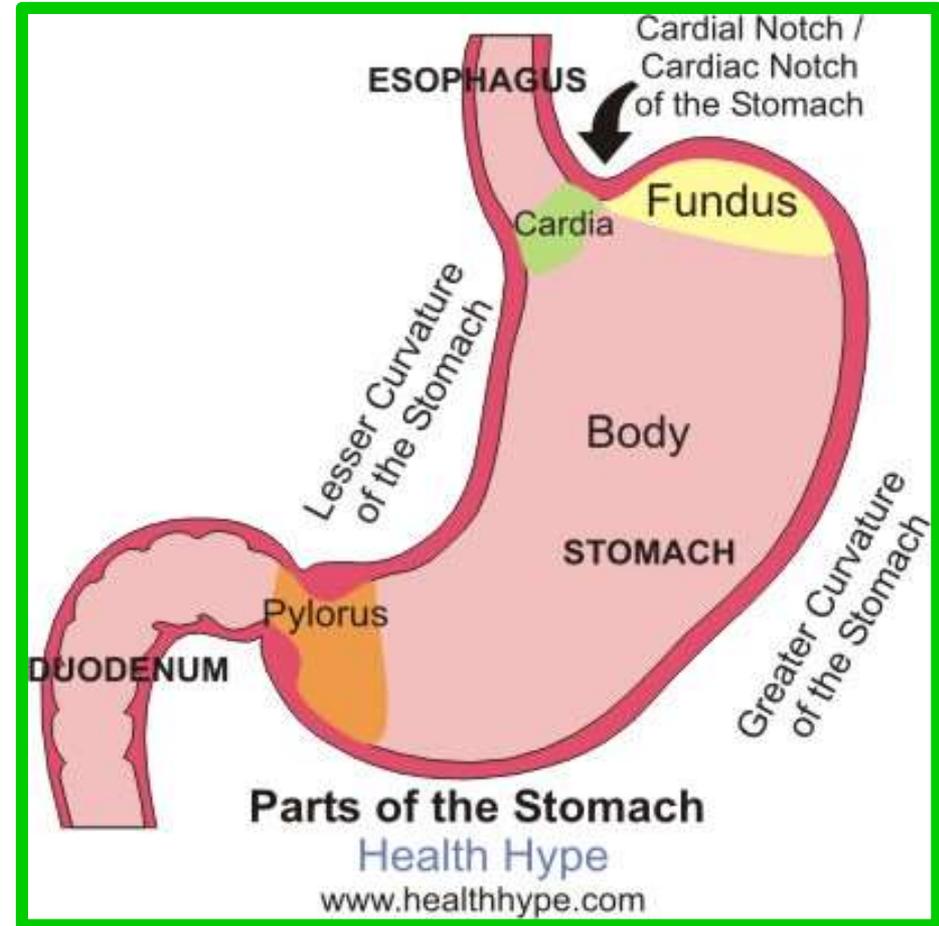


# Stomach

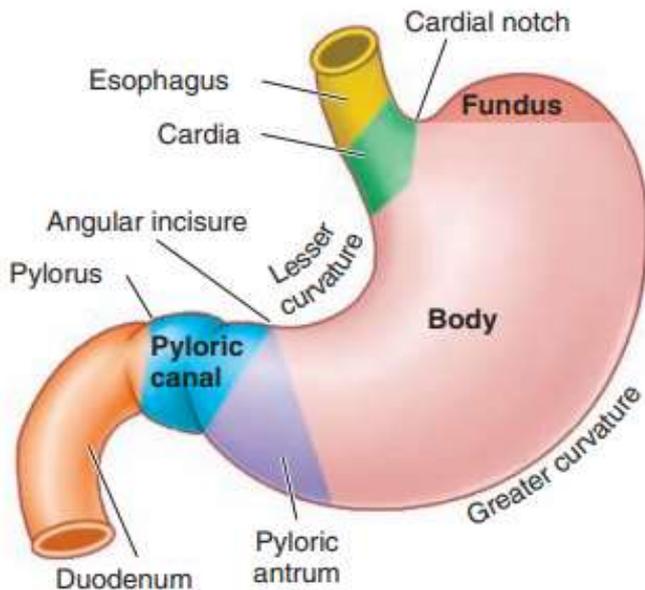
The stomach is divided into the following parts

**Fundus:** This is dome-shaped and projects upward and to the left of the cardiac orifice. It is usually full of gas

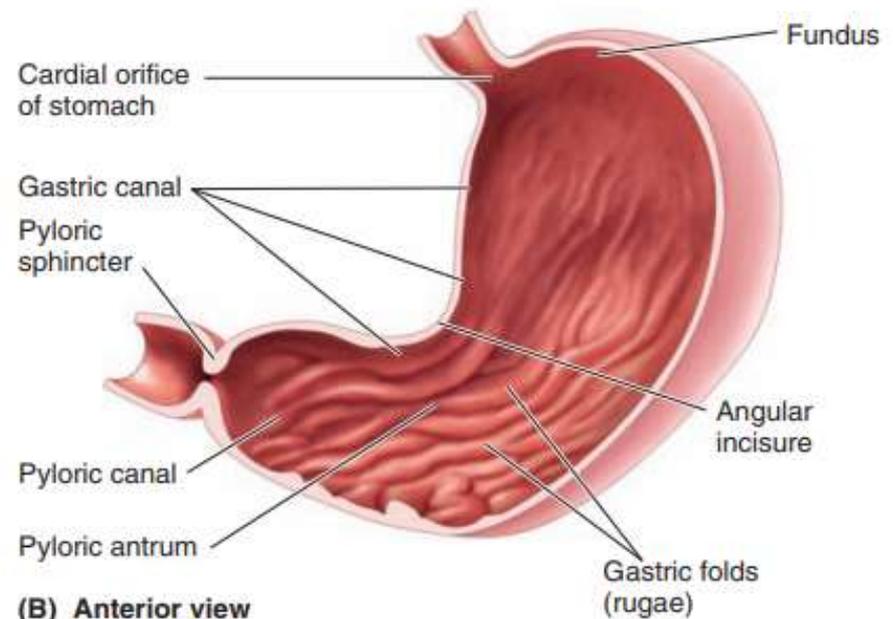
**Body:** This extends from the level of the cardiac orifice to the level of the incisura angularis, a constant notch in the lower part of the lesser curvature .



- ❖ **Pyloric antrum:** This extends from the **incisura angularis** to the **pylorus**.
- ❖ **Pylorus:** This is the most tubular part of the stomach. The thick muscular wall is called **the pyloric sphincter**, and the cavity of the pylorus is **the pyloric canal**



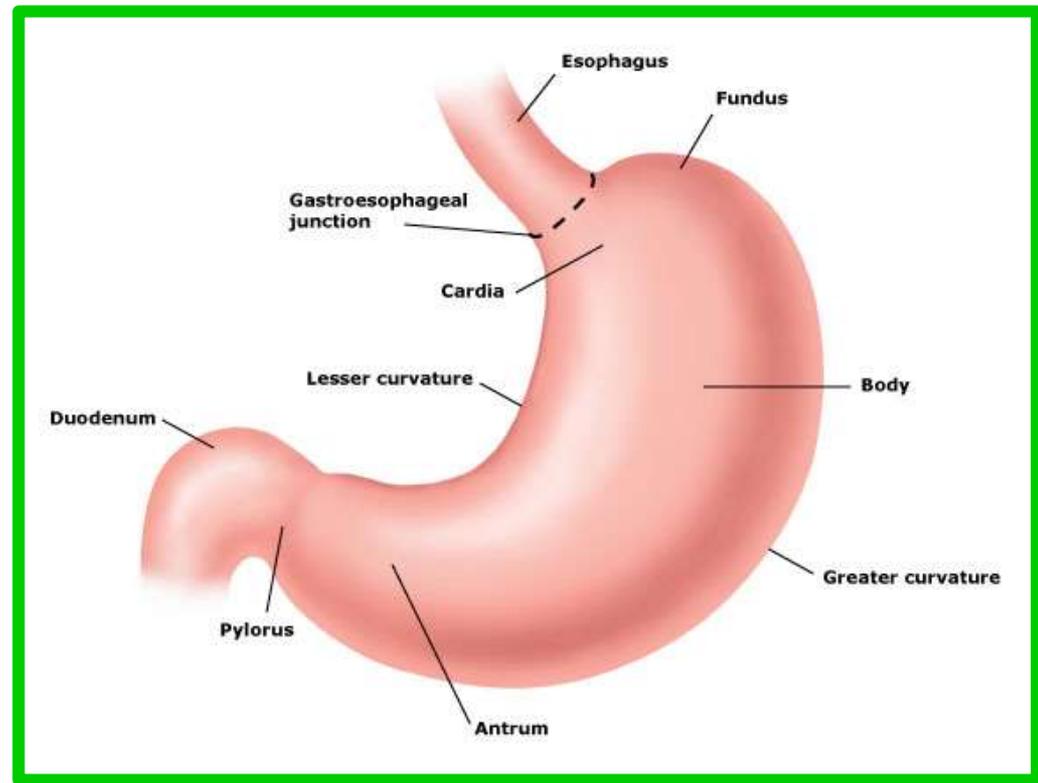
(A) Anterior view



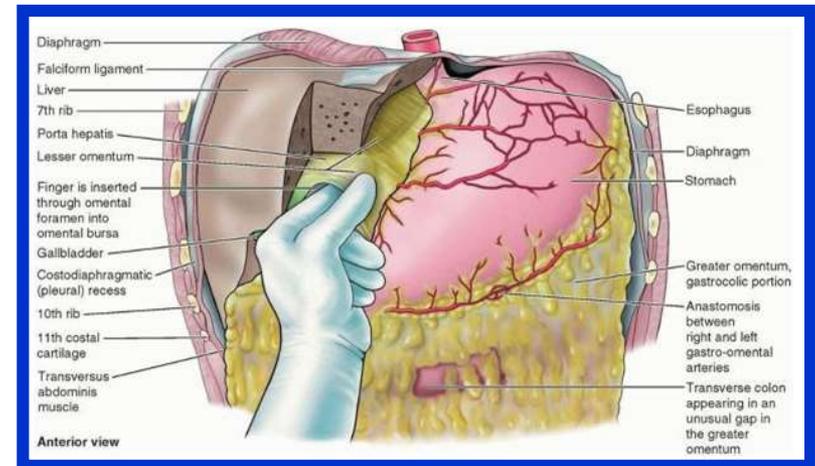
(B) Anterior view

# Stomach

❖ The lesser curvature forms the right border of the stomach and extends from the cardiac orifice to the pylorus. It is suspended from the liver by the lesser omentum



❖ The greater curvature is much longer than the lesser curvature and extends from the left of the cardiac orifice, over the dome of the fundus, and along the left border of the stomach to the pylorus

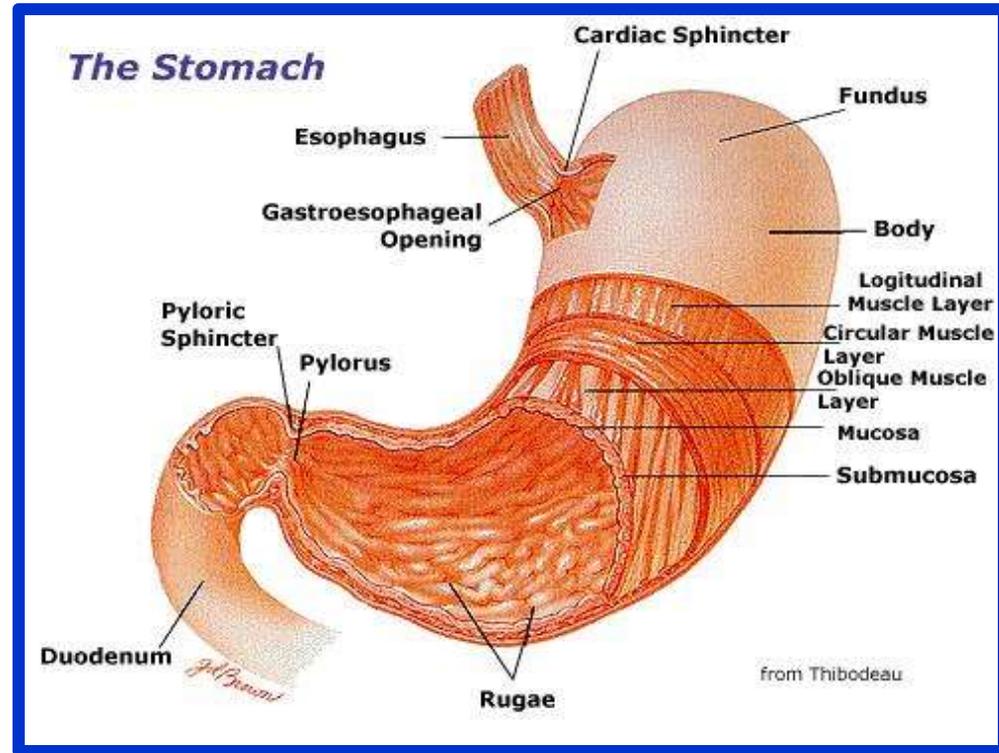


# Stomach

❖ The cardiac orifice is where the esophagus enters the stomach. that prevents regurgitation of stomach contents into the esophagus.

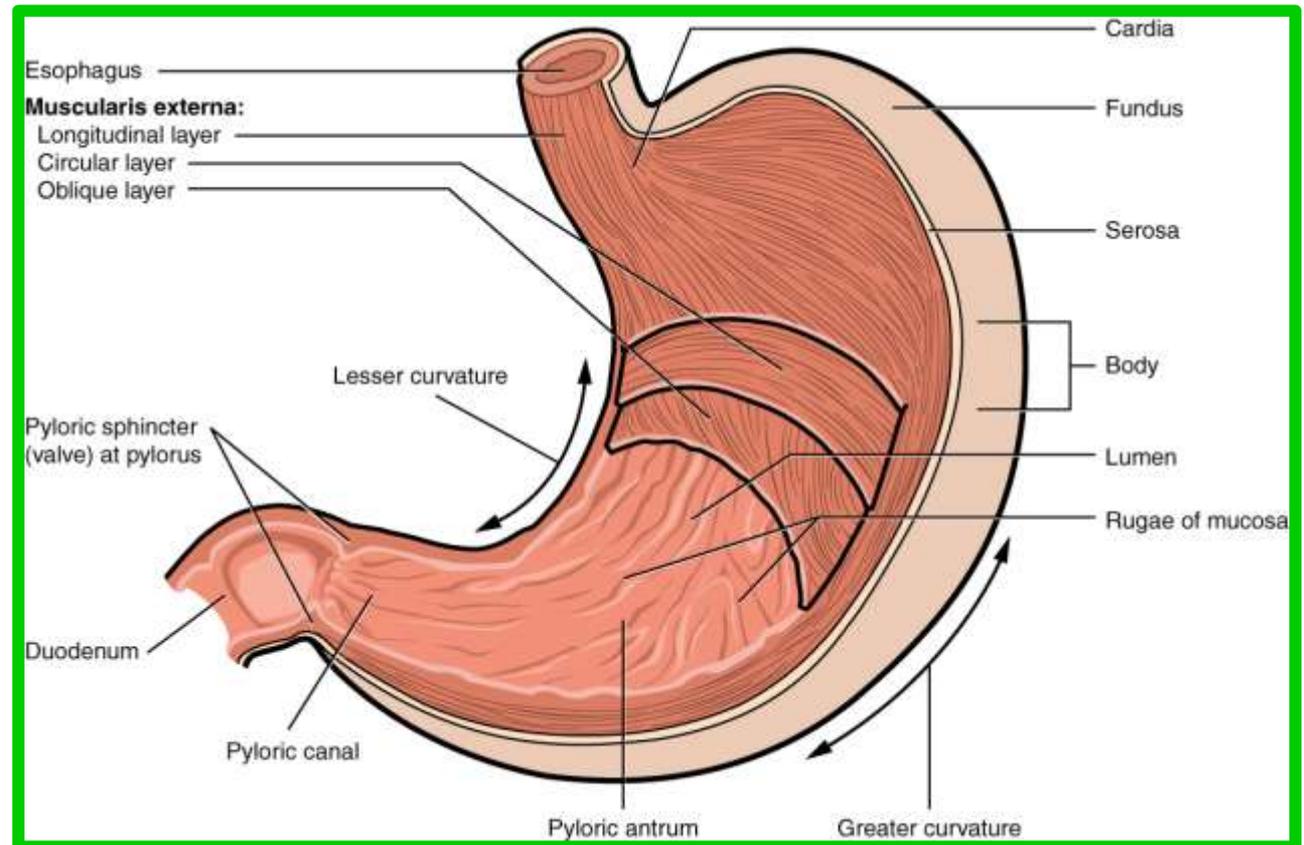
❖ The pyloric orifice is formed by the pyloric canal, which is about (2.5 cm) long. The circular muscle coat is much thicker.

❖ The pylorus lies on the transpyloric plane.



# Stomach

- ✓ The mucous membrane of the stomach is thick and vascular and is thrown into numerous folds, or **rugae**, that are mainly longitudinal in direction
- ✓ The muscular wall of the stomach contains **longitudinal** fibers, **circular** fibers, and **oblique** fibers

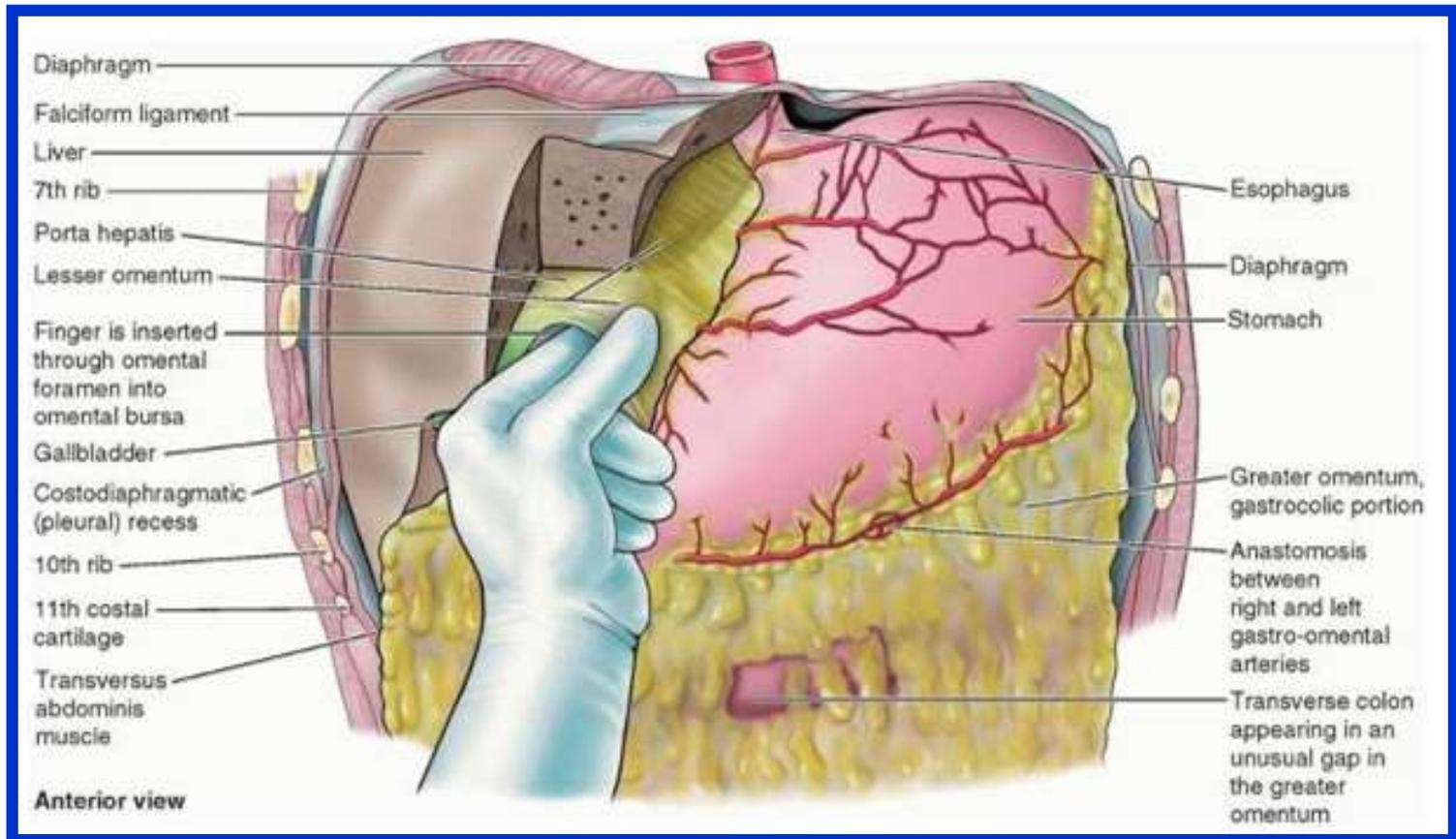


Dr. Aiman Qais Maathidy

Tuesday 5 April 2022

# Stomach

The peritoneum (visceral peritoneum) completely surrounds the stomach. It leaves the lesser curvature as **the lesser omentum** and the greater curvature as the **gastrosplenic omentum** and **the greater omentum**

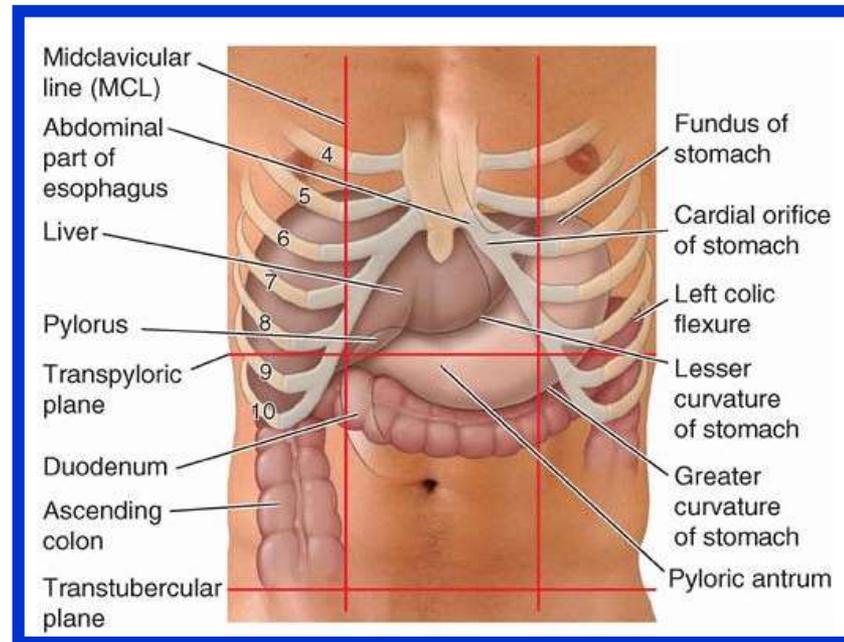


# Stomach

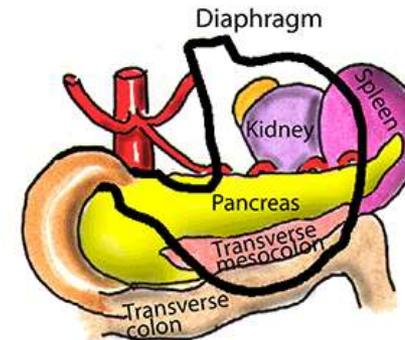
## Relations

**Anteriorly:** The anterior abdominal wall, the left costal margin, the left pleura and lung, the diaphragm, and the left lobe of the liver .

**Posteriorly:** The lesser sac, the diaphragm, the spleen, the left suprarenal gland, the upper part of the left kidney, the splenic artery, the pancreas, the transverse mesocolon, and the transverse colon



### STOMACH - RELATIONS



#### ANTERIOR

Abdominal wall  
Left costal margin  
Diaphragm  
Left lobe of liver

#### SUPERIOR

Left dome of diaphragm

#### POSTERIOR

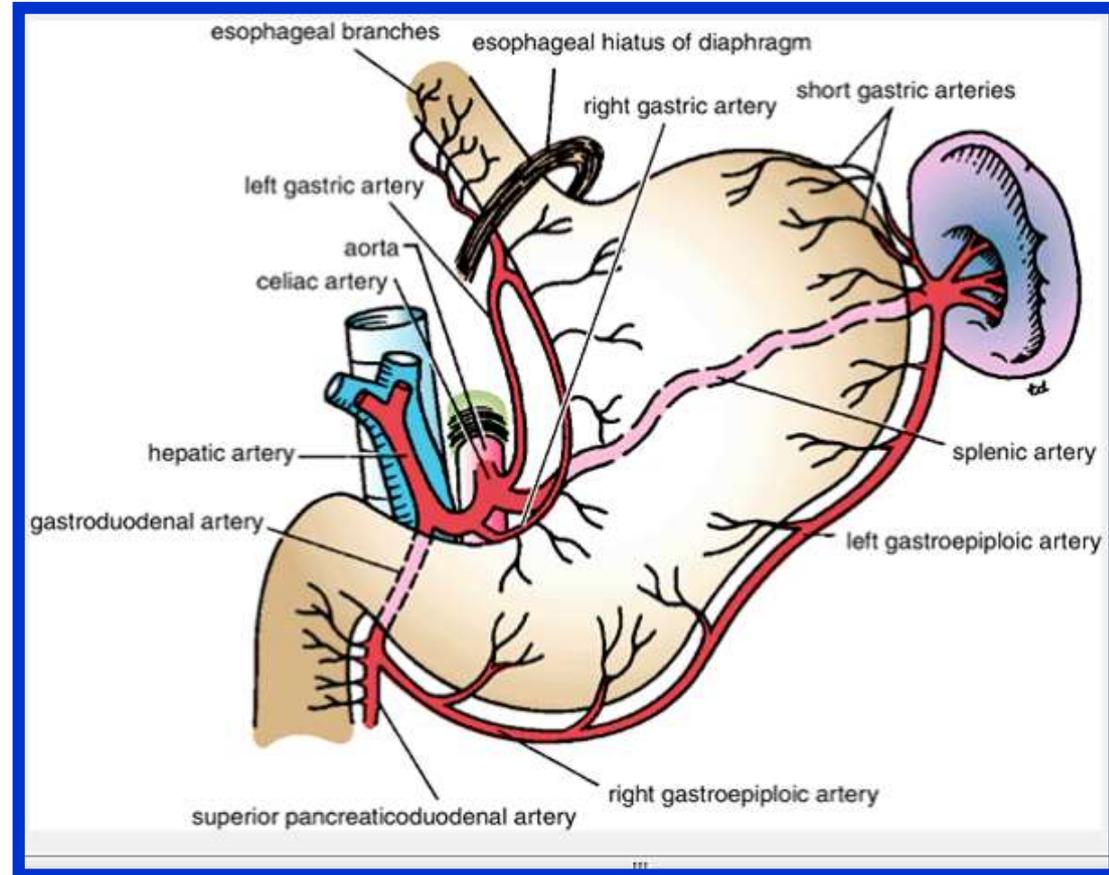
Lesser sac  
Pancreas  
Transverse mesocolon  
Transverse colon  
Left kidney/suprarenal gland  
Spleen/splenic artery

# Stomach

## Blood Supply

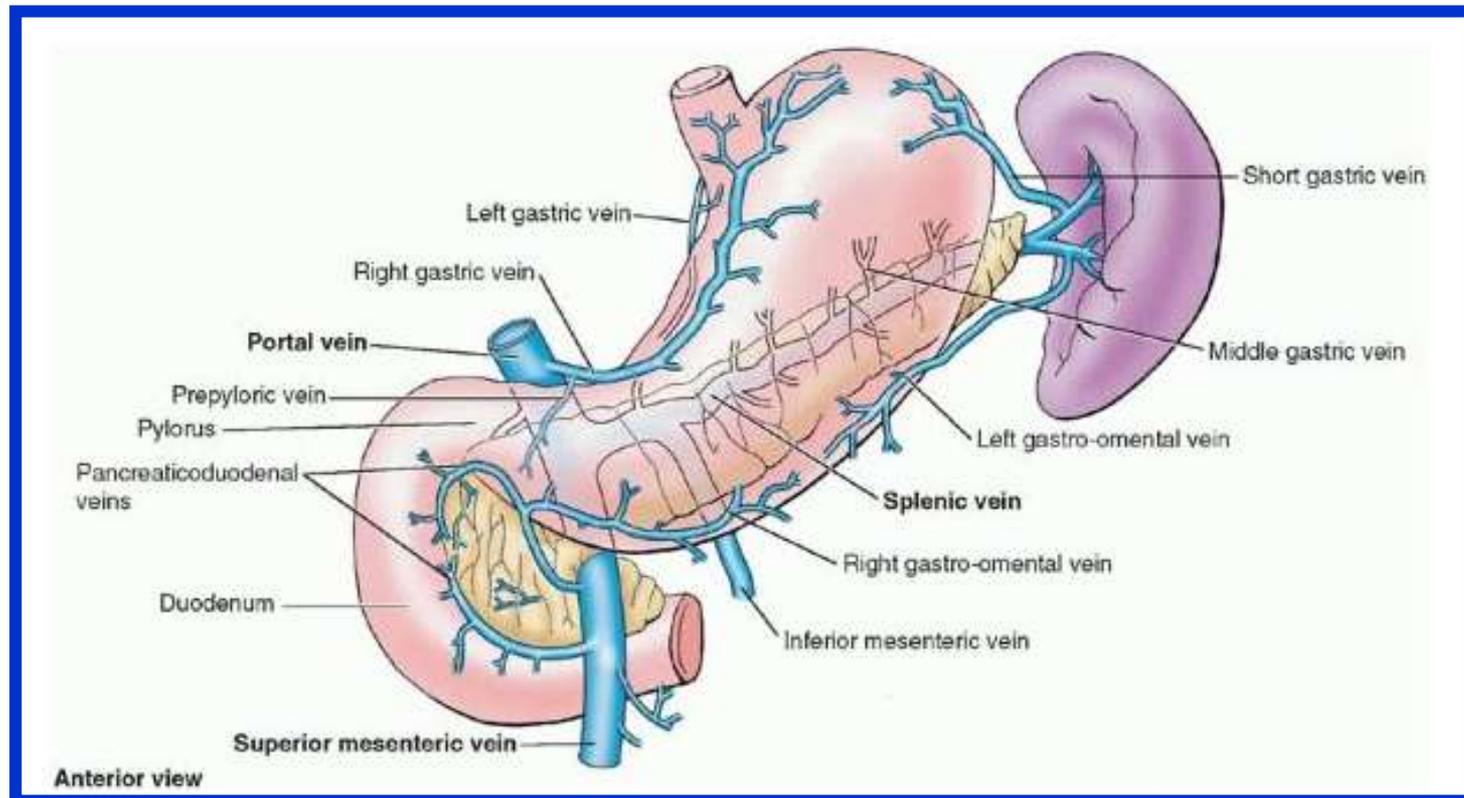
The arteries are derived from the branches of **the celiac artery**

- ❖ The left gastric artery
- ❖ The right gastric artery
- ❖ The short gastric arteries
- ❖ The left gastroepiploic artery
- ❖ The right gastroepiploic artery



## Veins

- ❖ The veins drain into the portal circulation.
- ❖ The **left** and **right gastric veins** drain directly into the portal vein.
- ❖ The **short gastric veins** and the **left gastroepiploic veins** join the splenic vein.
- ❖ The **right gastroepiploic vein** joins the superior mesenteric vein.

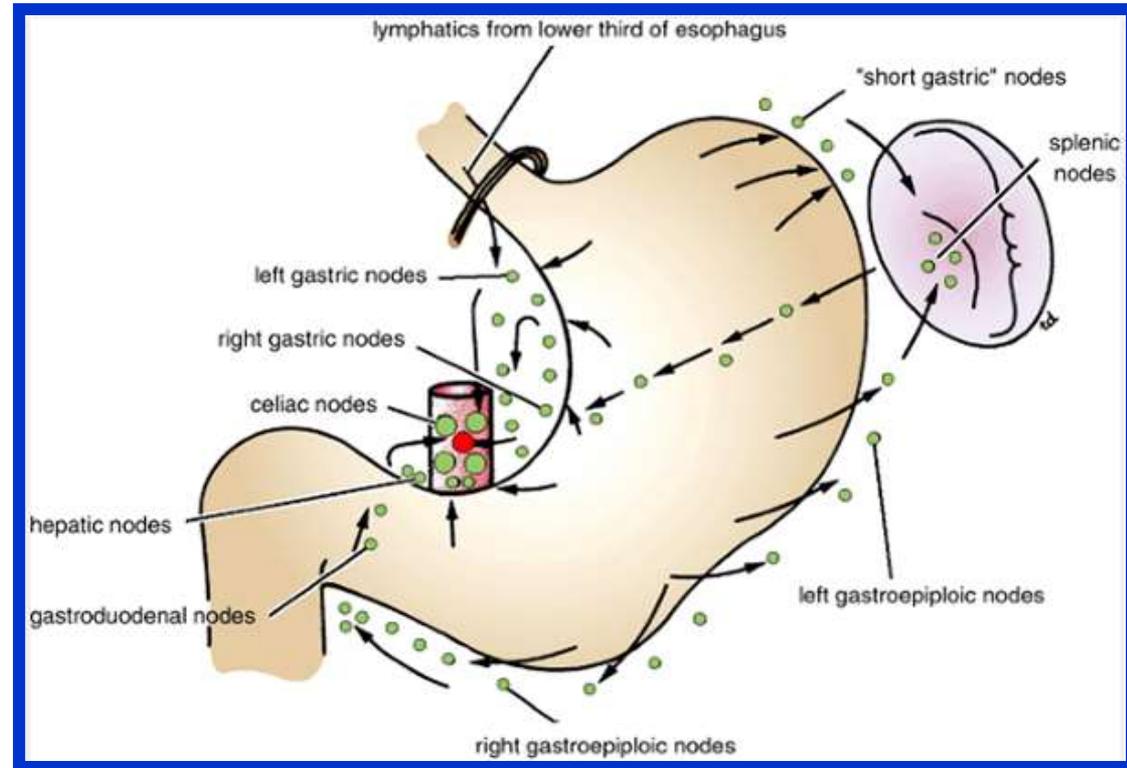


# Stomach

## Lymph Drainage

✓ The lymph vessels follow the **arteries** into the **left and right gastric nodes**, the **left and right gastroepiploic nodes**, and the **short gastric nodes**.

✓ All lymph from the stomach eventually passes to the **celiac nodes** located around the root of **the celiac artery** on the posterior abdominal wall

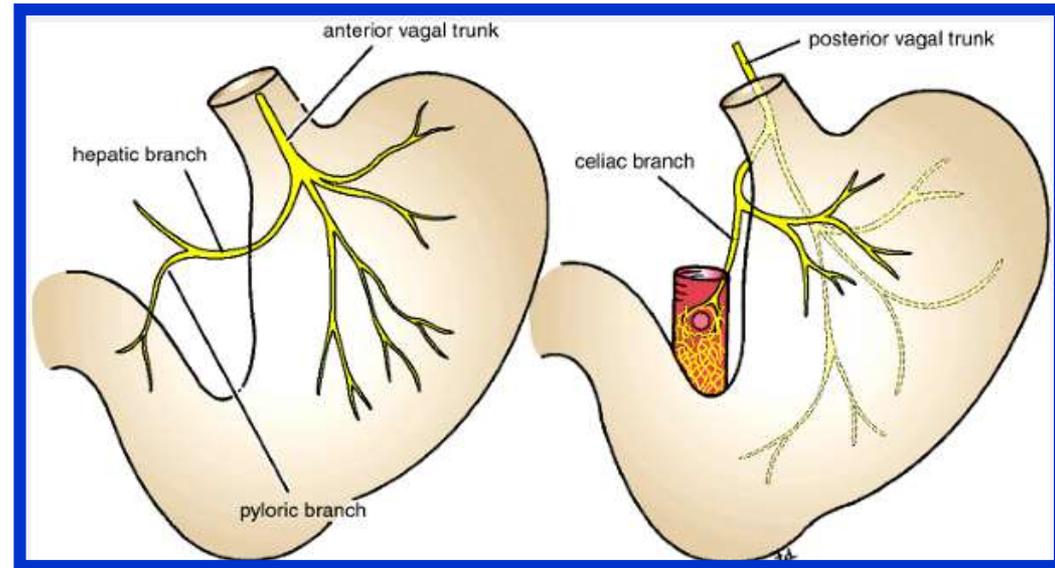


# Stomach

# Nerve Supply

The nerve supply includes **sympathetic fibers** derived from **the celiac plexus** and **parasympathetic fibers** from the **right and left vagus nerves**

□ **The anterior vagal trunk**, which is formed mainly from **the left vagus nerve**, enters the abdomen on the anterior surface of the esophagus., then divides into branches that supply the anterior surface of the stomach.



**A large hepatic branch** passes up to the liver, and from this a **pyloric branch** passes down to the pylorus

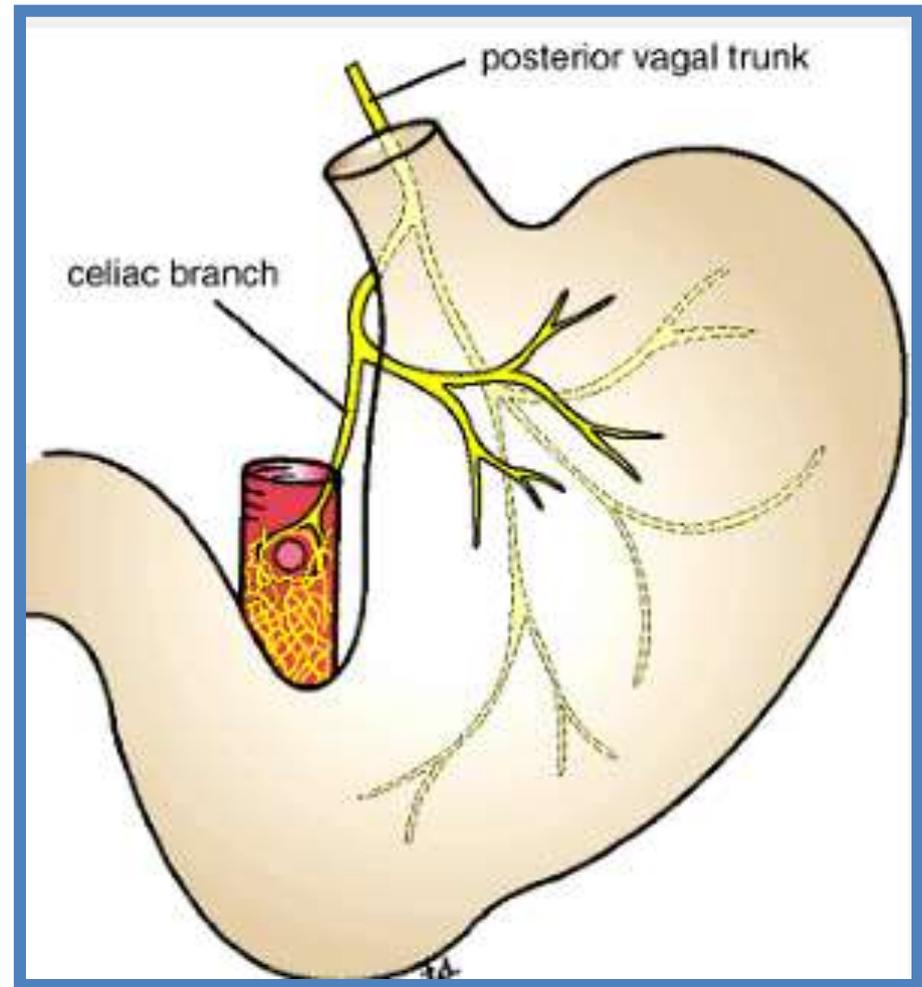
# Stomach

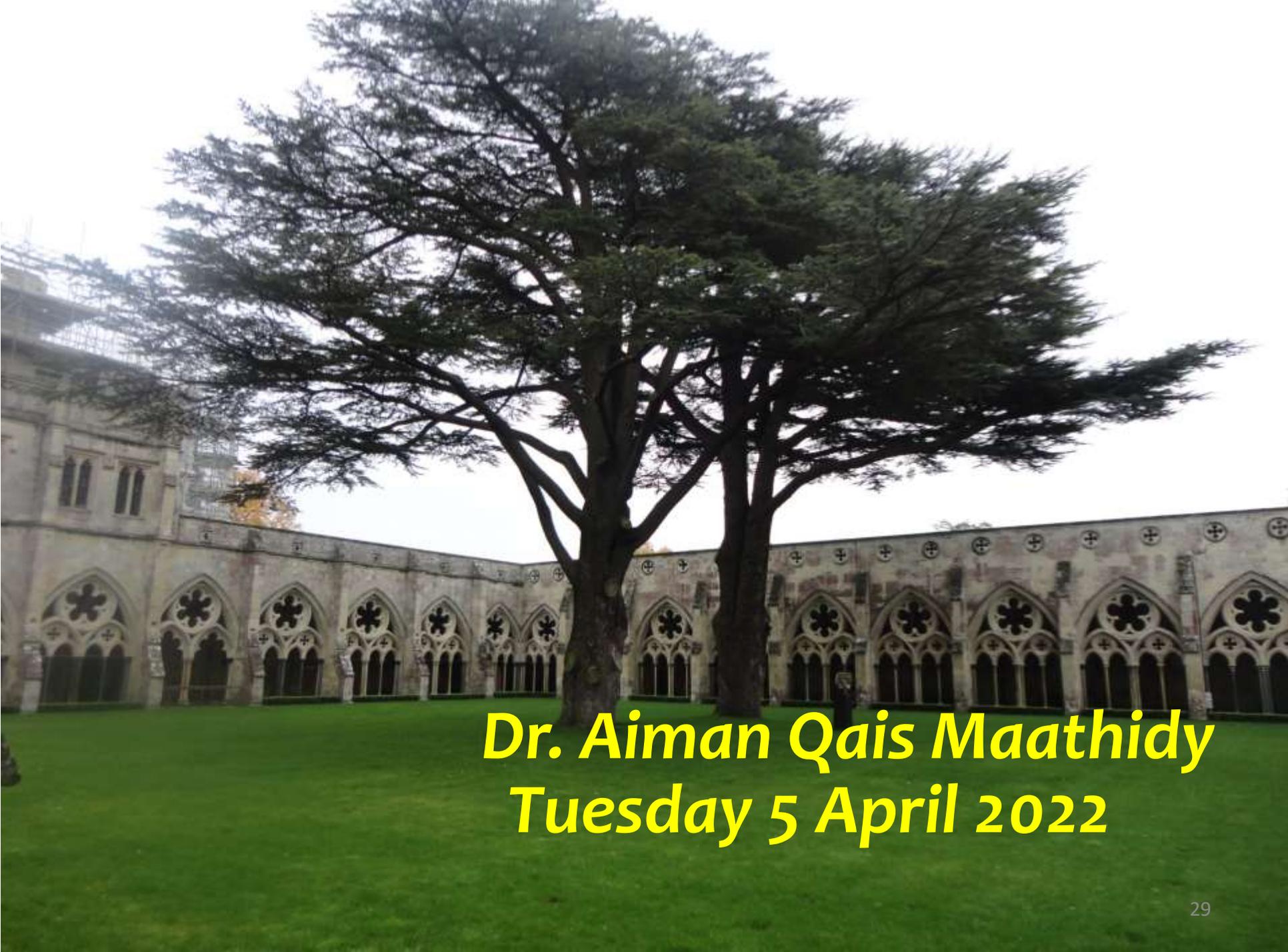
## Nerve Supply

❑ The posterior vagal trunk, which is formed mainly from the right vagus nerve, enters the abdomen on the posterior surface of the esophagus.

The trunk supply mainly the posterior surface of the stomach.

A large branch passes to the celiac and superior mesenteric plexuses





***Dr. Aiman Qais Maathidy***  
***Tuesday 5 April 2022***