Esophagus, Stomach & Spleen

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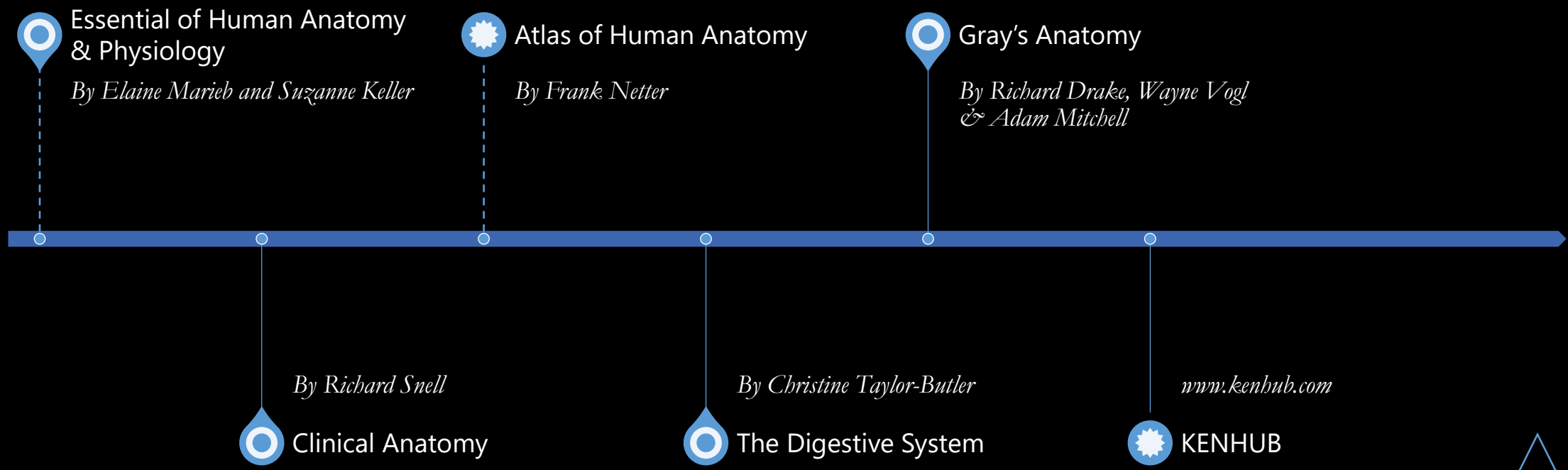
Resources


Essential of Human Anatomy & Physiology
By Elaine Marieb and Suzanne Keller
Atlas of Human Anatomy
By Frank Netter
Gray's Anatomy
By Richard Drake, Wayne Vogl & Adam Mitchell
By Richard Snell
Clinical Anatomy
By Christine Taylor-Butler
The Digestive System
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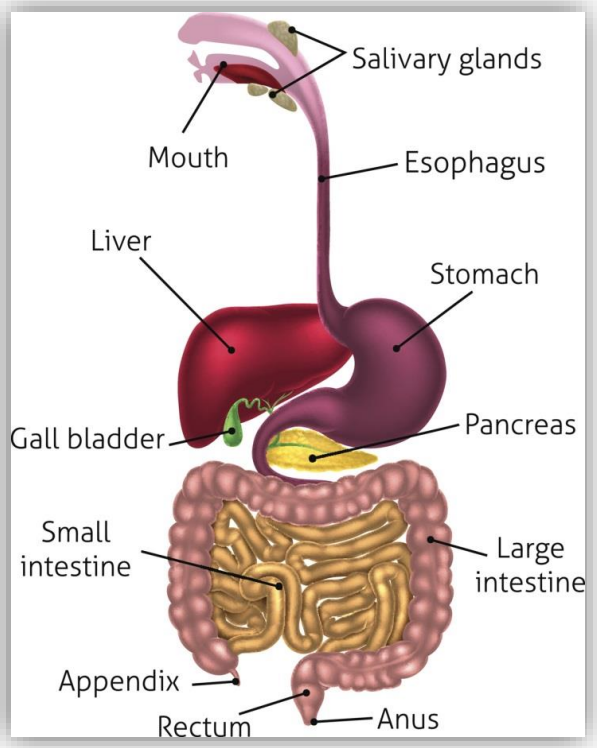
Background

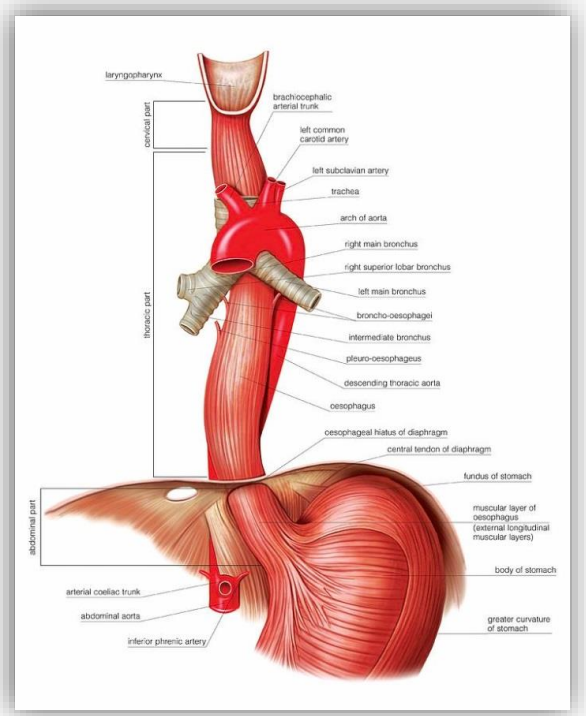
- The organs of digestive system could be divided into two groups:
  - **Alimentary Canal**
    - Mouth and Pharynx
    - Esophagus and stomach
    - Intestines and anus
  - **Accessory Organs**
    - Slavery glands
    - Liver
    - Gallbladder
    - Pancreas



Esophagus

Introduction

- The esophagus is a muscular tube about 25 cm long.
- It begins as a continuation of the pharynx at the level of the 6th cervical vertebra.
- It passes through the diaphragm at the level of the 10th thoracic vertebra to join the stomach.
- Connects pharynx to stomach
- It has four layers;
  - Mucosa
  - Submucosa
  - Musculosa
  - Serosa
- The esophagus plays a role as the passage of food from pharynx to stomach via process of peristalsis.



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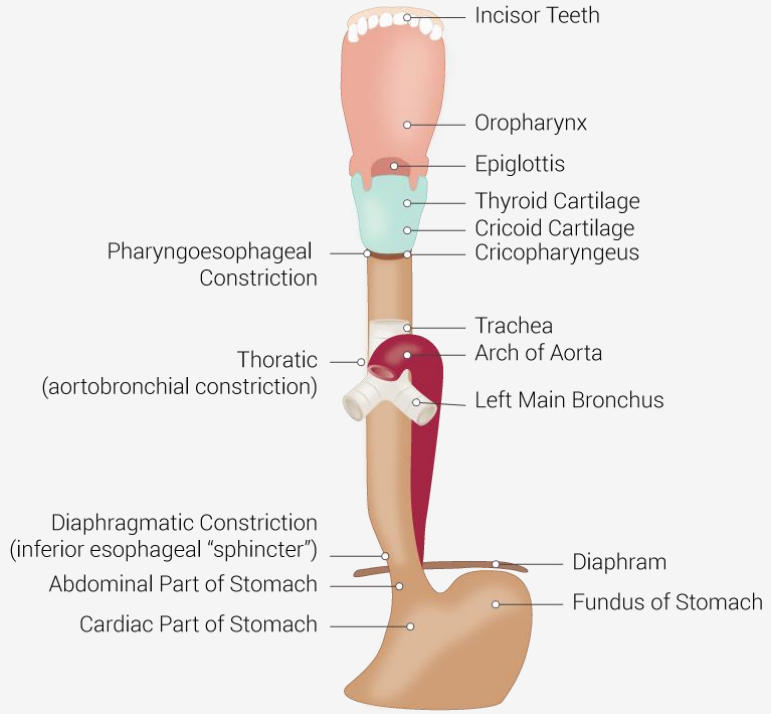
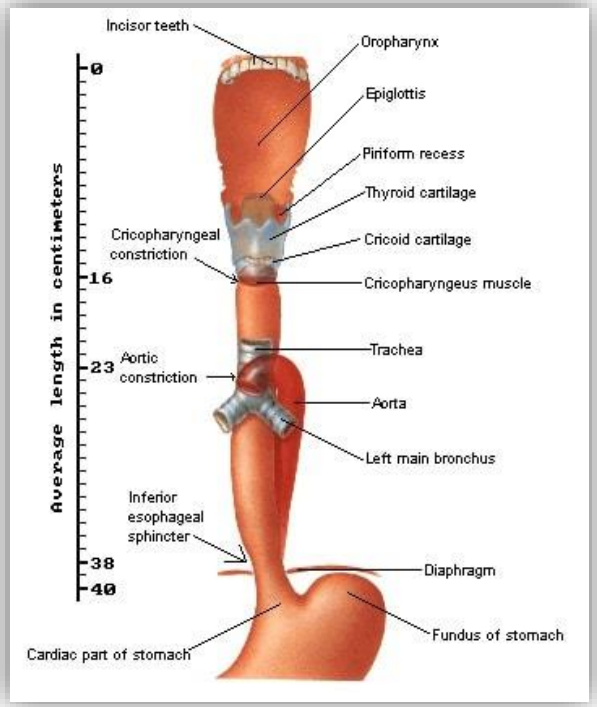
Relations

- The esophagus lies in front of the vertebral column.
- Laterally, it is in contact with the lobes of the thyroid gland.
- The trachea and the recurrent laryngeal nerves lie in front of it.
- Anteriorly:
  - Trachea
  - Left recurrent laryngeal nerve
  - Left principal bronchus
  - Pericardium
  - Left atrium
- Posteriorly:
  - Bodies of the thoracic vertebrae
  - Thoracic duct
  - Azygos veins
  - Right posterior intercostal arteries
  - Descending thoracic aorta



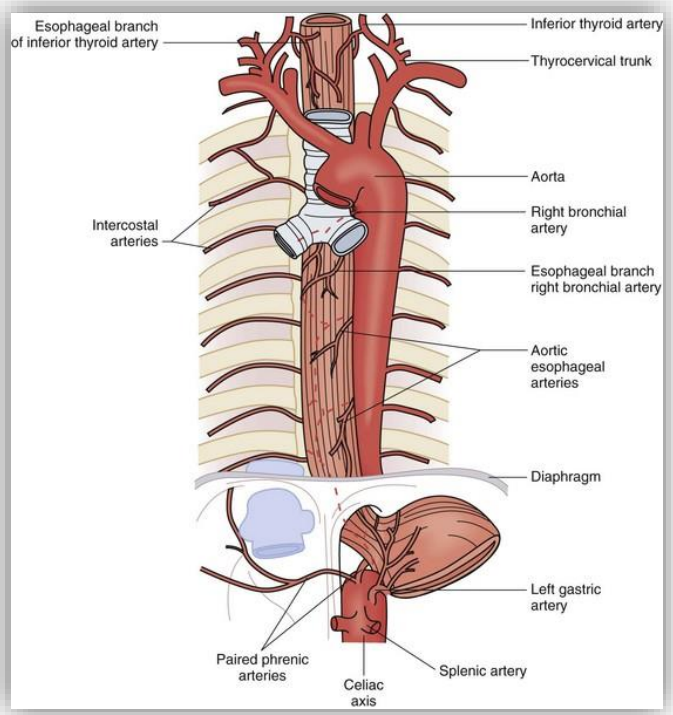
Constrictions

- They may cause difficulties in passing an esophagoscopy.
- In case of a suicide attempt by swallowing of caustic liquids, this is where the burning is the worst and strictures develop.
- The esophageal strictures are a common place of the development of esophageal carcinoma.



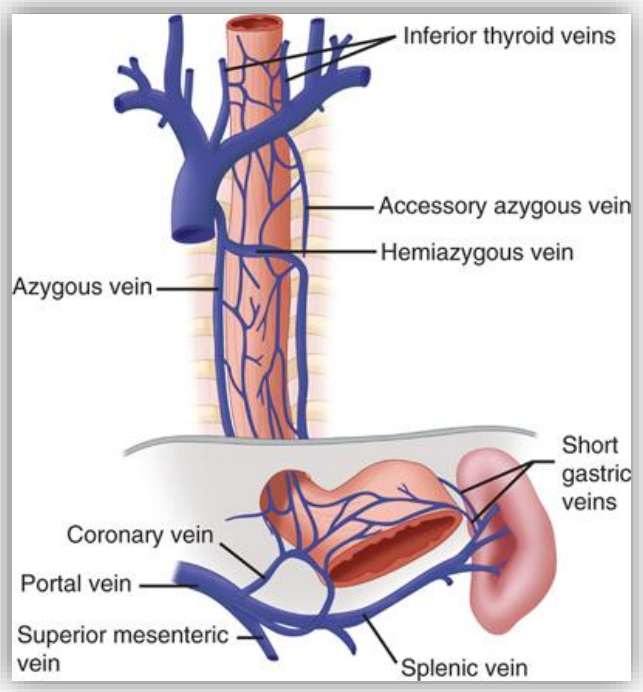
Blood Supply

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



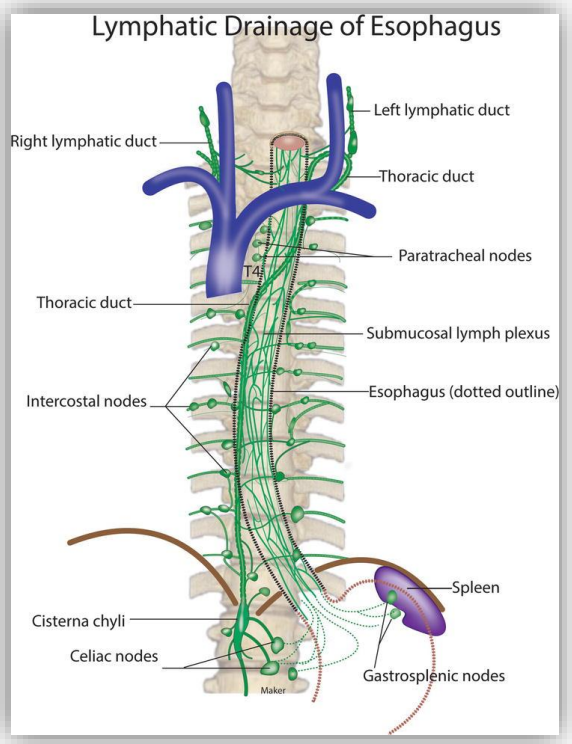
Blood Drainage

- The esophageal veins from the upper third drain in into the **inferior thyroid veins**.
- The veins from the middle third drain in the **azygos veins**.
- The veins from the lower third drain into the **left gastric vein**, a tributary of the portal vein.



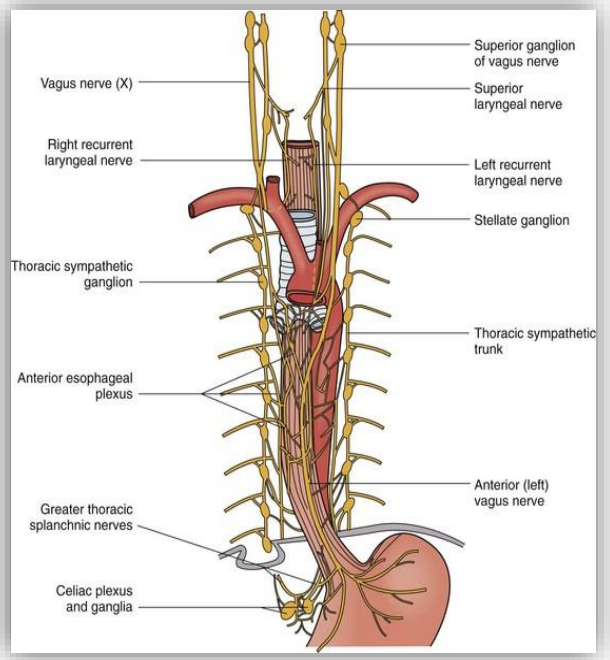
Lymph Drainage

- The upper third of the esophagus is drained in the **deep cervical nodes.**
- The middle third is drained into the **superior** and **inferior mediastinal nodes.**
- The lower third is drained in the **celiac lymph nodes**.



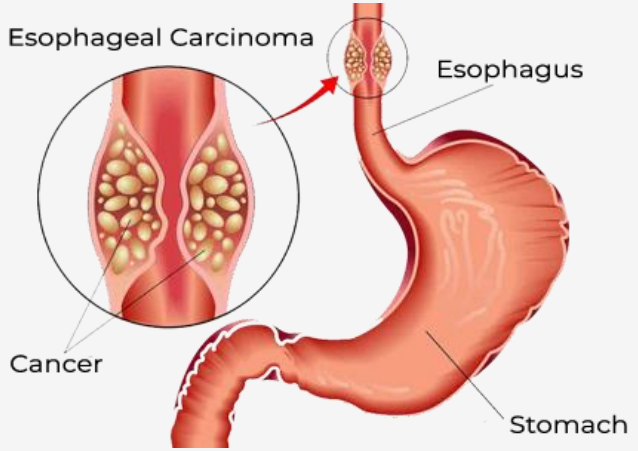
Innervation

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



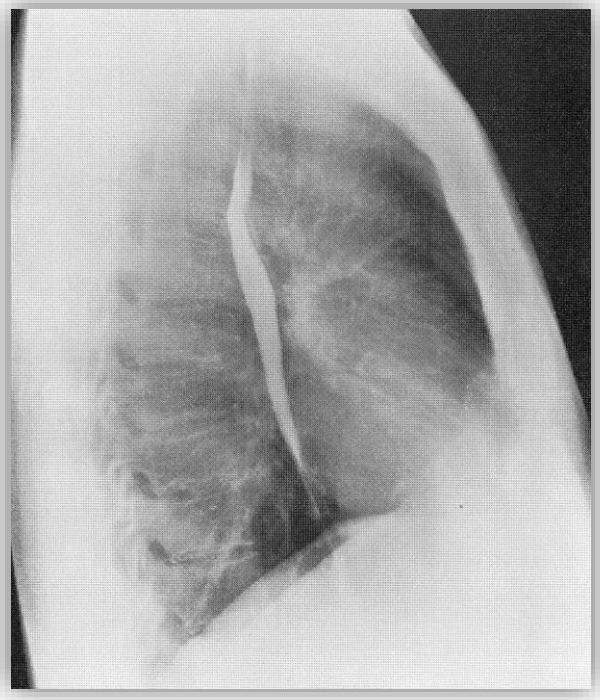
Carcinoma

- Carcinoma in the lower third of the esophagus will spread below the diaphragm. Why?
- The lymph of the lower third of the esophagus is drained below the diaphragm.
- Surgery will include removal of the lesion and what else?
  - The stomach
  - The upper half of the duodenum
  - The spleen
  - The omenta
- Why all these organs must be removed?
  - Due to the lymphatic drainage of this region, the cancer of the lower third of the esophagus has spread to them too.
- How will the continuity of the gut will be restored?
  - By esophagojejunostomy.



Esophagus and Right Atrium

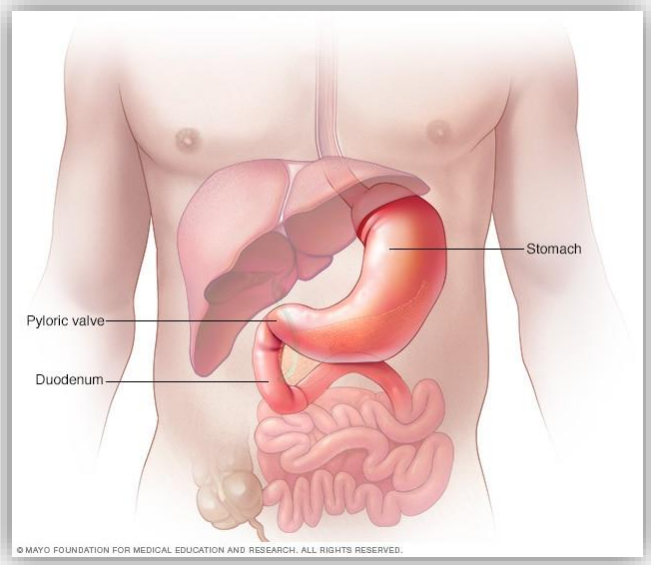
- There is a close relationship between the left atrium of the heart and the esophagus.
- What is the clinical application?
- A barium swallow in the esophagus will help the physician to assess the size of the left atrium in case of a heart failure.



Stomach

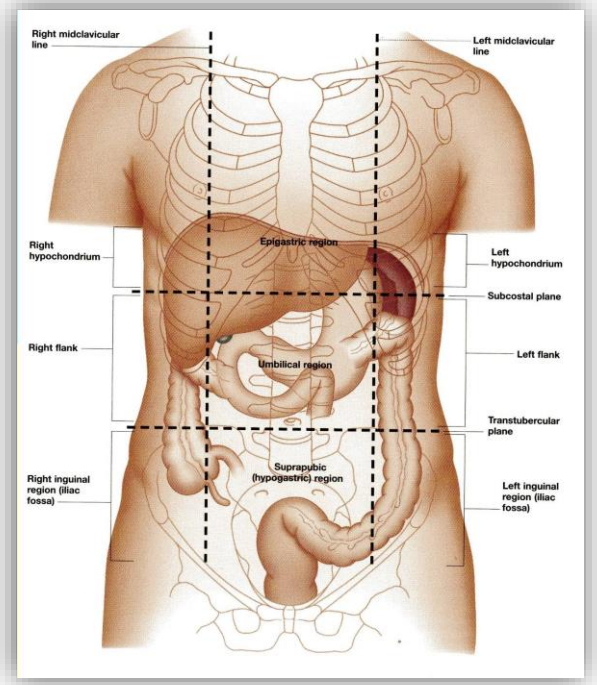
Introduction

- C- Shaped, 25cm long.
- Hidden by liver & diaphragm.
- Located between the esophagus and the small intestine.
- Parts:
  - Cardiac region
  - Fundus
  - Body
  - Pylorus
- Borders:
  - Lesser & Greater curvatures
- Surfaces:
  - Anterior & Posterior



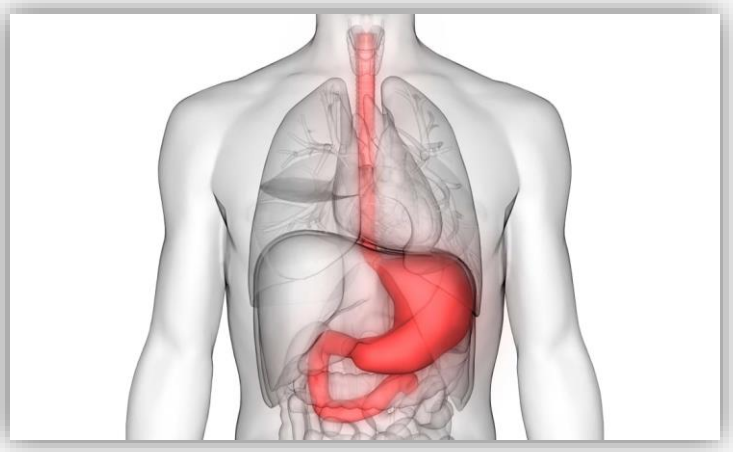
Location

- The stomach is a dilated part of the alimentary canal.
- It is located in the upper part of the abdomen.
- It extends from beneath the left costa region into the epigastric and umbilical region.
- Much of the stomach is protected by the lower ribs.
- It is roughly J-shaped.



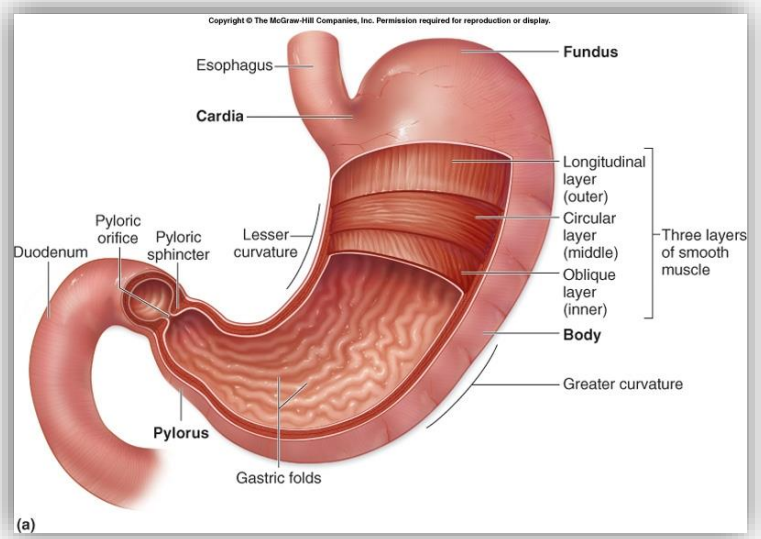
Functions

- **Digestion**
  - It secretes protein digesting enzymes called proteases and strong acids to aid in food digestion through smooth muscular contractions before sending partially digested food (chyme) to the small intestines.
- **Absorption**
  - Although the absorption is mainly a function of the small intestine, some absorption of certain small molecules nevertheless does occur in the stomach through its lining



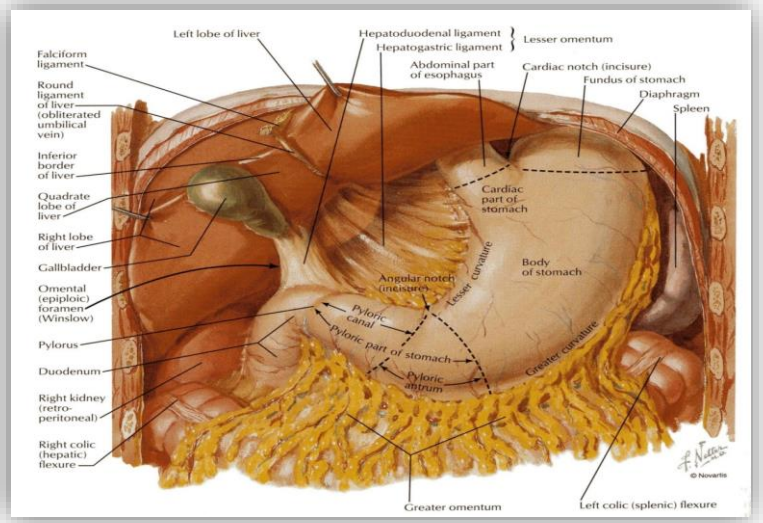
Sphincters

- Two sphincters keep the contents of the stomach contained.
- The **cardiac sphincter** found in the cardiac region at the junction of the esophagus and stomach.
- The **pyloric sphincter** at the junction of the stomach with the duodenum.



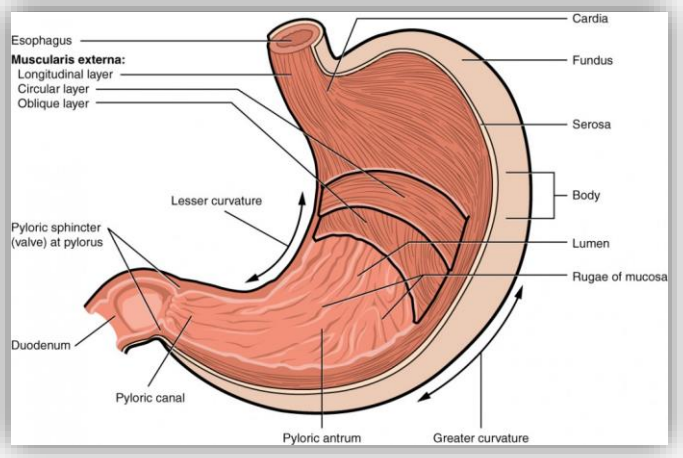
Curvatures

- Greater curvature
  - Forms the left border of the stomach
  - Extends from the cardiac orifice to the pylorus
  - Upper part attached to the spleen by the gastrosplenic ligament
  - Lower part attached to the transverse colon by the greater omentum.
- Lesser curvature
  - Forms the right border of the stomach
  - Extends from the cardiac orifice to the pylorus
  - Attached to the liver by the lesser omentum.



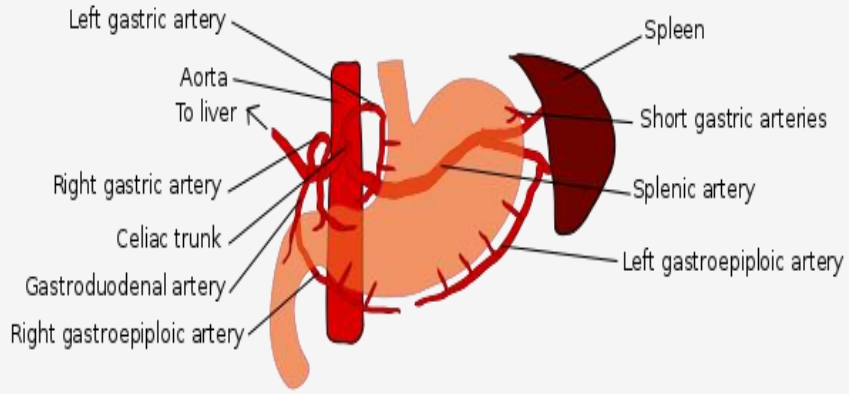
Walls

- Has three layers of muscle fibers:
  - **Outer:** longitudinal fibers (concentrated along the curvatures)
  - **Inner:** circular fibers. Encircle the body and are thickened at the pylorus to form the pyloric sphincter.
  - **Innermost:** oblique fibers. They loop over the fundus and pass down along the anterior and posterior walls, running parallel with the lesser curvature.



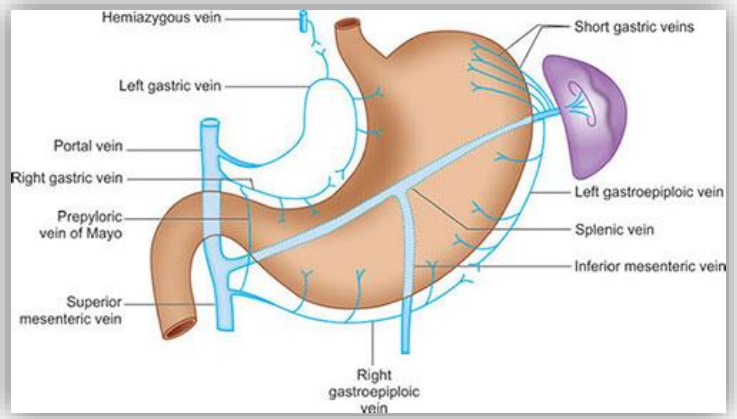
Blood Supply

- Left gastric artery
  - Branch of the celiac artery.
  - Supplies the lower third of the esophagus and the upper right part of the stomach.
- Right gastric artery
  - Branch of the hepatic artery.
  - Supplies the lower right part of the stomach.
- Short gastric arteries
  - Branch of the splenic artery at the hilum of the spleen.
  - Supply the fundus.
- Left gastroepiploic artery
  - Branch of the splenic artery at the hilum of the spleen.
  - Supplies the upper part of the greater curvature.
- Right gastroepiploic artery
  - Branch of the gastroduodenal branch of the hepatic artery.
  - Supplies the lower part of the greater curvature.



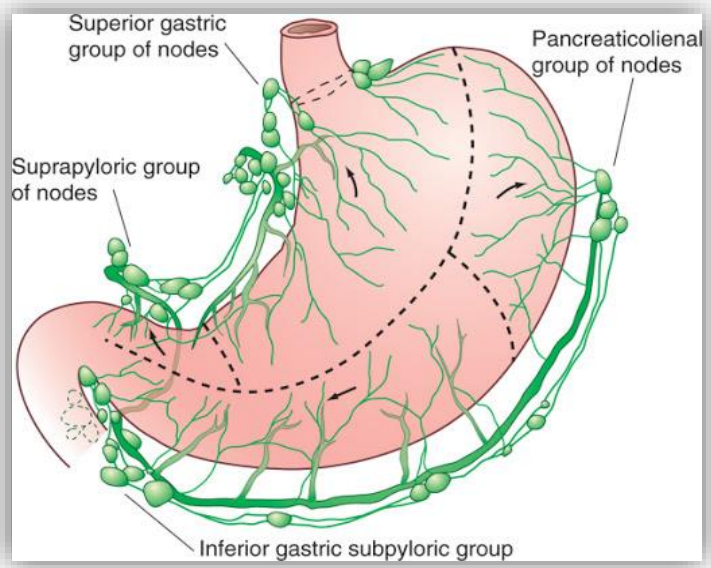
Blood Drainage

- All of them drain in the portal circulation.
- The right and left gastric veins drain directly in the portal vein.
- The short gastric veins and the left gastroepiploic vein join the splenic vein.
- The right gastroepiploic vein drain into the superior mesenteric vein.



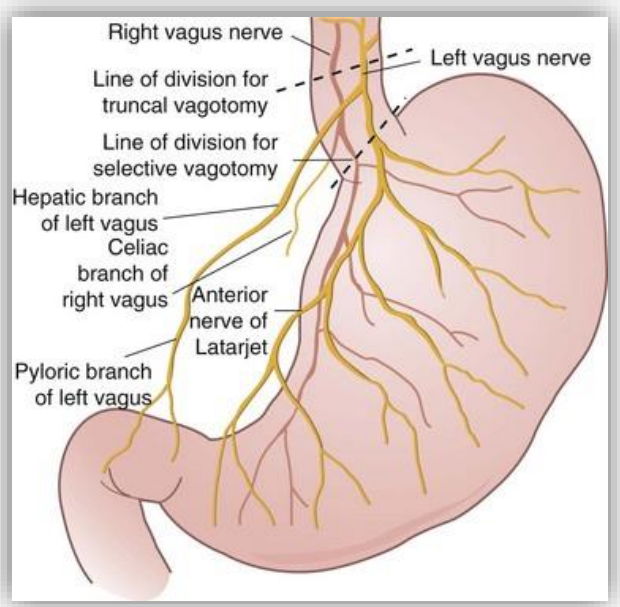
Lymph Drainage

- The lymph vessels follow the arteries.
- The lymph is first drained to the:
  - Left and right gastric nodes
  - Left and right gastroepiploic nodes and the
  - Short gastric nodes
- Ultimately, all the lymph from the stomach is collected at the **celiac nodes**.



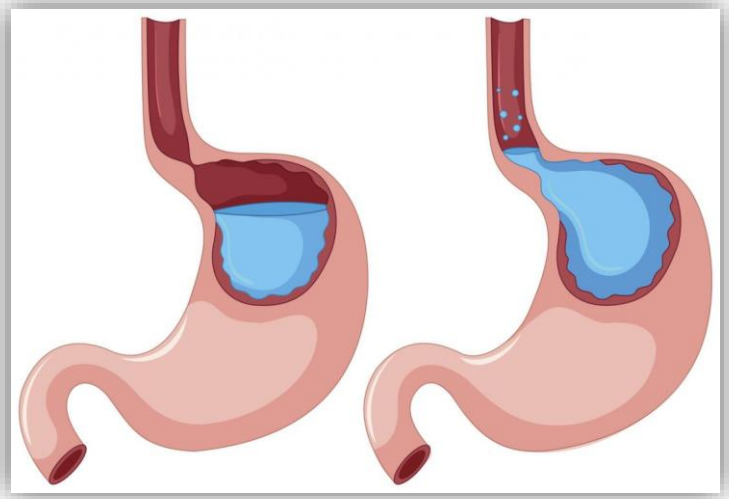
Innervation

- The stomach is supplied by both the parasympathetic and sympathetic parts of the autonomic nervous system.
- **Parasympathetic**
  - Preganglionic from right (posterior vagal trunk) and left (anterior vagal trunk) vagus nerves.
  - Postganglionic neurons are very short and lie within the wall of the stomach.
- **Sympathetic**
  - Preganglionic fibers mainly from the thoracic splanchnic nerves.
  - Postganglionic arise in the ganglia of the celiac plexus



Gastro-Esophageal Reflux Disease

- GERD is a digestive disorder affecting the lower oesophageal sphincter.
- It refers to the movement of gastric acid and food into the oesophagus.
- Symptoms include dyspepsia, dysphagia, and an unpleasant sour taste in the mouth.
- There are three main causes of reflux disease:
  - Dysfunction of the lower esophageal sphincter.
  - Delayed gastric emptying.
  - Hiatal hernia.
    - A hiatus hernia occurs when a part of the stomach protrudes into the chest through the esophageal hiatus in the diaphragm
- Treatment involves lifestyle changes, medication to reduce stomach acid and surgery.



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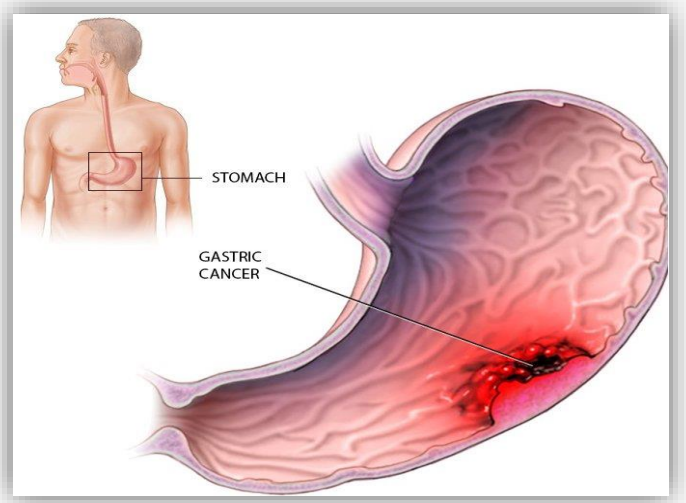
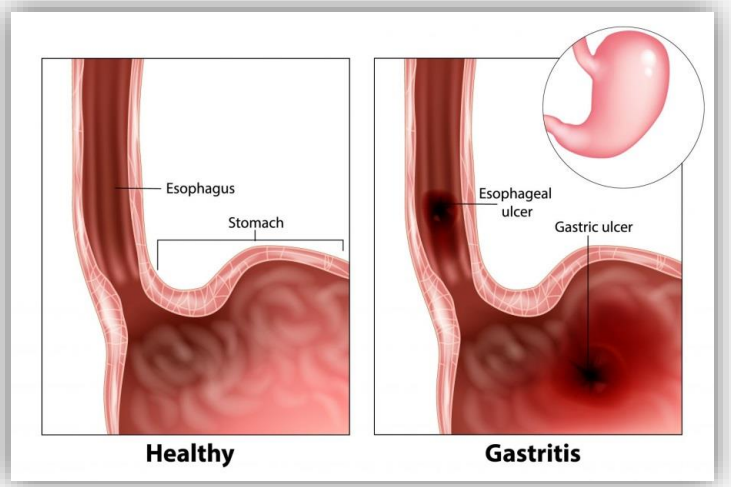
Gastric Carcinoma

- Gastric carcinoma is also called stomach cancer.
- Most gastric cancers are adenocarcinomas.
- The risk factors for developing stomach cancer are Helicobacter pylori (H. pylori) infection, cigarette smoking, excessive consumption of alcohol and a diet that is high in foods and beverages that contain nitrates and nitrites such as smoked and salted fish and meats and pickled vegetables.
- Symptoms may include anorexia, dysphagia, indigestion, bloating, nausea and hematemesis.
- Treatment for gastric cancer includes surgery, radiotherapy and chemotherapy.



Gastritis

- Gastritis is a condition in which there is an abnormal inflammation of the mucous lining of the stomach.
- Symptoms may include dyspepsia, nausea or vomiting.
- There are many causes of gastritis.
- One of the most common causes is infection by the bacteria Helicobacter pylori.
- Treating H. pylori infection is important as it may lead to gastric ulcer disease or cancer.
- Other causes of gastritis include prolonged use of alcohol or NSAIDs (Nonsteroidal anti-inflammatory drugs) such as aspirin, iron supplements and chemotherapy.



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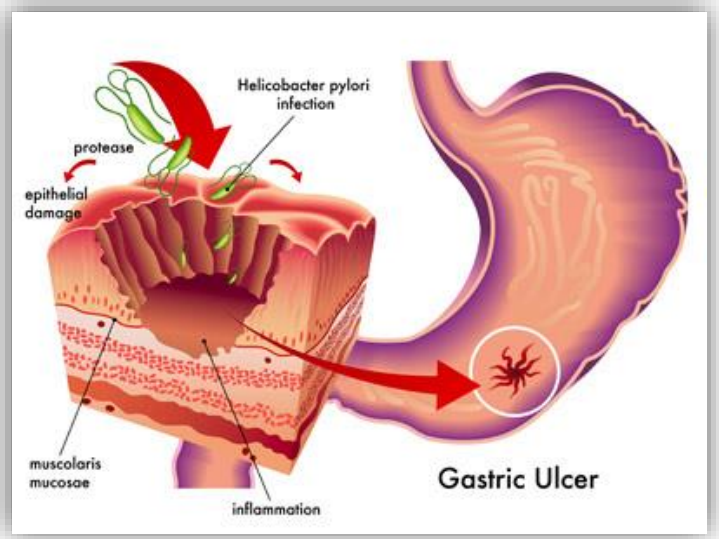
Gastric Ulcers

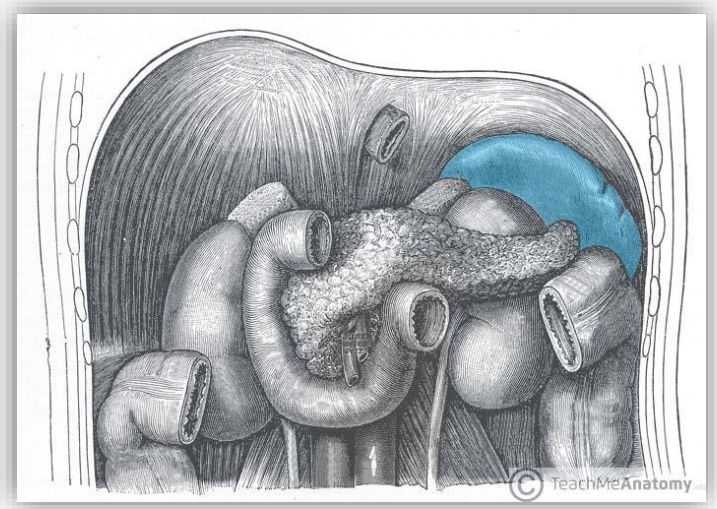
- Gastric ulcers and duodenal ulcers are also known as peptic ulcers.
- They are erosions in the lining of the stomach or intestinal tract.
- Most peptic ulcers are caused by the bacterium Helicobacter pylori (H. pylori).
- Long term use of NSAIDs, such as aspirin and ibuprofen, is another common cause.
- Lifestyle factors, stress and diet used to be thought to cause ulcers, but recent research has shown that while these factors can worsen ulcers and prevent healing, they do not cause them.
- Peptic ulcers result in a burning pain in the stomach and duodenum.
- The pain may be temporarily relieved by eating food or by taking antacids.
- A combination of antibiotics and acid-reducing medication is the most effective treatment for H. pylori-induced peptic ulcers.



Spleen

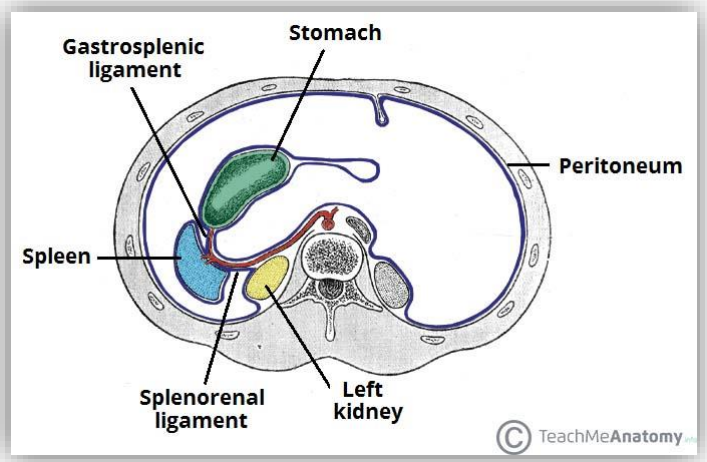
Introduction

- The spleen is oval-shaped and has a notched anterior border.
- It is reddish color, and it is the biggest lymphoid organ in the body.
- It lies beneath the left coupole of the diaphragm close to the 9^{th}, 10^{th} and 11^{th} ribs.
- It is long axis lies along the shaft of the 10th rib and its lower pole extends to the midaxillary line.



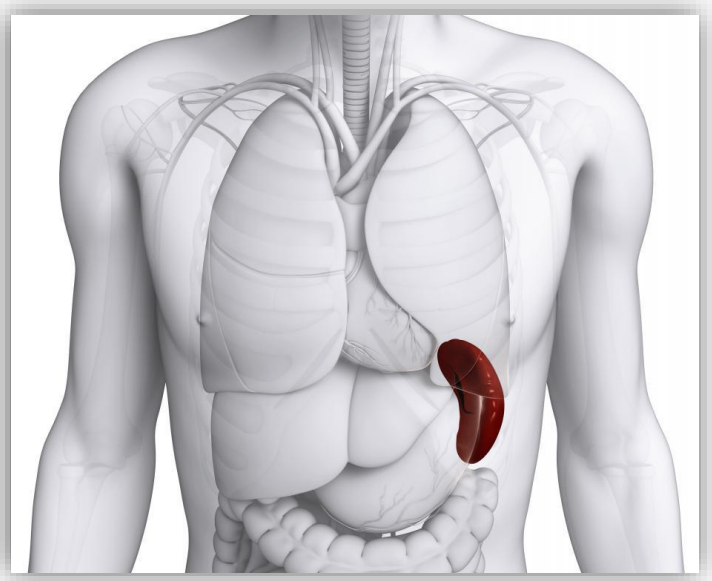
Position

- The spleen in located in the upper left quadrant of the abdomen, under cover of the diaphragm and ribcage and therefore cannot be palpated on clinical examination (except when enlarged).
- The spleen is connected to the stomach and kidney by parts of the greater omentum – a double fold of peritoneum that originates from the stomach:
- Gastrosplenic ligament – connects the spleen to the greater curvature of the stomach.
- Splenorenal ligament – connects the hilum of the spleen to the left kidney. The splenic vessels and tail of the pancreas lie within this ligament



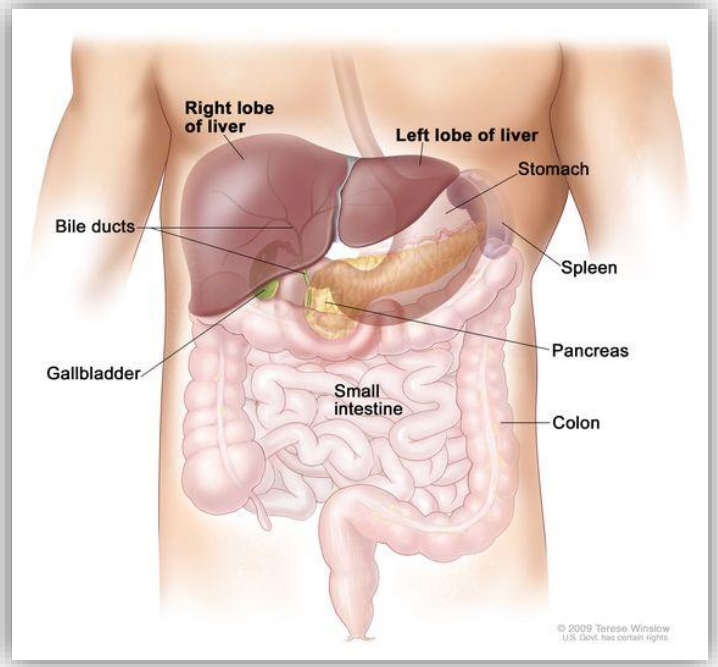
Functions

- The spleen functions mainly as a blood filter, removing old red blood cells.
- It also plays a role in the immune response.



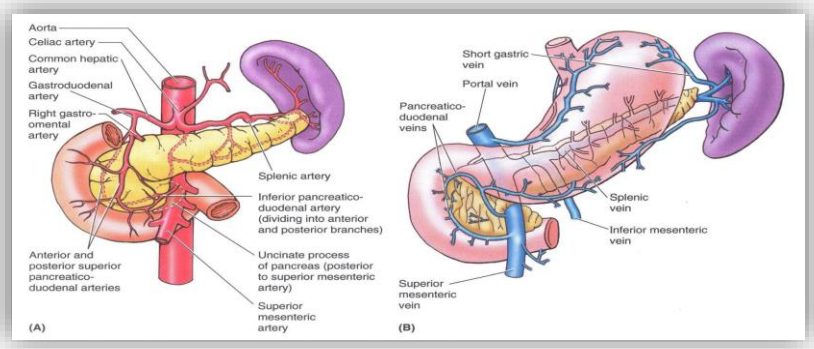
Relations

- **Anteriorly:**
  - the stomach.
  - tail of pancreas.
  - left coilic flexure.
  - left kidney lies along its medial border.
- **Posteriorly:**
  - the diaphragm.
  - left pleura.
  - left costodiaphragmatic recess.
  - left lung.
  - 9th, 10th and 11th ribs.



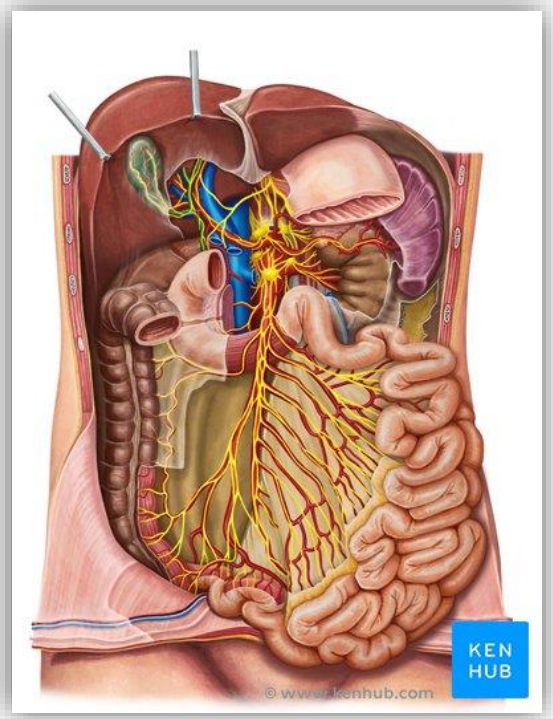
Blood Circulation

- **Splenic artery:**
  - The biggest branch of the celiac artery.
  - It has a tortuous course and runs along the superior border of the pancreas.
  - Before entering the spleen at the hilum, it divides into 6 branches.
- **Splenic vein:**
  - Leaves the hilum and runs behind the body of the pancreas.
  - Behind the neck of the pancreas, it joins the superior mesenteric vein to form the portal vein.
- **The lymph vessels**
  - It emerges from the hilum and pass through a few lymph nodes (pancreaticosplenic nodes) along the course of the Splenic artery and then drain into the celiac nodes.



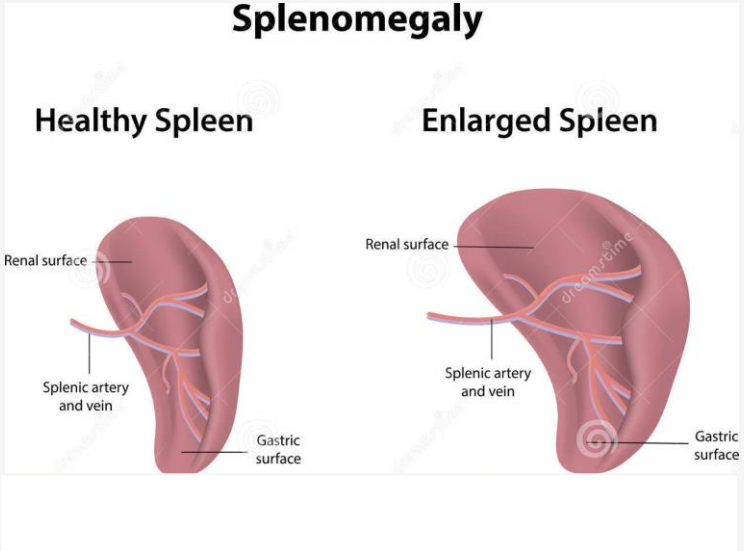
Innervation

- The nerves accompany the splenic artery and are derived from the **celiac plexus**.



Disorders

- **Splenomegaly**
  - Irregular enlargement where the spleen is enlarged for various reasons, such as cancer.
- **Asplenia**
  - Where the spleen is not present or functions abnormally.



Questions?

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