**The Stomach**

it is a muscular, hollow organ in the gastrointestinal tract of humans, The stomach has a dilated structure and functions as digestive organ, It performs a chemical breakdown by means of enzymes and hydrochloric acid. the stomach is located between the esophagus and the small intestine. Stomach divided into four regions

The cardia,   The fundus , The body , The [pylorus](https://en.wikipedia.org/wiki/Pylorus)

The stomach is much like a bag with a lining. The stomach is made of these 4 layers:

* **Mucosa**. This is the first layer or lining. It contains the glands that release digestive juices. These are called hydrochloric acid and pepsin. This is where most stomach cancers start.
* **Submucosa**. This second layer supports the mucosa. It is rich in blood vessels, lymphatic vessels, and nerves.
* **Muscularis**. The third layer is made of thick muscles. They help to mix food with the digestive juices.
* **Serosa**. This is the last and outermost layer. It’s the lining that wraps around the stomach to confine it.

**The Duodenum**

the most proximal portion of the small intestine, forms a C-shaped loop around the head of the pancreas and is in continuity with the pylorus proximally and the jejunum it is divided into four parts

The [duodenal bulb](https://en.wikipedia.org/wiki/Duodenal_bulb), about 2 cm long, is the first part of the duodenum and is slightly dilated. Then the second ,third and fourth segments.

The wall of the duodenum also devided like the stomach to mucosa, submucosa, muscularis, and serosa layers.

**Gastroduodenal Mucosal Secretions and Protective Factors**

hydrochloric acid (HCl) is the primary gastric secretion, the stomach also secretes water, electrolytes (hydrogen [H+], sodium [Na+], potassium [K+], chloride [Cl-], and bicarbonate [HCO3]), enzymes (pepsin and gastric lipase), and glycoproteins (intrinsic factors and mucin) to assist in a wide variety of physiologic functions.

**The Mucosal Barrier**

The mucosa of the stomach and duodenum is exposed to the digestive effect of gastric acid. Gastric enzymes that can digest protein can also digest the stomach itself. The stomach is protected from self-digestion by the mucosal barrier. This barrier has several components.

**First**, the stomach wall is covered by a thick coating of mucus that is bicarbonate-rich to neutralize acid.

**Second**, the epithelial cells of the stomach’s mucosa meet at tight junctions, which block gastric acid from penetrating the underlying tissue layers.

**third**, stem cells quickly replace damaged epithelial mucosal cells, when the epithelial cells are shed. the surface epithelium of the stomach is completely replaced every 3 to 6 days.

**Physiology of mucosal barrier**

The mucosa are maintained through micro vascular supply through which tissues and glands are functions, microvasclar (capillary) patency are maintained through prostaglandins that helps in following actions

1. epithelial mucus secretions.
2. secretion of HCO3.
3. maintains mucosal blood flow.
4. maintains epithelial proliferation.

**Peptic ulcers**

are a common clinical problem characterized by defects of the mucosa of the stomach or the duodenum. Men and women are at equal risk for developing PUD, and the overall lifetime risk for both genders is 10%.

The most important risk factors for the development of peptic ulcers are

1. infection with H. pylori and use of
2. 2-NSAIDs and
3. 3- stress.

Common sites of gastric ulcer is in the antrum and the lesser curvature, Common sites of the duodenal ulcer is in the first part (the bulb).

**The risk factors for NSAID induced ulceration and complications** is 1-dose related and increases with -age older than 60 years, -concurrent corticosteroid use, 4-increasing duration and dose of therapy, 5-anticoagulant therapy, and a 6-history of prior ulcer disease

**Symptoms**

Patient with peptic ulcer may be a symptomatic or presented with abdominal pain, vomiting, or bleeding

**Diagnosis is with Endoscopy**

Treatment is with stop NSAID, treatment of H pylori, give Proton Pump Inhibitors like omeprazole.

**Complications of Peptic Ulcer Disease**

**1-Bleeding:-** PUD is the leading cause of upper GI bleeding, due to erosion of the mucus epithelial surface reaching the blood vessels.

**2-Perforation:-** Perforation, which occurs when a peptic ulcer erodes through the full thickness of the stomach or duodenum

**3-Gastric Outlet Obstruction:-** edema, spasm, and inflammation lead to obstruction, or as a consequence of chronic ulceration with scarring and fibrosis.

Helicobacter pylori are curved, flagellated, gram-negative rods found only in gastric epithelium. However, only a minority of patients with H. pylori gastritis develop peptic ulcer disease (PUD) or gastric cancer.

Factors important in the organism’s (H.pylori) ability to colonize the stomach include its

1. Motility with flagella.
2. production of urease which produce Ammonia that neutralizes acid.
3. bacterial adherence.

**NSAIDs**

are one of the most widely used classes of drugs. It affects the mucosa through decreased synthesis of mucosal prostaglandins

NSAID-related mucosal injury

This includes sub-epithelial hemorrhages, erosions, and ulcerations, erosions are likely to be small and superficial, whereas ulcers tend to be larger (more than 5 mm in diameter) and deeper.

**Stress-Related Gastric Mucosal Damage**

During critical illness, events such as shock, hypotension,

and catecholamine release are associated with reduced blood flow and mucosal ischemia. When blood flow to the mucosa is inadequate, the normal mucosal protective mechanisms, including epithelial turnover and mucus and HCO3 secretion, are altered.