Comparison between antacids, Hisamine II Blockers and Proton Pump Inhibitors

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ABSTRACT:
Digestive System is one of the important systems of the human body. The digestive system helps for digestion and absorption of food and removes waste from body. Stomach is one of organ of this system which helps for digestion by releasing enzyme and protects body from microorganism by secreting hydrochloric acid.The hyperacidity is the one of the major health problem in present situation. The regular hyperacidity will leadmany complications like Peptic Ulcer, Zollinger-Ellison Syndrome, GERD, and Gastritis. To treat all these diseases many types of drugs are available like Antacids, Histamine2 blockers, Proton Pump Inhibitors. These drugs have different Mechanism ofAction, Uses and side effects.
Keywords: Stomach, Ulcer, Parietal Cells, Peptic Ulcer, Zollinger-Ellison Syndrome.

INTRODUCTION

The digestion is the process of breaking down of large food molecules into smaller molecules with the help of digestive enzyme and acid. The digestive system contributes to homeostasis by breaking down food into `forms that can be absorbed and used by body cells. It also absorbs water, vitamins and minerals and eliminates wastes from the body. Food material intake by body is in the complex form and that can be break down into small piece or simpler form for obtain the energy**(1).**

❖ **Definition:** "The System that swallows food and liquids and breaks them down into substances that the body can use for energy, growth, and tissue repair. Waste products the body cannot use leave the body through bowel movements**(2)".** Or

"All those processes involved in breaking down large, complex, insoluble molecules into simple, soluble so that these substances can be absorbed quickly into the blood for transport to the cells that utilize them**(3)".**

The digestive tract or alimentary canal more than 30 feet or 10 meters long and start from the mouth and rectum and anus. In between this two ends the mouth, the pharynx, the esophagus, the stomach, the small intestine and large intestine and ending in the rectum, and finally into the anus.The accessory organs or structure of digestion systems are teeth, tongue, salivary glands, liver and pancreas**(4).**

❖ **Functions of Digestive System:** The digestive system performs the six functions. In the following sections we the functions digestive systems(**5, 6,7).**

1. Ingestion- Taking the food into mouth. Then that food is making into small pieces and it is called as **mastication.** Moistening the food with salivary secretions and mastificated and moistened food is swallowed inside and this process is named as **deglutition.** The whole complex process is called as the **Ingestion.**

2. Mechanical Processing: Crushing and shearing. Makes materials easier to propel along digestive tract.

3. Digestion: The large particles into smaller particles grinding action and by enzymes present in the digestive tract.

4. Secretion: The glandular organs and epithelium cells present in digestive system secrets the enzymes, water, buffers, acids and mucus o conduct their respective functions in metabolism, absorptions and protection.

5. Absorption: The metabolized food like nutrients, electrolyte and water are move from digestive tract to blood stream or interstitial fluid.

6.Egestion or Excretion: The undigestedfoods, waste products are excreted through the rectum in the form of feces. Which are voided through the anus.

Each part of your GI tract breaks down food and liquid and carries it through your body. During the digestive process, your body absorbs nutrients and water. Then, expel the waste products of digestion through your large intestine.

⇒ **DIGESTIVE SYSTEM ORGANS**

Food moves through your GI tract in a few steps**(8, 9).**

❖ **Mouth**: As food enter into mouth then chew and swallow by mouth and tongue pushes food into throat. A small piece of tissue called the epiglottis covers windpipe. The epiglottis prevents choking.

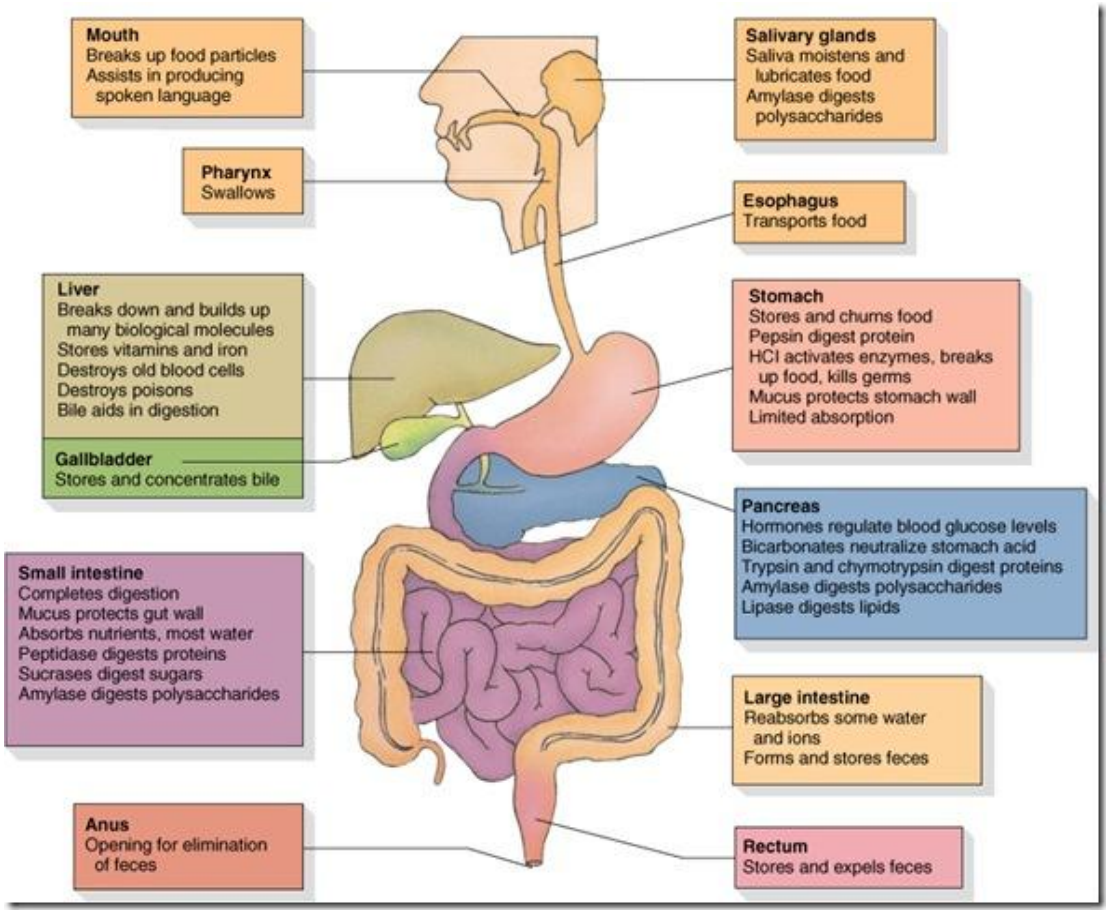
❖ **Esophagus**: Food travels down a hollow tube called the esophagus. At the bottom esophageal sphincter relaxes to let food pass to stomach. (A sphincter is a ring-shaped muscle that tightens and loosens.)

❖ **Stomach**: Stomach creates digestive juices and breaks down food specially protein. It holds food until it is ready to enter into small intestine for further digestion.

❖ **SmallIntestine**: Food mixes with the juices of intestine, liver and pancreas and completes the metabolism of carbohydrates, Proteins, and fats. Intestinal walls absorb nutrients and water from food and send waste products to the large intestine.

❖ **LargeIntestine**: Large intestine turns waste products into stool. It pushes the stool into rectum.

❖ **Rectum**: The rectum is the lower portion of your large intestine. It stores stool until you have a bowel movement.



The stomach is the important muscular hollow organ in the upperdigestive system of human and vertebrae animals. It is inferior to the esophagus and superior to the small intestine, it is situated in the abdomen under the diaphragm. Its major part is to the left of the midline. The capacity is 1-2 liters. The Stomach is involved in the gastric and cephalic phase secretion. The stomach temporarily stores the bolus and breakdown the food by chemical methods and converted into the chyme. The hydrochloric acid is kills the bacteria and protect the body from infection. The stomach is surrounded by parasympathetic and sympathetic nerves which control the gastric acid secretion by stimulating and inhibiting stomach nerves.

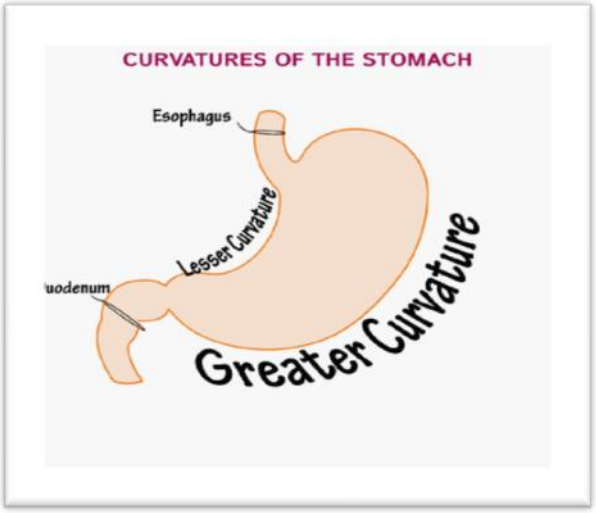
⇒ **CURVATURES OF THE STOMACH (10, 11)**

The medial and lateral borders of the stomach curved.

❖ **Greater Curvatures:** Forms the long, convex lateral border of the stomach. Begins at the cardiac notch it arches backward and passes inferior to the left. It curves to the right and continue to medially to reach the pyrolic antrum. The blood is supplied by short gastric arteries and the right and left gastro-mental arteries branches.

❖ **Lesser Curvatures:** Forms the shorter concave medial surface of the stomach. The most inferior part of the

lesser curvature, the angular notch indicates the junction of the body and pyrolic region gives attachment to the hepatogastric ligament and is supplied by the left gastric artery and right gastric branch of the hepatic artery.

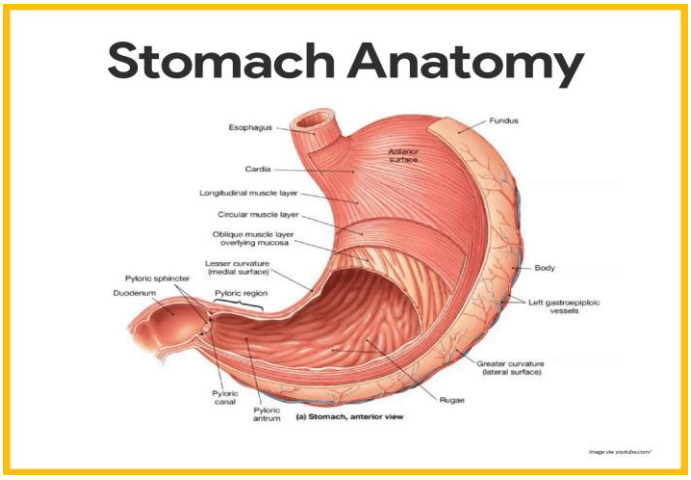


⇒ **STOMACH PARTS (12, 13, 14, 15).**

The stomach comprised the 4 regions. The Cardia, Fundus,Body and Pylorus.

❖ **Anatomic Regions:**

- **Cardia:** variable length extending from 1 - 15mm.Mucous secreting glands are connected loosely. Pit to gland concentration is 50:50.May is expanded in individuals with acid reflux. The Cardia is connected to the esophagus which contains the lower esophagus sphincter-that allows the bolus to enter into the stomach and prevent the back flow.
- **Body (corpus) and Fundus:** is also called as oxyntic mucosa. Acid and enzyme secreting glands are present in this part. Ratio pit to gland volume is 25:75.Mucin cells are present at neck, which secret mucus and that prevent stomach inner cells by acid action. Parietal cells and chief cells are the glandular constituents. The fundus is the dome shaped structure present inferior, left and above to the Cardia.The body –which is the main part of the stomach where the digestion of the food takes places.
- **Pylorus:** is distal part of the stomach and its size ranges from 3 - 4 cmloosely arranged mucous secreting glands are present. Ratio of pit to gland volume is 50:50. Usually no cystic dilatation of glandsproximal extent along the lesser curvature exceeds that along the greater curvature.



⇒ **STOMACH CELLS (16, 17, 18, 19, 20, 21,22, 23, 24, 25).**

The stomach contains the different 3 types of cells are present. The all the 3 types of cells produce and secrete the secretion.

1. The mucous or goblet cells: That makes the lining of the stomach and that will protect the under lining of the organs and glands.They are found across the mucosal epithelial liningand deeper within each gastric pit, where they are known as mucous neck cells.

❖ **Components of gastric mucosa:**

- **Gastric pits**: surface invaginations that function as conduits of secretions; entirely lined by surface mucous (foveolar) cells regardless of anatomic region.
- **Gastric glands:** synthesize acids, enzymes and mucin, constituents and their products vary depending on anatomic region of the stomach. Glands are organized into isthmus, neck and base. Gastric stem cells are housed in the isthmus and neck portion of glandular mucosa.

2. Parietal Cells: Secret the Hydrochloric Acid and that hydrochloric acid is activate the Pepsin enzyme by converting Pepsinogen into Pepsin. .Parietal cells and they are also called as oxyntic cells. The epithelial cells in the stomach secrete hydrochloric acid (HCL) and intrinsic factor. These cells are located in the gastric glands found in the lining of the fundus and body regions of the stomach. They contain an extensive secretory network of canaliculi from which the HCL is secreted by active transport into the stomach. The enzyme hydrogen potassium ATPase (H+/K+ ATPase) is unique to the parietal cells and transports the H+ against a concentration gradient of about 3 million to 1,which is the steepest ion gradient formed in the human body. Parietal cells are primarily regulated via histamine, acetylcholine and gastrin signaling from both central and local modulators. Parietal cells have an intricate intracellular canalicular network, connecting with the gland's lumen. A canaliculus is a deep infolding that serves to increase surface area. More quantity of microvilli extends from the canalicular surface, alongside a tubule vesicular membrane system in the nearby cytoplasm. In a cell undergoing active secretion, microvilli in the canaliculi increases, while the tubule vesicular system diminishes.

3.Chief Cells: At the base of the gland are the zymogenic (chief) cells chief cells are located at the base of glands distributed throughout the fundus and corpus of the stomach.Pepsinogen is activated into the digestive enzyme pepsin when it comes in contact with hydrochloric acid produced by gastric parietal cells. This type of cell also secretes gastric lipase enzymes, which help digest triglycerides into free fatty acids and di- and mono-glycerides. There is also evidence that the gastric chief cell secretes pepsin in response to the presence of food in the stomach. Pepsin has been found in the pepsinogen granules of chief cells.

4. Endocrine Cells:

Cell types include:

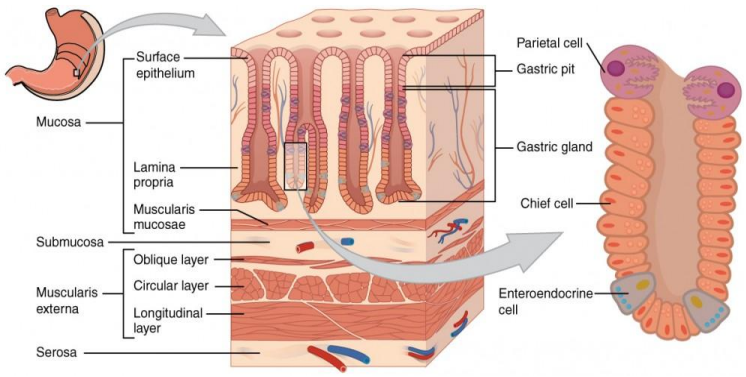
❖ **G cells:** Present in fundus. It works in combination with gastric chief and parietal cells. They secrets gastrin hormone. Gastrin hormone act on the Enterochromaffin-like (ECL) cells of the fundus and release the histamine in stomach. The release histamine binds to the receptor of Parietal cells and start producing more quantity of hydrochloric acid.

❖ **Enterochromaffin-like (ECL) cells:**These cells secrete histamine when gastrin stimulates them. Histamine binds to receptors on the parietal cells and increases hydrochloric acid secretion. These cells exist mainly in the body and fundus of the stomach. Accumulates the 30% of endocrine cells.

❖ **D cells:** Throughout the stomach these cells are distributed. Mainly these cells are present in pyrolus region. They secrets thehormone called somatostatin, it is inhibitory hormone. When acidity level increase in stomach it release and stop the action of gastrin and overall production of gastric acid.

❖ **Enterochromaffin (EC) cells:**Distributed to through the stomach. These cells secrets the serotonin hormone. The hormone helps to gastrointestinal tract motility and fluid secretion. The Enterochromaffin-like [ECL] Cell.

❖ **X cells:** the cells are present in gastric body and fundus region. These cells secret the ghrelin hormone. The hormone is help for increase appetite and hunger. They also help for promote the fat storage.

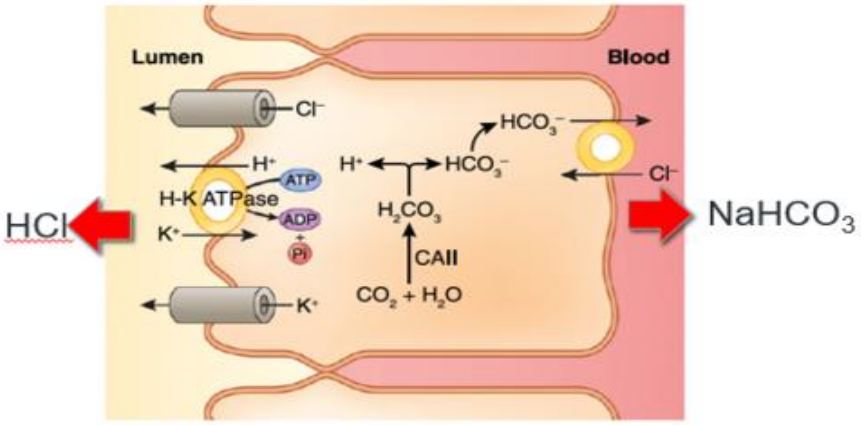


⇒ ***REGULATION OF GASTRIC SECRETIONS(26)***

The regulation of gastric secretion is proceeding through neural and hormonal mechanisms. Gastric juice is produced all the time but the amount different to subject to the regulatory factors. Regulation of gastric secretions may be divided into cephalic, gastric, and intestinal phases.
The cephalic phases happens when smell and thoughts of food occurs.
The presence of food in the stomach begins the gastric phase.
The presence of acid chyme in the small intestine starts the intestinal phase.

⇒ **ACID RELEASE PATHWAY IN STOMACH(27, 28, 29).**

Since the parietal cell was known to secrete gastric acid, many drugs were developed to target the parietal cell in order to inhibit the acid secretion. The major functional targets in the parietal cell were the histamine type 2 (H2) receptor and the gastric H+, K+-ATPase.1,2 Histamine binds to the H2 receptor, leading to elevation of intracellular cyclic AMP concentrations and activation of protein kinase A (PKA). One effect of PKA activation is the phosphorylation of cytoskeleton proteins involved in the transport of the gastric H+, K+-ATPase from cytoplasm to the plasma membrane, i.e., from the vesicular and/or tubular vesicular membrane to the canaliculus. In the canaliculus the gastric H+, K+-ATPase can access KCL of the extracellular region and exchange the intracellular proton with the extracellular K ion, which represents the gastric acid secretion. The H2 receptor is crucial in making the acid secreting morphology of the parietal cell, while the gastric H+, K+-ATPase is the final functional work on the acid secretion.



⇒ **COMPOSITION OF GASTRIC JUICES (30).**

Daily secretion: 2.5-3litres/day.
Ph:1-2.
Reaction: Acidic due to Hydrochloric Acid.
Electrolyte: Cations-Sodium, Potassium, Hydrogen, Magnesium.
Anions- Chloride, Bicarbonate, Sulphate.

Enzymes: Pepsinogen, Renin, Gastric Lipase, Lysozyme.
Mucus: Soluble and visible 2 type's mucus present.
Intrinsic Factor
Water.

⇒ **CAUSES, SIGN & SYPTOMS FOR HYPERACIDITY (31)**

❖ **CAUSES OF HYPERACIDITY**

Diet: Consuming spicy, fatty, or acidic foods can trigger acid reflux.
Overeating: Large meals put pressure on the lower esophageal sphincter (LES), allowing acid to escape.
Obesity: Excess weight increases abdominal pressure, making acid reflux more likely.
Lifestyle Choices: Smoking and excessive alcohol consumption can relax the LES, facilitating acid reflux.
Stress: High-stress levels can increase stomach acid production.
Medications: Certain drugs, like aspirin or ibuprofen, can irritate the stomach lining.
Pregnancy: Hormonal changes and pressure from the growing foetus can cause acid reflux.
Hiatal Hernia: This condition can make it easier for stomach acid to move into the esophagus.

❖ **SIGNS AND SYMPTOMS**

Heartburn: A burning sensation in the chest, often after eating.
Regurgitation: The feeling of acid backing up into the throat or mouth.
Difficulty in Swallowing: Also known as dysphagia.
ChestPain: Sometimes mistaken for a heart attack.
ChronicCough: Especially at night.
Hoarseness: Particularly noticeable in the morning.
A feeling of a Lump in the Throat: Also called Globus sensation.
Nausea: Particularly after meals.

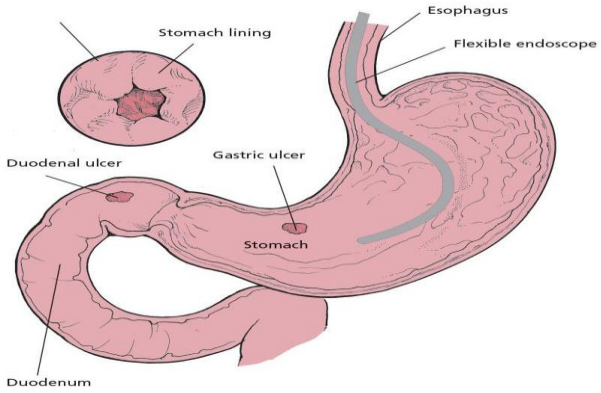
❖ **POTENTIAL RISKS OF UNTREATED HYPERACIDITY**

While hyperacidity is often considered a minor inconvenience, chronic and untreated cases can lead to more serious health complications:
Oesophagitis: Prolonged exposure to stomach acid can cause inflammation and erosion of the esophageal lining. This condition can lead to pain, difficulty swallowing, and bleeding.
Barrett'sesophagus: This condition occurs when the lining of the esophagus changes, becoming more like the lining of the intestine. It's a risk factor for esophageal cancer.
EsophagealStricture: Repeated damage from stomach acid can cause scar tissue to form, narrowing the esophagus and making swallowing difficult.
DentalProblems: Frequent exposure to stomach acid can erode tooth enamel, leading to increased sensitivity and decay.
RespiratoryIssues: Aspirating stomach acid into the lungs can cause pneumonia, asthma, or other respiratory problems.
SleepDisturbances: Nighttime reflux can interfere with sleep, leading to fatigue and decreased quality of life.
ChronicCough: Acid irritation in the throat can trigger a persistent cough.
Laryngitis: Acid reaching the larynx (voice box) can cause inflammation, leading to hoarseness and voice changes.
Increased Risk of **esophagealCancer**: While rare, chronic acid reflux is a risk factor for adenocarcinoma of the esophagus.

⇒ **DISEASE RELATED IN STOMACH (32, 33, 34)**

❖ **Peptic Ulcer Disease:** A lesion in a membrane. Gastrointestinal tract exposed to acidic gastric juice are called as peptic ulcer. Peptic ulcer leads bleeding and if that is untreated then that can lead to anemia due to large blood loss. It is generally more common in occurrence in male adultsand in low socio-economic group. Though the exact cause of peptic ulcer is not known, gastric acid and pepsin are known to play a definite role in lesion or ulcer formation.
The common symptoms include heartburn, nausea and substernal pain. In severe conditions
hemorrhage, manifested by black, tarry stools and gastric perforation may occur.

Peptic ulcer viewed through an endoscope



❖ **Zollinger- Ellison Syndrome:** One or more tumors that secrete hormones those lead to increased acid production. Severe GERD and peptic ulcer disease result from this rare disorder.

⇒ **DRUGS USED FOR HYPERACIDITY COMPLICATIONS**

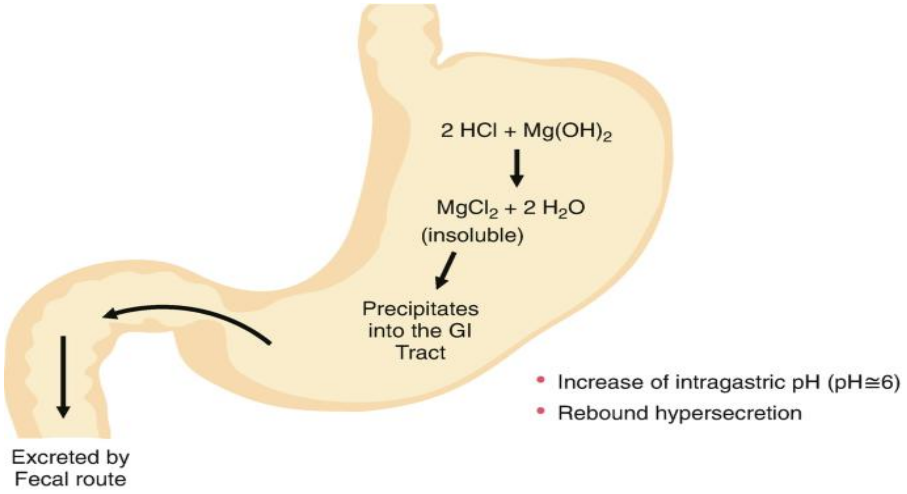
❖ **Antacid(35, 36, 37, 44)**

Antacids neutralize acid in the stomach and esophagus, which in turn helps to relieve heartburn, indigestion, and acid reflux.

Antacids act by neutralizing excess hydrochloric acid (HCL) in gastric juice and inhibit the proteolytic enzyme pepsin. An antacid that increases gastric pH from 1.5 to 3.5 can reduce the concentration of gastric acid by 100-fold. 5 A few studies reported that some antacids can be safely used during pregnancy owing to their local action rather than systemic effects.

- **Mechanism of Action:** Antacids are the base they react with hydrochloric acid present in stomach and form the salt and water and neutralize the acid.
- **Pharmacokinetic**:It is admistered through the oral route in the form Tablets and Suspension.

Distribution: Small amount distributed.
Metabolism: Small quantity is metabolized in liver
Excreted: Excreted through the faces or urine



- **Uses:** Heartburn, indigestion, or an upset stomach. Some antacids can also be used in the treatment of constipation and diarrhea.
- **Side Effects:** Antacids that contain magnesium salts may cause diarrhea, whereas those that contain calcium or aluminum may cause constipation. They may also cause kidney stones and osteoporosis.

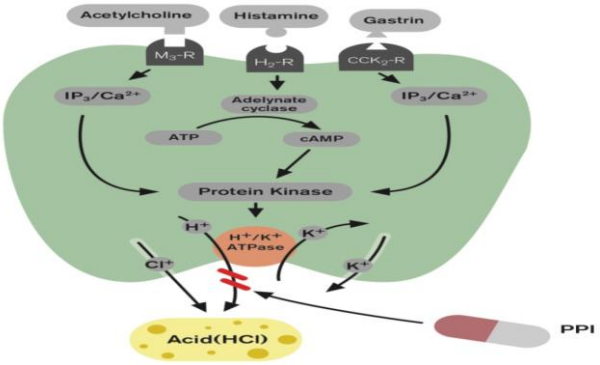
Furthermore, they have common interactions with other drugs such as fluoroquinolone, tetracycline antibiotics, iron, itraconazole and prednisone.

❖ **Proton Pump Inhibitors (38,39,40)**

PPI (proton pump inhibitor) is a medicine that reduces the effect of acid in the stomach by reducing the body's production of acid. It is a class of medication that causes a profound and prolonged reduction in stomach acid production. PPI irreversibly inhibits the stomach H+/K ATPase proton pump. It is the most potent inhibitor of acid secretion in the stomach. PPI largely supersedes the action of H2 receptor antagonists, which is another class of medication with similar effects. Proton pump inhibitors are among the most widely sold medication in the world at the moment.

- **MechanismofAction**: Proton pump inhibitors act by irreversibly blocking the hydrogen/potassium adenosine triphosphatase enzyme system of the gastric parietal cells. The proton pump is the terminal stage in gastric acid secretion, being directly responsible for secreting H+ ions into the gastric lumen, making it an ideal target for inhibiting acid secretion. Because the H,K-ATPase is the final step of acid secretion, an inhibitor of this enzyme is more effective than receptor antagonists in suppressing gastric acid secretion all of these drugs inhibit the gastric H,K-ATPase by covalent binding, so the duration of their effect is longer than expected from their levels in the blood. More effective than H2 antagonists and reduce gastric acid secretion by up to 99%.
- **Pharmacokinetic: Absorption**: quickly and completely absorbed through small intestine.

Metabolism: Metabolize in Liver.
Excretion: Through Feces



- **Uses:** Dyspepsia, peptic ulcers, gastro esophageal reflux disease, Barrett's esophagus, eosinophilic esophagus, stress gastritis, and gastrinomas. Furthermore,
- **Side Effects:** Headache, nausea, diarrhea, abdominal pain, fatigue, fatigue, dizziness, rash, itch, flatulence, constipation, anxiety, depression, Myopathies, and Rhabdomyolysis.

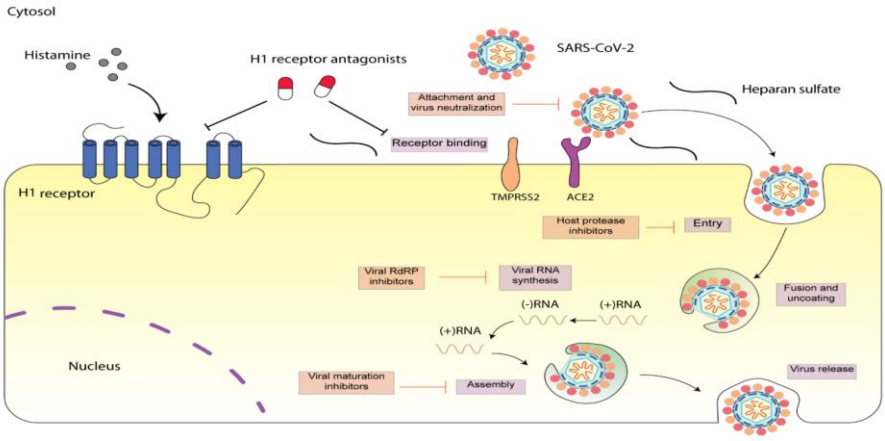
❖ **Histamine Blocker (41, 42,43)**

Circulating gastrin triggers the release of histamine from enterochromaffin-like cells in the body of the stomach. Histamine stimulates the parietal cells via their H2 receptors. The parietal cells secrete acid, this increase in gastric acid release occurs through the activation of adenylate cyclase, which raises intracellular cyclic adenosine monophosphate (cAMP) levels. Cyclic AMP then activates protein kinase A (PKA), which phosphorylates proteins involved in moving H+/K+ ATPase transporters to the plasma membrane. Increasing H+/K+ ATPase transporters at the plasma membrane allows more acid secretion from parietal cells.

- **Mechanism of Action:**Histamine2 blockers decrease gastric acid secretion by reversibly binding to histamine Histamine2 receptors located on gastric parietal cells. Histamine2 blockers drugs bind to the receptors and inhibittheactivity of the endogenous ligand histamine. Hisamine2 blockers thus function as competitive antagonists. By blocking the histamine receptor and thus histamine's stimulation of parietal cell acid secretion is decrease and Histamine2 blockers suppress stimulated and basal gastric acid secretion induced by histamine.
- **Pharmacokinetic: Absorption**: quickly and completely absorbed through orally.

Metabolism: Slightly metabolize in Liver.

Excretion: Through Kidney.



- **Uses:** Peptic ulcers, GERD, Stress Induced Ulcer, Zollinger- Ellison Syndrome, Etc.
- **Side Effects:** Dizziness, headache, and even diarrhea. Serious side effects can include tightness in the chest, confusion, irregular heartbeat, and fever.

TABLE I: secretions & functions of digestive system organs

Sr. No.	ORGANS NAME	ENZYME PRODUCED AND RELEASE	FUNCTIONS

1.	**Mouth or Buccal Cavity.**	Salivary gland secret amylase	➢ Breakdown of Polysaccharide. ➢ Saliva moistens and Lubricates food. ➢ Teeth help of breakdown of food.
2.	**Pharynx**	Not Release any Enzyme.	➢ Help for Swallow Chyme.
3.	**Esophagus**	Not Release any Enzyme.	➢ Transport food from mouth to stomach.
4.	**Stomach**	Pepsin Enzyme	➢ Pepsin digests Protein.
		HCL	➢ Activate the Pepsinogen enzyme into Pepsin. ➢ Kills the germs present in food.
		Mucin	➢ Protects Stomach wall by Hydrochloric Acid.
5.	**Small Intestine**	Peptidase	➢ Digest the protein, converts the amino acids.
		Sucrases	➢ Digest the Carbohydrate the convert into Monosaccharides.
		Amylase	➢ Digest Polysaccharides.
		Other function	➢ Absorbs the food and water
6.	**Large Intestine**	Not Release any Enzyme.	➢ Reabsorbs some water and ions. ➢ Forms and stores faces
7.	**Rectum**	Not Release any Enzyme.	➢ Stores and expels faces
8.	**Anus**	Not Release any Enzyme.	➢ Opening for remove of faces.
9.	**Liver**	Bile salt	➢ To mix and digest the lipids.
		Other functions	➢ Synthesis and breaks down the many biological substances. ➢ Stores vitamins and iron. ➢ Break down old blood cells. ➢ Neutralize the poison.
10.	**Pancreas**	Trypsin & Chymotrypsin	➢ Digest Protein.
		Amylase	➢ Breakdown Polysaccharides
		Lipase	➢ Digest Lipids.
		Bicarbonate	➢ Neutralize stomach acid in small intestine.
		Hormones	➢ Maintains the sugar level in blood.

TABLE II: stomach cells- their secretions and functions.

Sr. No.	NAME OF STOMACH CELL	SECRETION	FUNCTIONS
1.	**Goblet Cells or Mucus Cells**	Mucin	❖ Protects the Stomach wall from Hazards (Acid).
2.	**Parietal Cells**	Hydrochloric Acid	❖ Converts Pepsinogen into activated Pepsin. ❖ Kills the germs and Prevents body by germs.
3.	**Chief Cells or Zymogenic Cells**	Pepsinogen(Pepsin)	❖ Inactivated Pepsinogen enzyme is release, which is then converts into activated Pepsin and digest the Protein.
4.	**Endocrine Cells 5 Types**		
	i. G Cells	Gastrin	❖ Act on ECL cells and helps for histamine release.

	ii. Enterochromaffin Like Cells (ECL)	Histamine	❖ Help for hydrochloric acid.
	iii. Enterochromaffin Cells	Serotonin	❖ Help for GIT motility & fluid Secretion.
	iv. D Cells	Somatostatin	❖ Suppress excessive Acid in stomach.
	v. X Cells	Gherlin	❖ Increase Appetite and fat storage.

TABLE III: comparison table between antacids, hisamine2 blockers and proton pump inhibitors.

Sr.No.	Description	Antacids	Hisamine2 Blockers	Proton Pump Inhibitors
1.	**Mechanism of Action**	Antacids are the base they react with hydrochloric acid present in stomach and form the salt and water and neutralize the acid.	Histamine2 blockers decrease gastric acid secretion by reversibly binding to histamine receptors located on gastric parietal cells. By blocking the histamine receptor and thus histamine's stimulation of parietal cell acid secretion is decrease and Histamine2 blockers suppress stimulated and basal gastric acid secretion induced by histamine.	Proton pump inhibitors act by irreversibly blocking the hydrogen/potassium ATP enzyme system of the gastric parietal cells. The proton pump is the terminal stage in gastric acid secretion, being directly responsible for secreting H+ ions into the gastric lumen, making it an ideal target for inhibiting acid production.
2.	**Pharmacokinetic**	Absorption: only systemic antacid. Metabolism:In liver. Distribution: small quantity. Excretion: Urine	Absorption: Orally Metabolism: In liver Excretion: Urine	Absorption: Orally Metabolism:In liver Distribution: Excretion: Feces
3.	**Uses**	Helps to relieve heartburn, indigestion, and acid reflux.	Peptic ulcers, GERD, Stress, Induced Ulcer, Zollinger- Ellison Syndrome, Etc.	Dyspepsia, Peptic ulcers, GERD, Stress Induced Ulcer, Gastritis, Zollinger- Ellison Syndrome, Etc.
4.	**Side Effects**	Constipation and Diarrhea	Dizziness, headache, and even diarrhea. Serious side effects can include tightness in the chest, confusion, irregular heartbeat, and fever.	Headache, Nausea, Diarrhea, Abdominal Pain, Fatigue, Dizziness, Rash, Constipation, Anxiety, Depression, Etc.
5.	**Examples**	Magnesium Hydroxide, Aluminium Hydroxide, Sodium Bicarbonate, Etc.	Cimetidine, Ranitidine, Etc.	Pantaprazole, Omeprazole, Rabeprazole, Etc.

CONCLUSION

The digestive system is a complex and essential network responsible for the breakdown, absorption, and assimilation of nutrients, as well as the elimination of waste. It plays a critical role in maintaining overall health and homeostasis. Disorders of the digestive system, ranging from common conditions such as acid reflux, gastritis, and irritable bowel syndrome (IBS) to more severe diseases like inflammatory bowel disease (IBD), liver cirrhosis, and gastrointestinal cancers, can significantly impact a patient's quality of life and may lead to serious complications if left untreated.

This review highlights the intricate structure and function of the digestive tract and emphasizes the importance of early detection, accurate diagnosis, and evidence-based management of digestive diseases. Advances in diagnostics, pharmacotherapy, and minimally invasive procedures have improved patient outcomes, yet challenges remain, particularly in the management of chronic and lifestyle-related gastrointestinal disorders.

An integrated approach combining dietary modifications, pharmacological therapy, patient education, and preventive healthcare is essential for effective management. Continued research into gut microbiota, genetic factors, and emerging therapies promises to further enhance our understanding and treatment of digestive system disorders.

In conclusion, maintaining digestive health is not only vital for nutrient absorption but also for overall well-being, underscoring the need for awareness, prevention, and early intervention in digestive diseases.

In summary, antacids, H2 receptor antagonists, and proton pump inhibitors represent three major therapeutic classes used in the management of acid-related gastrointestinal disorders. Each class offers unique advantages and limitations in terms of mechanism of action, onset and duration of effect, clinical indications, and safety profile.

Antacids act quickly by neutralizing existing stomach acid and are most appropriate for immediate, short-term symptom relief. H2 receptor blockers, by inhibiting histamine-mediated acid secretion, provide moderate and sustained acid suppression and are suitable for mild to moderate gastroesophageal reflux disease (GERD) and peptic ulcer disease. PPIs, by irreversibly blocking the final step in acid production, offer the most potent and long-lasting acid suppression, making them the treatment of choice for severe or chronic acid-related conditions, including erosive esophagitis and Zollinger-Ellison syndrome.

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