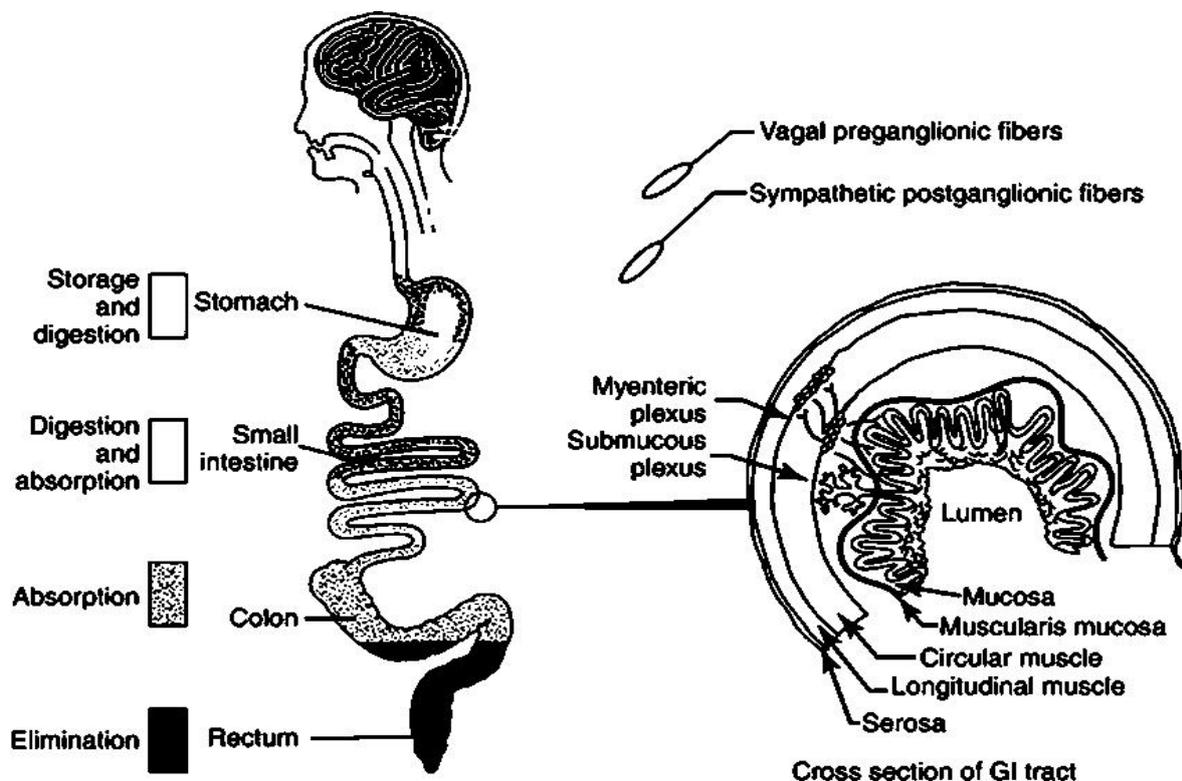


What is gastro biliary system ?

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- The biliary tract, (biliary tree or biliary system) refers to **the liver, gall bladder and bile ducts** , and how they work together to make, store and secrete bile.
- **Bile** consists of water, electrolytes, bile acids, cholesterol, hospholipase and conjugated bilirubin.



To fully understand how the biliary system works, it's important to know the definition of some related medical terms, including the following.

Duodenum:

- This is the first of three sections of the small intestine,
- It receives food from the stomach
- It receives digestive juices from the liver, gallbladder, and pancreas via the biliary tract.
- This is the part of the small intestine that is primarily involved in breaking down food .

NB . that nutrients can later be absorbed in the jejunum (middle section of the small intestine).

Liver: A large glandular organ that performs many vital metabolic functions, such as the digestion of fats to make energy in the body. The liver cells make bile.

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Bile:

- A thick, greenish-brown substance made in the liver and stored in the gallbladder,
- Bile is comprised of water, bile acids, cholesterol, phospholipids, bile pigments (such as bilirubin), and electrolytes.
- It is important in enabling the body to digest and absorb fats and fat-soluble vitamins, such as vitamins .

Bile duct:

- This is a small, hollow tube that functions to transport bile.
- The biliary system is comprised of a system of these ducts, which flow from the liver to the gallbladder for storage and then into the small intestine (duodenum).

Gallbladder :

- A pear-shaped organ located in front of the duodenum, just underneath the liver,
- the gallbladder's main function is to store bile. It connects to the cystic duct.

Pancreas

- : A large gland located behind the stomach,
- the pancreas secretes pancreatic enzymes (such as lipase, which breaks down fats) into the biliary system via the pancreatic duct.

Common GI Conditions

- Acid Reflux, Heartburn, GERD
- Dyspepsia/Indigestion
- Nausea and Vomiting
- Peptic Ulcer Disease
- Abdominal Pain Syndrome
- Belching, Bloating, Flatulence
- Biliary Tract Disorders,
- Gallbladder Disorders
- Gallstone Pancreatitis
- Gallstones in Women
- Constipation and Defecation Problems
- Diarrhea (acute)
- Diarrhea (chronic)
- Irritable Bowel Syndrome
- Hemorrhoids and Other Anal Disorders
- Rectal Problems in Women

the digestive tract often includes one or more of the following symptoms:

- ✧ Bleeding.
- ✧ Bloating.
- ✧ Constipation.
- ✧ Diarrhea.
- ✧ Heartburn.
- ✧ Incontinence.
- ✧ Nausea and vomiting.
- ✧ Pain in the belly.

Peptic ulcer

Peptic ulcer disease is a condition in which painful sores or ulcers develop in the lining of the stomach or the first part of the small intestine (the duodenum).

- **Gastric ulcers** that occur on the inside of the stomach
- **Duodenal ulcers** that occur on the inside of the upper portion of your small intestine (duodenum)

causes peptic ulcer disease

- ✧ The most common causes of peptic ulcers are infection with the bacterium **Helicobacter pylori (H. pylori)**
- ✧ Long-term use of nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen (Advil, Motrin IB, others) and naproxen sodium (Aleve).

Stress and spicy foods do not cause peptic ulcers.

Symptoms

- ✧ *Burning stomach pain medication, but then it*
- ✧ *Feeling of fullness, bloating or belching may come back.*
- ✧ *Intolerance to fatty foods*
- ✧ *Heartburn*
- ✧ *Nausea*
- ✧ *Stomach acid makes the pain worse, when having an empty stomach.*
- ✧ *The pain can often be relieved by eating certain foods that buffer stomach acid or by taking an acid-reducing*
- ✧ *The pain may be worse between meals and at night.*
- ✧ *Many people with peptic ulcers don't even have symptoms.*
- ✧ *Less often, ulcers may cause severe signs or symptoms such as:*
- ✧ *Vomiting or vomiting blood — which may appear red or black*

✧ *Dark blood in stools, or stools that are black or tarry*

✧ *Trouble breathing*

✧ *Feeling faint*

✧ *Nausea or vomiting*

✧ *Unexplained weight loss*

✧ *Appetite changes*

Risk factors

- ✧ taking NSAIDs,
- ✧ Smoke.
- ✧ infected with H. pylori.
- ✧ Drink alcohol.
- ✧ Have untreated stress.
- ✧ Eat spicy foods.

Complications

- ✧ **Internal bleeding.** Severe blood loss may cause black or bloody vomit or black or bloody stools.
- ✧ **A hole (perforation)**
- ✧ **Obstruction.** Peptic ulcers can block passage of food through the digestive tract,
- ✧ **Gastric cancer.** H. pylori have an increased risk of gastric cancer

Treatment

- ❖ Antibiotic medications to kill H. pylori. .
- ..
- ❖ Medications that block acid production and promote healing. ..
- ✓ **Proton pump inhibitors (PPIs)** PPIs work by reducing the amount of acid in stomach produces,
- ✓ PPIs preventing further damage to the ulcer as it heals naturally.

✓ They're usually prescribed for 4 to 8 weeks. Omeprazole, pantoprazole and lansoprazole are the PPIs most commonly used to treat stomach ulcers..

- Medications to reduce acid production. ...
- Antacids that neutralize stomach acid. ...
- Medications that protect the lining of your stomach and small intestine

Prevention

You may reduce your risk of peptic ulcer if you follow the same strategies recommended as home remedies to treat ulcers. It also may be helpful to:

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Protect yourself from infections. It's not clear just how *H. pylori* spreads, but there's some evidence that it could be transmitted from person to person or through food and water.

•

You can take steps to protect yourself from infections, such as *H. pylori*, by frequently washing your hands with soap and water and by eating foods that have been cooked completely.

•

•

Use caution with pain relievers. If you regularly use pain relievers that increase your risk of peptic ulcer, take steps to reduce your risk of stomach problems. For instance, take your medication with meals.

•

Work with your doctor to find the lowest dose possible that still gives you pain relief. Avoid drinking alcohol when taking your medication, since the two can combine to increase your risk of stomach upset.

•

If you need an NSAID, you may need to also take additional medications such as an antacid, a proton pump inhibitor, an acid blocker or cytoprotective agent. A class of NSAIDs called COX-2 inhibitors may be less likely to cause peptic ulcers, but may increase the risk of heart attack.

•

Drugs Affecting Gastro Intestinal Function

- Drugs that are used in treating ulcers in the stomach and duodenum.
- drugs that affect motility in the upper GI tract. Then, moving down to the large intestine,
- **we can divide the agents into those that**
 - i) enhance motility
 - ii) t reduce motility.
- Some drugs are binds to pancreatic and gastric lipase and inactivates the enzyme.
- This reduces the absorption of dietary fat .
- **Drugs Neutralizing Gastric Acid.**

(Duodenal and gastric ulcers are often caused by the bacterium Helicobacter pylori. The treatment objective is eradication of H. pylori with a combination of antibiotics and H₂ blockers.)

D₂-like receptors are inhibit key regulatory roles in essentially all cells and calcium channels, and activate inhibitory G-protein (G proteins belong to the larger group of enzymes called GTPases). **activated inwardly rectifying potassium channels**

*(H₂ blockers are a group of medicines that reduce the amount of acid produced by the cells in the lining of the stomach. They are also called 'histamine H₂-receptor antagonists' but are commonly called H₂ blockers. They include **cimetidine, famotidine, nizatidine and ranitidine**)*

Human body is built to naturally maintain a healthy balance of acidity and alkalinity. The lungs and kidneys play a key role in this process. A normal blood pH level is 7.40 on a scale of 0 to 14, where 0 is the most acidic and 14 is the most basic. This value can vary slightly in either direction.

.Antacids

ACTION (Drugs Neutralizing Gastric Acid) Antacids are weak bases that neutralize gastric hydro- chloric acid.

- ✓ They raise the pH (potential of hydrogen value- range 0 to 14) of the stomach contents,
- ✓ decrease the acid load delivered to the duodenum and reduce the activity of pepsin (stomach enzyme/ cell).
- ✓ Antacids are given between meal and at bed time when symptoms of hyperacidity usually occur;
- ✓ the presence of food in the stomach can prolong their neutralizing capacity.
- ✓ **Antacids:** Sodium bicarbonate acts rapidly, has a brief effect and raises the pH of gastric secretion to 7.4. On neutralizing gastric acid
- ✓ . Antacids are poorly absorbed from GIT (•Aluminium hydroxide •Magnesium trisilicate •Magaldrate)
- ✓ (•Aluminium hydroxide •Magnesium trisilicate •Magaldrate) have slow onset but longer effect and raise the gastric pH to 3.5–4. The pepsin activity is inhibited around pH 4.
- ✓ (. Aluminium hydroxide and Magnesium trisilicate) neut- ralize gastric hydrochloric acid to form aluminium chloride and magnesium chloride which further react with intestinal bicarbonates to form aluminium carbonate and magnesium carbonate.
- ✓ Sodium chloride formed in these reactions gets reabsorbed to compensate the loss of chlorides during gastric acid neutralization. Buffer type non-systemic antacids do not disturb the acid-based balance of the body.
- ✓ **constipation – diarrhoea, are a side effect.**
Hyperglycemia ,

. **Proton Pump Inhibitors (PPIs)** (Esomeprazole •Lansoprazole •Pantoprazole •Rabeprazole.

ACTION

- ✓ inactivate the proton pump irreversibly and shut off the acid secretion,
- ✓ PPIs are the most widely used drugs for peptic ulcer and related disorders, because of their efficacy and safety
- ✓ PPIs also inhibit gastric mucosal carbonic anhydrase and reduce bicarbonate secretion to mucus
- ✓ It has also anti-H. pylori activity.

ADRs: diarrhoea, headache, inhibition of vitamin B12, hypochlorhydria and risk of enteric infections

Cimetidine Famotidine •Nizatidine •Ranitidine •Roxatidine

- ✓ for treatment of peptic ulcer

Action

- ✓ . Antagonist of H₂-receptors (H₂-blockers)
- ✓ inhibit the secretion of gastric acid
- ✓ Peak plasma concentrations are usually attained within 1 to 3h after the dose, but a second peak after oral administration has been observed with cimetidine, ranitidine, famotidine, ramixotidine and etintidine.
- ✓ The mean oral bioavailability for the H₂-antagonists ranges from 50 to 70%. Reports on the plasma profiles after intravenous administration are available only for cimetidine, ranitidine, famotidine and nizatidine: plasma concentrations
- ✓ . All of the H₂-antagonists are eliminated quite rapidly, with a terminal half-life of 1 to 3h and a total body.

ADRs: reduced glomerular filtration rate, diarrhoea, headache,

Laxative and Purgative Drugs

- Laxatives provide elimination of soft semisolid stool and Purgatives provide more watery evacuation.
- Laxatives are used: to treat constipation; to avoid undue straining at defecation in cases of hernia, haemorrhoids etc

➤

❖ Lactulose is an osmotic laxative drug.

- It is nonabsorbable- indigestible disaccharide (sugar), which increases fecal bulk by hydrophilic and osmotic action.
- It is given in dose of 10 g orally. Latency period is 1 to 3 days. Lactulose is also used for treatment of hepatic encephalopathy.

❖ Liquid paraffin

- ✓ **is Mineral oil** any of various colorless, odorless, light mixtures of higher alkanes from a mineral source, particularly a distillate of petroleum,

- ✓ Liquid paraffin is a fecal lubricant and stool softener as it retards water absorption from the stool.
- ✓ It is given 15 to 30 ml per day at bed time. Latency period is 1 to 3 days.
- ✓ Purgatives are used for complete colonic cleansing prior to GI endoscopic procedures or before intestinal operation.

Mucosal Protective Drugs •Sucralfate (aluminium salt of sulfated sucrose)
Misoprostol etc

- ✓ mucosal protective agent, any drug **that protects the mucosal lining of the stomach from acidic gastric juices.**
- ✓ The mucosal barrier is the name given to the barrier in the stomach that resists the back-diffusion of hydrogen ions.
- ✓ The barrier is a layer of thick mucus secreted together with an alkaline fluid.
- ✓ in acidic environment (pH < 4) polymerizes and forms a gel over ulcer crater which acts as acid resistant physical barrier.

Antiemetic Drugs (Meclizine ,Meclizine + Pyridoxine, , Promethazine theoclate,
Prochlorperazine, Ondansetron,)

What are antiemetic drugs?

Antiemetic drugs are prescribed to help with nausea and vomiting that are side effects of other drugs. This may include drugs for anesthesia used during surgeries or chemotherapy for cancer. Antiemetic drugs are also used for nausea and vomiting caused by:

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- motion sickness
- morning sickness during pregnancy
- severe cases of the stomach flu (gastroenteritis)
- other infections

M/A

These drugs work by interfering with the neurotransmitter receptors involved in vomiting.

Neurotransmitters are the cells that receive the signals to send a nerve impulse.

The pathways that control these bodily reactions are complex.

Types of antiemetic drugs

Some antiemetic drugs are taken by mouth. Others are available as an injection or as a patch placed on body.

The type of antiemetic drug should take depends on what is causing symptoms:

■ Antiemetics for motion sickness

Antihistamines that prevent nausea and vomiting caused by motion sickness are available over the counter (OTC). They work by keeping inner ear from fully sensing motion and include:

- dimenhydrinate (Dramamine, Gravol)
- [meclizine](#) (Dramamine Less Drowsy, Bonine)

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Antiemetics for stomach flu

The stomach flu, or [gastroenteritis](#), is caused by a virus or bacteria. The OTC drug bismuth-subsalicylate (Pepto-Bismol) works by coating ystomach lining.

also OTC glucose, fructose, or phosphoric acid (Emetrol).

Antiemetics for chemotherapy

Nausea and vomiting are a common part of chemotherapy treatment. Antiemetic drugs are used before and after chemotherapy to prevent symptoms.

Some prescription treatments include:

- **serotonin 5-HT₃ receptor antagonists:** dolasetron (Anzemet), granisetron (Kytril, Sancuso), ondansetron (Zofran, Zuplenz), palonosetron (Aloxi)
- **dopamine antagonists:** prochlorperazine (Compazine), domperidone (Motilium, not available in the US), olanzapine (Zyprexa)
- **NK1 receptor antagonists:** aprepitant (Emend), rolapitant (Varubi)
- **corticosteroids:** [dexamethasone](#) (DexPak)
- **cannabinoids:** cannabis (medical marijuana), dronabinol (Marinol)

Antiemetics for surgery

Postoperative nausea and vomiting (PONV) can be caused by the anesthesia used during a surgery. Prescription drugs used for treating PONV include:

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- **serotonin 5-HT₃ receptor antagonists:** dolasetron, granisetron, ondansetron
- **dopamine antagonists:** [metoclopramide](#) (Reglan), droperidol (Inapsine), domperidone
- **corticosteroids:** dexamethasone

Antiemetics for morning sickness

Morning sickness is common during pregnancy. However, antiemetic drugs aren't usually prescribed unless it's severe.

[Hyperemesis gravidarum](#) is a pregnancy complication that causes severe nausea and vomiting. If you have this condition, your doctor may prescribe:

- antihistamines, such as dimenhydrinate
- vitamin B-6 (pyridoxine)
- dopamine antagonists, such as prochlorperazine, promethazine (Pentazine, Phenergan)
- metoclopramide if other treatments don't work

Side effects of antiemetic drugs

The side effects depend on the type of antiemetic drug you take:

- **bismuth-subsalicylate:** dark-colored tongue, grayish-black stools
- **antihistamines:** drowsiness, dry mouth

- **dopamine antagonists:** dry mouth, fatigue, constipation, tinnitus, muscle spasms, restlessness
- **neurokinin receptor agonists:** decreased urination, dry mouth, heartburn
- **serotonin 5-HT₃ receptor antagonists:** constipation, dry mouth, fatigue
- **corticosteroids:** indigestion, acne, increased appetite and thirst
- **cannabinoids:** changes in perception, dizziness

If you experience any of the following, consult your doctor:

- worsening of nausea or vomiting
- severe constipation
- muscle weakness
- convulsions
- loss of hearing
- rapid heartbeat
- severe drowsiness
- slurred speech
- psychological symptoms, like hallucinations or confusion
-

Natural antiemetic treatments

The most well-known natural antiemetic is ginger (*Zingiber officinale*). Ginger contains 5-HT₃ antagonists known as gingerols.

Aromatherapy with peppermint essential oil may also be a [safe and effective](#) [Trusted Source](#) way to overcome nausea and vomiting.

Try rubbing a couple drops into the back of neck and taking deep breaths.

Antiemetic drugs safe for pregnancy

Motion sickness drugs like meclizine and dimenhydrinate are safe for pregnant women.

Vitamin B-6 and dopamine antagonists have been found to be safe, but are only used in severe cases of morning sickness.

Antiemetic drugs safe for children

It's always a good idea to consult a doctor before giving medication to children.

For motion sickness

Dimenhydrinate and diphenhydramine (Benadryl) can be used to treat nausea in children over 2 years old, but make sure you follow dosage instructions.

For gastroenteritis

- **Recent studies have found that ondansetron may be safe and effective for children with a severe case of gastroenteritis.**

Promethazine shouldn't be used by babies or young children. Don't give bismuth-subsalicylate to children 12 years of age or younger.

Vomiting means expulsion of gastric contents through mouth due to mass antiperistalsis. It is often preceded by nausea. Vomiting can be life saving, physiological response to the ingested toxic substances

Ondansetron

ACTION

- ✓ **act** 5-HT₃ receptors (Work as might be expected due to their role in emesis, 5-HT₃ receptors are involved in **information transfer in the gastrointestinal tract**, and in the enteric nervous system they regulate gut motility and peristalsis)
- ✓ is one of the medications most commonly used for empiric treatment of nausea and vomiting.
- ✓ It has extreme utility as an antiemetic drug, and it is effective against nausea and vomiting of various etiologies.
- ✓ The dose is 8 mg every 8 hours.

ADR Headache, lightheadedness, dizziness, drowsiness, tiredness, or constipation may occur.

Domperidon

- ✓ Domperidone is a dopamine antagonist that principally blocks the dopamine receptors located in the Chemoreceptor Trigger Zone (CTZ) and stomach.
 - ✓ Its gastroprokinetic action is based on its blocking effect of dopamine receptors that have an influence on the motility of the gastrointestinal tract.
 - ✓ Epigastric sense of fullness, feeling of abdominal distension, upper abdominal pain
 - ✓ Heartburn with or without regurgitations of gastric contents in the mouth
 - ✓ Non-ulcer dyspepsia
 - ✓ Dyspeptic symptom complex, often associated with delayed gastric emptying, gastroesophageal reflux and esophagitis
 - ✓ cute nausea and vomiting of the functional, organic, infectious, dietetic origin or induced by radiotherapy or drug therapy or induced in migraine.
-
- ✓ Domperidone is sometimes used to increase milk supply

pharmacodynamics consists of the following:

- Affinity: attraction between a drug and its receptor.
- Efficacy: the drug's ability to activate the receptor once it has bound to it.
- Potency: the amount of a drug that's necessary to produce a desired effect.
- Agonist: a drug that promotes the activity of its receptor.

