



# DRUGS ACTING ON DIGESTIVE SYSTEM

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## 8.1 Antacid, Anti-ulcer drugs

▶ **Antacid-** the drugs which are used to neutralize excessive acidity in the stomach are called as antacids.

▶ **Classification**


1. **Systemic antacids (Water soluble)-** when administered, get absorbed into systemic circulation & may cause systemic alkalosis.

eg- **Sodium bicarbonate**


1. **Non-systemic antacids (water insoluble)-** when administered, form insoluble complexes in the small intestine.

eg- **Magnesium hydroxide, aluminum hydroxide gel, magnesium trisilicate, calcium carbonate, magnesium oxide.**

# Mechanism of action

- ▶ The antacids act as weak bases & reduce the quantity of free hydrochloric acid in the stomach by the following mechanisms.
    1. Direct neutralization of pre-formed acid.
    2. Buffering of pre-formed acids
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# Ideal properties of antacids

- ▶ It should have a capacity to neutralize excessive acidity.
  - ▶ It should have a quick & prolonged action
  - ▶ It should not interfere with digestion & absorption of food
  - ▶ It should be non-toxic, palatable, cheap & easily available.
  - ▶ It should not cause evolution of gas.
  - ▶ It should not cause constipation or diarrhea
  - ▶ It should not cause alkalosis.
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# Pharmacology of Antacids

## ❑ Systemic antacids- Sodium bicarbonate

- ▶ It is white, water soluble & completely absorbed antacid.
- ▶ It reacts with gastric acid as follows.



- ▶ It is effective & rapidly acting antacid.
- ▶ 1 gm drug neutralizes 120 ml of 0.1 N HCl.
- ▶ During the neutralization process, carbon dioxide is liberated, which gives the patient a sense of relief from abdominal discomfort.
- ▶ It is not recommended for long term use as it produces systemic alkalosis.

▶ **Contraindication**

1. Hypertension
2. Congestive cardiac failure
3. Renal disorders

▶ **Preparations**

- ▶ 1-5 gm in water & repeated as required.

# Peptic Ulcer

- ▶ Is one of the common diseases of adult male.
- ▶ It is caused as a result of digestive action of pepsin & dil.HCl against which the normal stomach & duodenum are protected by their mucus secretions.
- ▶ In peptic ulcer, there is an excessive secretion of gastric acid.
- ▶ **Treatments**
  - i. Controlling gastric acidity, hyper motility & spasms.
  - ii. Promoting ulcer healing.
  - iii. Use of antacids, milk or ion exchange resin.
  - iv. Withdrawal of stimulants of gastric acid like alcohol, tobacco etc.
  - v. Surgical removal of acid producing gastric mucosa.

▶ **Drug treatments for peptic ulcer**

- i. Aluminium hydroxide gel
- ii. Magnesium hydroxide
- iii. Aluminium trisilicate
- iv. Magnesium oxide
- v. H<sub>2</sub> receptor antagonists
  - a) Ranitidine- tablet 150 mg oral
  - b) Cimetidine- 200 mg –Tagamet



# Emetics

▶ The drugs which induce vomiting are called emetics.

▶ **Emesis**- it is the process of vomiting.

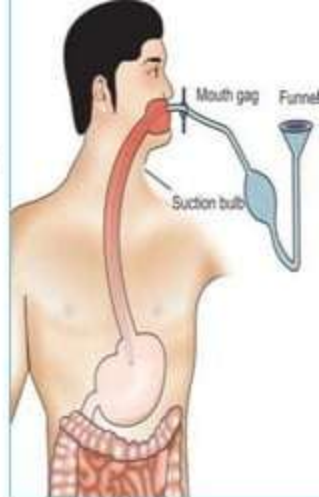
▶ **It can be caused due to:**

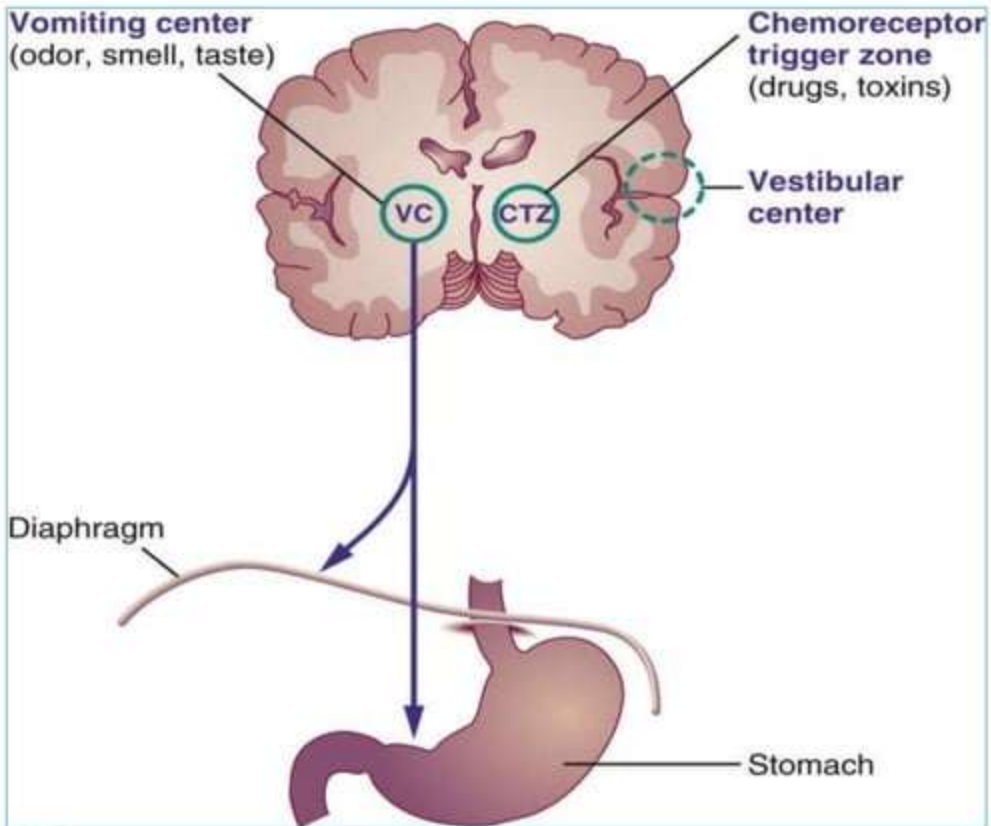
1. Stimulation of CTZ
2. Local irritation in GIT
3. Vestibular stimulation
4. Psychological

▶ **Drugs**- Apomorphine, ipecac, mustard, sodium chloride solution

▶ **Uses of emetics**

1. In poisoning cases for gastric lavage
2. As expectorants.





## 8.2 Anti-Emetics

▶ The drugs which prevent or relieve nausea and vomiting are called antiemetic.

### ▶ **Classification**

1. Anticholinergics- scopolamine
2. Antihistaminics- Diphenhydramine, cyclizine
3. Antidopaminergics- Chlorpromazine
4. Miscellaneous- Haloperidol, Tri-metho-benzamide, Benzquinamide.

### ▶ **Mechanism of action**

1. By acting directly on vomiting centre
2. By acting on CTZ (Chemo Receptor Trigger Zone)
3. By acting peripherally.

▶ **Preparations**

1. Scopolamine hydrobromide- 0.6 mg to 1 mg s.c
2. Chlorpromazine- 10-25 mg

▶ **Uses of antiemetic**

1. To control vomiting during cancer therapy.
2. Preanaesthetic medication
3. To treat vomiting during pregnancy
4. To treat vomiting due to motion sickness.
5. To treat vomiting during GIT disturbances
6. To treat vomiting due to psychological reasons.

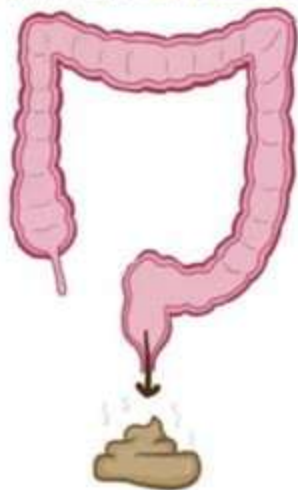
## 8.3 Laxatives & Purgatives

- ▶ **Cathartics-** it is a pharmacological agent, which when administered, increase tone, motility, peristalsis & relieves constipation.
- ▶ **Purgatives-** the drugs which promote defecation are called purgatives.
- ▶ These are drastic cathartics, which when administered, relieve constipation, by causing gripping pain in abdomen & loss of water.
- ▶ **Laxatives-** these are mild cathartics, which when administered, relieve constipation without gripping pain in abdomen & loss of water.

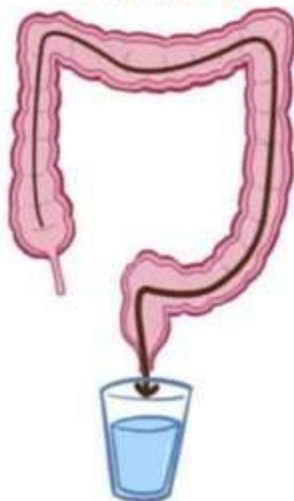
↑ PASSAGE of STOOL

# LAXATIVES & CATHARTICS

FULLY FORMED FECAL  
MATTER from RECTUM



EVACUATION of  
ENTIRE COLON



▶ **Classification**

1. **Stimulant/ Irritant purgatives-** senna, castor oil, phenolphthalein, biacodyl.
2. **Osmotic purgatives/ saline purgatives-** magnesium sulphate, potassium phosphate.
3. **Bulk purgatives-** methyl cellulose, agar-agar, isapgol.
4. **Emollient purgatives/ lubricant purgatives-** liquid paraffin.

## ▶ Senna

1. Senna is a stimulant purgative.
  2. Senna contains anthraquinone glycosides which act by stimulation of large bowel & also probably by inhibiting NaCl & water reabsorption in the colon.
  3. Hence increase evacuation of faecal matter from the colon & produce purgation.
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- ▶ **Preparations-** senna (Glaxena)- 0.6-2 gm at bed time.





## ▶ **Castor oil**

1. When castor oil is ingested orally, it is hydrolyzed by pancreatic lipase to glycerol & ricinoleic acid.
2. This ricinoleic acid, by its irritant action, stimulated the peristaltic movements of intestine & produces purgation.
3. Full dose of castor oil produces purgation within 2-6 hrs.


### ▶ **Saline purgatives**

1. These drugs act by maintaining a volume of fluid in the bowel by osmosis.
2. These drugs increase the osmotic pressure by secreting additional fluid in the intestinal tract resulting in increase in bulk & stimulate the peristalsis of GIT, hence they are used in constipation.

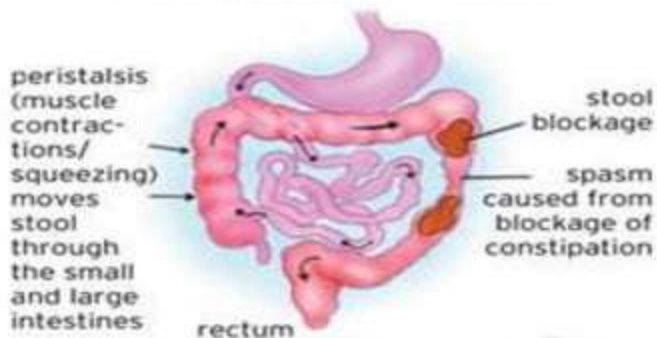
### ▶ **Examples**

1. Magnesium sulphate- 5-15 gm before breakfast
2. Magnesium carbonate- 2-4 gm as required
3. Magnesium hydroxide- 2-4 gm as required.

▶ **Clinical application of cathartics**

1. To treat constipation.
  2. In food or drug poisoning saline purgatives are used.
  3. In hemorrhoids.
  4. Used before radiological examination of GIT.
  5. In gynecological practice.
  6. In case with anal fissures.
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## Constipation & Laxatives



## 8.4 Anti-diarrheal drugs

- ▶ **Diarrhea** is defined as rapid passage of fecal matter through gastro-intestinal tract & a frequent passage of semisolid or liquid feces.
- ▶ **Anti-diarrhoeal drugs** are pharmacological agents, which when administered, alter the tone & motility of bowels, or act as adsorbents, which adsorb the irritants.

## ► **Classification**

1. **The opiates-** Paregoric, codeine phosphate
2. **Diphenoxylate hydrochloride-** Lomotil
3. **Anti-spasmodic-** Atropine sulphate, belladonna tincture
4. **Hydrophilic agents-** Methyl cellulose, isapgula husk
5. **Demulcents-** Bismuth carbonate, magnesium oxide
6. **Adsorbents-** activated charcoal, kaolin,
7. **Miscellaneous drugs-** Lactulose, cholestyramine, chenode-oxy-cholic acid

## **i. The opiates**


- ▶ Opiates are used for symptomatic relief of diarrhea.
- ▶ When administered, these agents reduce the propulsive movements of the colonic muscle & thereby allow the feces to remain for a longer time in the lumen so that water is re-absorbed.
- ▶ Disadvantage is that, these agents may cause addiction & tolerance, if taken frequently.
- ▶ **Preparations**
  - i. Paregoric- camphorated preparation of opium-4 ml
  - ii. Codeine phosphate- 16-30 mg

- ▶ **Hydrophilic agents-** when administered, absorb water in the lumen & form gelatinous mass. This reduce free water content of stool.
- ▶ Methyl cellulose- Celevac- 1-3 gm
- ▶ Isapgula husk- Isogel- 3-5 gm

- ▶ **Demulcent-** when administered, provide soothing effect to the irritated intestinal mucosa.
- ▶ Bismuth carbonate- 2 gm orally
- ▶ Magnesium oxide- 1 gm orally.



❖ **Why morphine does produce constipation?**

- Morphine reduces peristaltic movements of the gut.
  - Due to this there is a delay in passage of food in intestine & thus large amount of water is reabsorbed from the intestinal contents.
  - Hence intestinal contents become hard & do not evacuate easily. Hence morphine produce constipation.
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❖ **Why is tincture of opium used in diarrhoea?**

- ▶ Because morphine is a main alkaloid of opium.
- ▶ Morphine reduces peristalsis & motility of the gut.
- ▶ Morphine increases reabsorption of water from the intestine & prevents the evacuation of watery stools.
- ▶ Hence due to constipating effect, morphine is used in diarrhoea.

# Assignment

1. Define antacid. Classify it with example.
2. Give ideal properties of antacid.
3. What is peptic ulcer? Give causes & treatment of peptic ulcer.
4. Define emetics. Enlist causes of emesis. Give drugs with their uses.
5. Define antiemetic with examples? Enlist uses of antiemetic.
6. What are purgative? Classify it with example.
7. How does senna acts as purgatives?
8. How does castor oil acts as purgatives?
9. Why morphine does produce constipation?
10. Write a note on saline/osmotic purgatives.
11. What is the difference between laxatives & purgatives?
12. Why is tincture of opium used in diarrhea?