

Pharmacology

Drugs that Affect the
Gastrointestinal System

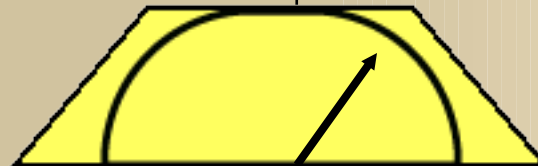
Topics

- Peptic Ulcer Disease
- Constipation
- Diarrhea
- Emesis
- Digestion

Peptic Ulcer Disease

**Factors that
Increase Acidity**

**Factors that
Protect Against
Acidity**



Peptic Ulcer Disease

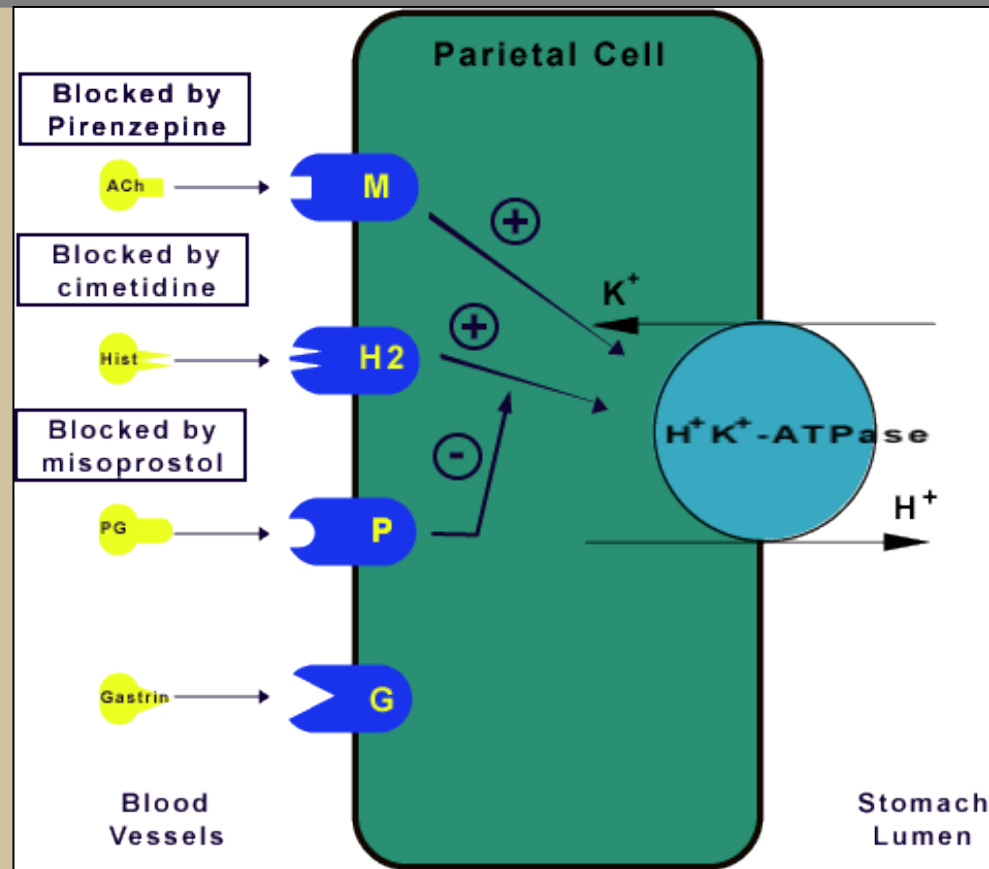
- Factors Increasing

- *H. pylori*
- NSAIDs
- Acidic agents
- Pepsin
- Smoking

- Factors Decreasing

- Mucus production
- Buffers
- Blood flow
- Prostaglandins

Regulation of Gastric Acid Secretion



H₂ Receptor Antagonists

- Inhibits gastric acid secretion
- No effect on H₁ receptors
- cimetidine (Tagamet[®])
- ranitidine (Zantac[®])
- famotidine (Pepcid[®])
- nizatidine (Axid[®])

H₂ Receptor Antagonists

- Indications:
 - PUD
 - GERD
 - Prevention of aspiration pneumonia

Proton Pump Inhibitors

- $K^+H^+ATPase$ (Proton Pump)
- Irreversible inhibition
 - Must synthesize new enzyme
 - Long duration
- omeprazole (Prilosec[®])
- lansoprazole (Prevacid[®])

Anticholinergics

- pirenzepine (Gastrozepine[®])
- Other anticholinergics have too many side effects and are not used

Prostaglandin Analog

- misoprostol (Cytotec[®])
 - Approved for treating PUD due to long term NSAID use

Antacids

- Increase pH of gastric environment
- Hydroxides
 - Aluminum
 - Magnesium
- Carbonates
 - Calcium

Antacids

- Most OTC drugs are combinations
 - DiGel[®]
 - Amphojel[®]
 - Maalox[®]
 - Milk of Magnesia[®]
 - Mylanta[®]

Antibiotics

- Aimed at eliminating *H. pylori*
- bismuth (Pepto-Bismol[®])
- metronidazole (Flagyl[®])
- amoxicillin (Amoxil[®])
- tetracycline (Achromycin V[®])

Stool Formation

Water absorbed in colon (~90%)

- Excessive absorption
 - Constipation: hard, dehydrated stool
 - Increases strain on defecation
 - Harmful for subset of patients
 - Recent episiotomy, colostomy, hemorrhoids, cardiovascular disease
- Inadequate absorption
 - Diarrhea: soft, non-formed, liquid stool

Terms

Laxative

Production of soft, formed stool over 1 or more days

Cathartic

Rapid, intense fluid evacuation of bowel.

Laxatives

- Bulk forming
- Surfactants
- Stimulants
- Osmotics

Bulk Forming Laxatives

- Absorb water
- Soften and enlarge stool
- Fecal swelling promotes peristalsis

- methylcellulose (Citrucel[®])
- psyllium (Metamucil[®])
- Polycarbophil

Surfactant Laxatives

- Lowers surface tension
 - Facilitates water penetration

- Docusate salts
 - Colace[®]
 - Modane Soft[®])

Stimulant Laxatives

- Stimulate peristalsis
- Increases water and electrolytes secretion into intestinal lumen
- Decreases water and electrolyte reabsorption

- Phenylolphthalein
 - (Ex-Lax[®], Feen-a-Mint[®], Correctol[®])
- bisacodyl (Ducolax[®])

Osmotic Laxatives

- Poorly absorbed salts remain in fecal matter
- Pull water into lumen

- Magnesium hydroxid (Milk of Magnesia®)

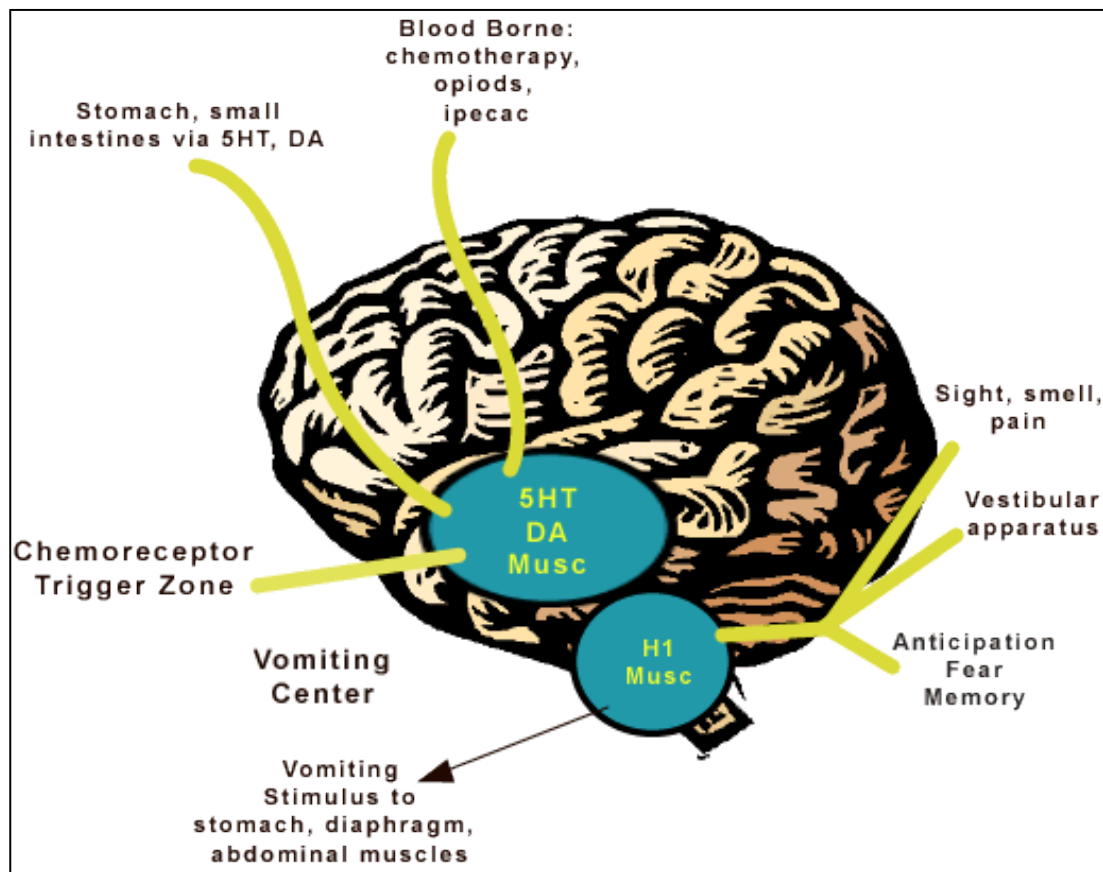
Antidiarrheal

- Diarrhea is usually a compensatory action...
 - Treatment aimed at cause, not symptom
- Opioid receptors in GI tract decrease motility
 - Increase time for water reabsorption

Antidiarrheal Agents

- paregoric/opium tincture
- diphenoxylate (Lomotil[®])
- defenoxin (Motofen[®])
- loperamide (Imodium[®])

Vomiting Stimulus



Antiemetics

- Serotonin (5HT) Antagonists
- Dopamine (DA) Antagonists
- Anticholinergics (muscarinic blockers)
- Cannabinoids

Serotonin Antagonists

- Used to treat side effects of chemotherapy-induced emesis
- ondansetron (Zofran®)
- Doesn't affect dopamine receptors
∴ no extrapyramidal effects
- Granisetron (Kytril®)

Dopamine Antagonists

- Phenothiazines
 - prochloraperazine (Compazine®)
 - promethazine (Phenergan®)
- Butyrophenones
 - haloperidol (Haldol®)
 - droperidol (Inapsine®)
- metoclopramide (Reglan®)

Cannabinoids

- Tetrahydrocannabinol (THC)
 - Active ingredient in marijuana
 - Dronabinol (Marinol[®])
 - Nabilone (Cesamet[®])

Digestion Aids

- Useful for inactive vagal stimulus/bypassed duodenum
- Pancreatin (Entozyme[®])
- Pancrelipase (Viokase[®])