1 Drugs for Gastrointestinal Disorders
Unit 15

2 The digestive system breaks down food, absorbs nutrients, and eliminates wastes

3 Peptic ulcer disease
   - Caused by erosion of the mucosal layer of the stomach or duodenum.
   - Risk Factors
     - Close family history of PUD
     - Blood group O
     - Smoking tobacco
     - Alcoholic beverages
     - Beverages and food containing caffeine
     - Drugs, including glucocorticoids, aspirin, and NSAIDs
     - Excessive psychological stress
     - Infection with the bacterium Helicobacter pylori

4 Natural defenses against stomach acid

5 Mechanism of peptic ulcer formation

6 Duodenal Ulcer
   - Gnawing/burning upper abdominal pain 1 to 3 hours after a meal
   - Pain is worse when stomach is empty, often disappears following ingestion of food
   - Nighttime pain, nausea, and vomiting
   - If erosion progresses deeper into the mucosa, bleeding will occur
   - Many duodenal ulcers heal spontaneously
   - Most frequent in the 30- to 50-year-old age group

7 Gastric Ulcers
   - Less common
   - Relieved by food, pain may continue even after a meal
   - Loss of appetite, weight loss, and vomiting
   - Severe ulcers may penetrate through the wall of the stomach and cause death
   - More common in those older than age 60

8 Gastroesophageal Reflux Disease (GERD)
   - Intense burning known as heartburn
   - Acidic contents of stomach move up into esophagus
   - May lead to ulcers in the esophagus
   - Usually caused a loosening of the sphincter located between esophagus and stomach
   - Strongly associated with obesity, losing weight may eliminate the symptoms
   - Many of the drugs prescribed for peptic ulcers are also used to treat GERD

9 Peptic Ulcer Drug Treatment
   - Peptic ulcer disease is treated by a combination of lifestyle changes and pharmacotherapy
   - H2-receptor blockers
Mechanisms of action of antiulcer drugs: (a) Proton-pump inhibitors act by blocking acid secretion by the HCl pump; (b) H2-receptor blockers act by decreasing acid secretion; (c) antibiotics act by removing *H. pylori*; (d) antacids act by neutralizing acids.

Drugs for Peptic Ulcer Disease (continued)

**Proton-Pump Inhibitors**
- Effective at reducing gastric acid secretion
- Act by blocking the enzyme responsible for secreting hydrochloric acid in the stomach
- Reduce acid secretion more than H2-receptor blockers and have a longer duration of action
- Drugs of choice for the treatment of PUD and GERD used only for the short-term control

Proton-Pump Inhibitors
- Heal more than 90% of duodenal ulcers within 4 weeks and about 90% of gastric ulcers in 6 to 8 weeks
- Beneficial effects last 3 to 5 days after therapy is stopped
- Adverse effects: uncommon, occasional headache, abdominal pain, diarrhea
- Examples: Nexium, Prevacid, Prilosec

**H2 Receptor blocker**
- H2-receptor blockers reduce the secretion of gastric acid
- H2-receptor - Responsible for increasing acid secretion in the stomach
- Cimetidine (Tagamet), the first and others (Zantac, Pepcid) suppress the volume and acidity of stomach acid
- Also used to treat the symptoms of GERD

**H2 Receptor blocker**
- Adverse effects minor
- Patients with liver or renal disease may experience confusion, restlessness, hallucinations or depression
- Patients should be advised not to take antacids at the same time as H2-receptor blockers because the absorption of these drugs will be lessened

**Antacids**
- Antacids rapidly neutralize stomach acid and reduce the symptoms of peptic ulcer disease and GERD
- Alkaline, inorganic compounds of aluminum, magnesium, or calcium
- Combinations of aluminum hydroxide and magnesium hydroxide are the most common type (Mylanta, Maalox)
- Other Examples: Tums (calcium carbonate), Milk of Magnesia (magnesium hydroxide), Sodium
Bicarbonate

18  □ Antacids
   • Combination products combine antacids and H2-receptor blockers into a single tablet
   • Simethicone – an antiflatulent, is sometimes added to antacid preparations, it reduces gas bubbles that cause bloating and discomfort

19  □ Antibiotics to Treat
Helicobacter pylori
   • Antibiotics are administered to eliminate Helicobacter pylori, the cause of many peptic ulcers
   • Amoxicillin (Amoxil, others)
   • Clarithromycin (Biaxin)
   • Metronidazole (Flagyl)
   • Tetracycline (Achromycin, others)

20  □ Other Drugs to Treat
Peptic Ulcer Disease
   • Sucralfate (Carafate)
     – Sucrose (sugar) plus aluminum hydroxide (antacid)
     – Produces a thick, gel-like substance, coats the ulcer, protects from further erosion, promoting healing
   • Misoprostol (Cytotec)
     – Prostaglandin-like substance
     – Inhibits gastric acid secretion and stimulates the production of protective mucus

21  □ Other Drugs to Treat
Peptic Ulcer Disease
   • Metoclopramide (Reglan)
     – Used for patients who fail to respond to first-line agents
     – More commonly prescribed to treat nausea/vomiting associated with surgery or cancer chemotherapy
     – Available by the oral, IM or IV routes

22  □ Laxatives
   • Laxatives are used to promote defecation
   • Bulk-forming
     – Absorb water add to the size to the fecal mass
     – Prevention and treatment of chronic constipation
     – Slow onset of action
     – Not used when a rapid and complete bowel evacuation is necessary

23  □ Laxatives
   • Stimulant
– Promote peristalsis by irritating the bowel
– Rapid-acting
– More likely to cause diarrhea and cramping
– Should only be used occasionally
– May cause dependence and depletion of fluid & electrolytes

**24 Laxatives**
- Saline/osmotic
  - Cause water to be retained in the fecal mass
  - Produce a bowel movement in 1-6 hours
  - Should not be used on a regular basis
  - Possible fluid and electrolyte depletion

**25 Laxatives**
- Stool softeners/surfactant
  - Cause more water and fat to be absorbed into the stools
  - Used to prevent constipation
- Miscellaneous
  - Act by mechanisms other than the above

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**27 Opioids for Treatment of Diarrhea**
- Most effective for controlling severe diarrhea
- Rapid onset and effectiveness
- At doses used for diarrhea, opioids do not produce dependence or serious adverse effects
- Most common opioid antidiarrheal is Schedule V controlled substance, diphenoxylate (Lomotil)
- Loperamide (Imodium) is an opioid that carries no risk for dependence and is available OTC.

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**29 Client Education Guidelines**
- Monitor bowel habits
- Monitor fluid intake
- Laxative should not be used long term, smooth muscle of colon can lose tone
- Discontinue use if severe abdominal cramping or diarrhea occur
- Do not use laxatives if suspected bowel obstruction

**30 Emetic Usage**
- Indications
– Ingestion of poisons
– Overdose of drugs
• Ipecac syrup given orally or apomorphine given subcutaneously will induce vomiting in about 15 minutes
• Only use under direct medical supervision

31 Anti-Emetic versus Anti-Vertigo
• Anti-emetic (against vomiting)
  – Drugs to stop the reflex to vomit
  – Effective for antineoplastic drug therapy (often use several anti-emetics)
  – Many drugs given IM, IV, suppository to avoid being vomited
• Anti-vertigo (against dizziness)
  – Often caused by motion sickness or disturbances in the inner ear
  – Scopolamine drug of choice
  – Antihistamines (dimenhydrinate -Dramamine and meclizine –Antivert)

32 Antiemetic Drugs
• Antiemetics are prescribed to treat nausea, vomiting, and motion sickness
• Belong to a number of different classes
  – Antipsychotics
  – Antihistamines
  – Serotonin-receptor blockers
  – Glucocorticoids
  – Benzodiazepines

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34 Selected Antiemetics (continued)

35 Anti-obesity Drugs
• Anorexiants and lipase inhibitors are used for the short-term management of obesity
• Sibutramine (Meridia)
  – Most widely prescribed
  – Short-term control of obesity
  – Suppresses appetite, probably by affecting the hunger center in the brain

36 Anti-obesity Drugs
• Orlistat (Xenical)
  – Blocks the enzyme lipase in the GI tract, which blocks the absorption of fats
  – May also decrease absorption of other substances, including fat-soluble vitamins and coumadin

37 Review Prototypes
• Tagamet (cimetidine)
  – H2 Receptor Blockers
• Prilosec (omprazazole)
  – Proton pump inhibitor
• Metamucil (psyllium muciloid)
  – Bulk laxative
- Lomotil (diphenoxylate with atropine)
  - Opioid antidiarrheal
- Compazine (prochlorperazine)
  - Antiemetic, phenothiazine