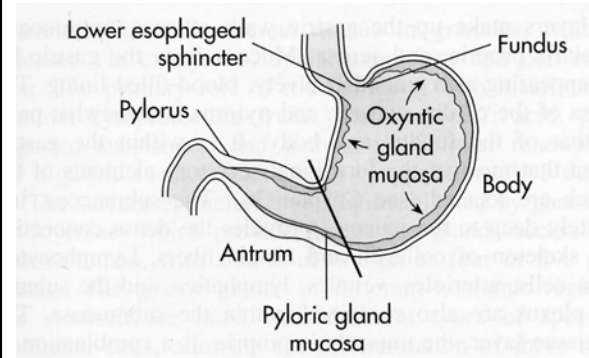


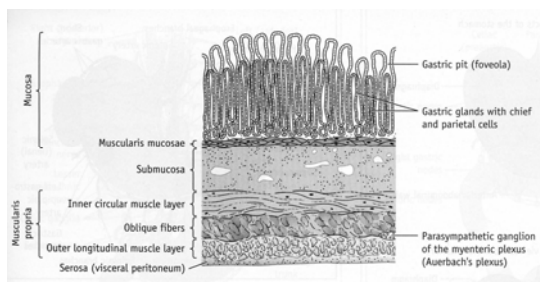
Stomach: Physiology

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Stomach: Anatomic Regions



Microscopic Anatomy of the Body



Gastric Cells: Localization and Secretory Products

GLAND AREA (% OF TOTAL)	ANATOMIC COUNTERPART	EXOCRINE CELLS WITHIN GLANDS	SECRETORY PRODUCTS
Cardiac (<5%)	Proximal stomach just below esophago-gastric junction	Mucus neck	Mucin, PGI ₂
Oxyntic (75%)	Fundus and body	Mucus neck Chief Parietal	Mucin, PGI and PGI ₂ #, PGI and PGI ₂ #, leptin HCl, intrinsic factor\$
Pyloric (~25%)	Antrum and pylorus	Mucus neck	Mucin, PGI ₂

Gastric Secretory Products and Their Functions

LACIINE SECRETIONS

PRODUCT	FUNCTION
Hydrochloric acid	Provides optimal pH for pepsin and gastric lipase (see below) Facilitates duodenal inorganic iron absorption Negative feedback of gastrin release Stimulation of pancreatic HCO_3^- secretion Suppression of ingested microorganisms
Pepsins	Early hydrolysis of dietary proteins Liberation of vitamin B_{12} from dietary protein
Gastric lipase	Early hydrolysis of dietary triglyceride
Intrinsic factor	Binding of vitamin B_{12} for subsequent ileal absorption
Mucin/ HCO_3^-	Protection against noxious agents

Gastric Secretion: Regulatory Mechanisms

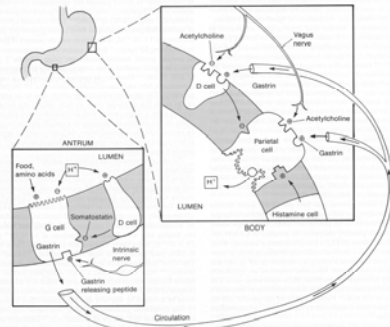
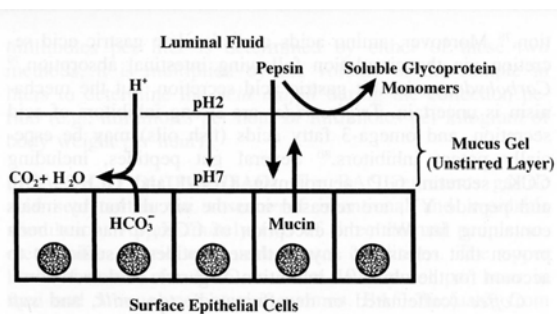
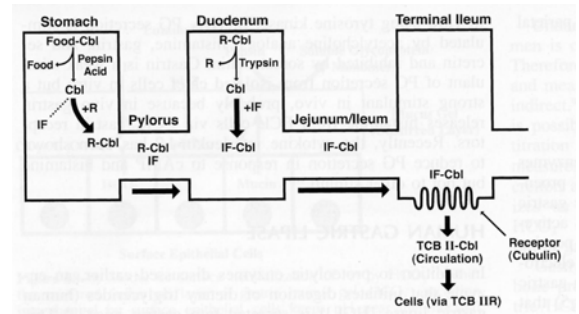


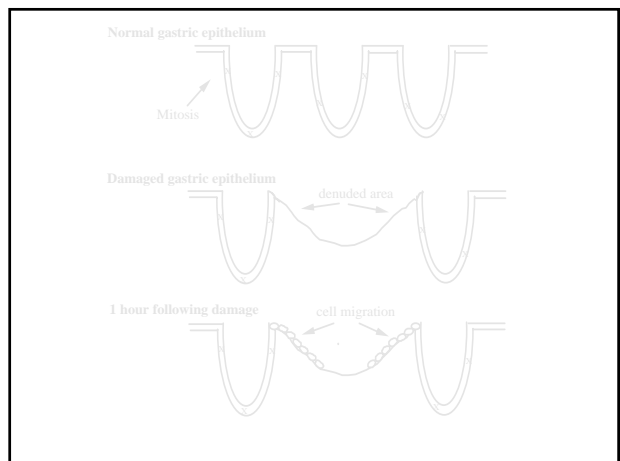
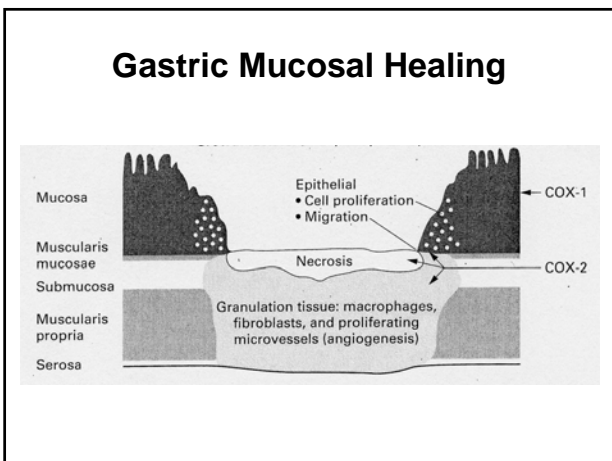
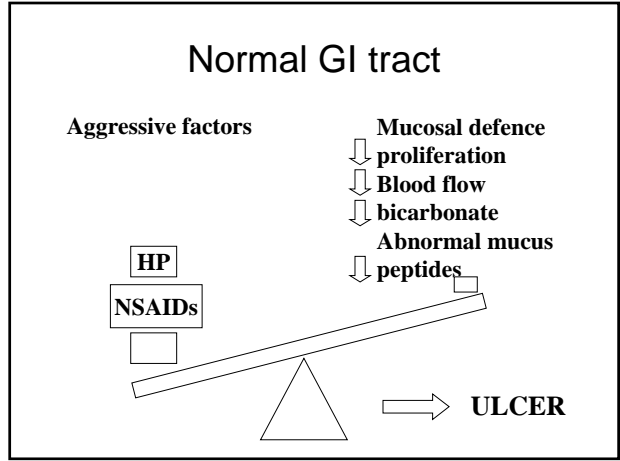
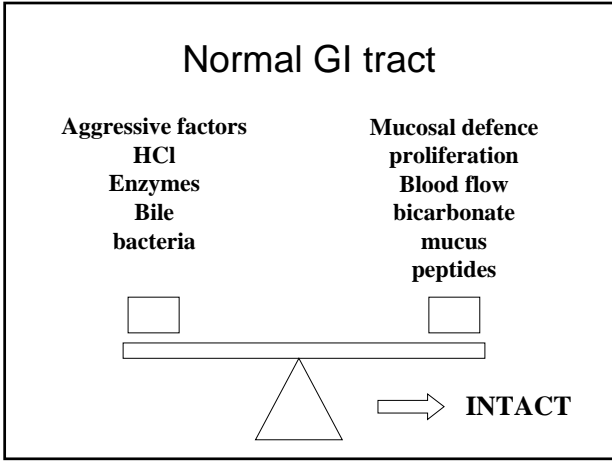
FIGURE 13-6 Regulation of gastric acid secretion. Major gastric mucosal ligand-receptor interactions regulating parietal cell HCl secretion are shown. D cell, somatostatin cell; G cell, gastrin cell. (Adapted from Feldman M. Acid and gastric secretion in duodenal ulcer disease. The Regulating Peptide Letter 1989;1:1.)

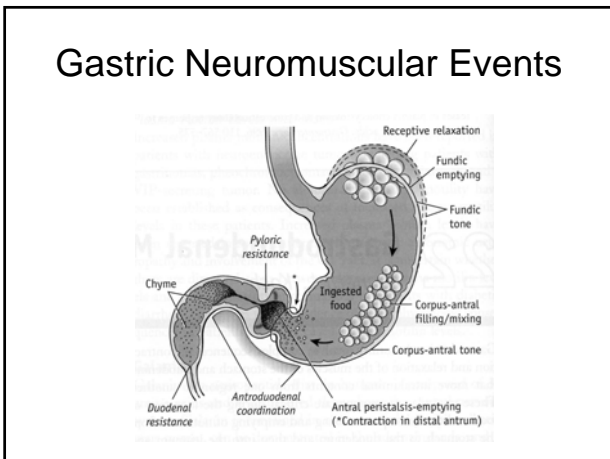
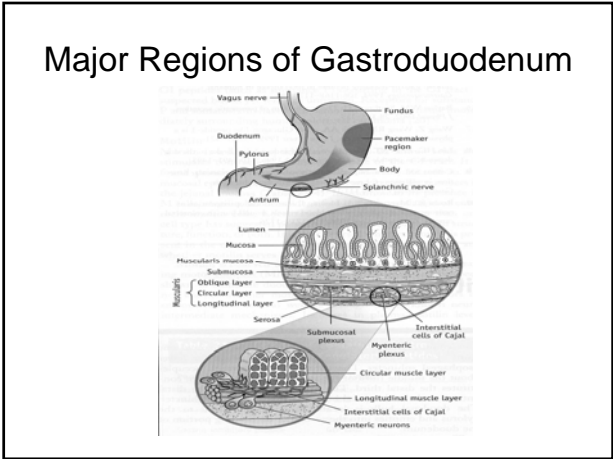
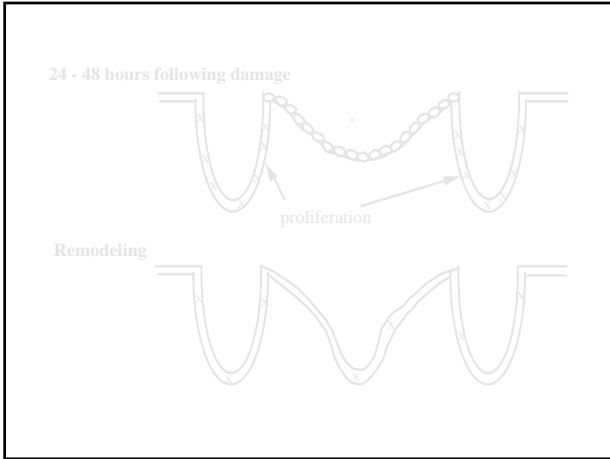
Mucus and Bicarbonate Secretion



Intrinsic Factor and Vitamin B12

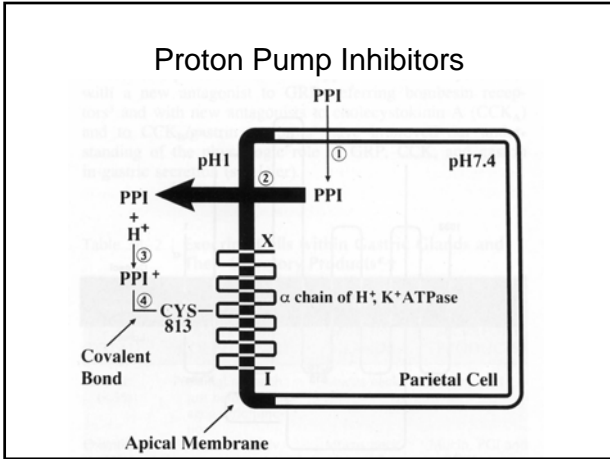






Drugs That Inhibit Gastric Acid Secretion

DRUG CATEGORY	EXAMPLE (U.S. TRADE NAME)	DAILY DOSE (U.S.)†	ROUTE	
Proton pump inhibitors‡	Omeprazole§ (Prilosec)	20–40 mg	Oral	
	Esomeprazole (Nexium)	20–80 mg	Oral	
	Lansoprazole (Prevacid)	15–30 mg	Oral	
	Pantoprazole (Protonix)	40–80 mg	Oral, injection	
	Rabeprazole (Aciphex)	20–40 mg	Oral	
Receptor antagonists	Histamine, H ₂	Cimetidine (Tagamet)	800 mg	Oral, injection
		Ranitidine (Zantac)	300 mg	Oral, injection
		Nizatidine (Axid)	300 mg	Oral
		Famotidine (Pepcid)	40 mg	Oral, injection
Muscarinic, Anticholinergic	Atropine/related drugs	Varies with drug	Oral, injection	
	Pirenzepine* (pirenzepine)	—	Oral	
Muscarinic, Cholecystokinin-B	L 365,260* (pirenzepine)	—	Oral	
	spiroglumide*	—	Oral	
Receptor agonists	Prostaglandin E	Misoprostol (Cytotec)	400–800 µg	Oral
Somatostatin	Octreotide (Sandostatin)	≥100 µg	Injection	



Diseases Associated with Increased Gastric Secretion

- Duodenal Ulcer (30-50%)
- Zollinger Ellison Syndrome
- Antral G cell Hyperplasia
- Overproduction of histamine (basophilic leukemia, systemic mastocytosis)

CONSEQUENCES: Acid peptic disorders of the gut with chronic diarrhea, malabsorption, hypokalemic hypochloremic metabolic alkalosis

Diseases Associated with Decreased Gastric Secretion

- Chronic Atrophic Gastritis
- Chronic Active Superficial Gastritis
- Menetrier's Disease
- Gastric Ulcer
- Gastrointestinal Tumors secreting VIP or somatostatin
- Severe hypocalcemia (hypoparathyroidism)
- Leprosy

Consequences: protein or lipid maldigestion – Vit B12 malabsorption – increased risk of gastric infection – iron deficiency anemia

Medications That Affect Gastric Emptying

MEDICATION	THERAPEUTIC USE	GE	MODE OF ACTION
Cardiovascular			
Potassium	Electrolyte balance	Delay	Not known
Dopamine	Vasopressor	Delay	Via dopamine receptor
Nifedipine, diltiazem, verapamil, others	Antihypertensive, antilanginal	Delay or no effect	Calcium channel blocker
Respiratory			
Isoproterenol	Asthma, COPD	Delay	β -Adrenergic
Theophylline	Asthma, COPD	Not known	Smooth muscle relaxant
Gastrointestinal			
Sucralfate	Peptic ulcer	Delay or no effect	Mucosal coating and antacid
Aluminum hydroxide	Dyspepsia, heartburn	Delay	Antacid
Bulk laxatives	Constipation	Acceleration	Gastric distention
Opiates	Diarrhea	Delay	Increased smooth muscle tone
Psychiatric/Neurologic			
Tricyclics	Depression	Delay	Anticholinergic, norepinephrine-enhancing
Phenothiazines	Psychosis, antiemetic	Delay	Anticholinergic
Diazepam	Anxiety	Acceleration	Spasmodic
L-Dopa	Parkinson's disease	Delay	Via dopamine receptor
Hormonal			
Synthetic estrogen	Hormonal therapy	Delay	? Gastric sex hormone receptors