



# Diseases of the Stomach and Duodenum

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## INTRODUCTION

The stomach acts as a reservoir for recently ingested food and initiates the process of digestion. By storing large quantities of food (1.5 to 2 L in the adult), the stomach allows intermittent feeding. Once solid particles have been reduced in size to accommodate the much smaller capacity of the duodenum, the gastric contents are released through the pylorus in a controlled fashion. This chapter focuses on the anatomy and physiology of the stomach and duodenum as well as on the most common disease processes that involve these organs.

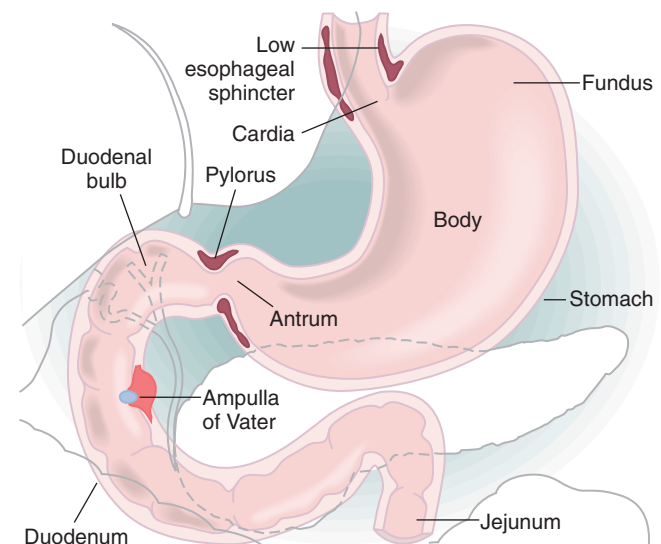
## GASTRODUODENAL ANATOMY

The stomach is in continuity with the esophagus proximally and the duodenum distally. The *lower esophageal sphincter*, a circular smooth muscle structure located at the distal end of the esophagus, creates a high-pressure zone that under normal conditions prevents gastric contents from refluxing into the esophagus. Similarly, the pyloric sphincter, the most distal portion of the stomach, plays an important role in the trituration of solid food particles and ensures the downstream propulsion of the food bolus, preventing duodenogastric reflux. The stomach is divided into four regions (Fig. 36-1; Video 36-1). The cardia is a poorly defined transition from the esophagogastric junction to the fundus. The dome-shaped fundus projects upward above the cardia and is the most superior part of the stomach in contact with the left hemidiaphragm and the spleen. The body, or corpus, located immediately below and continuous with the fundus, is the largest part of the stomach and is characterized by the presence of longitudinal folds known as rugae. The antrum extends from the incisura angularis, a fixed sharp indentation that marks the end of the gastric body, to the *pylorus*, or *pyloric channel*, a tubular structure that joins the stomach to the duodenum.

The mucosa, or inner lining of the stomach, is formed by a layer of columnar epithelium. The submucosa, immediately deep to the mucosa, provides a skeleton of dense connective tissue in which lymphocytes, plasma cells, arterioles, venules, lymphatics, and the myenteric plexus are contained. The third tissue layer, the muscularis propria, is a combination of an inner oblique, middle circular, and an outer longitudinal smooth muscle layer. The serosa, a thin, transparent continuation of the visceral peritoneum, is the final layer of the stomach wall. The autonomic innervation of the stomach stems from both sympathetic and

parasympathetic nervous systems. The anterior and posterior trunks of the vagus nerve provide parasympathetic innervation, whereas the celiac plexus, coursing along the vascular supply of the stomach, provides sympathetic innervation.

The gastric mucosal surface is composed of a single layer of mucus-containing columnar epithelial cells. The surface lining is invaginated by gastric pits, which provide access to the gastric lumen for gastric glands. The gastric glands of different regions



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| <p>① ↑ Increase LES tone</p> <ul style="list-style-type: none"> <li>-metoclopramide</li> <li>-cisapride</li> <li>-domperidone</li> </ul> <p>↓ Decrease LES tone</p> <ul style="list-style-type: none"> <li>-nitroglycerin</li> <li>-calcium channel blockers</li> <li>-progesterone</li> <li>-theophylline</li> <li>-benzodiazepines</li> <li>-opioids</li> <li>-chocolate</li> <li>-coffee</li> <li>-peppermint</li> </ul> | <p>② Gastric motility + duodenal</p> <p>↑ Increase</p> <ul style="list-style-type: none"> <li>-metoclopramide</li> <li>-cisapride</li> <li>-domperidone</li> <li>-erythromycin</li> </ul> <p>↓ Decrease</p> <ul style="list-style-type: none"> <li>-opioids</li> <li>-anticholinergics</li> <li>-hyperglycemia</li> <li>-tricyclic antidepressants</li> </ul> |
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**FIGURE 36-1** Anatomic regions of the stomach and duodenum. Agents that affect lower esophageal sphincter (LES) tone and gastro-duodenal motility.