

as *H. pylori* (see below) involves extensive interplay between innate (dendritic cells, epithelial cells, neutrophils, and macrophages) and adaptive (B and T cells) components. Helper T cells ( $T_H$  and  $T_H$  regulatory cells) have been extensively studied and appear to play an important role in a broad array of gastric physiology extending from gastric secretion to epithelial cell turnover via production of a number of cytokines.

The discovery of *H. pylori* has also led to the understanding that the stomach, once thought to be devoid of microorganisms due to its highly adverse environment (acid and pepsin), can serve as host for bacterial communities consisting of hundreds of phylotypes, otherwise known as its microbiota. The conceptual framework of the microbiome has been receiving extensive attention in light of its importance in human health and disease. The overall relevance of the gastric microbiome and its impact on gastric pathology remain to be established, but it is likely that alteration of microorganism homeostasis will play a role in aspects of certain disorders such as PUD, gastritis, and gastric cancer.

**Physiology of Gastric Secretion** HCl and pepsinogen are the two principal gastric secretory products capable of inducing mucosal injury. Gastric acid and pepsinogen play a physiologic role in protein digestion; absorption of iron, calcium, magnesium, and vitamin B<sub>12</sub>; and killing ingested bacteria. Acid secretion should be viewed as occurring under basal and stimulated conditions. Basal acid production occurs in a circadian pattern, with the highest levels occurring during the night and lowest levels during the morning hours. Cholinergic input via the vagus nerve and histaminergic input from local gastric sources are the principal contributors to basal acid secretion. Stimulated gastric acid secretion occurs primarily in three phases based on the site where the signal originates (cephalic, gastric, and intestinal). Sight, smell, and taste of food are the components of the cephalic phase, which stimulates gastric secretion via the vagus nerve. The gastric phase is activated once food enters the stomach. This component of secretion is driven by nutrients (amino acids and amines) that directly (via peptone and amino acid receptors) and indirectly (via stimulation of intramural