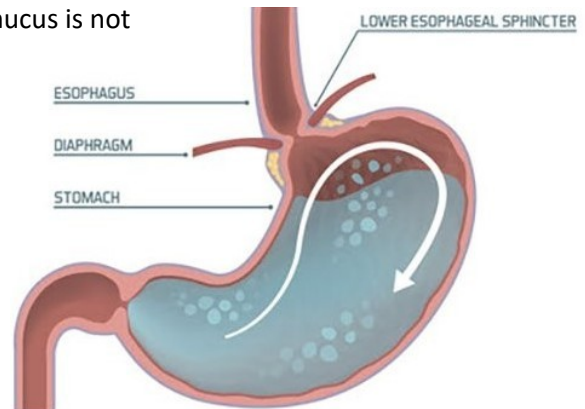


BIOS256 - Week 1 Case Study: Gastroesophageal Reflux Disease (GERD)

The digestive system plays a crucial role in breaking down food into nutrients, with certain nutrients primarily broken down in the stomach. The stomach produces hydrochloric acid and proteases (such as pepsin) to break down complex proteins into smaller peptides. These peptides can be further digested in the small intestine. The acidity in the stomach is necessary for the activation of digestive enzymes, but it can also damage the stomach lining if not properly contained.

To protect the stomach from the effects of this strong acid, the stomach lining is covered with a mucosal barrier that is composed of alkaline mucus. This mucus helps neutralize the acid and shields the stomach lining from being eroded. However, under certain conditions—such as peptic ulcers—there may be areas in the stomach lining where the protective mucus is not present.

The digestive system relies on sphincters to regulate the flow of materials in and out of different sections of the digestive tract. One key sphincter, the lower esophageal sphincter (LES), is located between the esophagus and the stomach. This sphincter prevents stomach acid from flowing backward (refluxing) into the esophagus. Another sphincter, the pyloric sphincter, controls the release of stomach contents into the duodenum (the first part of the small intestine).



Gastroesophageal reflux disease (GERD) occurs when the lower esophageal sphincter fails to function properly, allowing stomach acid to reflux into the esophagus. This can lead to symptoms such as heartburn, a sour taste in the mouth, nausea, and bloating. Over time, repeated exposure to acid can damage the esophagus.

Several factors can contribute to GERD, including dietary habits (e.g., excessive caffeine, alcohol, spicy foods), pregnancy, delayed stomach emptying, and anatomical issues like hiatal hernias. GERD is commonly treated with lifestyle changes, antacids, H₂-receptor antagonists, and proton pump inhibitors (PPIs).

Antacids neutralize stomach acid temporarily, while H₂ antagonists block histamine receptors in the stomach and reduce the secretion of acid. Proton pump inhibitors (PPIs) work by blocking the proton pumps in the stomach's acid-producing cells, preventing the production of stomach acid altogether.

