Stomach

The Lower Esophageal Sphincter (LES) keeps the opening to the stomach closed except during eating. This is meant to prevent stomach acid from regurgitating into the esophagus. The stomach is well-protected from its own acid; the esophagus is not designed for exposure to acid.

- **Gastroesophageal reflux disease (GERD)** is when the LES allows acid to splatter up into the esophagus. It can be caused by certain foods, certain eating routines, laying down after eating, pregnancy (LES is loosened by a pregnancy hormone called relaxin), or overweight (large belly presses up on stomach and forces some contents into the esophagus)
- **Achalasia** is the opposite problem, in which the LES is overconstricted and unable to open adequately during meals. Food piles up in the esophagus and causes great pain.

The Pyloric Sphincter prevents food leaving the stomach too rapidly. It needs to stay long enough to be mixed properly into uniform chyme and to have a low pH of 2.

Stomach Muscles: Circular, Longitudinal, and Oblique muscles churn the food until it is a uniform mixture with a pH of ~2. This mixture is called "**chyme**."—pronounced "Kime".

Stomach Secretions include:

- **Pepsinogen**: This globular protein is activated by low pH in the stomach. Once activated, it is called **Pepsin** and <u>begins chemical digestion of protein</u>.
- **HCl:** Acidifies the contents of the stomach, serving two primary purposes:
  - Converts pepsinogen→pepsin (protein in the meal increases HCl production)
  - Kills or damages most bacteria that could cause disease in the small intestine
- **Intrinsic Factor Deficiency results in pernicious anemia**. Here's why:
  - Intrinsic Factor is produced in the stomach and is necessary for Vitamin B12 absorption
  - A lack of Vitamin B12 is one cause of anemia, because this vitamin is important for red blood cell production. Note that this anemia is a situation in which the dietary needs of B12 are being met (only found in animal foods), but the production of the intrinsic factor is too low to allow adequate absorption.
  - Gastric bypass surgery increases risk of Vitamin B12 deficiency since there is less stomach to produce intrinsic factor.
- **Rennin (producing WREN – IN)**: produced by human infants to begin coagulation of milk proteins so that all the nutrients from the milk can have time to be fully absorbed when the milk reaches the intestine. Humans make less and less rennin as they mature. Rennin is used in cheese production and other processes that require milk to clump or coagulate.

Rugae: Folds in the stomach wall that allow the stomach to expand greatly with food as needed. The stomach "shrinks" when it is empty, such as during fasting.

Pylorus: Means "gateway" and is the last region of the stomach before the pyloric sphincter. *Helicobacter pylori* is a bacteria that is somewhat unusual in its ability to survive the acid of the stomach. It is associated with development of ulcers, although as many of 90% of infected persons are asymptomatic.