Gastric Digestion 2: Gastric Motility, Breakdown, and Emptying

Postprandial Gastric Motility

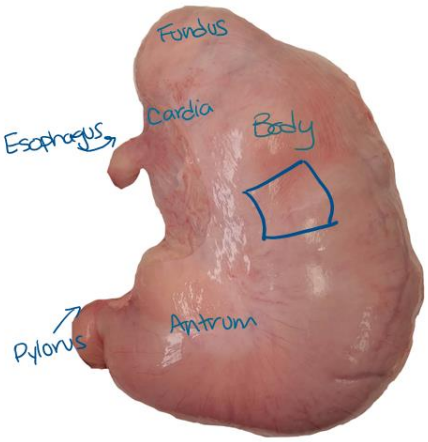
The musculature of the stomach is comprised of 4 layers:

1) Oblique muscle layer (inner):

2) Circular muscle layer:

3) Longitudinal muscle layer:

4) Serosa:



Postprandial Gastric Motility

Postprandial gastric motility serves multiple purposes, depending on the region of the stomach:

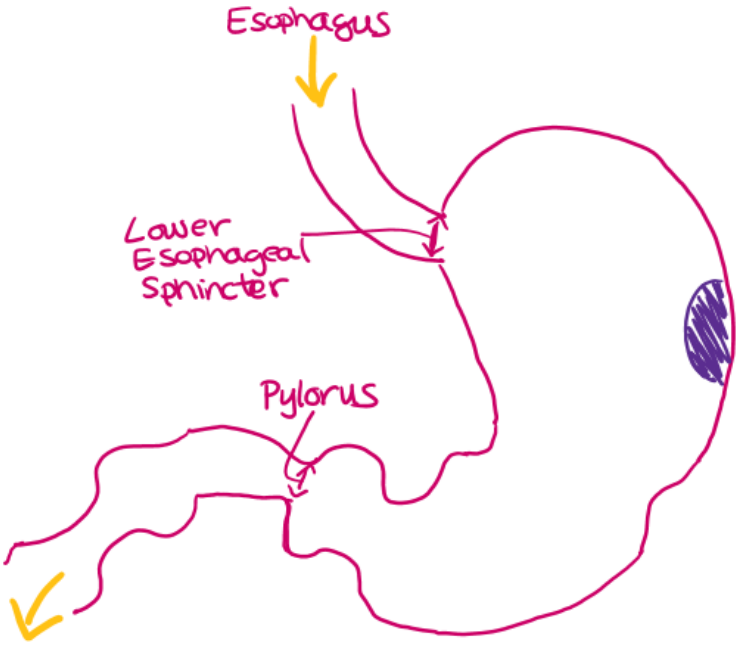
Gastric contraction waves originate in the _____

The gastric pacemaker region serves as the _____

Proximal gastric motility:

Distal gastric motility:

Postprandial Gastric Contractions: Proximal vs. Distal Stomach



Receptive Relaxation & Gastric Accommodation

The fundus serves an important purpose as a _____,

which is accomplished through two types of muscular activity:

1) Receptive Relaxation →

2) Gastric Accommodation →

The receptive relaxation and gastric accommodation processes allow for the stomach to hold

_____without significant _____.

After ingestion of a large meal, _____ of the meal will remain in the proximal stomach.

Gastric Peristaltic Contractions (Antral Contraction Waves)

The propulsive contractions that act to mix and break down ingested food particles are _____ that are also known as _____.

Antral contraction waves, or _____, begin at the _____ and propagate from the _____ to the _____.

The frequency of the ACWs follows the _____, which is _____.

Phases of Postprandial Gastric Motility

Similar to gastric secretions, there are also three phases of postprandial gastric motility:

1) Cephalic:

2) Gastric:

3) Intestinal

Fasting Gastric Motility

Between meals, as there are still_____ , and there is also_____

Fasting gastric motility is known as the_____,

which is a 3-phase cycle that lasts about _____.

Phase 1: _____ of the cycle

Characterized by _____

Phase 2: _____ of the cycle

Characterized by _____

Phase 3: _____ period

Characterized by _____

During phase 3, the _____

The frequency of phase 3 contractions is_____

Sometimes, the strong peristaltic contractions in Phase 3 of the MMC are referred to as:

_____

Once phase 3 is complete, the cycle repeats, and the stomach moves back to phase 1 where contractions are limited, until a meal is consumed.

Gastric Emptying

Gastric Emptying & Gastric Sieving

After a meal is consumed and begins to break down, the _____ opens periodically to allow portions of the meal _____.

During postprandial gastric motility, the pylorus opens _____ to allow digested materials to move into the duodenum.

Opening of the pylorus is coordinated with _____to allow material to enter. Typically, these contractions occur at _____.

When the pylorus opens, it does not completely relax; it only opens _____.

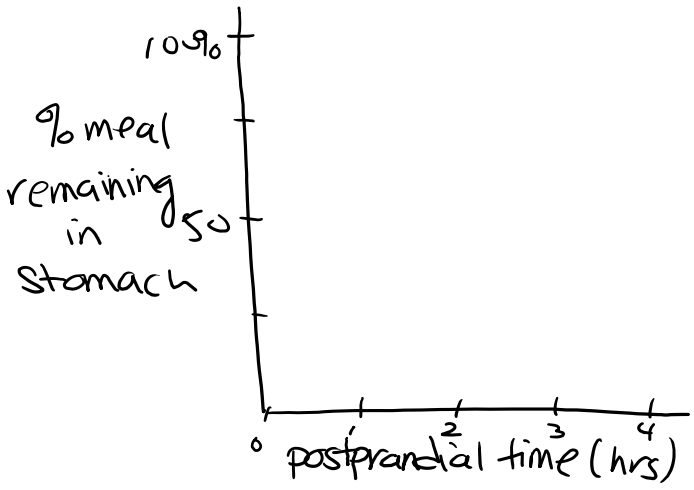
This limited opening of the pylorus results in a phenomenon known as _____, where small _____and larger particles _____.

In addition to the _____, the fundus also aids in gastric emptying by _____.

Factors that Impact Gastric Emptying

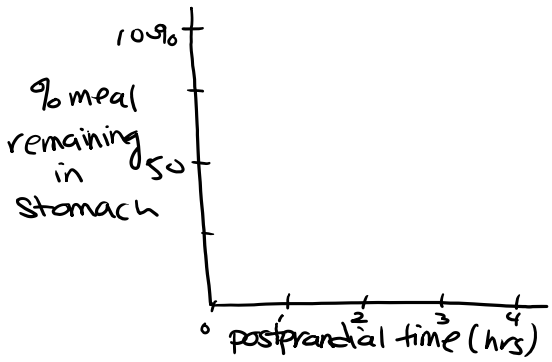
Gastric emptying of food components may vary based on:

-
-



Models to Describe Gastric Emptying

Why do we want to use empirical models to describe gastric emptying?



To determine the gastric emptying $t_{1/2}$, there are two equations that are commonly used:

1. Power-Exponential Model

- y(t) is
- $t_{1/2}$ is
- β is
- t is

2. Modified Power-Exponential Model

- y(t) is
- k is
- β is
- t is

From the modified power-exponential model, the $t_{1/2}$ can be calculated as (using k and β above):

Gastric Food Breakdown Processes