HEALTHY AND ACTIVE LIVING (FOOD/NUTRITION COMPONENT)

Date: April 30th, 2015

Course: PPL10

The remaining semester

Ontario

Ministry of Education

School Year Calendar 2014- 2015

Legend: H - Statutory Holiday Schedule; E- Scheduled Examination Day; P- Professional Activity Day; B - Board Designated Holiday; ⁄ Half Day

Month	Number of Instructional Days	Number of Professional Activity Days	Number of Scheduled Examination Days	1st Week					2nd Week					3rd Week					4th Week					5th Week				
				M	T	W	T	F	M	T	W	T	F	M	T	W	T	F	M	T	W	T	F	M	T	W	T	F
August 2014								1	4 H	5	6	7	8	11	12	13	14	15	18	19	20	21	22	25	26	27	28	29
September 2014				1 H	2	3	4	5	8	9	10	11	12	15	16	17	18	19	22	23	24	25	26	29	30			
October 2014						1	2	3	6	7	8	9	10	13 H	14	15	16	17	20	21	22	23	24	27	28	29	30	31
November 2014				3	4	5	6	7	10	11	12	13	14	17	18	19	20	21	24	25	26	27	28					
December 2014				1	2	3	4	5	8	9	10	11	12	15	16	17	18	19	22 B	23 B	24 B	25 H	26 H	29 B	30 B	31 B		
January 2015							1 H	2 B	5	6	7	8	9	12	13	14	15	16	19	20	21	22	23	26	27	28	29	30
February 2015				2	3	4	5	6	9	10	11	12	13	16 H	17	18	19	20	23	24	25	26	27					
March 2015				2	3	4	5	6	9	10	11	12	13	16 B	17 B	18 B	19 B	20 B	23	24	25	26	27	30	31			
April 2015						1	2	3 H	6 H	7	8	9	10	13	14	15	16	17	20	21	22	23	24	27	28	29	30	
May 2015								1	4	5	6	7	8	11	12	13	14	15	18 H	19	20	21	22	25	26	27	28	29
June 2015				1	2	3	4	5	8	9	10	11	12	15	16	17	18	19	22	23	24	25	26	29	30			

The remaining semester

June 25th, Final Exam Day (Thursday)

Ontario

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What we will cover

- **Food/Nutrition**: Understand the role macronutrients play, the role of vitamins/minerals, and the Canadian Food Guide/Food Pyramid.

- **Substance Use/Abuse:** Understand what recreational drugs are and how they can affect healthy living and physical activity.

- **Health and Sexuality:** Understand sexual stages of human development, safe sex measures, and what sexual transmitted diseases are.

The remaining course schedule

- **Weeks 1 – 4 (April 30th – May 21st)**: Food/Nutrition
- **Weeks 5 – 6 (May 28thth – June 4th):** Substances and Recreational Drugs
- **Weeks 7 - 8 (June 11th – June 18th):** Health and Sexuality
- **Week 9 (Monday June 22nd):** Review

Course grading Distribution

- Recall that the final exam will be on June 25th! (Please come on Monday June 22nd for the Review lecture)

- The final exam will be 50% Exercise Science material and 50% Food Nutrition material (including the other two units)

- Due to the course being on hiatus for the past two months, I have decided that everyone has 50% going in (everyone has passed basically).

Course grading Distribution

Gym Time (25%)	Final Exam (25%)
I take attendance :) -**Total Mark** is out of 24 (3 times per week) X 8 weeks = 23 (because of trip) -**Day Mark**: 0.7/1=attendance + 0.2= Participation + 0.1= Technique Mastery = 1.0	(1/2 Exercise Science and ½ Food/Nutrition) -Multiple Choice -Short Answer -Matching -Labelling Diagram(s) **Note**: Final Exam material has yet to be determined! You will only be responsible for what I put on my slides.

Course Grading Distribution

So 50% (Default)

+

30% (Gym Time)

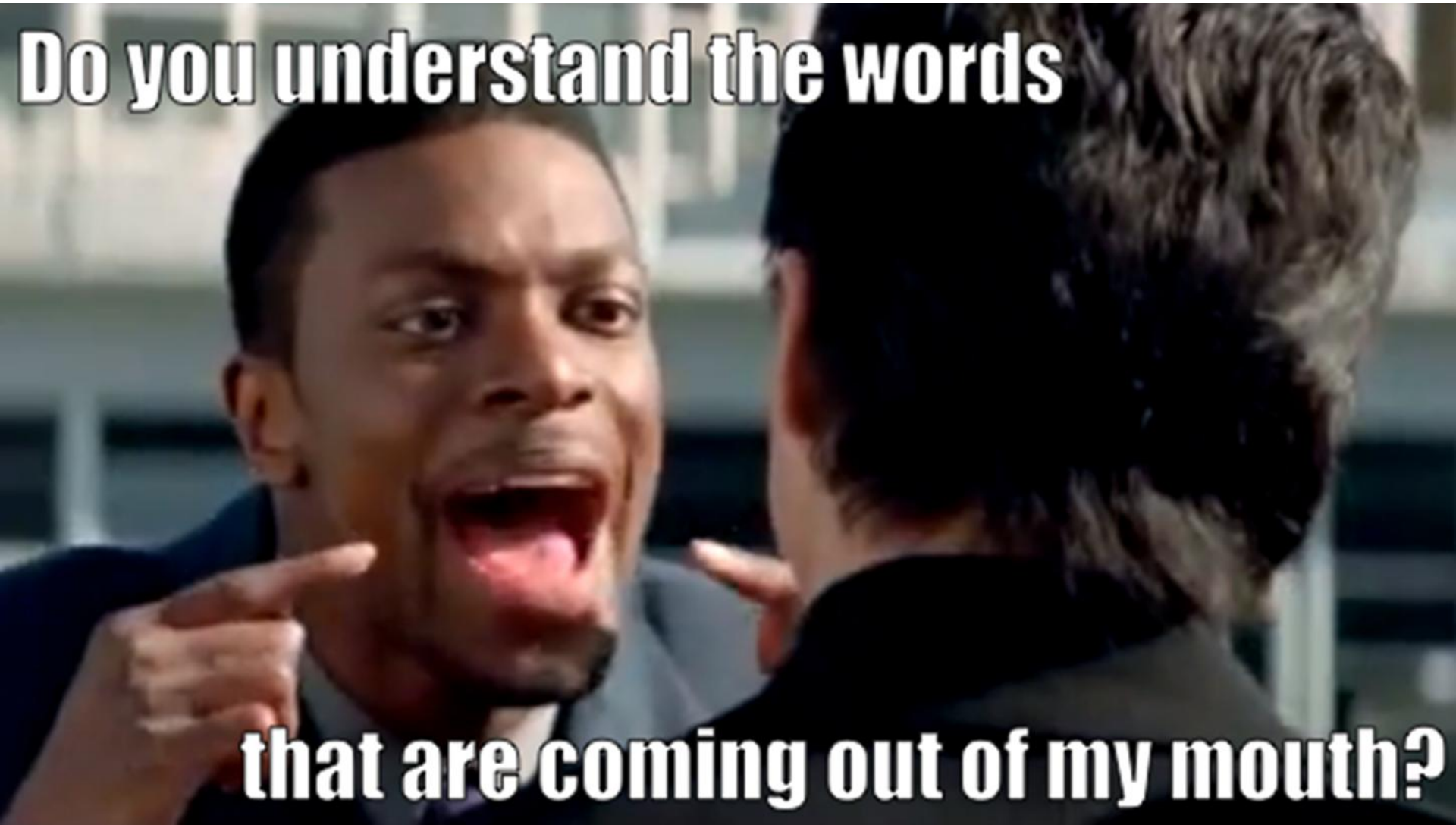
+

20% (Final Exam)

=

100% Course Breakdown

Questions on where we are headed?

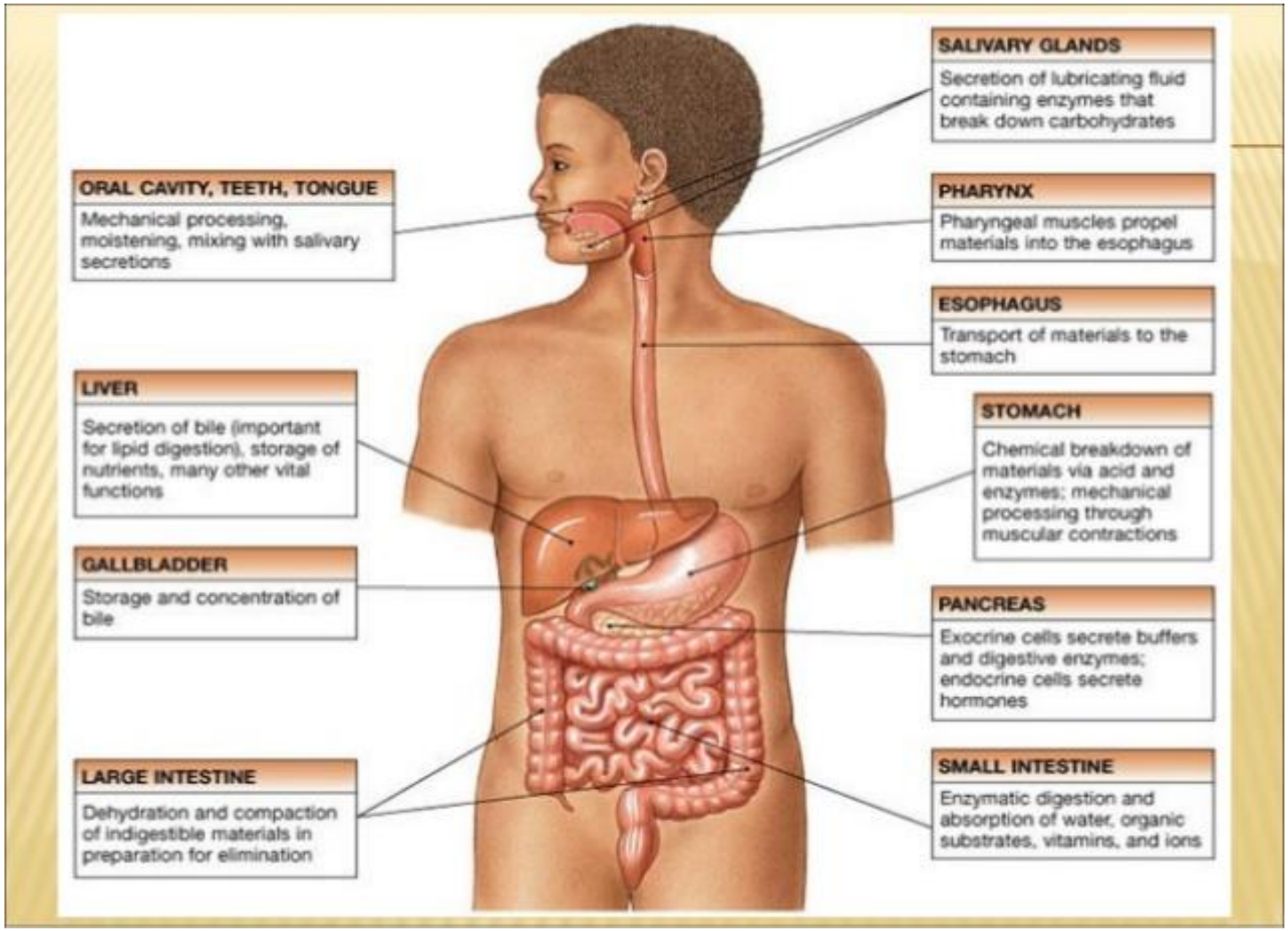


FOOD NUTRITION (WEEK 1)

Food/Nutrition Component Breakdown

- **Week 1:** Digestive System
- **Week 2:** Macronutrients (Fats, Carbs and Protein)
- **Week 3:** Vitamins/Minerals
- **Week 4:** Diets and how they work (and how they don’t)

Introduction to the Digestive System



Introductory Video to Digestion

- https://www.youtube.com/watch?v=s06XzaKqELk (Note: Start at 3:00 mark)

Lets start from the top

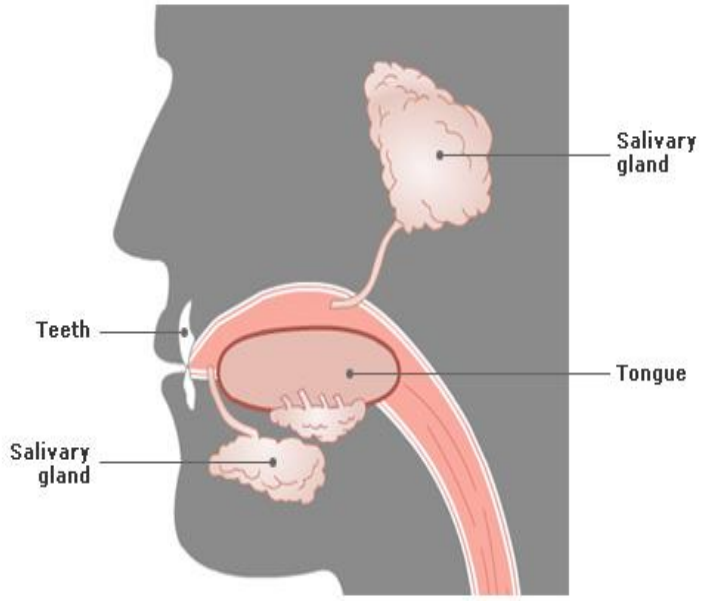
Oral Cavity Digestion

- Your olfactory system (nose) detects the smell of food and sends signals to the brain which transmits the signals to your salivary glands to start salivating.

- When you take your first bite, your salivary glands release saliva which is filled with salivary enzymes which attach to your food to break it down.

Oral Cavity Digestion

- Thus **chemical digestion** in the oral cavity works in part with the secretion of salivary enzymes. (i.e. salivary amylase for starches)



- Your teeth produce **mechanical digestion** by breaking down the food into smaller chunks.

Double Combo Digestion

- The teeth and salivary glands work together to prepare the food to go down the pharynx and into the esophagus.

- If the food is not properly broken down, you will experience symptoms like bloating, indigestion, and even more importantly, you **may not absorb all the nutrients.**

Esophageal Transport

- Food passes the **epiglottis** which is a flap of tissue that is connected to the base of your tongue. It prevents food from going down your trachea and into your respiratory system.

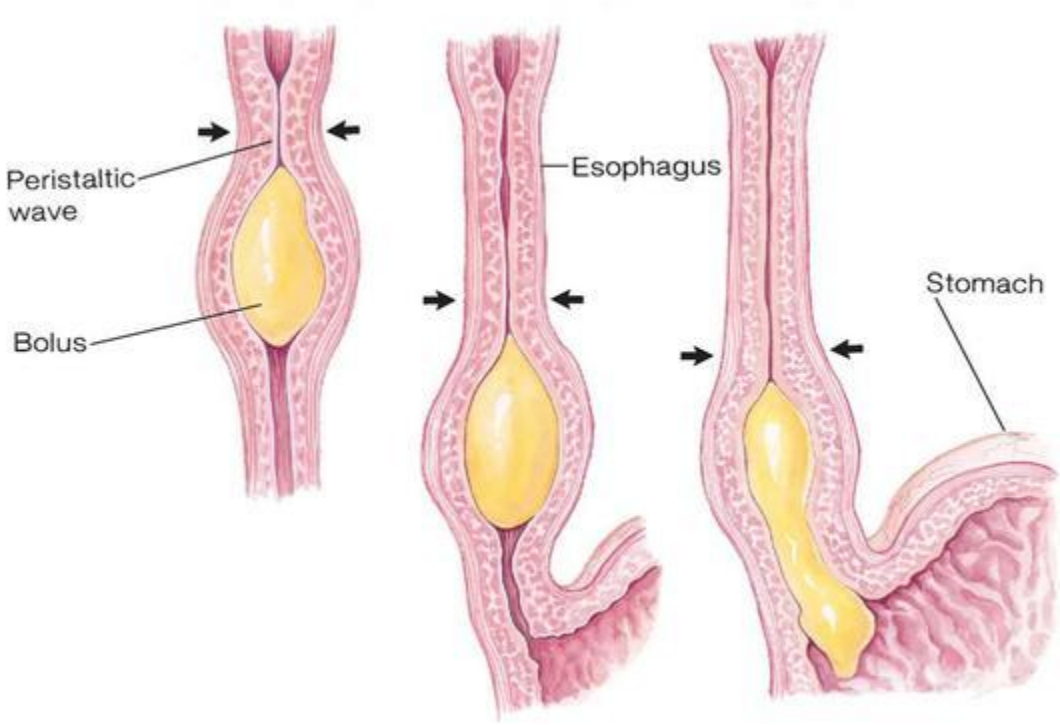
- The food then enters the pharynx which has muscles that propel your food into the passage of the esophagus.

- The food travels down the esophagus via rhythmic automatic muscle contractions called **peristalsis.**

Esophageal Transport

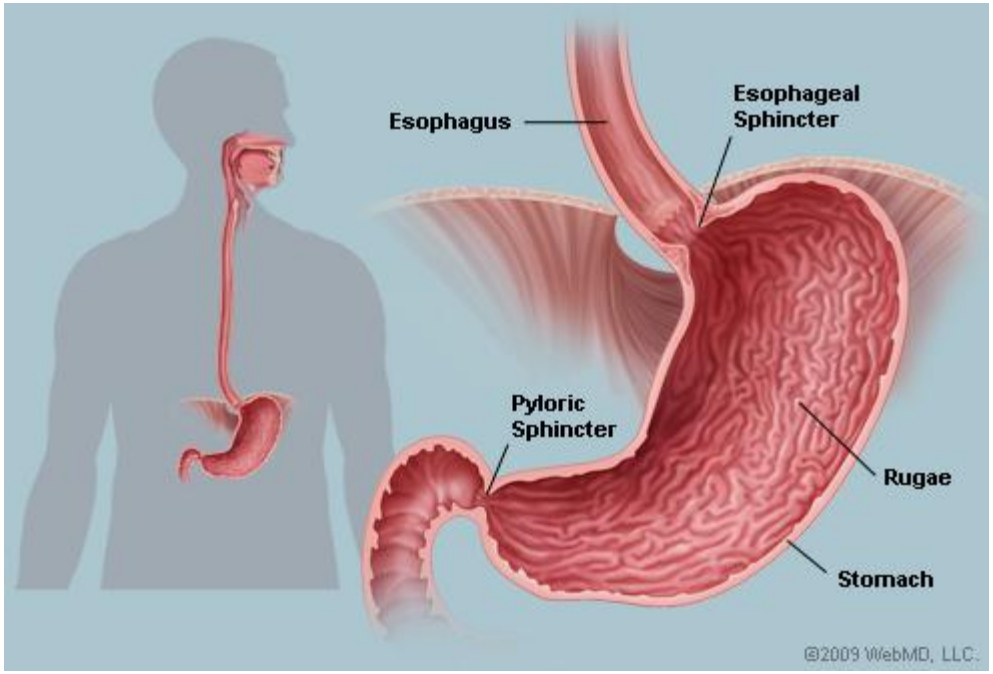
- Peristalsis pushes the food down and this process works even if you are eating upside down!

- It takes about **8-10** seconds for food to go down the esophagus and into the stomach.



Note: *Bolus* is the scientific term for food that is being digested.

The Stomach



The stomach is your chemical scrapyard for food.

Its walls are called rugae which act like folds to help increase or decrease the size of your stomach, depending on the amount of food that is present.

Breakdown in the Stomach

- In the stomach, hydrochloric acid (HCL) along with other enzymes is released to further break down the food so that it can absorbed in descending organs.

- Luckily, the stomach walls are lined with a mucuus to help protect the stomach from the digestive enzymes.

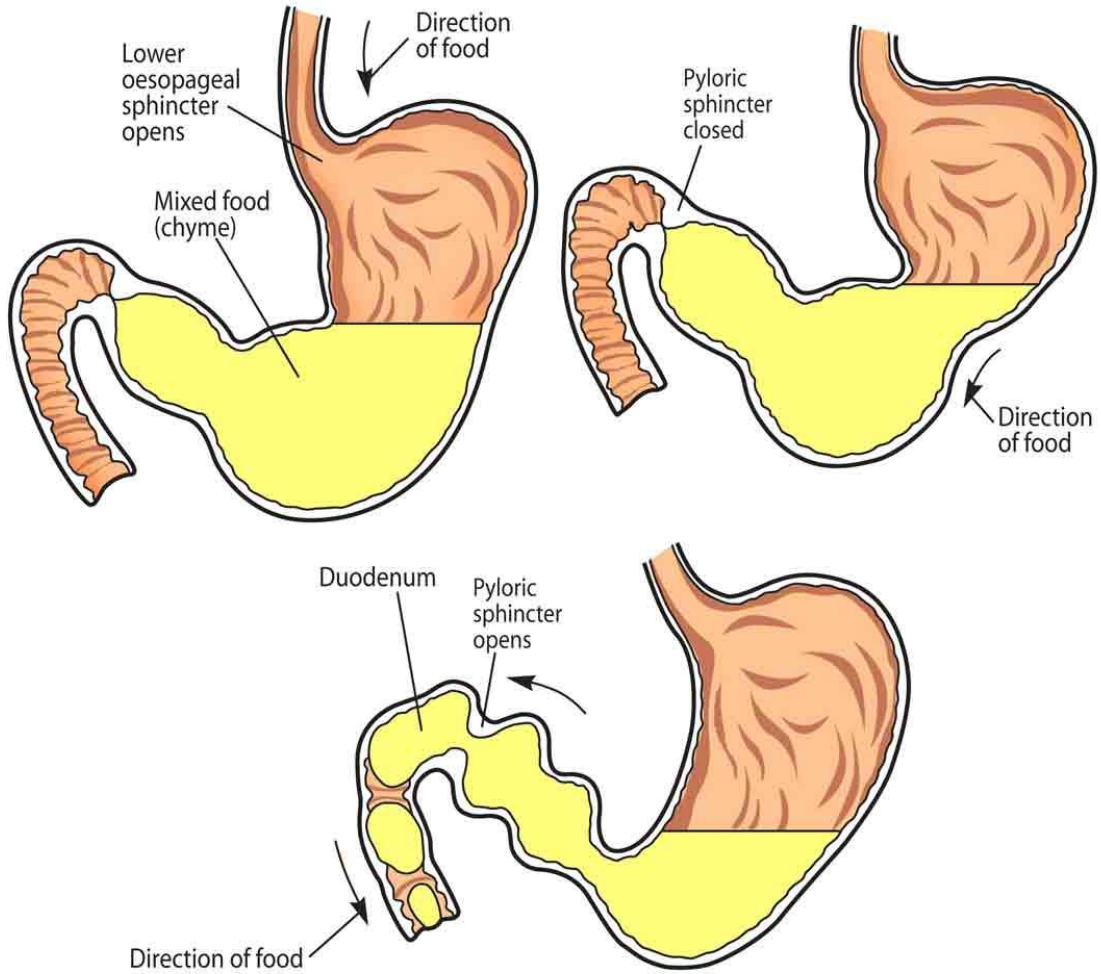
- Food is stored temporarily for 1-2 hours before being further processed into the small intestine.

The role of Chyme in the stomach

- **Chyme** is the combination of partially digested food mixed with gastric juices (i.e. HCL) that is then taken through the pyloric sphincter and into the first portion of the small intestine, the duodenum.

- Because it has a coating of various stomach acids, your stomach has to get rid of it otherwise it will cause harm to it.

The role of Chyme in the stomach



Small Intestine

- The primary function of the small intestine is the absorption of nutrients and minerals found in food.
- Made up of three segments – **the duodenum, jejunum** and **ileum.**
- It is 22 feet long on average with smooth muscle around propelling food via peristalsis.

Small Intestine

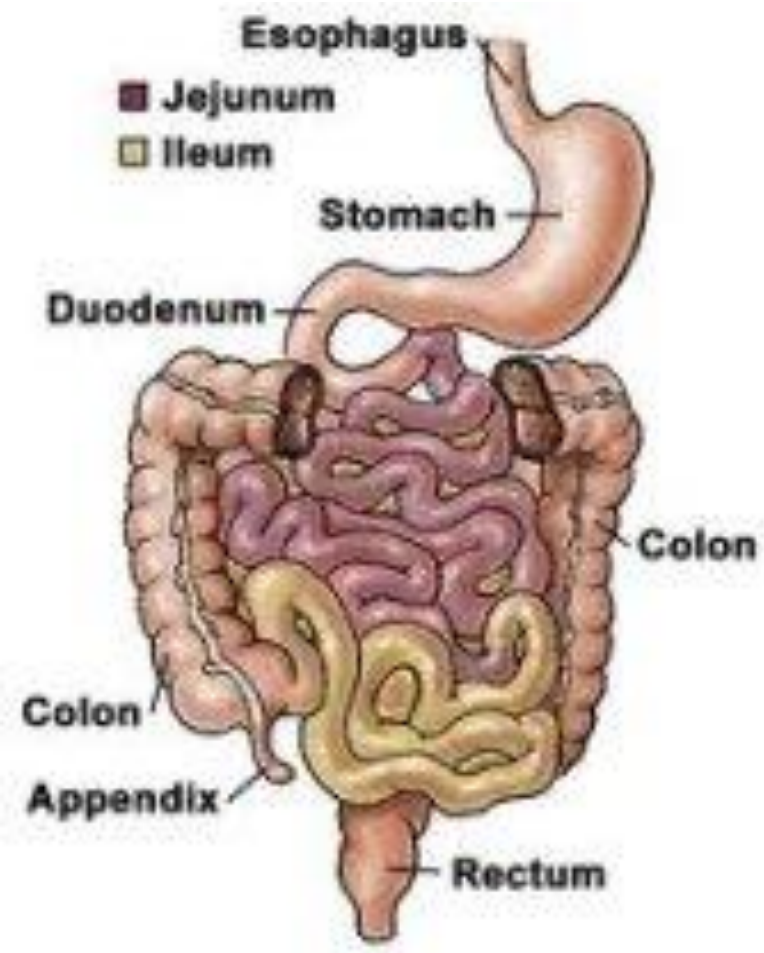
- Bile released from the liver and other enzymes from the pancreas further break down food here so that nutrients are ready to be absorbed into the blood stream, and circulate towards cells that require the nutrients.

- The duodenum is primarily responsible for the continuous break down process with the jejunum and ileum primarily responsible for absorption of nutrients into the bloodstream.

Small Intestine

- The key point to remember here is that the **small Intestine** is the main site for **absorption.**

(Food containing starches or simple carbs like candy or pasta are mainly absorbed in the mouth.)



What about the liver?

- The liver has multiple functions but during digestion, its main priority is to process the nutrients absorbed from the small intestine.

- The liver secretes **bile** which is used to digest fat. Bile is not present in the stomach unless you have acid reflux (acid going into the stomach).

- It also detoxifies potentially harmful chemicals and is used especially during the consumption of alcoholic beverages.

Other organs that are involved with breakdown

- Recall the liver and the function it plays with the secretion of bile.

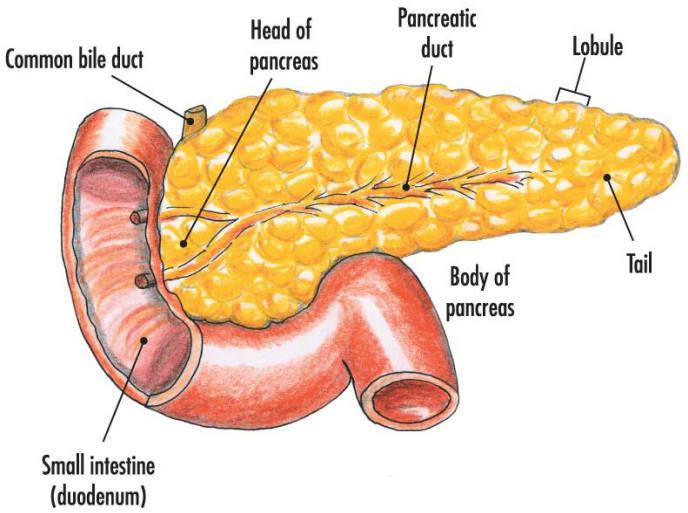
- The **pancreas** secretes a hormone called **insulin** that helps to transport and metabolize blood sugar.

- The **gallbladder** stores and concentrates **bile**, which it releases into the duodenum to help absorb and digest fats.

Other Organs diagrams

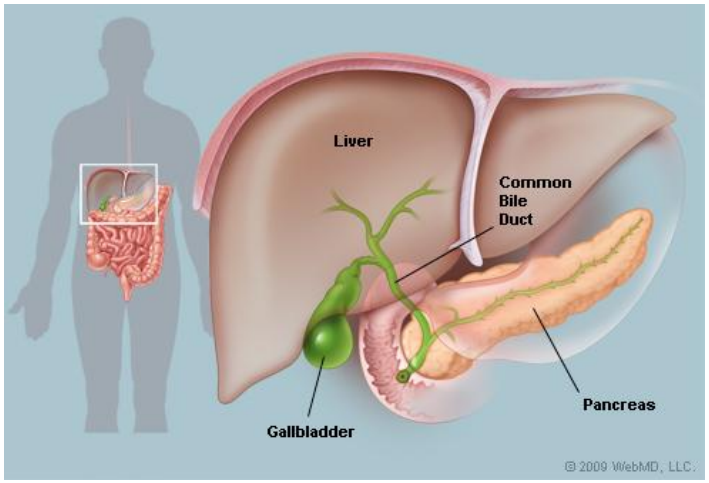
- The Pancreas

(Note it's location to the Small intestine)



- The Gallbladder

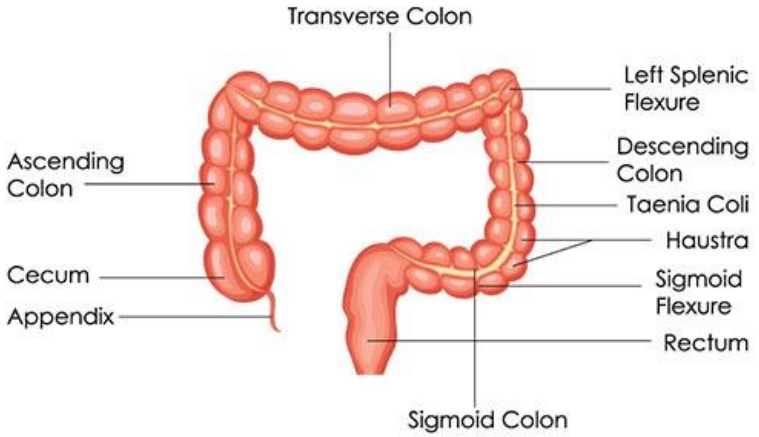
(Note the proximity of it With the liver and Pancreas)



Large Intestine (Colon)

- Has three colonal segments:

1) Ascending
2) Transverse
3) Descending



LARGE INTESTINE

- Left-over residue and waste is processed through this organ.

Large Intestine (Colon)

- **Peristalsis** occurs here as well given that smooth muscle surrounds the large intestine.
- Waste or stool is first processed in a liquid format because the chyme that was present in the small intestine was mixed with water as well.
- Before it is excreted, stool is stored in the **sigmoid section** where water is removed and bacteria latch onto the stool.

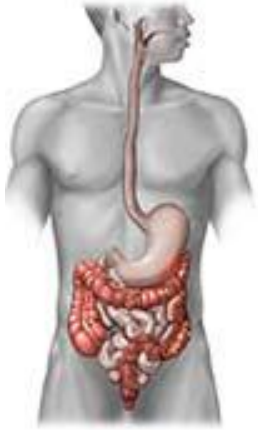
Large Intestine (Colon)

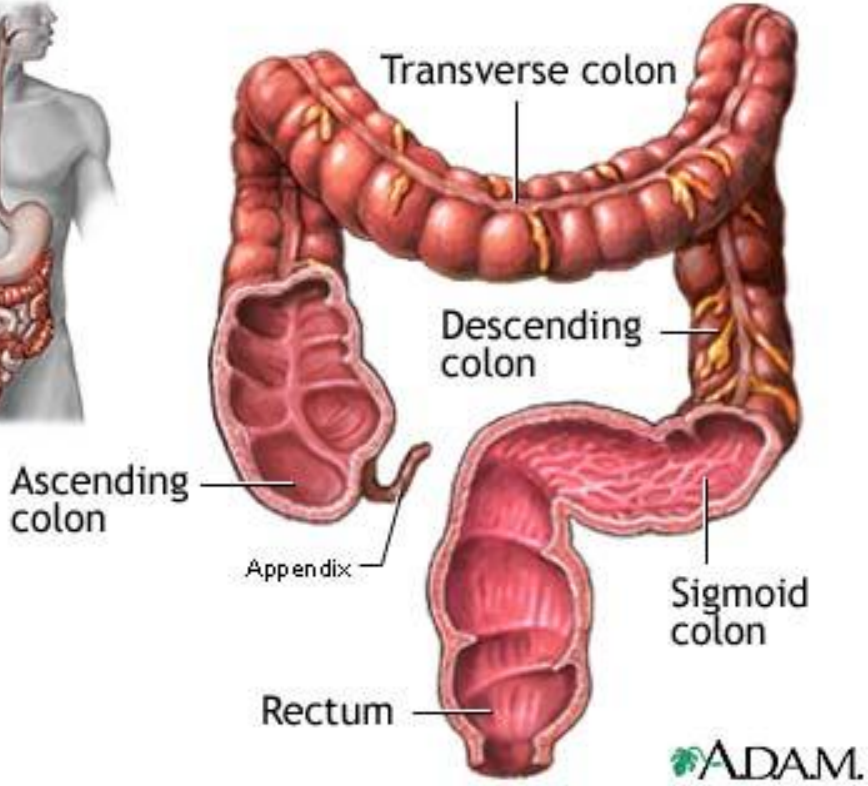
- Typically, it takes about **36** hours for stool to get through the colon.
- Once enough bacteria have performed their duties, the stool is then emptied into the **rectum** before being excreted fully.
- **Fiber** is a compound that helps to promote healthy bowel movements by latching onto the stool and creating bulk, but also making the stool smoother for better transition.

Excretion

- When food is stored in the rectum, the rectum relays signals back to the brain to determine if the stool is ready to be excreted.

- If contents are ready to be released, the anal sphincter relaxes and the **rectum** contracts.





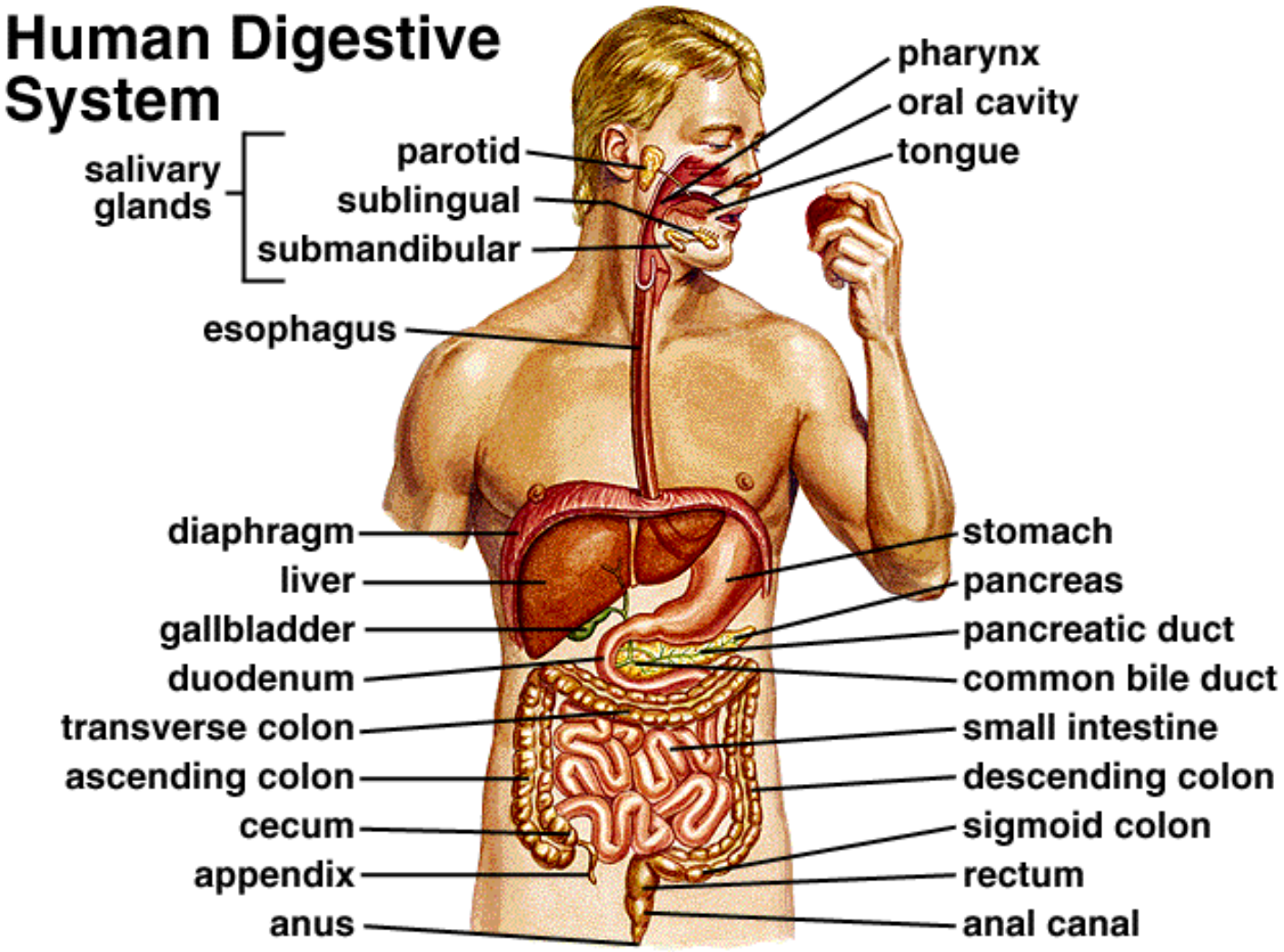
Final Stage of Digestion

- Within the anal canal, there are two sphincters:

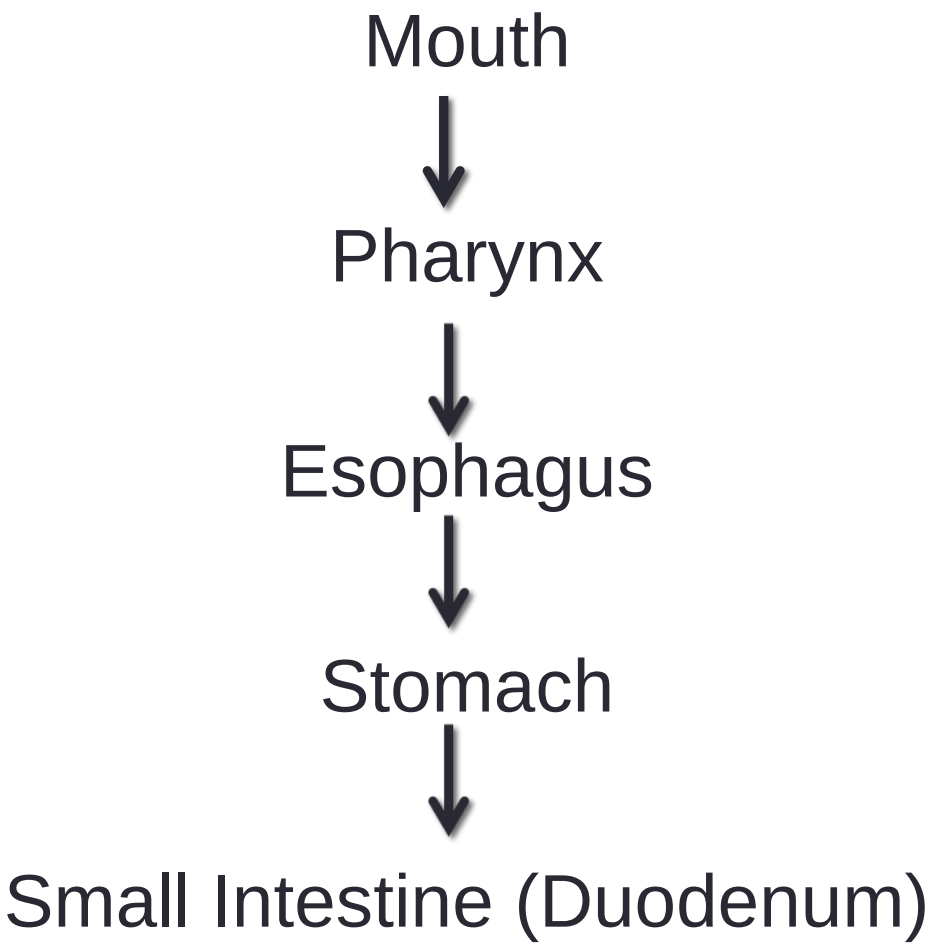
1) **Internal:** Composed of circular muscle tissue that keeps us continent (everything held together) when we are doing various activities (especially for sleeping). The muscles here are not under voluntary control.

2) **External:** Comprised of striated muscle tissue that is voluntarily controlled. Help propel stool out of our digestive system.

Overview of Digestive System



Review of descending structures



Review of Descending Structures

Small Intestine (Jujenum)

Small Intestine (Ileum)

Large Intestine (Ascending)

Large Intestine (Transverse)

Large Intestine (Descending)

Review of Descending Structures

Large Intestine (Sigmoid Colon)

↓

Rectum

↓

Anal Canal

↓

Excretion

What is the process of muscle contraction in the digestive system?

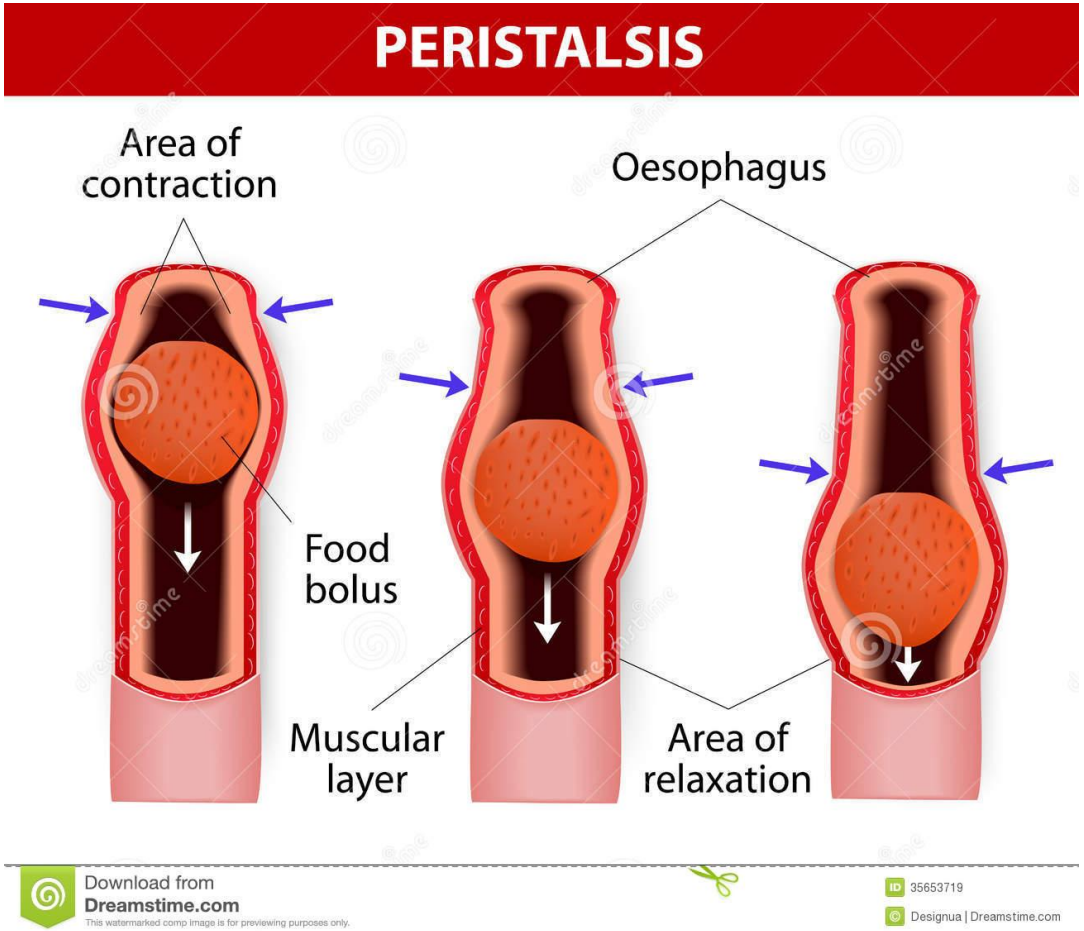
PERISTALSIS

(Why does food not go back up?)

Peristalsis Realized

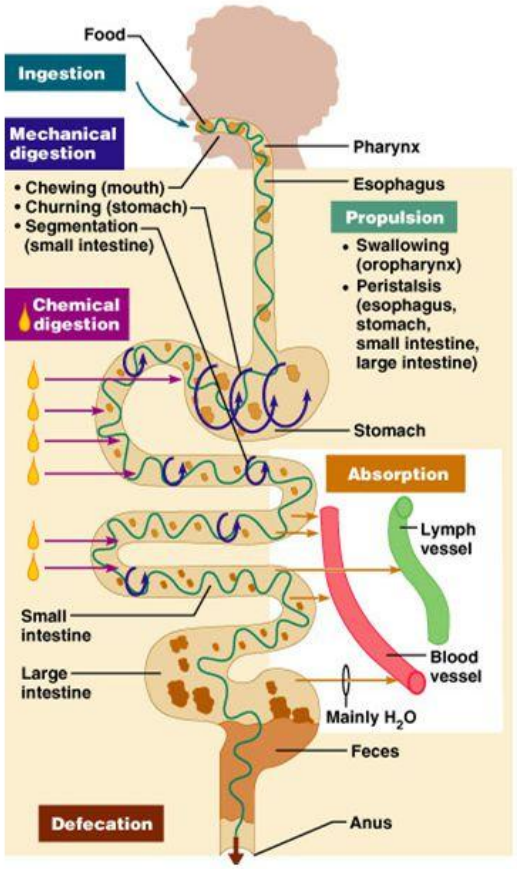
- Food does not go back up because of a pressure difference caused by the area contracting vs the area relaxing.

(60 > 40 pressure)



Note: Numbers are just an example

Overview of Functions



The Digestive Process

- Ingestion
  - Taking in food through the mouth
- Propulsion (movement of food)
  - Swallowing
  - Peristalsis – propulsion by alternate contraction &relaxation
- Mechanical digestion
  - Chewing
  - Churning in stomach
  - Mixing by segmentation
- Chemical digestion
  - By secreted enzymes: see later
- Absorption
  - Transport of digested end products into blood and lymph in wall of canal
- Defecation
  - Elimination of indigestible substances from body as feces

Diseased states of the digestive system

- The three most common ones are:

1) Celiac Disease: Inability for the digestive system to process and metabolize gluten. Damage to the lining of the intestine occurs.

2) Irritable Bowel Syndrome: Food moves either too slowly or too quickly through the intestines. As a result, the colon does not remove enough water.

3) Inflammatory Bowel Disease: Inflammation of the intestine where it is becomes swollen and painful. Diarrhea and bloating are symptoms.

QUESTIONS?

If not, we can proceed with discussion…