

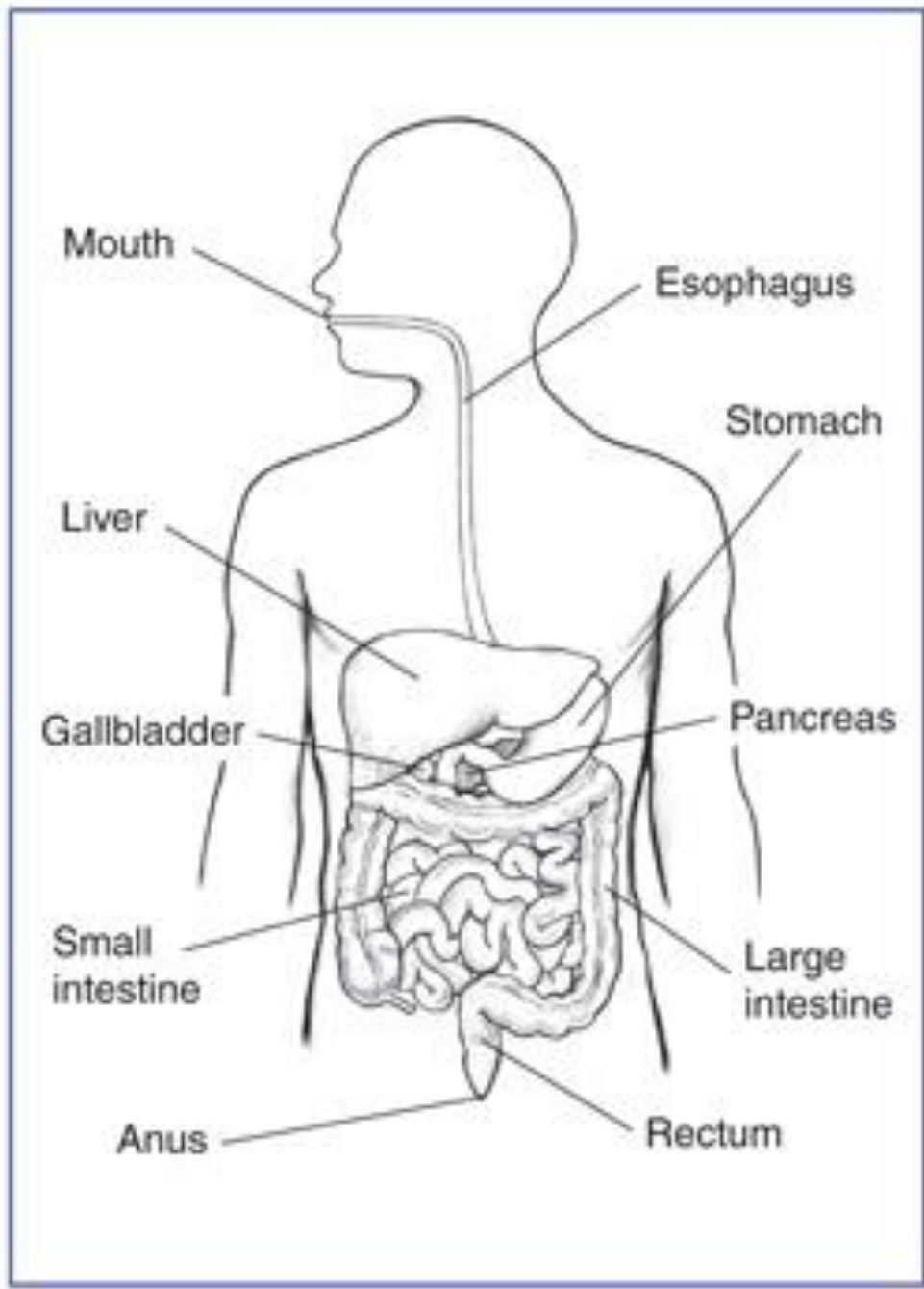
DIGESTION

THE PLACES

Day one

The Digestive System and Body Metabolism

- Digestion
 - Breakdown of food you eat
- Absorption
 - Passage of nutrients into the blood
- Metabolism
 - Production of cellular energy (ATP)



Parts of the Digestive System

- Alimentary canal – continuous coiled hollow tube
 - From mouth to anus
- Accessory digestive organs

<http://www.dnatube.com/video/8362/Animation-of-the-digestive-system>

Organs of the Digestive System

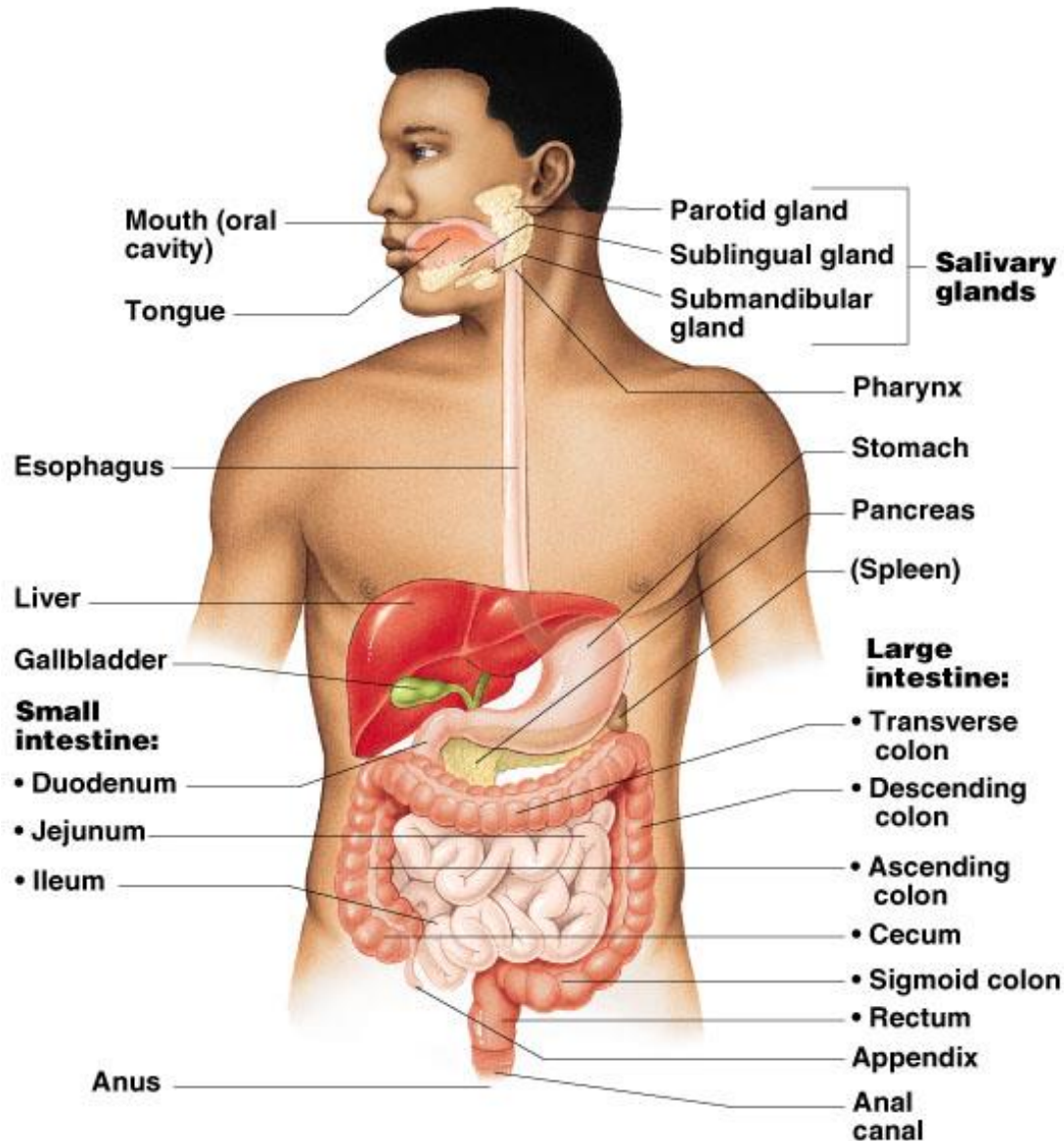


Figure 14.1

Starting at the Top

- MOUTH

- Salivary Glands

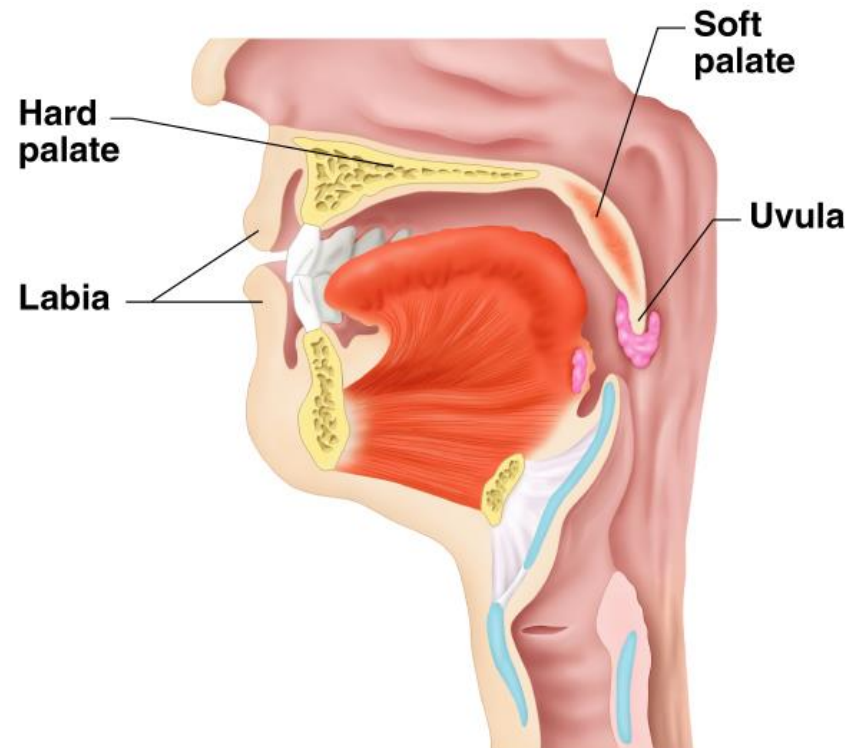
- Produce liquid
- Produce enzymes (chemical breakdown)

- Teeth

- Physical breakdown

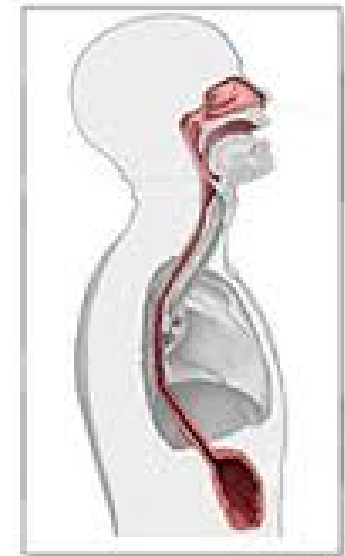
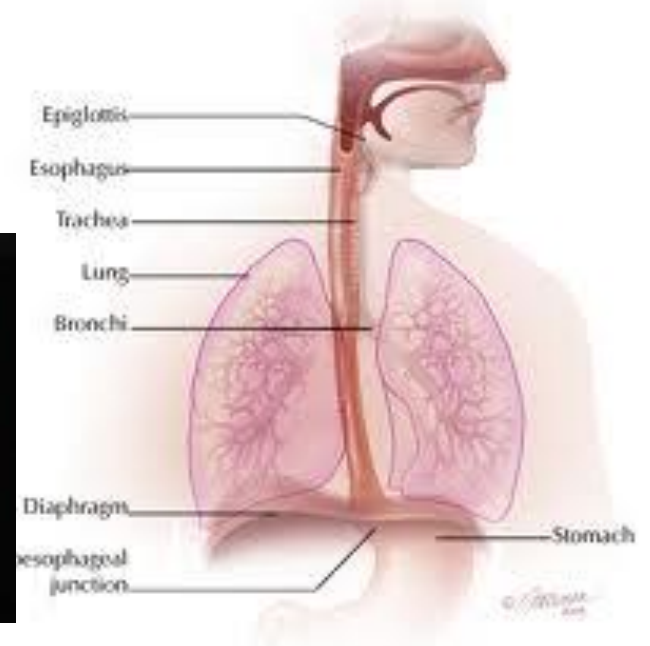
- Tongue

- Moves food around
- Helps in swallowing



After swallowing

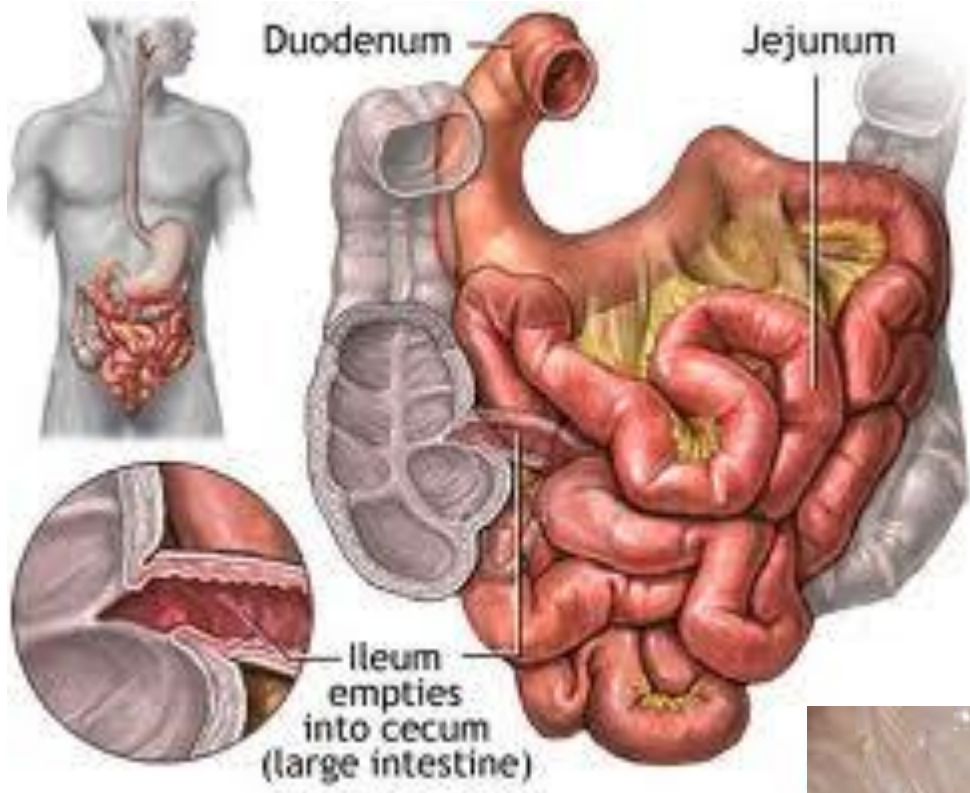
- PHARYNX
 - THROAT
 - Food and air
 - Before the split with the trachea
- ESOPHAGUS
 - After the trachea, food only
 - Smooth muscle (no rings or bone)



STOMACH

- Located on Left side
- Food enters at the esophageal sphincter
- Food empties into the small intestine at the pyloric sphincter
- Food storage and breakdown



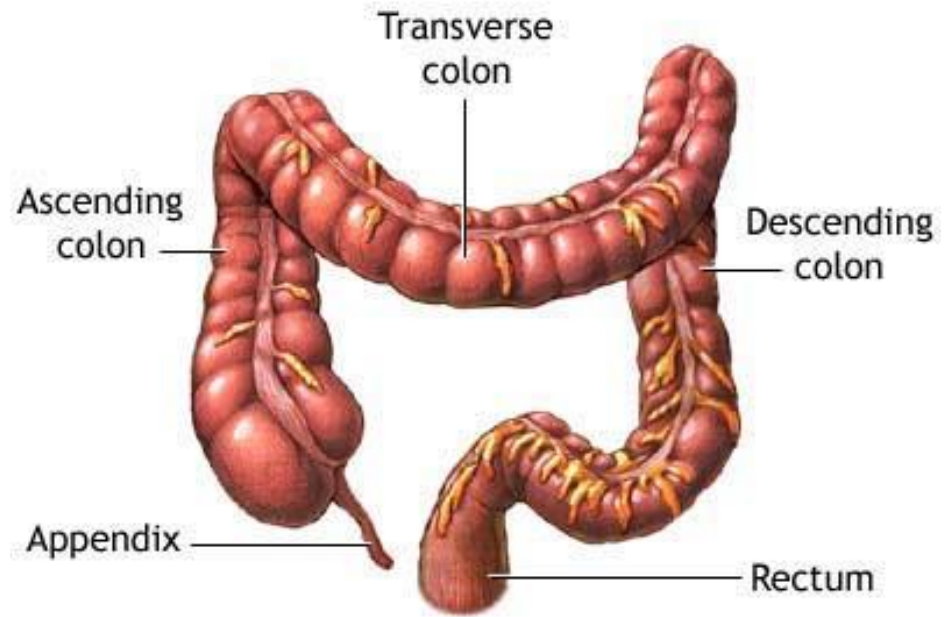


Small intestine

- Duodenum
 - Attached to the stomach
 - Jejunum
 - Ileum
 - Last part, connects to large intestine
- Average length 23 feet
 - Range 15 – 32 feet

Large Intestine

- Larger in diameter, but shorter than the small intestine
- Frames the internal abdomen



ADAM.

Structures of the Large Intestine

- Appendix – vestigial (no longer used)
- Colon – water reabsorption
- Rectum – fecal storage
- Anus – external body opening

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DIGESTION

- THE ACTIONS

- Nutrient breakdown
 - Mouth, stomach, sm intestine, (liver, pancreas, gall bladder)
- Nutrient Absorption
 - Small intestine
- Water absorption
 - Small and large intestine
- Waste elimination
 - Colon/rectum

MAKING A MODEL

On a piece of blank paper sketch the following

1. Mouth (teeth, tongue, saliva)
2. Pharynx
3. Esophagus
4. Stomach
5. Small Intestine
6. Appendix
7. Large Intestine/colon
8. Rectum/Anus

- Label each and write in a small box the main function.
- For the small intestine, how is the beginning of it different from the end

Digestion – accessory organs

- Day two

Organs of the Digestive System

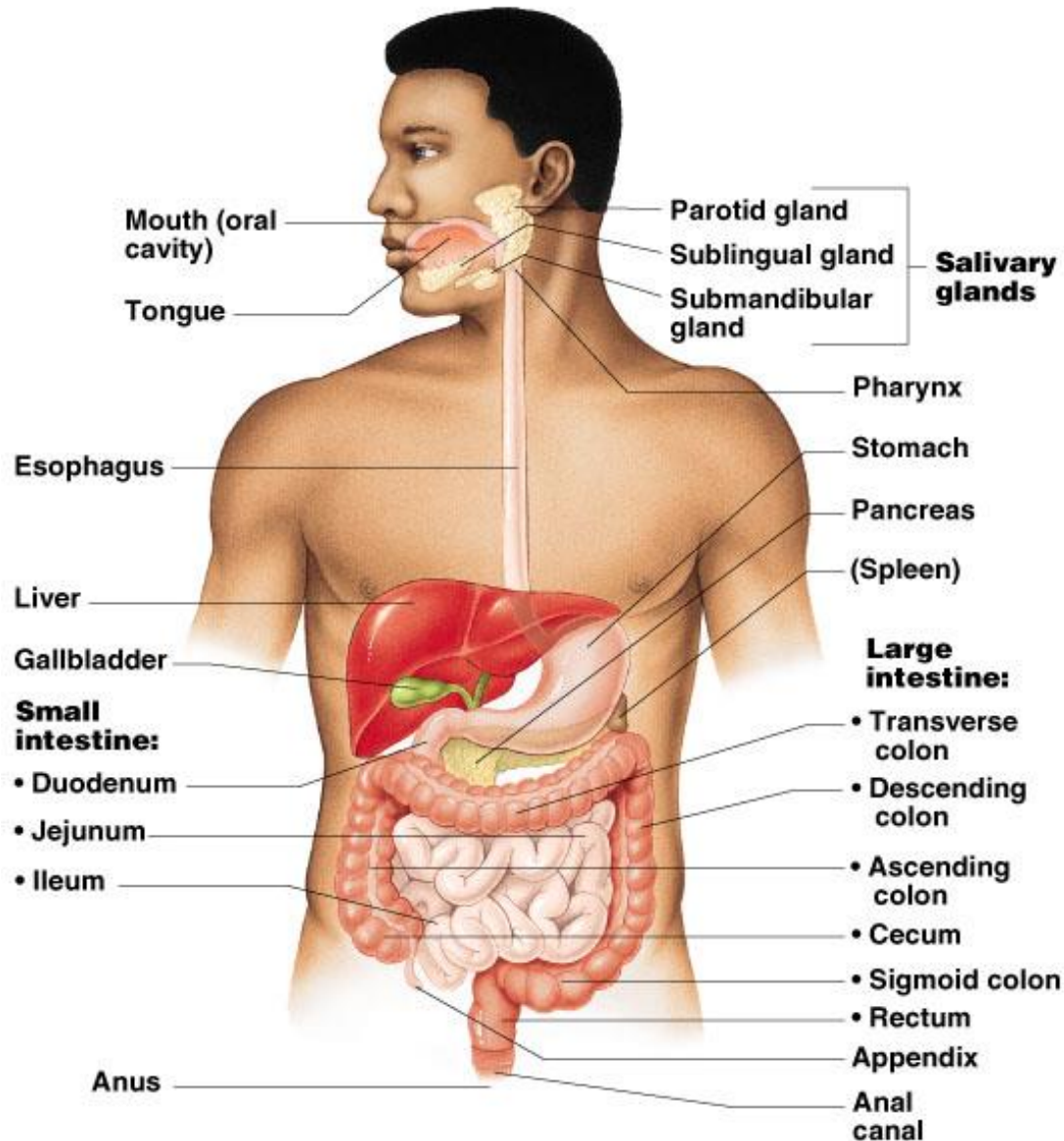
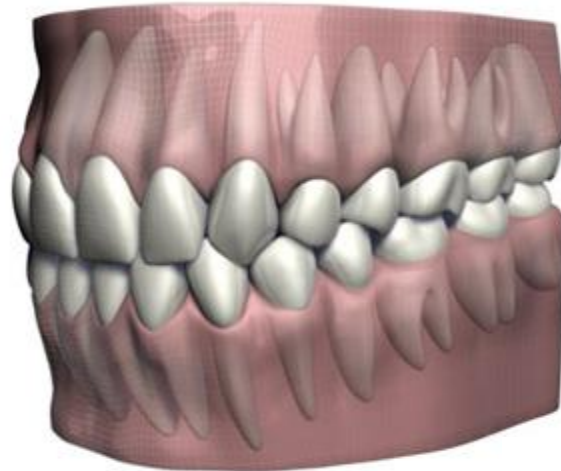


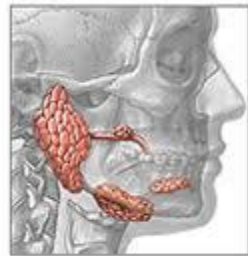
Figure 14.1

Accessory Digestive Organs

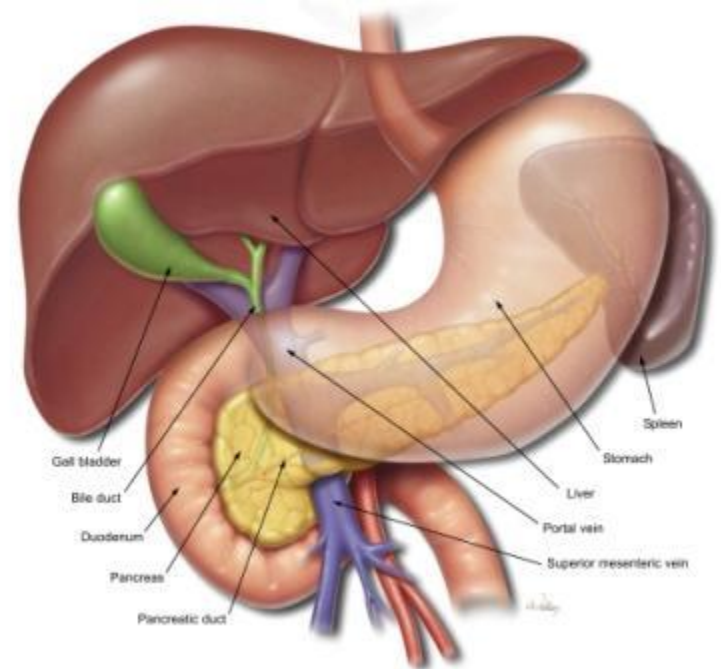
- Salivary glands
- Teeth
- Pancreas
- Liver
- Gall bladder



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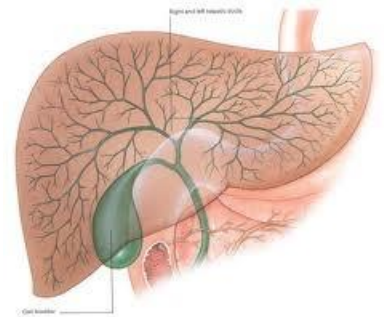


ADAM



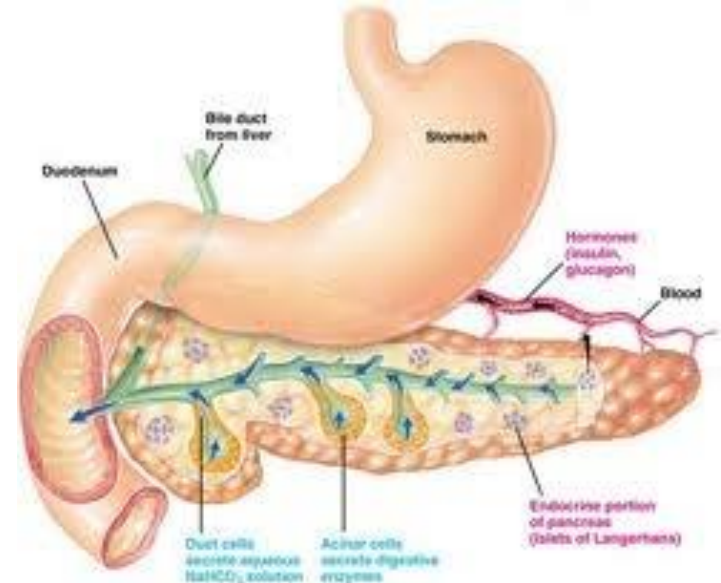
THOSE ACCESSORY ORGANS

- **Liver, Pancreas, Gall Bladder**
- **Liver & Gall Bladder**
 - Largest gland in the body
 - Breaksdown Hormones & Poisons
 - Produces bile
 - Which is stored and released by the gall bladder
 - Gallstones



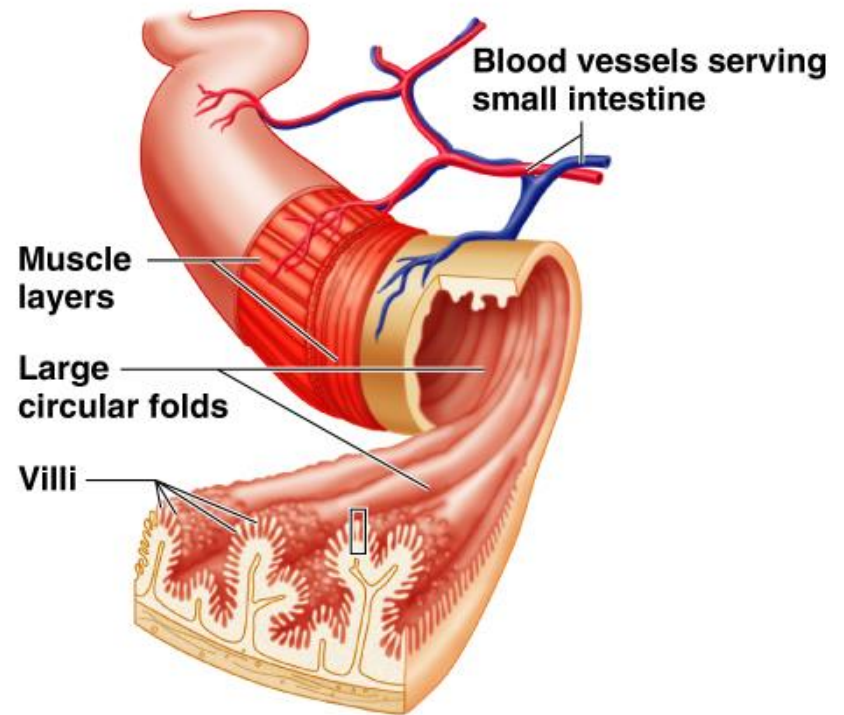
ACCESSORY ORGANS 2 - PANCREAS

- Produces lots of digestive enzymes that break down all categories of food
- Enzymes are secreted into the duodenum
- Produces Base to neutralize stomach acid
- Endocrine products of pancreas
 - Insulin
 - Glucagons



NUTRIENT ABSORPTION

- OCCURS IN SMALL INTESTINE
- HAS A LARGE SURFACE AREA TO INCREASE ABSORPTION
- USES FOLDING AND VILLI TO INCREASE SURFACE AREA.



(a) Small intestine

Digestion – the nutrients

- Day three

LAB

- Go start lab – have 15 minutes to do this
 - Page two steps #1 – 4
- Notes on macromolecules and enzymes
- Make predictions
- With 30 min left, get final data

So what are the nutrients?

- Carbohydrates
 - Monomer - Simple sugars – generally sweet stuff, fruit or candy
 - Polymer - Starches – potatoes, rice, bread
 - Fiber - undigestible carbohydrates
- Proteins (polymer)
 - Meat/poultry/fish
 - Soy/beans
 - Monomer – amino acids

Nutrients

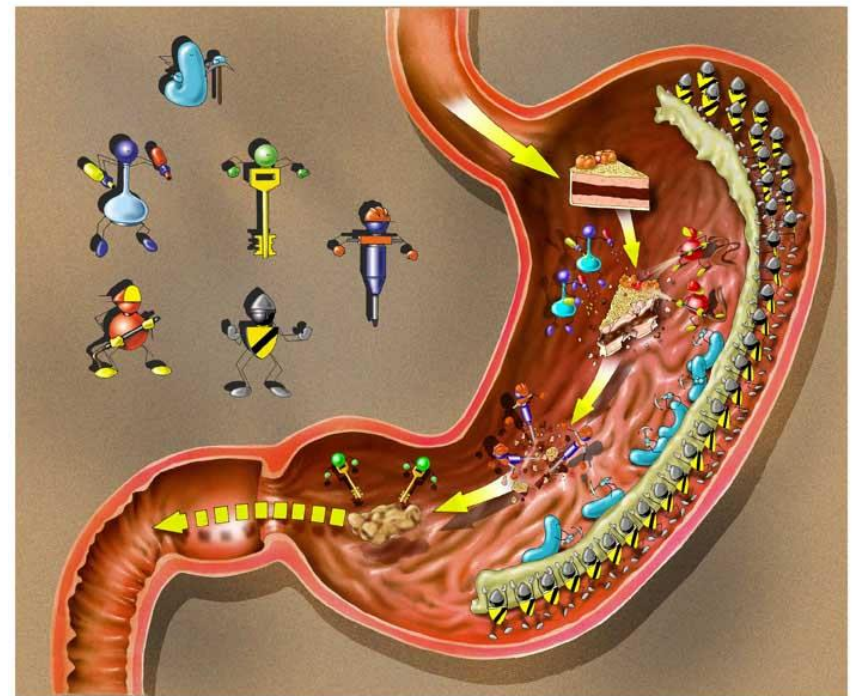
- Lipids
 - Fats, oils, cholesterol
 - Break down into fatty acids
- ~~Vitamins & minerals~~
 - ~~Required nutrients that your body is unable to make~~

NUTRIENT BREAKDOWN 1

- **MOUTH**
- Amylase released by salivary glands
- Grinding by teeth
- Liquid of saliva helps in swallowing.
- Tongue moves food around to assist in breakdown (strongest muscle by size)
- <http://video.answers.com/the-benefits-of-chewing-your-food-97704774>

NUTRIENT BREAKDOWN 2

- **STOMACH**
- Strong muscle
- “churning” helps in physical breakdown
- Gastric juices (acid) is chemical breakdown
- Mostly protein breakdown



Nutrient breakdown 3

•Small intestine

- NO PHYSICAL BREAKDOWN, ONLY CHEMICAL
- BILE & PANCREAS ENZYMES ADDED HERE
 - Enzymes that breakdown fats (lipases), nucleic acids (nucleases)
 - pH neutralizer

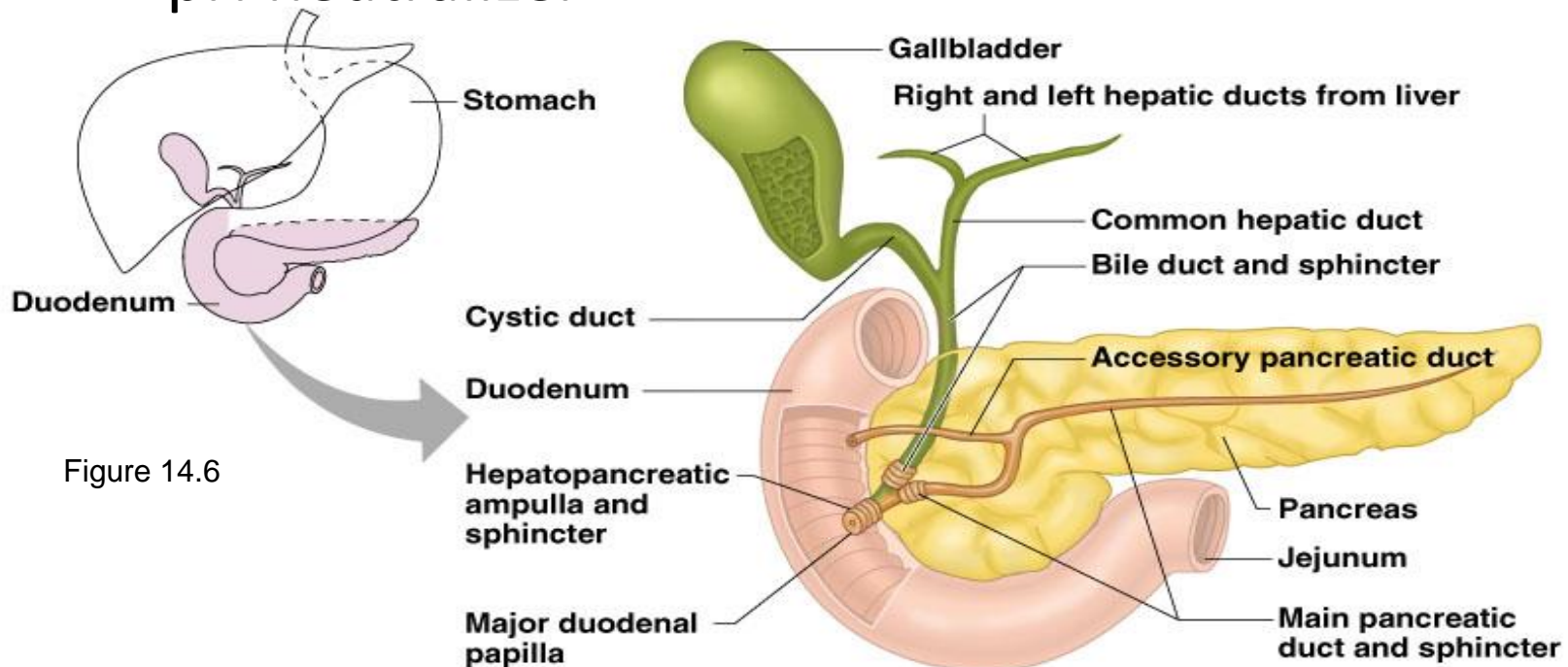


Figure 14.6

WATER ABSORPTION

Most absorption of water occurs in the small intestine.

Final 10% occurs in the large intestine

ELIMINATION

- Mostly digested food moves through your large intestine or colon
- Bacteria in colon digest some nutrients and produce vitamins from it
- Feces is stored in rectum
- Bacteria also produce gases...

lab

- Set up lab
- Read
- Make predictions

