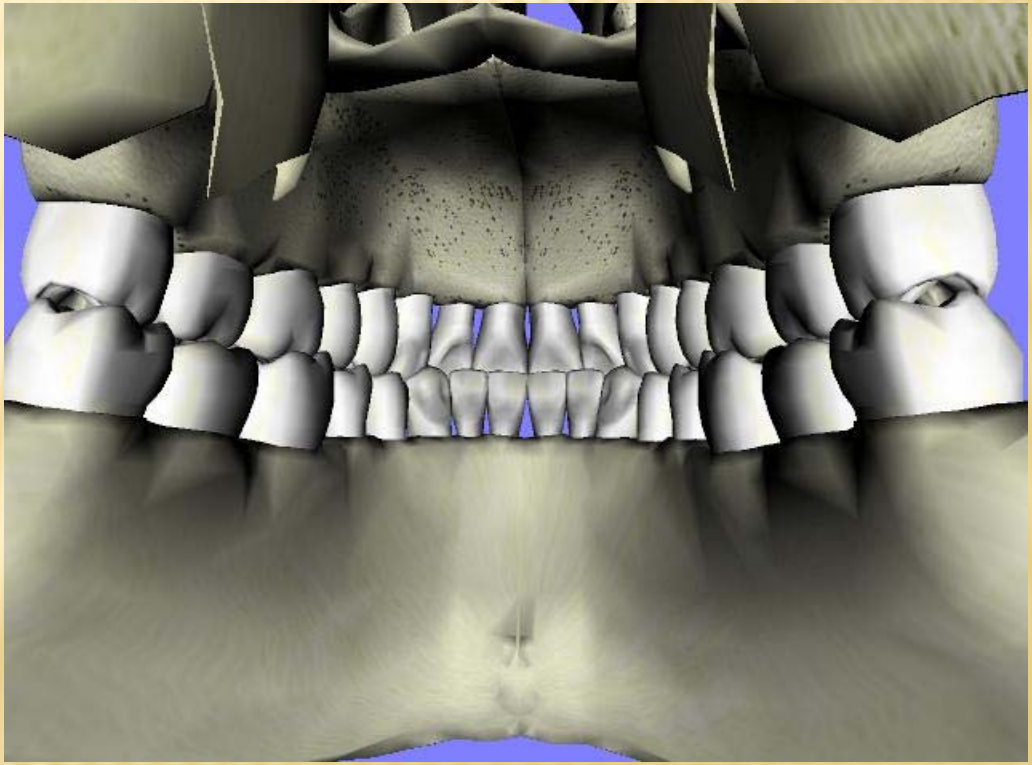
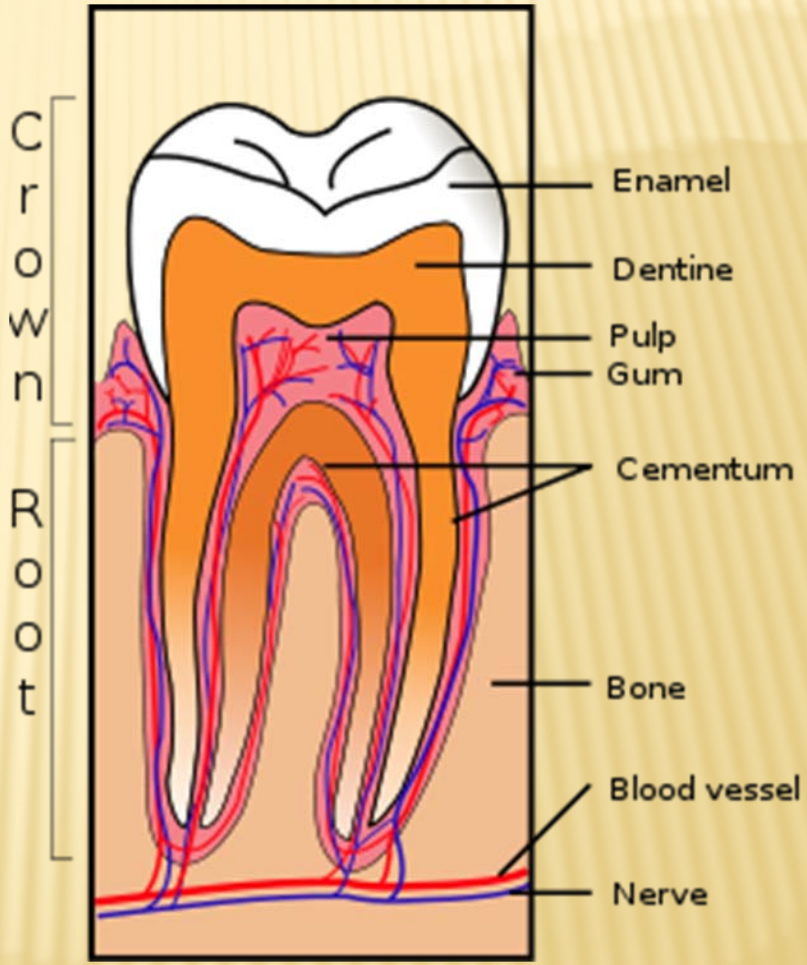
DIGESTION

- Digestion begins in the mouth & ends at the anus. This tube is called the “alimentary canal”
- Digestion breaks food into very small molecules that can be absorbed by the RBD. (4 types)
  - Protein – smallest molecules are amino acids
  - Carbohydrates (starch & sugar)-smallest molecules are glucose
  - Fats – sm. Molecules are glycerol & fatty acids
  - Fiber (cellulose, roughage)-used to push food along the “gut” (tube from mouth to anus) “fiber foods” have vitamins & minerals.

- Part of the digestive system
  - Mouth – combined sense of taste & smell
    - Teeth are the 1st step in food break down, 20 “baby” teeth, 32 permanent, 4 different types of teeth
      - Incisors (8)
      - Canine (4)
      - Molars (16)
      - Wisdom (4)

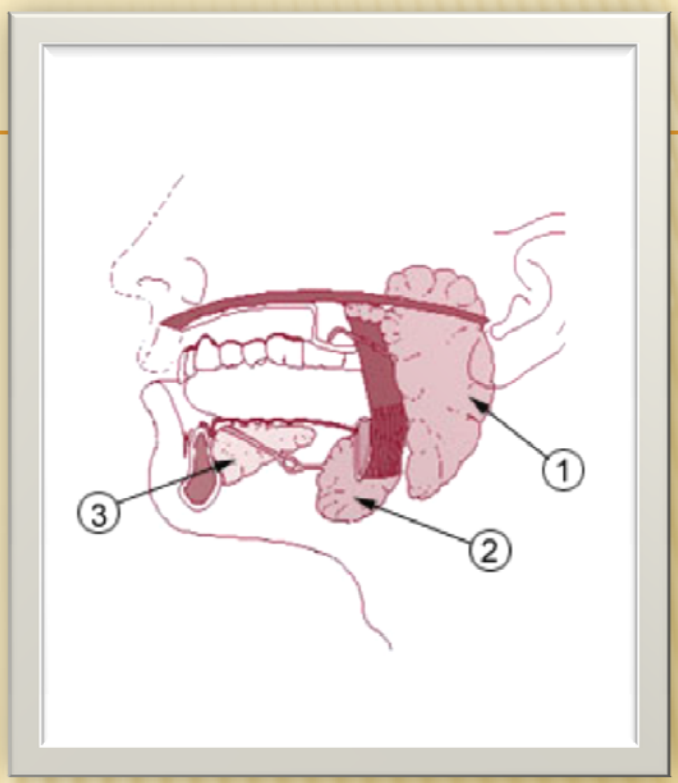


- Enamel – Dentin – Pulp

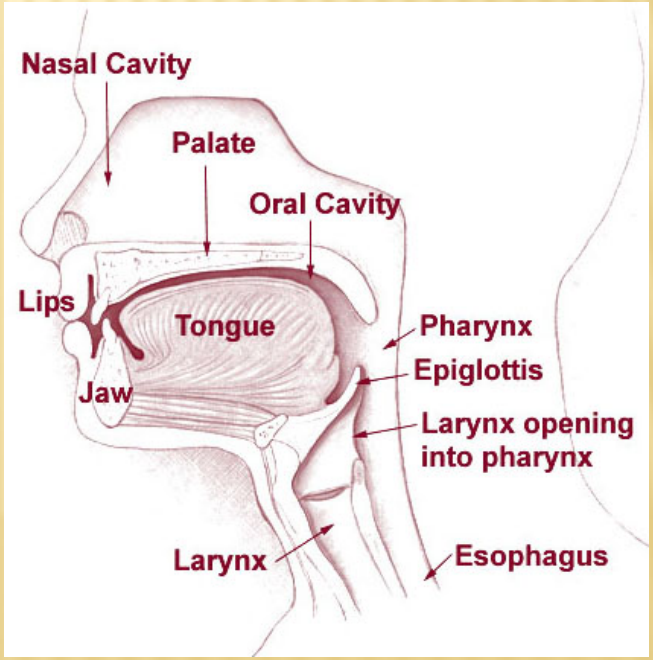


- Tooth decay – bacteria & sugar = plaque
- Gingivitis – inflammation of the gums
- Palate – hard – soft

- Salivary Glands (3 pairs)
  - Salivary amylase = enzyme
  - Enzyme breaks carbohydrates into maltose = disaccharide
- Tongue helps the teeth
  - Abrasive surface
  - Secretes mucus – food mixed with mucus & saliva is called “bolus”



- Pharynx – between mouth & esophagus (throat)
  - Swallowing is a reflex action
  - Larynx – voice box (Adam's) apple = cartilage)
  - Glottis – tip of trachea (windpipe)
  - Epiglottis – flap of tissue attached to glottis



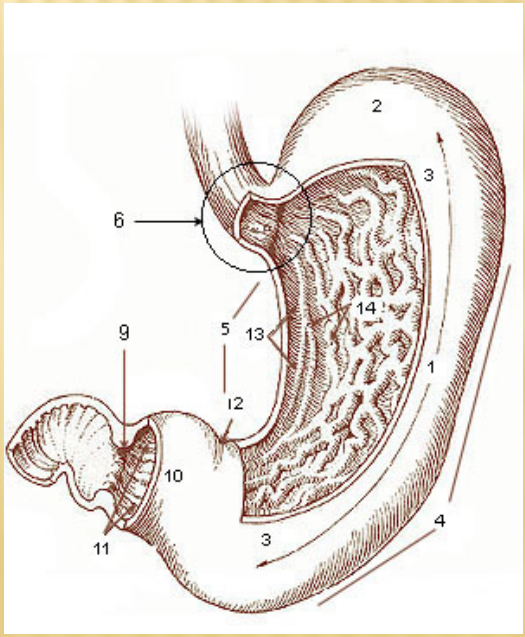
ESOPHAGUS

- Connects pharynx to stomach
- “Bolus” is pushed down this tube
- Smooth muscle
- “Peristalsis” = muscle contraction pushes food through “gut”
- Cardiac sphincter relaxes & boulus enters the stomach. This sphincter is weak.

STOMACH

- Located on the left side of the body.
- “J” shaped & holds about ½ gallon
- 3 layers of muscle used to “churn” food, “hunger pangs” = empty stomach churning
- Gastric glands produce juices which contain pepsin& hydrochloric acid (HCL) with start the break down of protein.
- Peptase breaks protein into “peptides”.

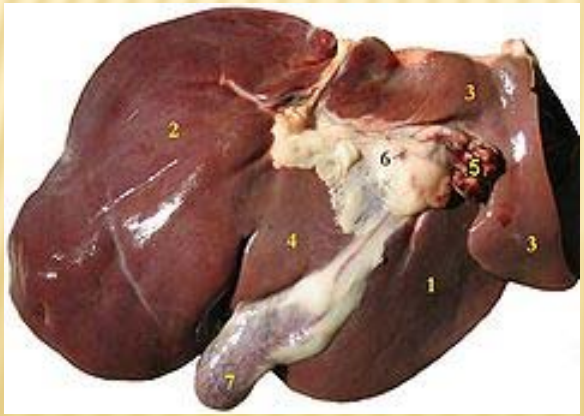
- pH of stomach is 233 because of HCl
- “rugae” are folds in the stomach
- Stomach empties in 2-6 hours & the bolus changes into “chyme”
- Chyme squirts into the small intestine (duodenum) through the strong “pyloric” sphincter muscle.

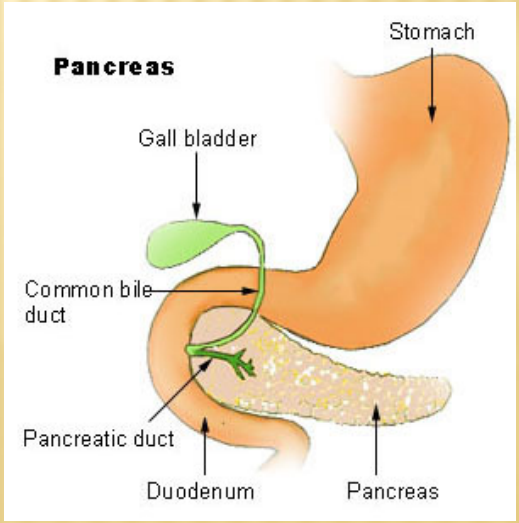


SMALL INTESTINE

- About 20 feet long
- 1st section is called the duodenum (Fe & Ca)
  - Finger-like projections called “villi” increase absorption
  - Length of intestine also increases absorption
- 2nd section is called the duodenum jejunum (acids & glucose)
- 3rd and last section is called the ilium (fat & vitium B12

- There are 3 accessory organs: liver, gall bladder and pancreas (food does not enter these organs)
  - Liver produces bile which is stored in the gall bladder
  - Bile breaks down fat into fat droplets this is the 1st step in fat digestion





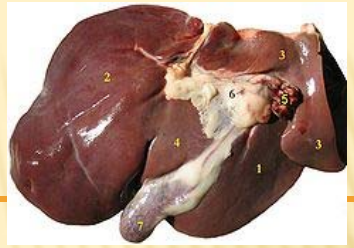
- Pancreatic amylase breaks starch + water into maltose – 2nd step is breakdown of carbohydrates (insulin & glucoglin)
- Trypsin breaks protein + water into peptides – 2nd step in breakdown of protein
- Lipase breaks fat droplets + water into glycerol & fatty acids – final step in breakdown of fat

INTESTINAL ENZYMES

- Produced by the wall of the small intestine
  - Peptidase breaks peptides + water into amino acids – final breakdown of protein
  - Maltase breaks maltose + water into glucose – final breakdown of carbohydrates

  The blood can only absorb nutrients when they have been broken down small enough (refer to the beginning of these notes)

LIVER



- The blood then takes the glucose & amino acids from the small intestines to the hepatic portal vein into the liver.
  - The liver changes glucose into glycogen & stores it until needed. When the body needs energy the liver changes glycogen back into glucose.
  - The liver converts amino acids into “urea” Which is a waste product & is sent to the kidneys.
  - The Liver removes bilirubin, a breakdown product of hemoglobin (the iron carrying substance in the blood) and excretes it in bile.

- Glycerol & fatty acids are too large to enter the bloodstream so they are absorbed by “lacteals” which are inside the villi. These lacteals lead into the lymph system. The fat is stored in the body’s favorite places.
- All nutrients have new been absorbed. All that is left is waste, water, vitamins & minerals

LARGE INTESTINE = COLON

- About 5 feet long
- Ascending colon (right) – cecum & appendix
- Transverse colon (crosses abdominal cavity)
- Descending colon (left)
  - Sigmoid colon (“S” shaped)
  - Rectum (storage)
  - Anus (sphincter muscle)
  - About 24 hours from plate to “potty”