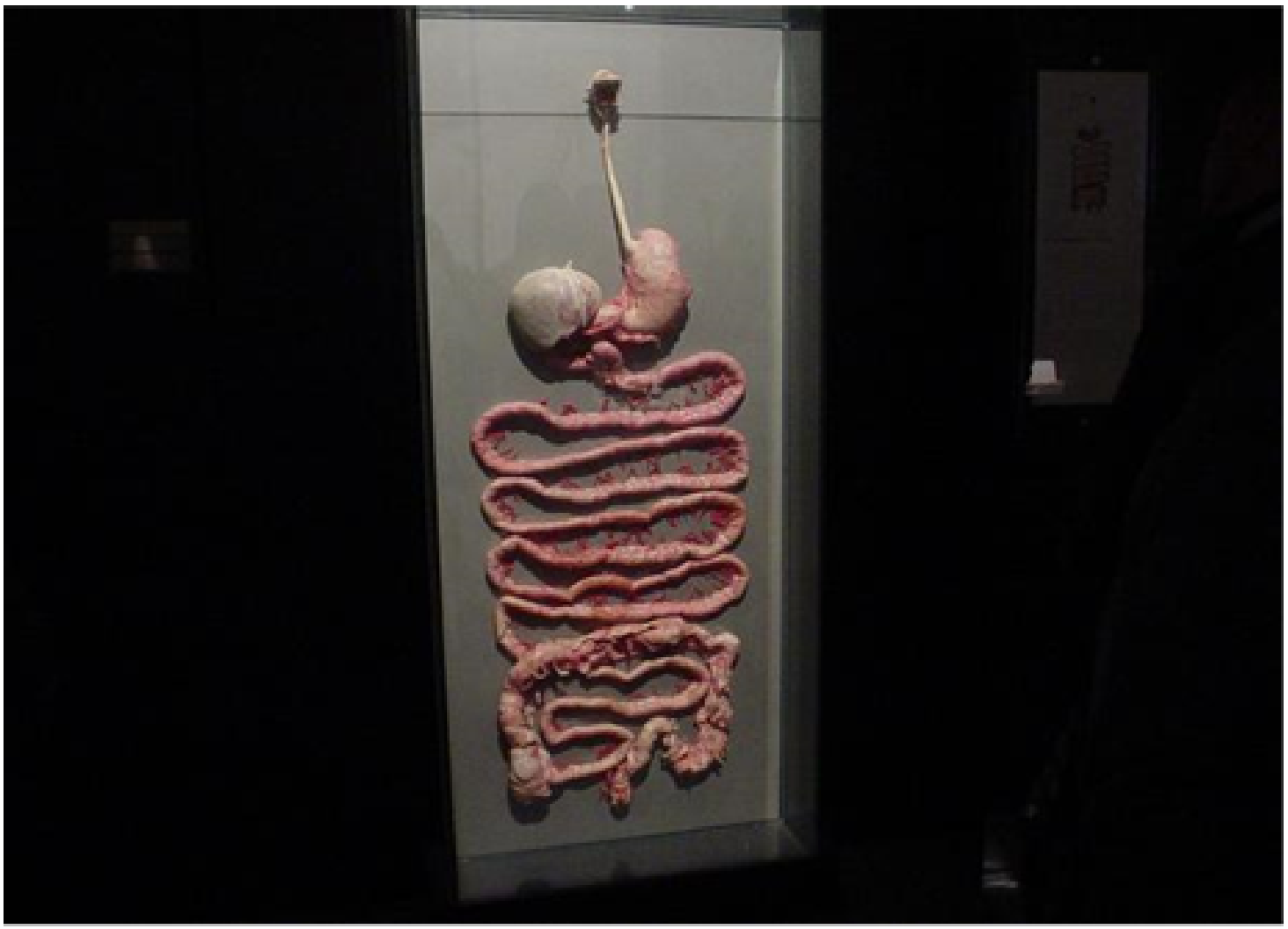
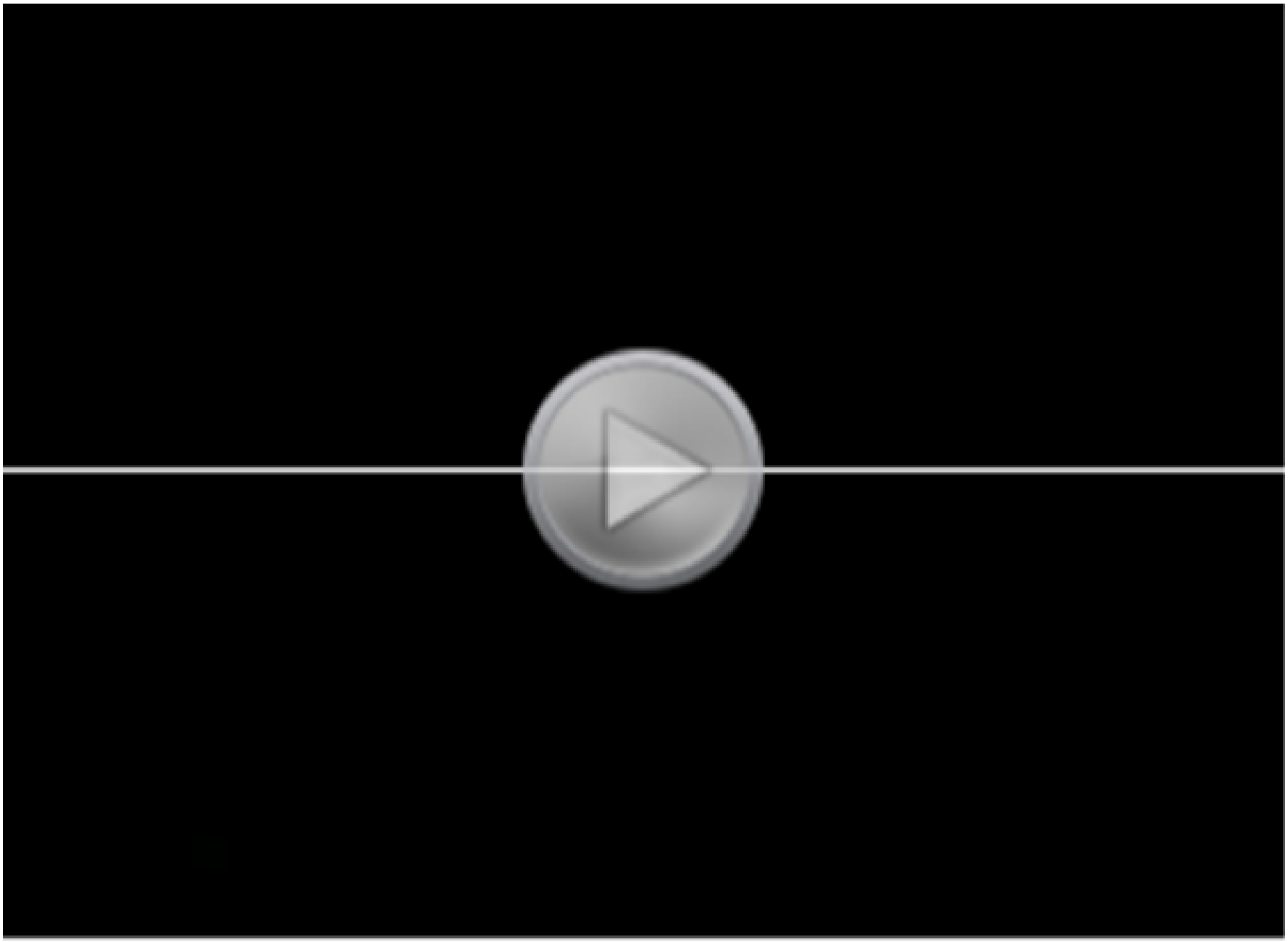
Anatomy of the Digestive System





https://www.youtube.com/watch?v=Rd9vQLTnPpk

Digestive System

- The organs of the digestive system are found in a tube called alimentary canal or gastrointestinal tract

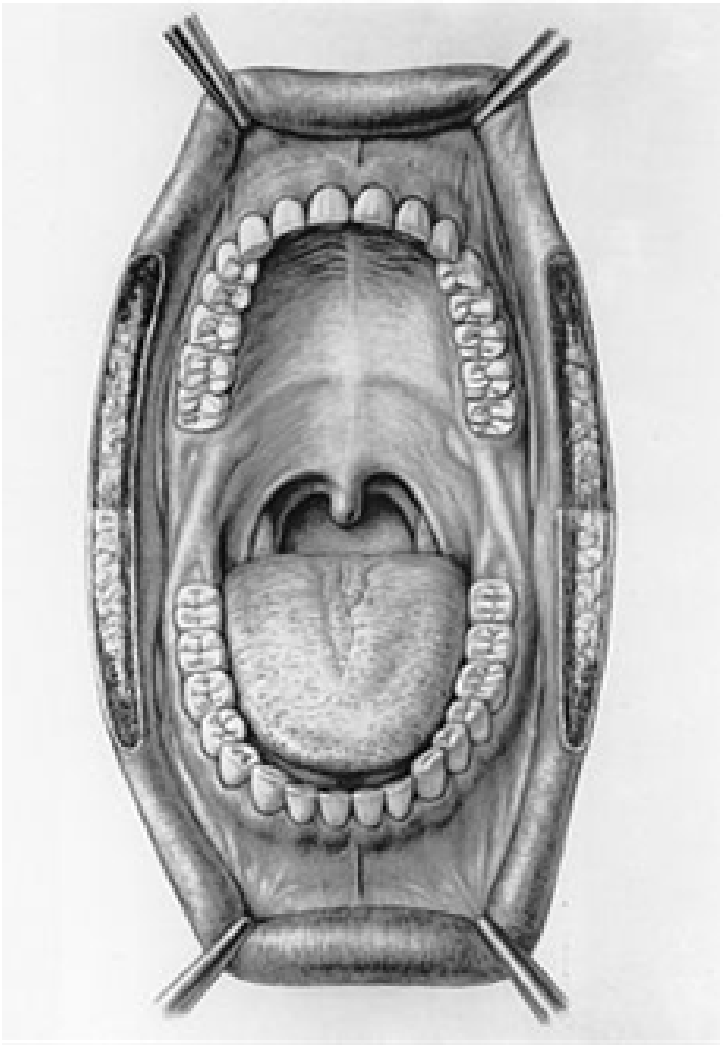
- Begins at the mouth and ends at the anus

Functions

- Purpose 1 = Injest the food
- Purpose 2 = Breakdown food into small molecules that can cross the plasma membrane
- Purpose 3 = Absorb nutrient molecules
- Purpose 4 = Eliminate nondigestible waste

The Mouth

- Also known as the Oral Cavity
- Receives food and begins physical and chemical digestion
- Vestibule - the space between the lips, teeth and cheeks



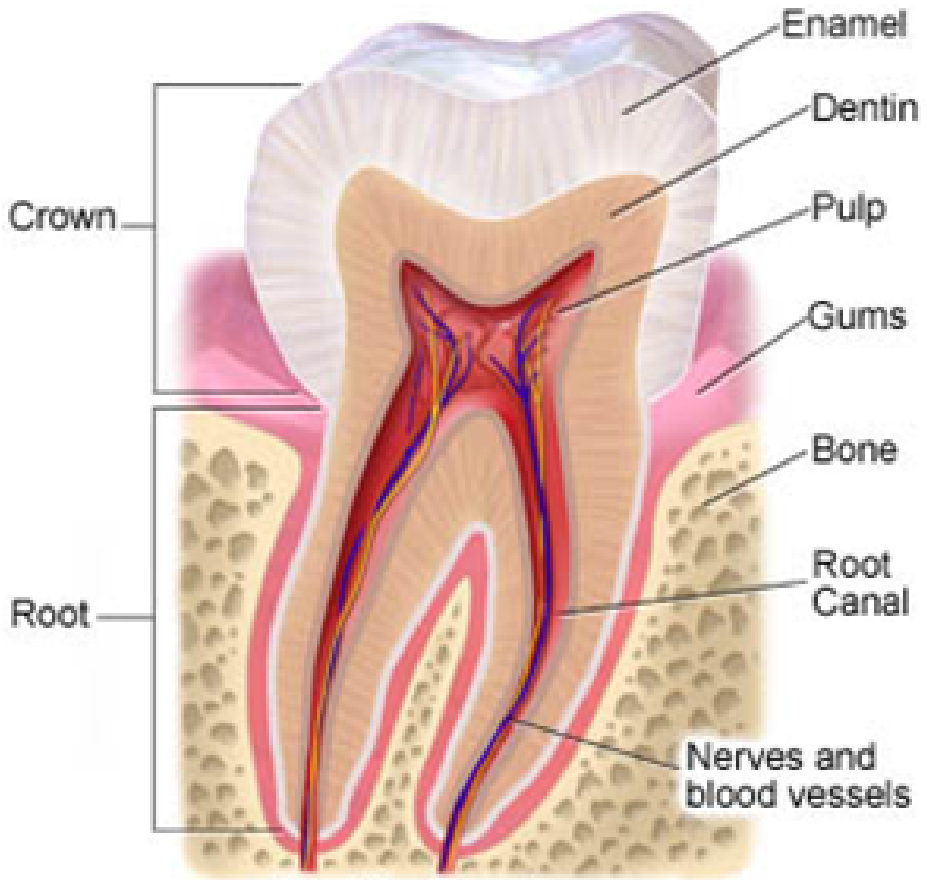
The Mouth cont.

- Teeth are found in both the maxilla and the mandible

- each tooth has

1. a crown that has an extremely hard layer of enamel, a thick bone-like inner portion called dentin,

2. a root that includes pulp which contains blood vessels and nerve endings



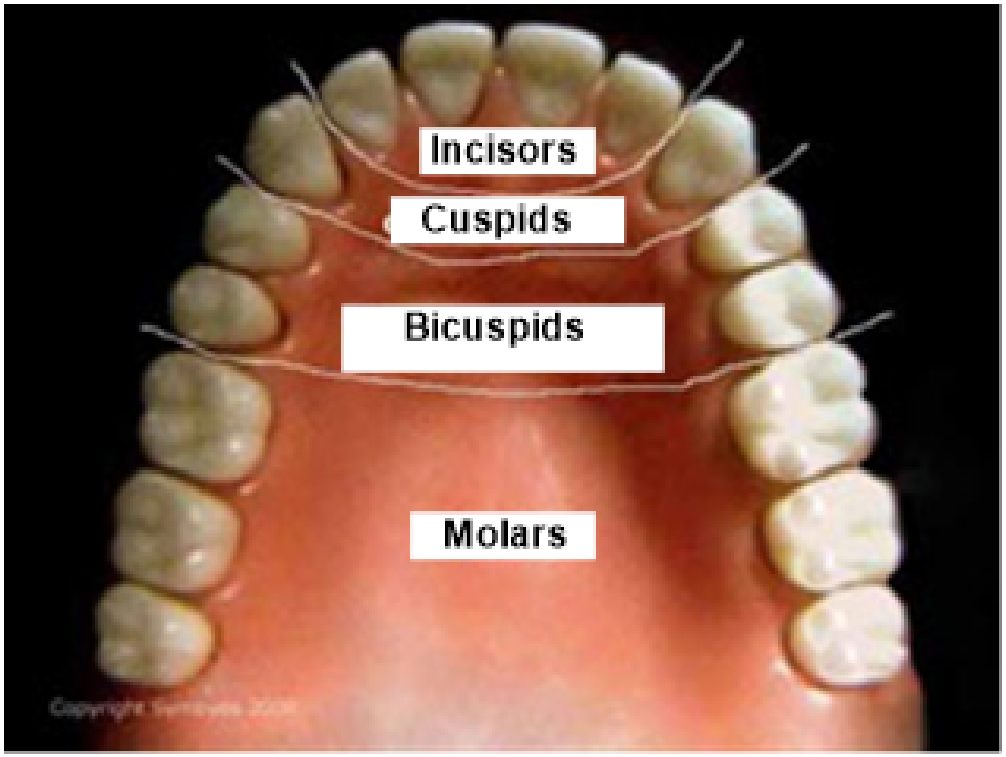
Tooth Anatomy

The Mouth cont.

- Teeth will bite, tear, chew and grind food to pieces that are managable to swallow

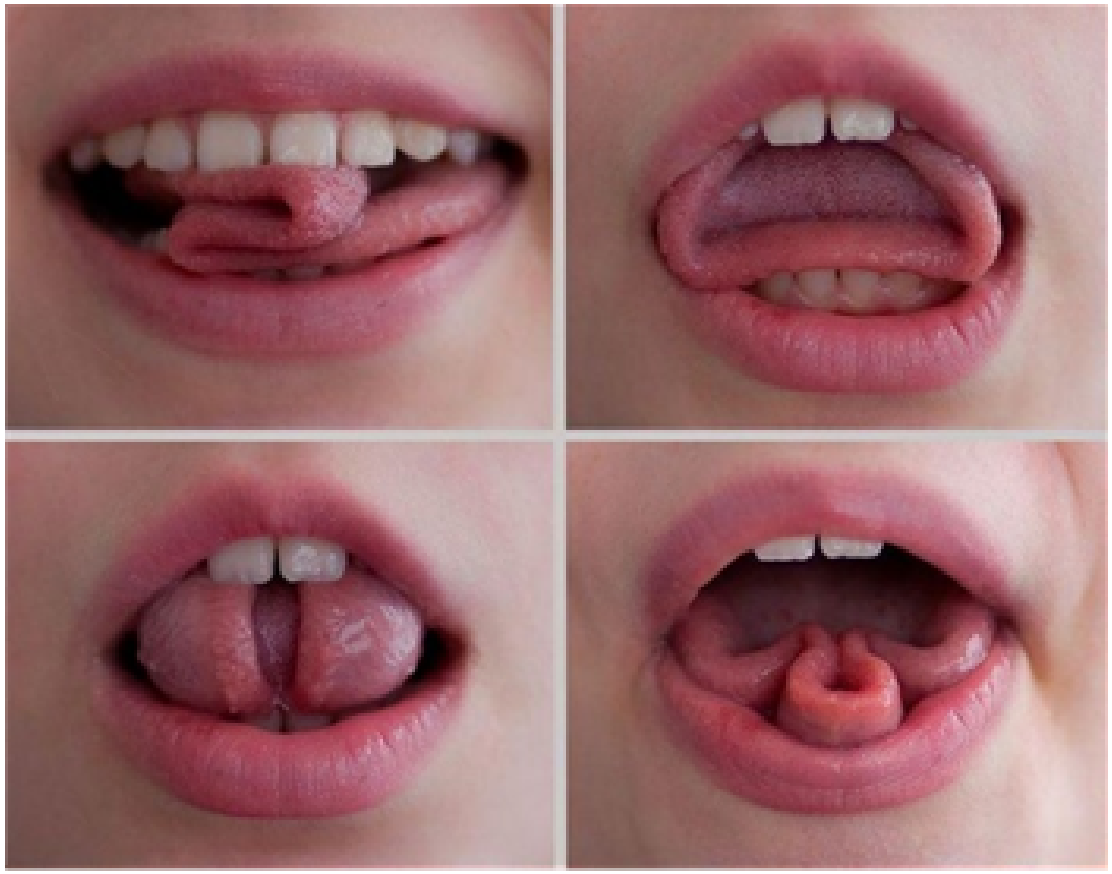
- There are 4 types of teeth

1. Incisors - biting
2. Cuspids - tear food
3. Bicuspids - grind food
4. Molars crush and grind food



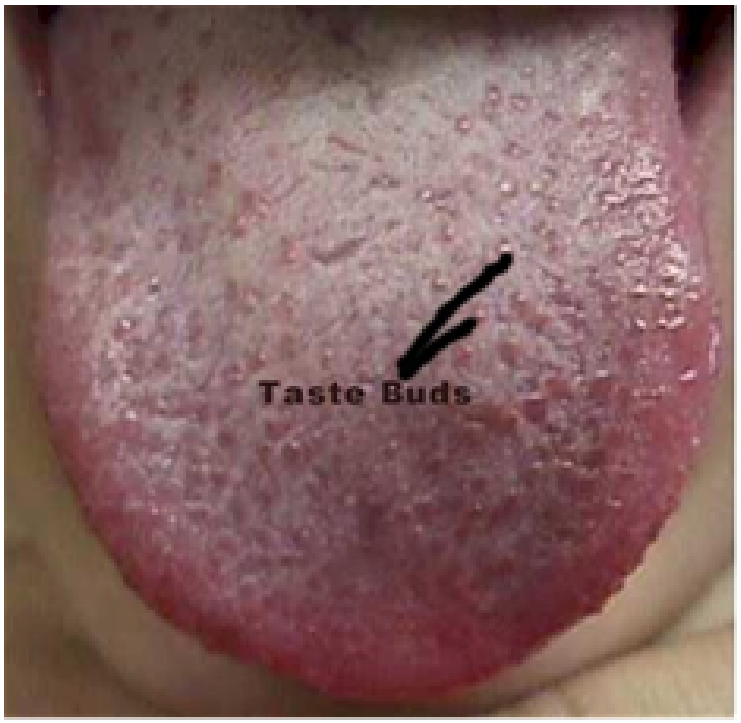
Tongue

- composed of skeletal muscle
- contraction can changes the shape
- exterior muscles cause tongue to move back and forth and up and down



Tongue

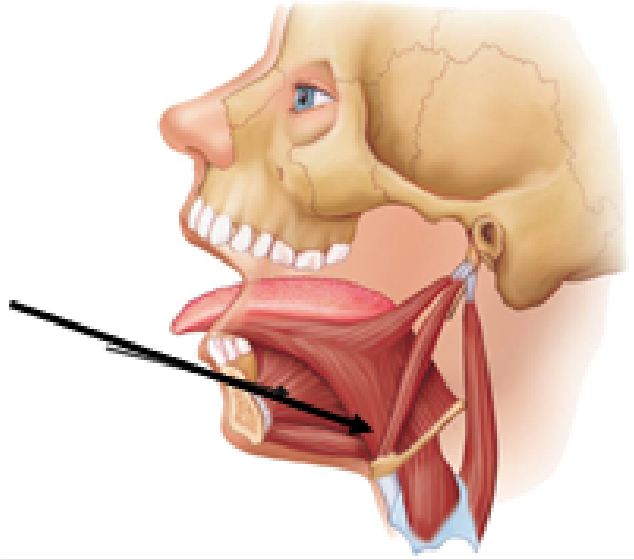
- papillae of the tongue contain taste buds and handle food



Tongue

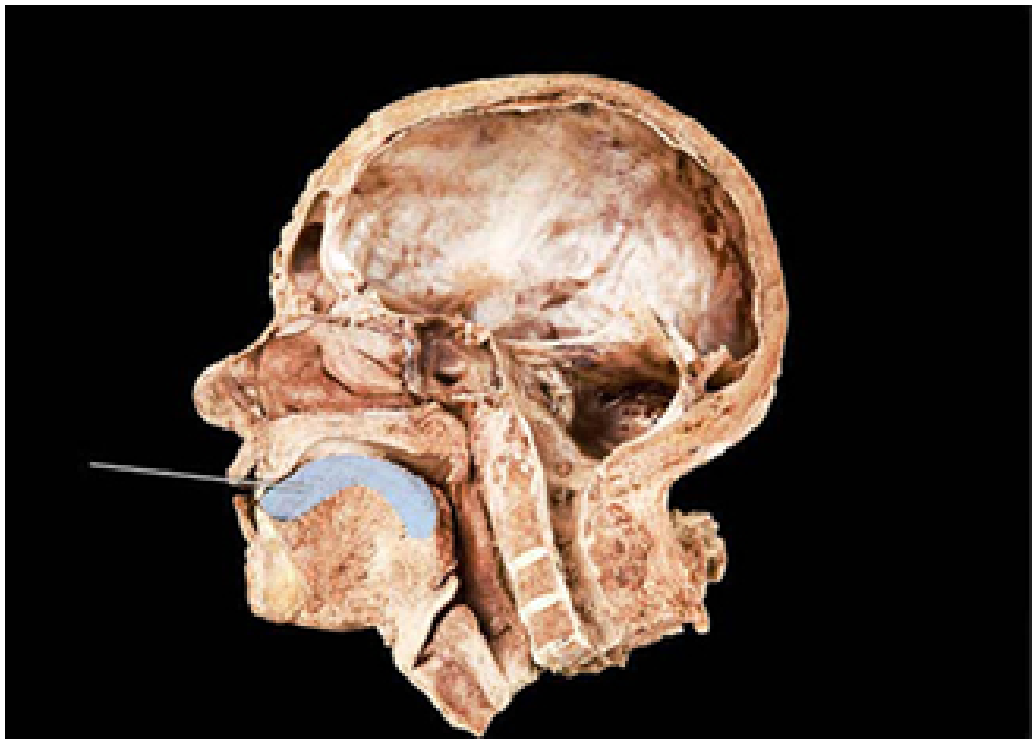
- the lingual frenulum attaches the tongue to the floor of the mouth

- posteriorly the tongue is attached to the hyoid bone



Tongue

- The tongue will ball up food (bolus) and push food toward the back of the mouth



Tongue

The tongue also is important for linguistics

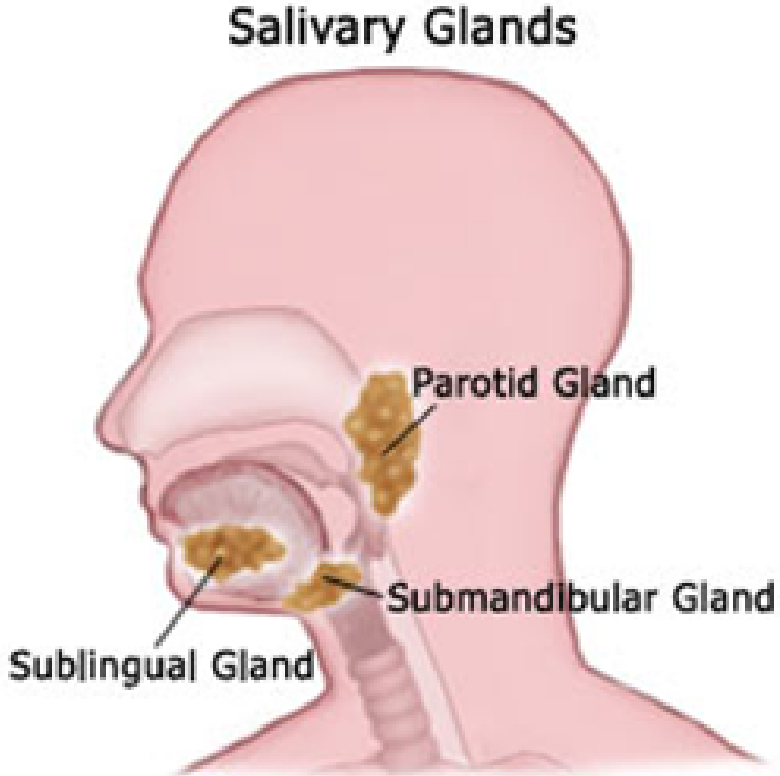
The Mouth cont.

- The roof of the mouth has two parts; hard palate - towards the front (formed by the maxilla and palatine bones), soft palate - towards the back (formed my muscle and glandular tissue)

- Uvula - at the end of the soft palate, hangy ball thing, gag reflex

The Mouth cont.

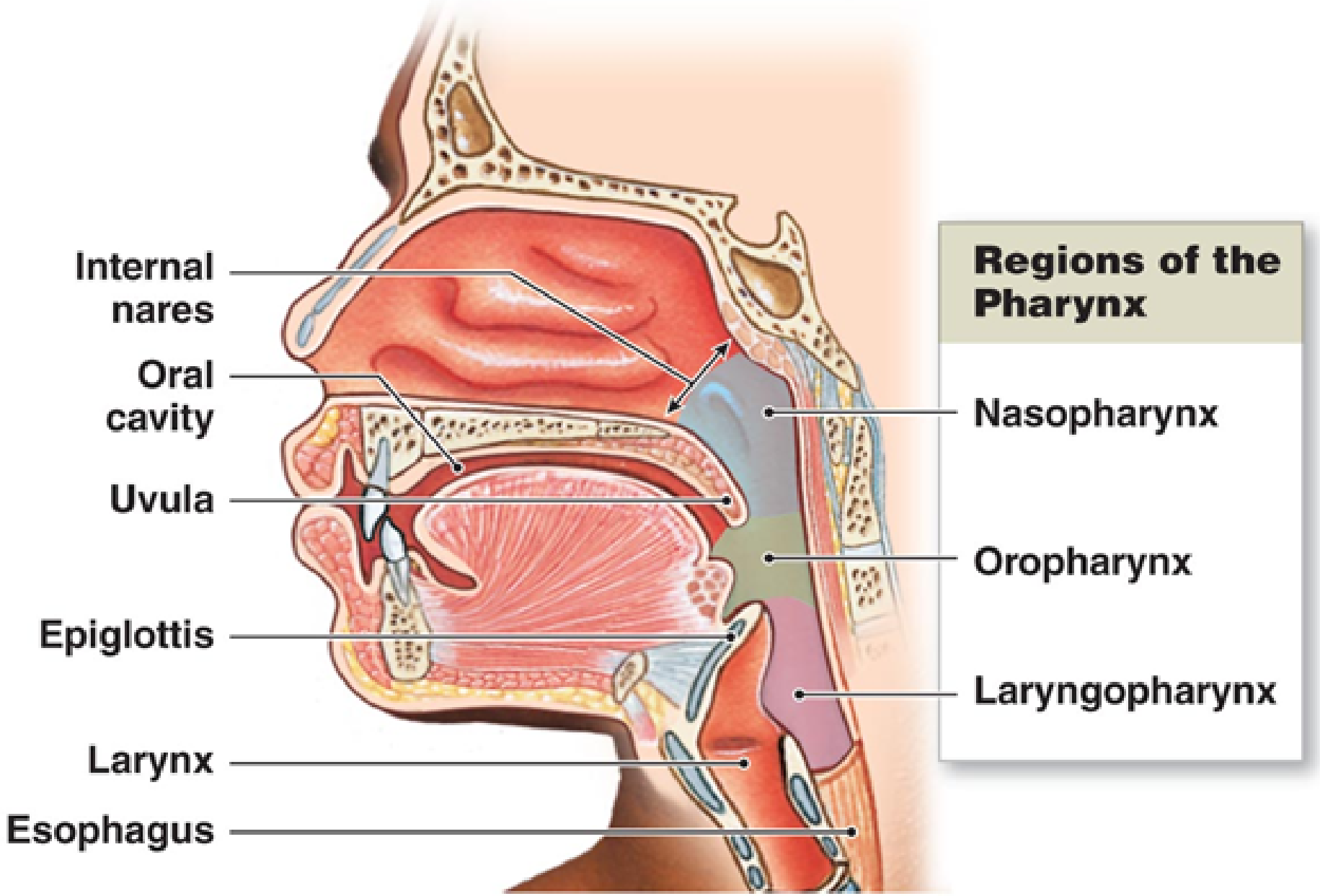
- Salivary glands - three pairs, produce saliva (water, mucus, and salivary amylase), moistens food and prepares it for swallowing, bathes the teeth and tongue



The Pharynx

- Passageway of food to esophagus
- Includes the palatine and lingual tonsils and pharyngeal tonsils (adenoids) - protect the body from infection and inhaled microbes
- Has 3 parts; nasopharynx - posterior to the nasal cavity and is passageway for air, oropharynx - posterior to the soft palate and passageway for air and food, laryngopharynx - superior to the esophagus and passageway for food

The pharynx, a common passageway for solid food, liquids, and air



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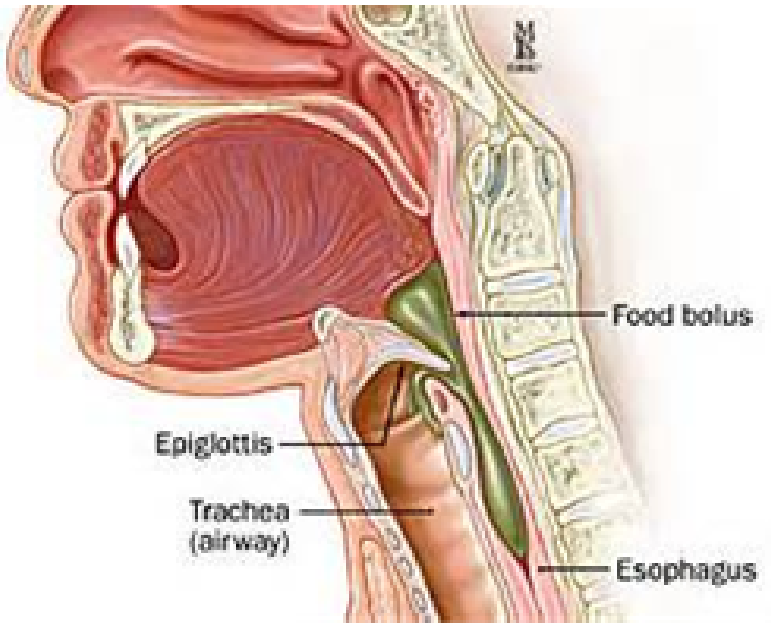
Swallowing

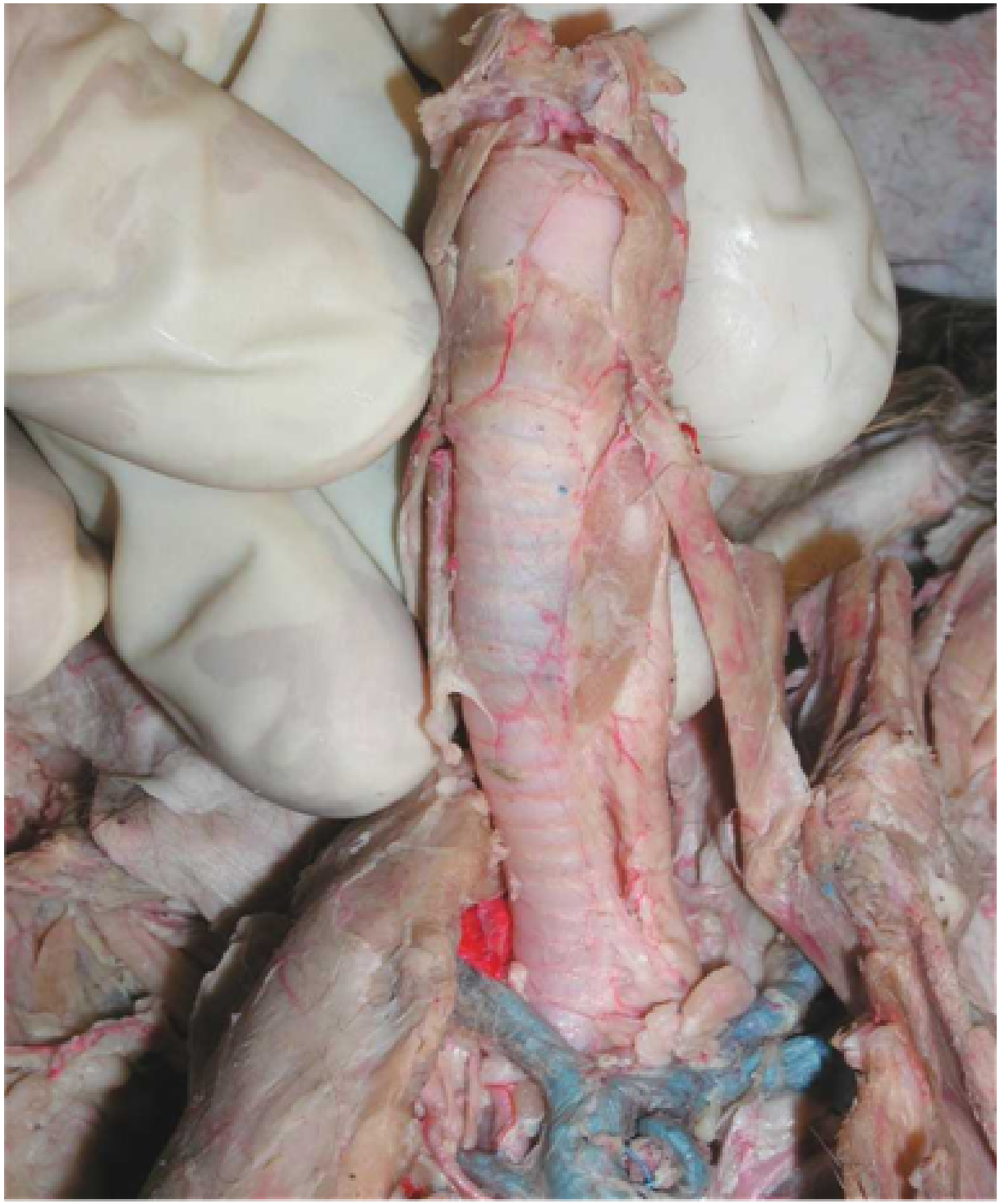
- includes both voluntary and involuntary action

- epiglottis - when swallowing the epiglottis will cover the trachea making it less likely for food to enter it, when breathing, the epiglottis will cover esophagus (food going down the wrong tube)



The Esophagus

- muscular tube that passes from the pharynx through the thoracic cavity and diaphragm into the abdominal cavity where it joins with the stomach
- peristalsis - the involuntary rhythmic muscle contraction that pushes food downward
- sphincters - muscles that encircle tubes and act as valves, there is a sphincter at the entrace to the stomach



Swallowing

https://www.youtube.com/watch?v=YQm5RCz9Pxc

Walls of the Digestive Tract

- The digestive tract from esophagus to rectum is a continuous tube composed of four layers

Layer 1 - innermost layer

Mucosa - a layer of epithelium supported by connective tissue and smooth muscle lines the lumen (central cavity) and contains glandular epithelial cells that secrete digestive enzymes and goblet cells that secrete mucus

Walls of the Digestive Tract cont.

Layer 2 - second innermost layer

- Submucosa - a broad band of loose connective tissue that contains blood vessles, lymphatic vessles, and nerves that lies beneath the mucosa, joins the mucosa to the muscularis layer, include lymph nodules that (like the tonsils) and helps protect us from disease

Walls of the Digestive Tract cont.

Layer 3 - second outermost layer

- Muscularis - two layers of smooth muscle that encircles the gut

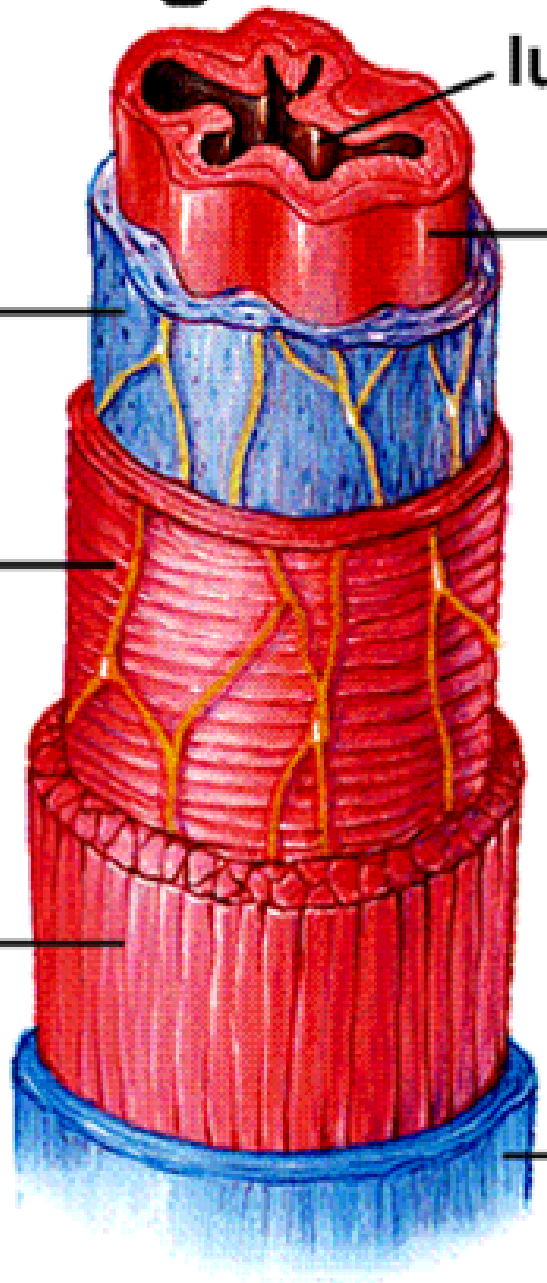
Walls of the Digestive Tract cont.

Layer 4 - outermost layer

- Serosa - very thin outermost layer, secretes a serous fluid that keeps the outer surface of the intestines moist so that they slide against one another

Sylvia S. Mader, Inquiry into Life, 8th edition. Copyright © 1997 The McGraw-Hill Companies, Inc. All rights reserved.

Wall of Digestive Tract



lumen

mucosa (mucous membrane layer)

submucosa (submucosal layer)

circular muscle

muscularis (smooth muscle layer)

longitudinal muscle

serosa (serous membrane layer)

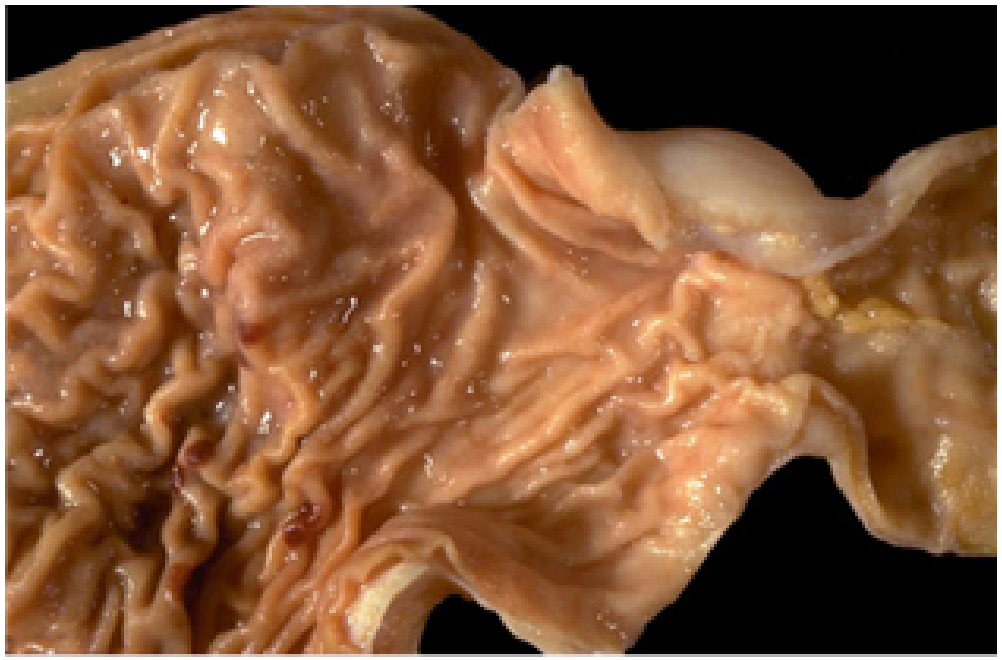
The Stomach

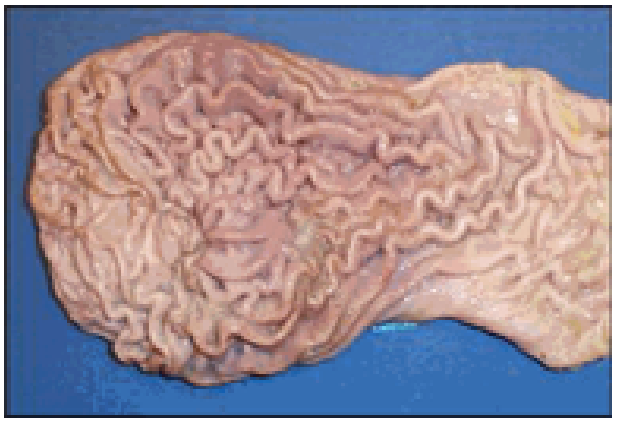
- Thick-walled, J-shaped organ that lies on the left side of the abdominal cavity inferior to the diaphragm and posterior to the liver

- Digests food both chemically (acid) and physically (movement)

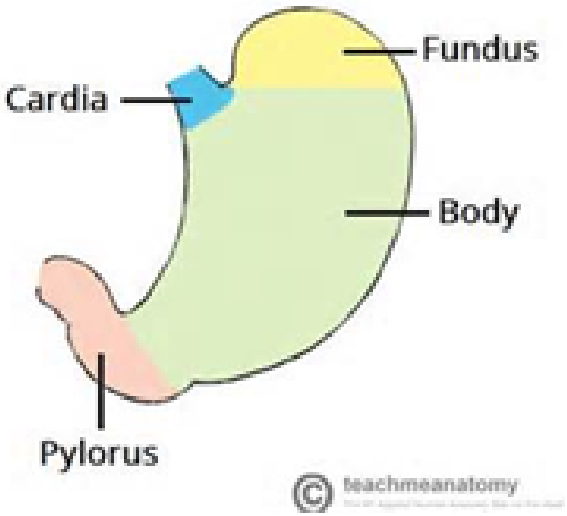
The Stomach

- stretchy and elastic due to deep folds called rugae





The Stomach



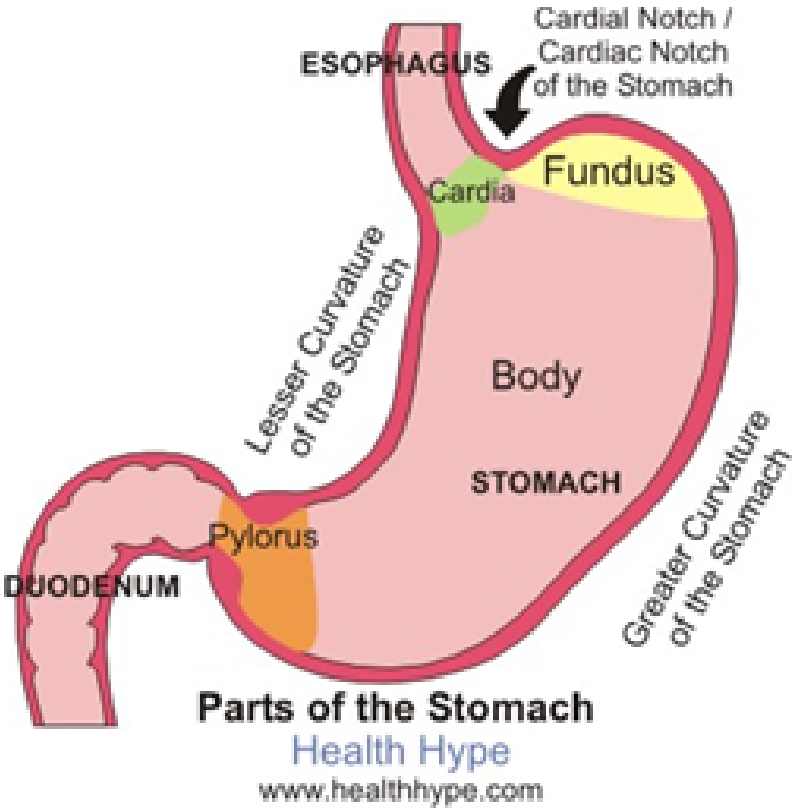
- 4 regions

1. cardiac (near the heart)

2. fundic (holds food temporarily)

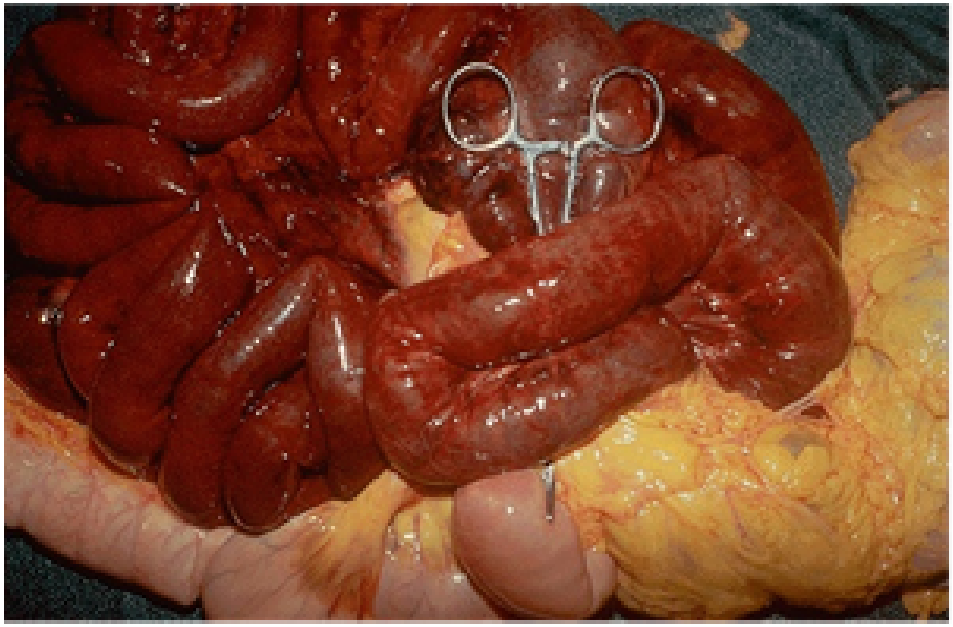
3.body (the main part)

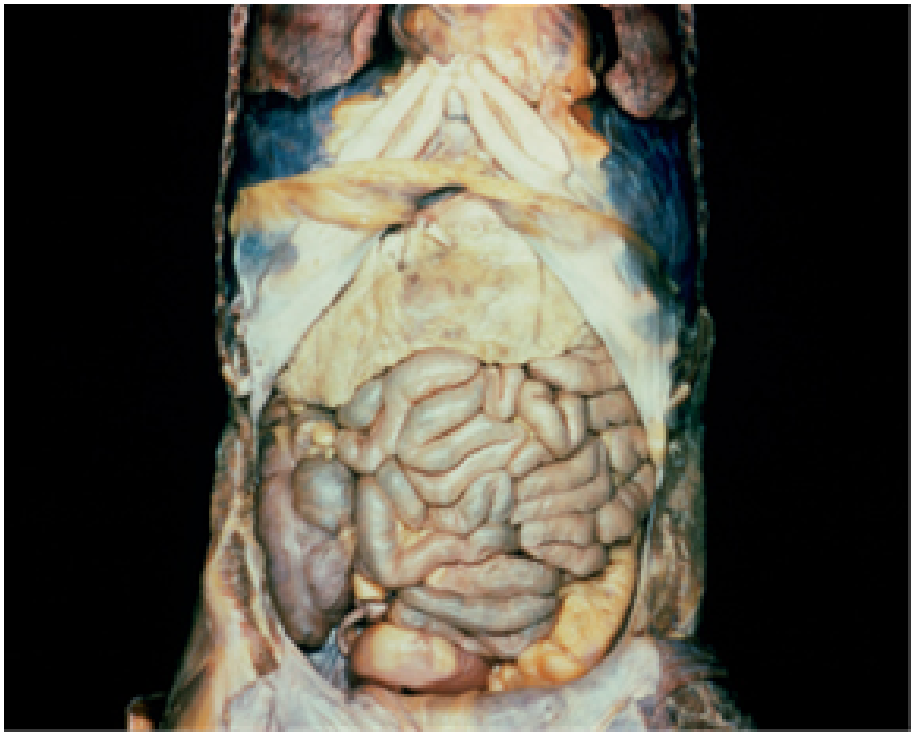
4. pyloric region (leads to the pyloric sphincter where food enters the first part of the intestine)



The Small Intestine

- Extends from the pyloric valve of the stomach
- Joins with the large intestine
- named for its diameter not its length (18+ ft)



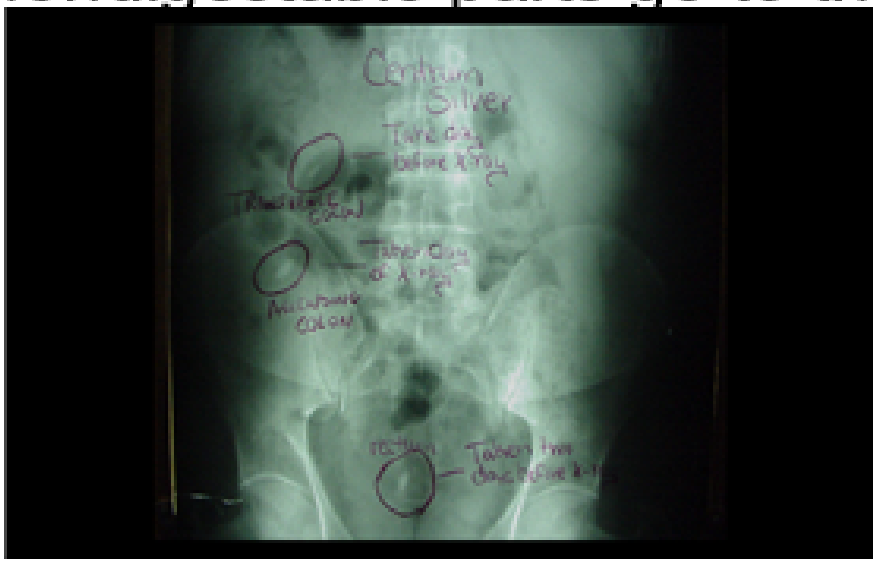


The Small Intestine

- all contents of food are digested in the small intestine down to molecules that can be absorbed

- receives secretions from pancreas and liver and produces intestinal juices

- Absorption of nutrients for the body's cells occur in the small intestine and nondigestable parts go to the large intestine

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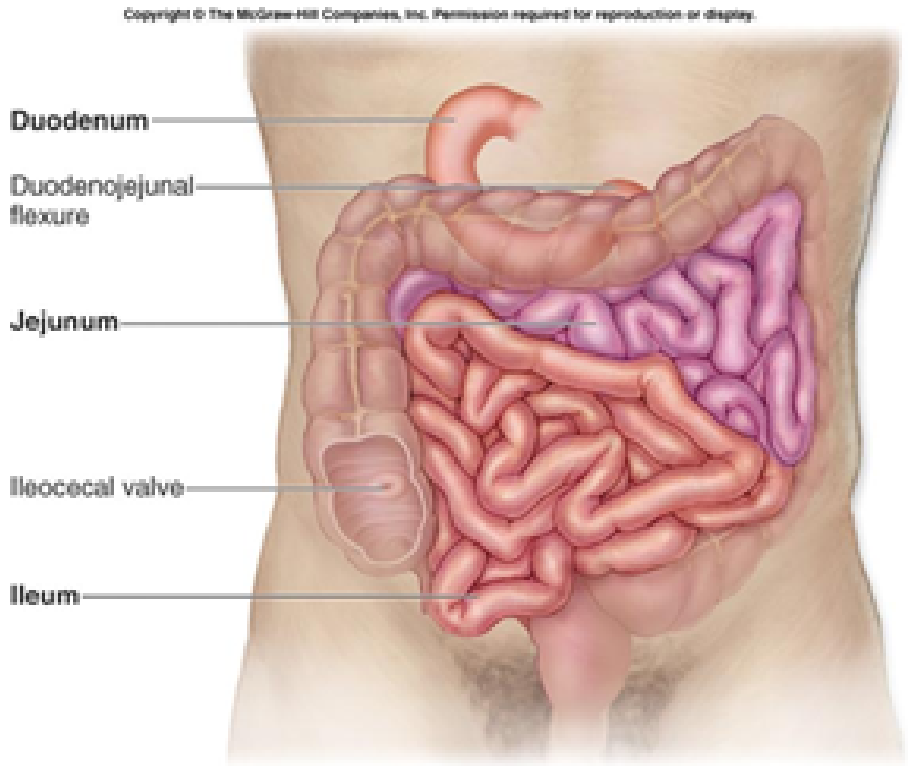
Regions of the Small Intestine

1. Duodenum - located right after the pyloric sphincter, contains glands that secrete mucus and receive pancreatic secretions and bile (emulsifies - causes droplets to disperse in water - fat) from the liver through a common duct

Regions of the Small Intestine

1. Jejunum - located after the duodenum, contains folds and villi that will absorb nutrients, about 3 feet long



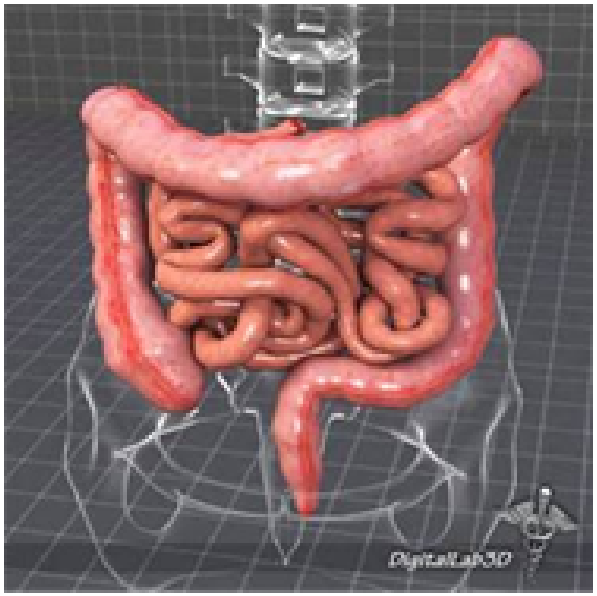
Regions of the Small Intestine

1. Ileum - located right after the jejunum, it is the longest section of the small intestine (over double the length of the jejunum), continues to absorb nutrients ceuse of villi, creates the attachment to the large intestine

The Large Intestine

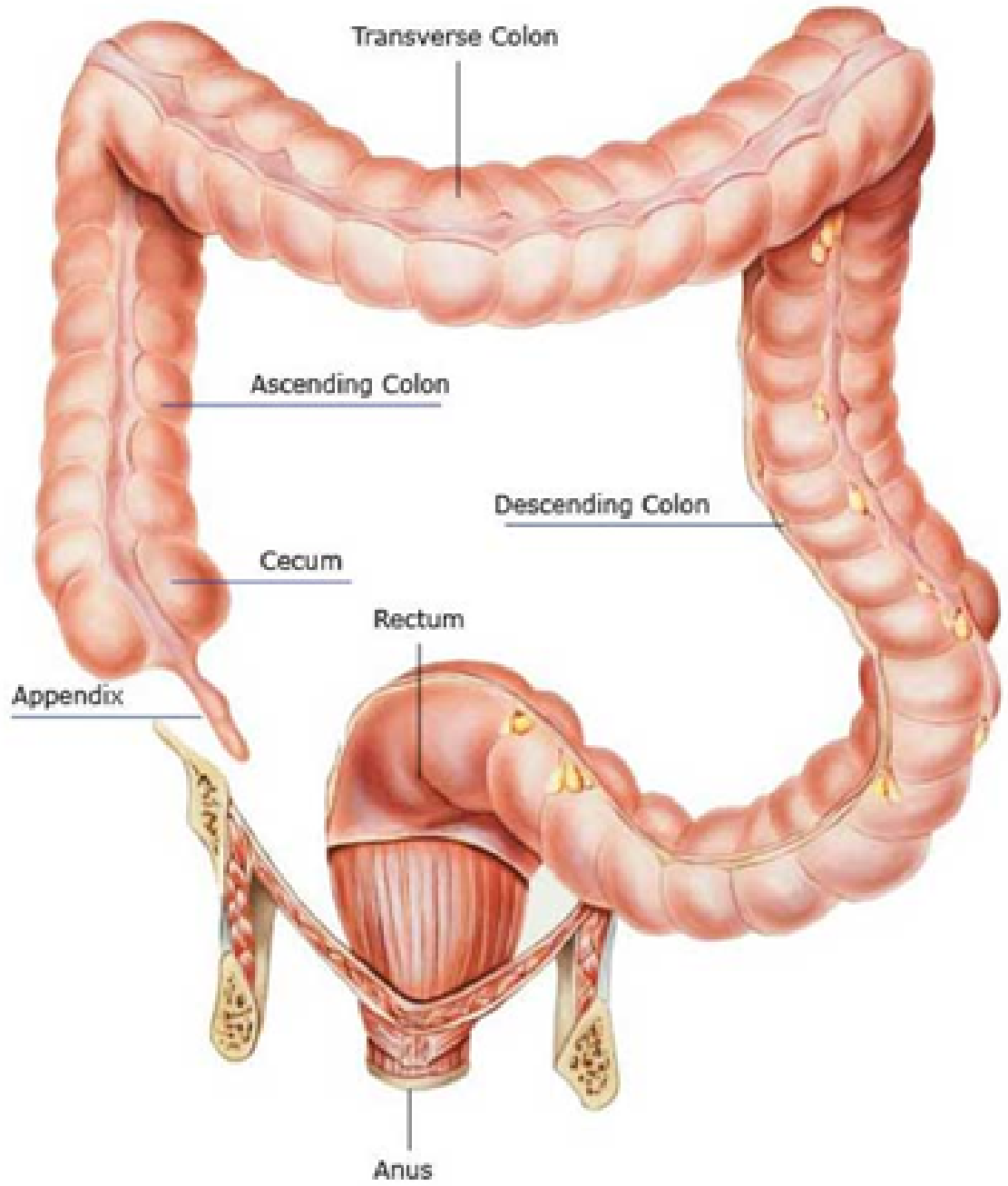
- includes the cecum, the colon, the rectum and the anal canal

- sucks most of the water out of the waste



The colon has 4 portions.

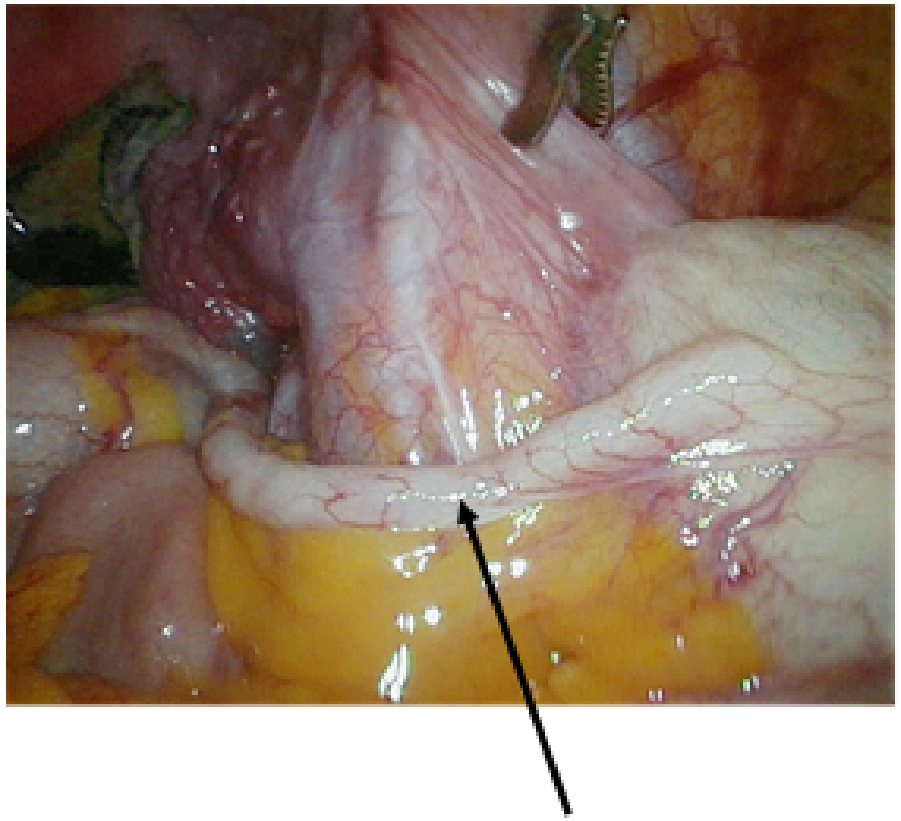
1. ascending colon
2. transverse colon
3. descending colon
4. sigmoid colon (enters into rectum)

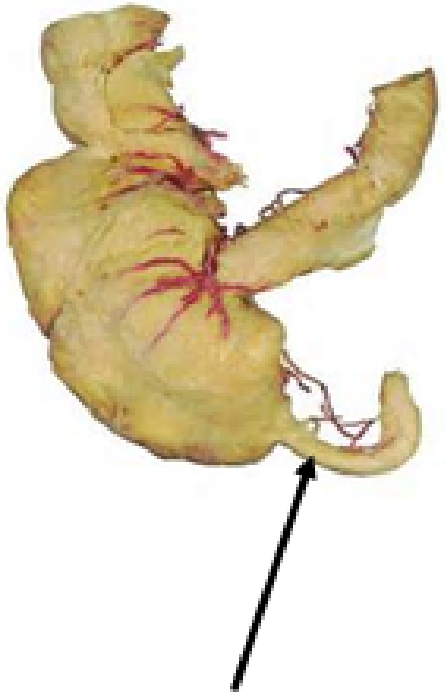


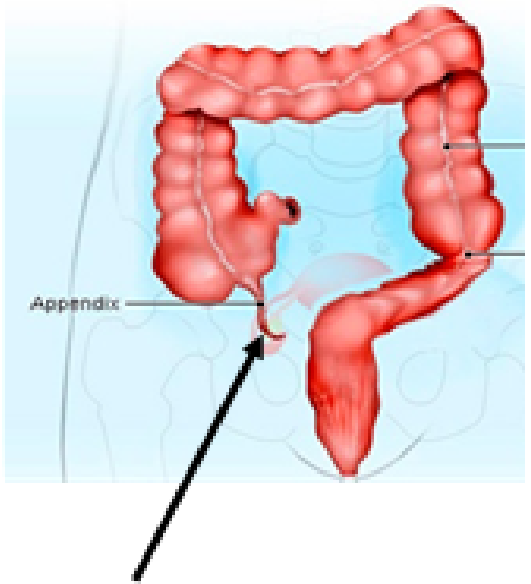
Large Intestine

The Large Intestine

- vermiform appendix - may play a role in fighting infections but is not needed and can be removed if it gets inflamed



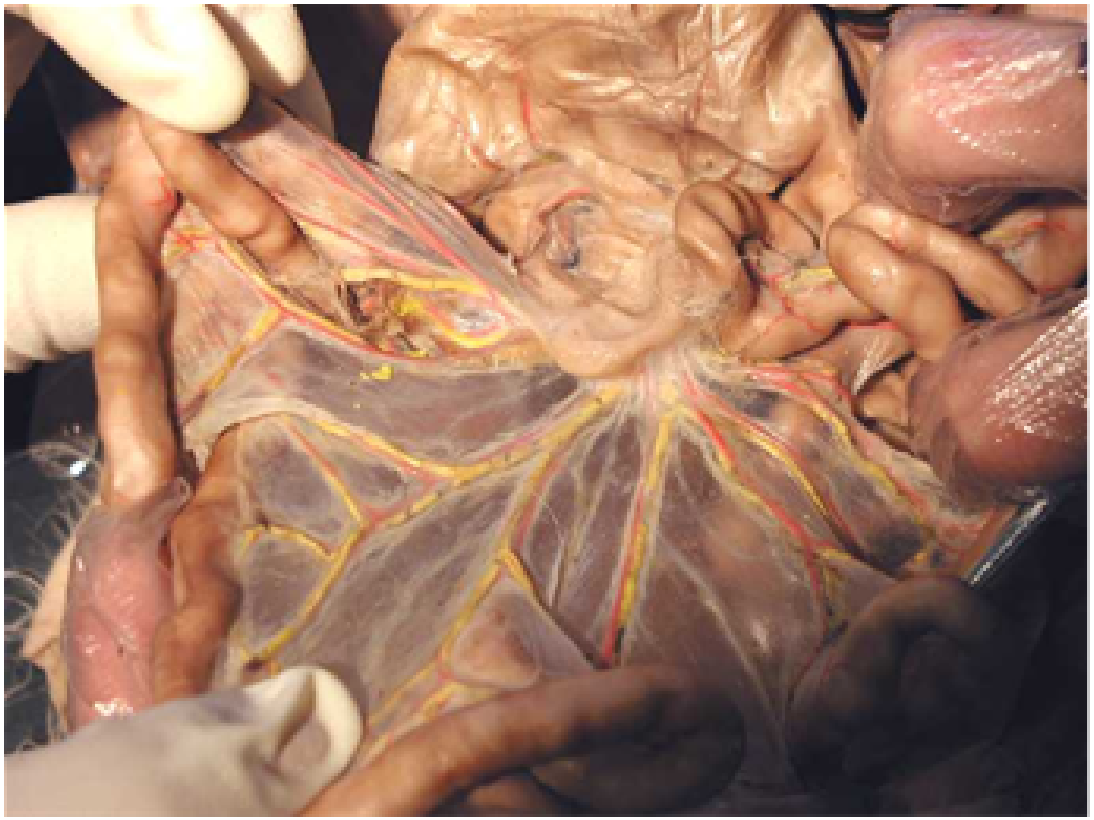


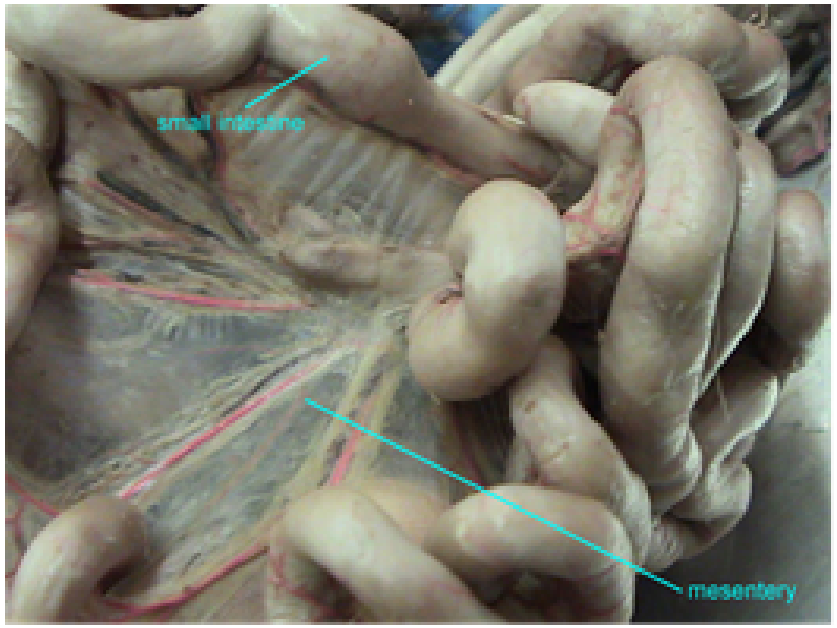


Peritoneum, a serous membrane covers and supports the abdomen

Mesentery

- a double layer of peritoneum, called the mesentery supports the visceral organs including blood vessels, nerves and lymphatic vessels





Mesentery

- Some portions of mesentery have specific names like lesser omentum (runs between the stomach and liver) and greater omentum (that hangs down in front of the intestines)

- contains fat that cushions and insulates

- contains macrophages to rid body of pathogens

- helps separate the parts to prevent spread of infection