

# The Human Digestive System

# Digestion

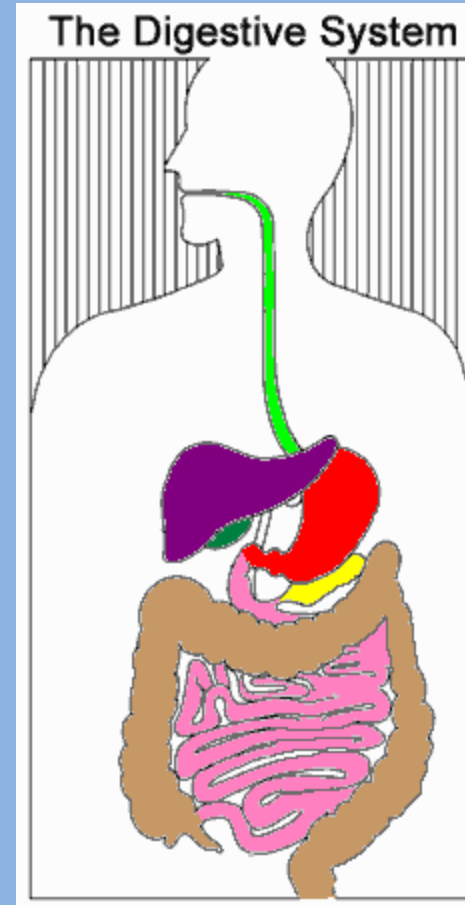
- Phases Include
  1. Ingestion
  2. Movement
  3. Mechanical and Chemical Digestion
  4. Absorption
  5. Elimination

# Digestion

- Types
  - Mechanical (physical)
    - Chew
    - Tear
    - Grind
    - Mash
    - Mix
  - Chemical
    - Enzymatic reactions to improve digestion of
      - Carbohydrates
      - Proteins
      - Lipids

# Digestive System Organization

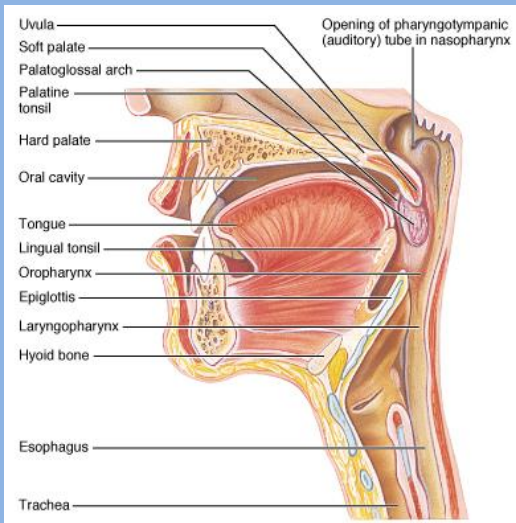
- Gastrointestinal (GI) tract
  - Tube within a tube
  - Direct **link/path** between organs
  - Structures
    - Mouth
    - Pharynx
    - Esophagus
    - Stomach
    - Small intestine
    - Large Intestine
    - Rectum



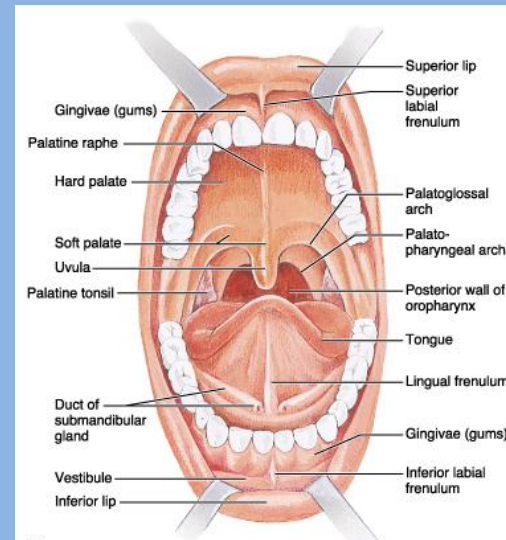
# Mouth

- Teeth mechanically break down food into small pieces. Tongue mixes food with saliva (contains amylase, which helps break down starch).

- Epiglottis is a flap-like structure at the back of the throat that closes over the trachea preventing food from entering it.



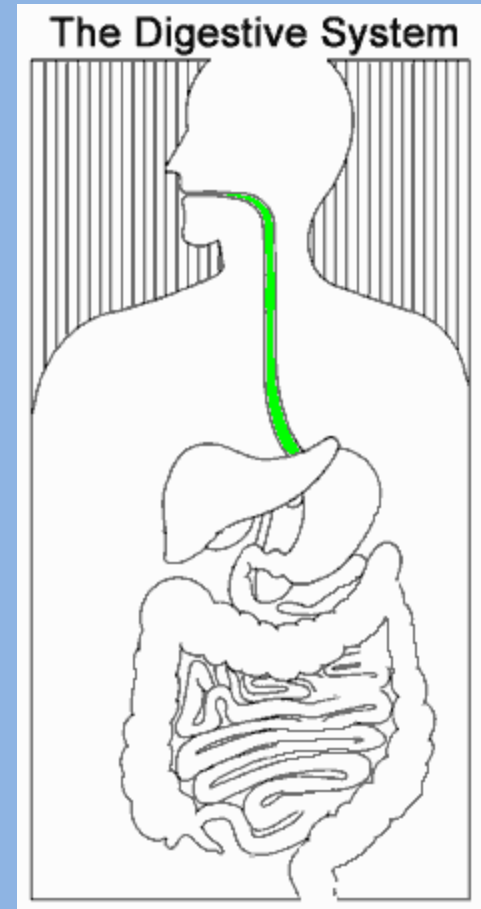
(a)  
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(b)  
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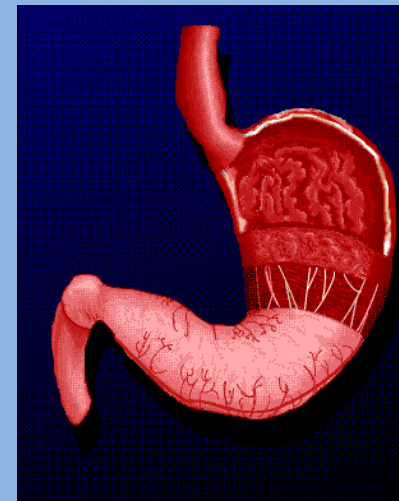
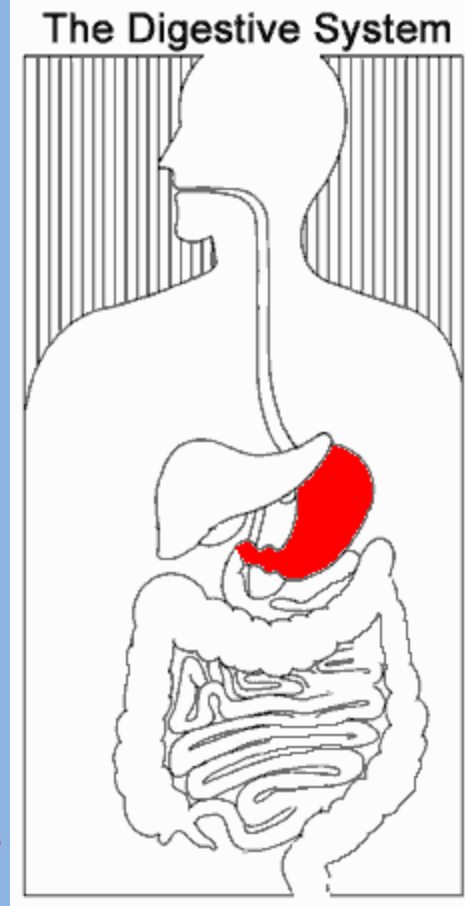
# Esophagus

- Approximately 10” long
- Functions include:
  1. Secrete **mucus**
  2. Moves food from the throat to the stomach using muscle movement called **peristalsis**
- If acid from the stomach gets in here that’s **heartburn**.



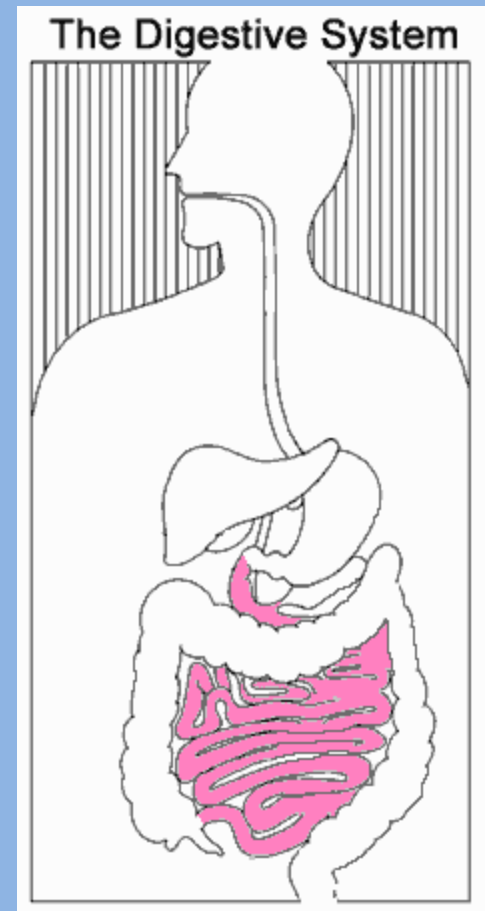
# Stomach

- J-shaped muscular bag that stores the food you eat, breaks it down into tiny pieces.
- Mixes food with **digestive juices** that contain enzymes to break down proteins and lipids.
- **Acid** in the stomach kills bacteria.
- Food found in the stomach is called **chyme**.

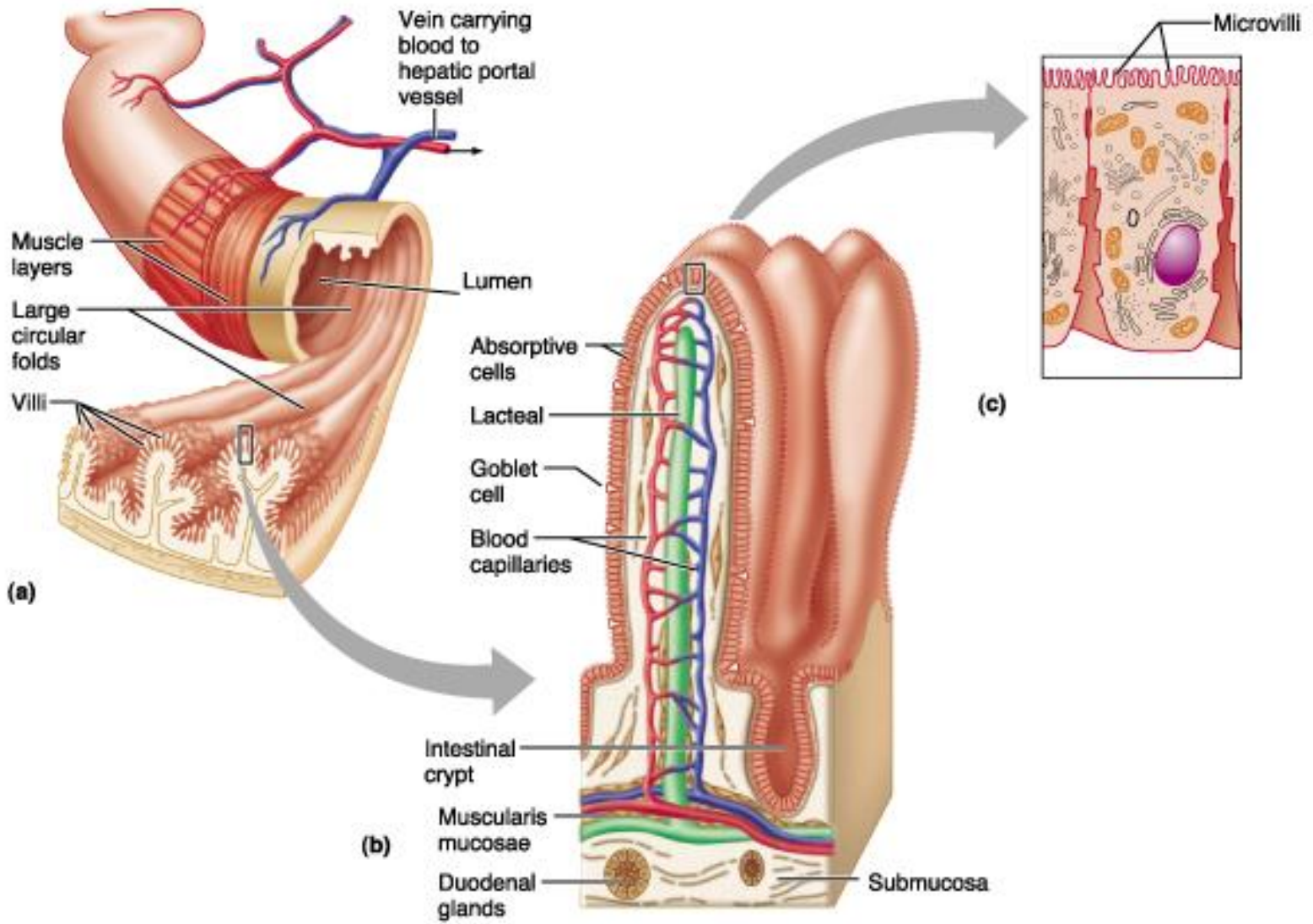


# Small Intestine

- Small intestines are roughly **7** meters long
- Lining of intestine walls has finger-like projections called **villi**, to increase surface area.
- The villi are covered in **microvilli** which further increases surface area for absorption.



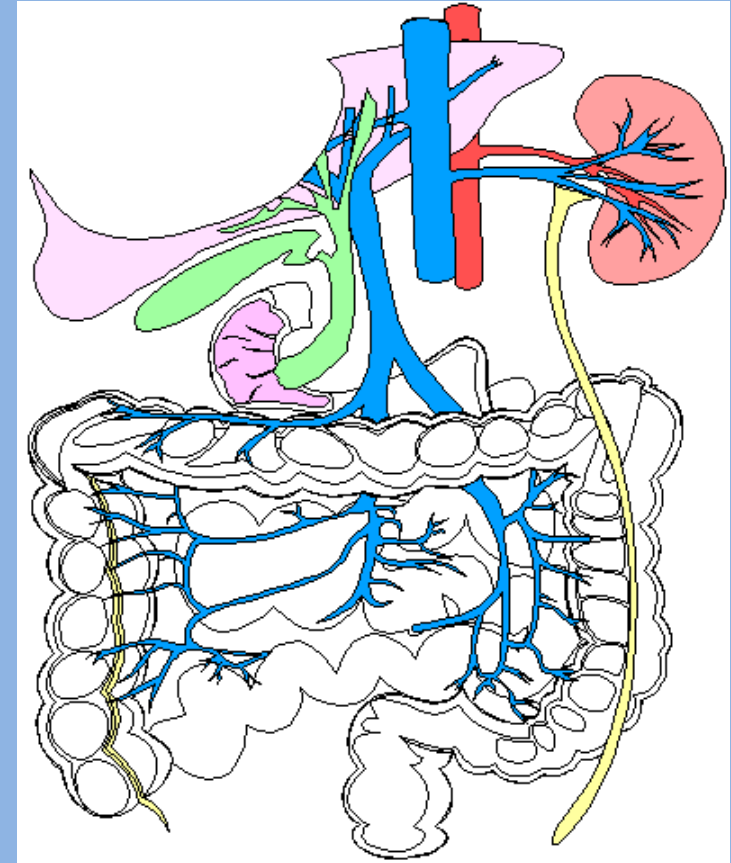




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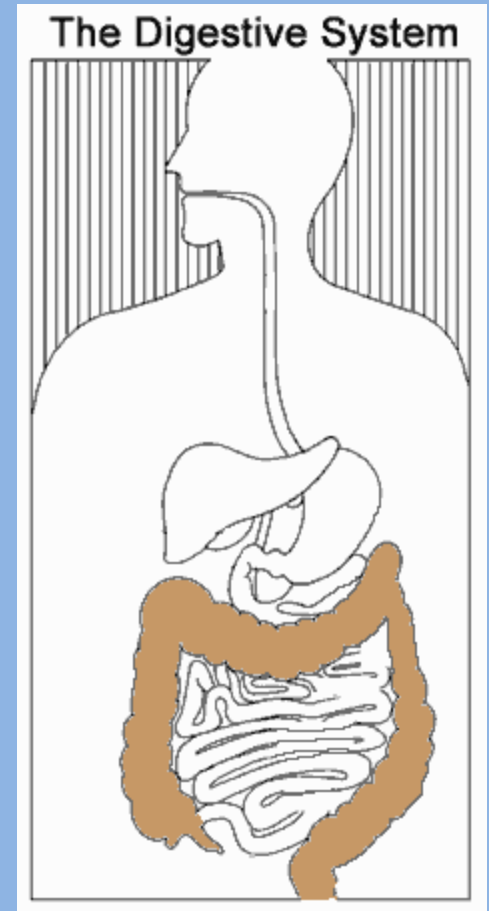
# Small Intestine

- Nutrients from the food pass into the **bloodstream** through the small intestine walls.
- Absorbs:
  - 80% ingested water
  - Vitamins
  - Minerals
  - Carbohydrates
  - Proteins
  - Lipids
- Secretes **digestive enzymes**



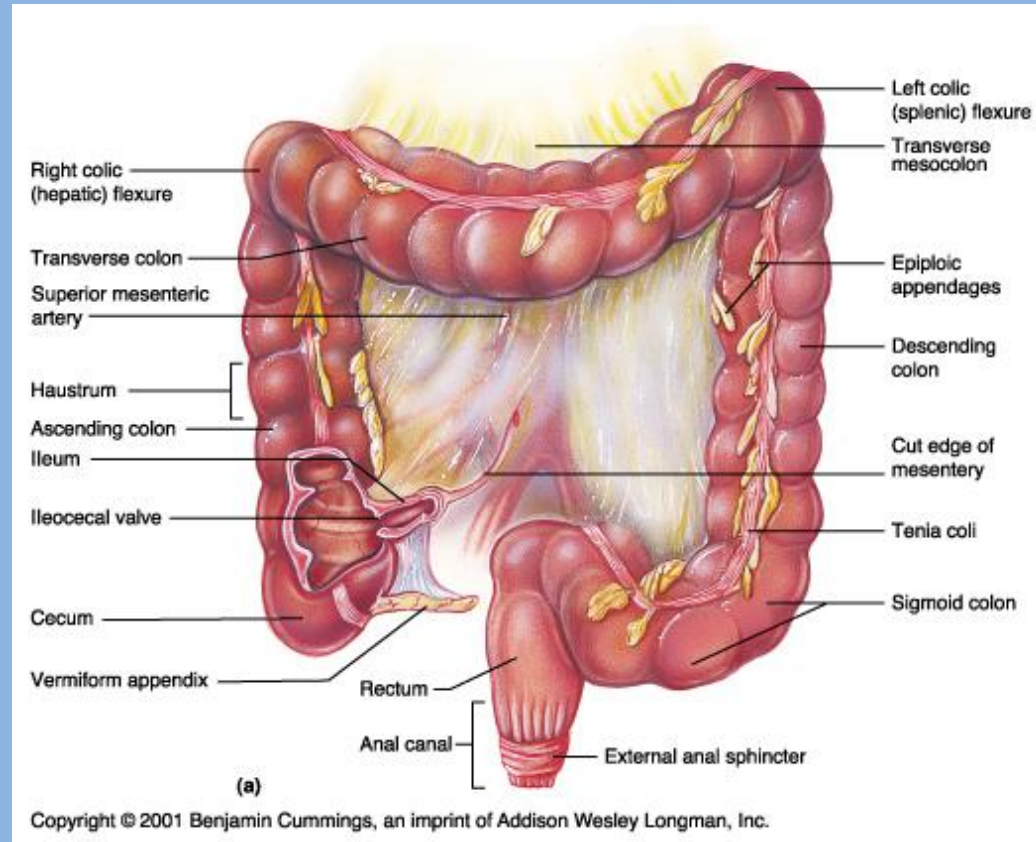
# Large Intestine

- About **5 feet** long
- Accepts what small intestines don't absorb
- **Rectum** (short term storage which holds feces before it is expelled).



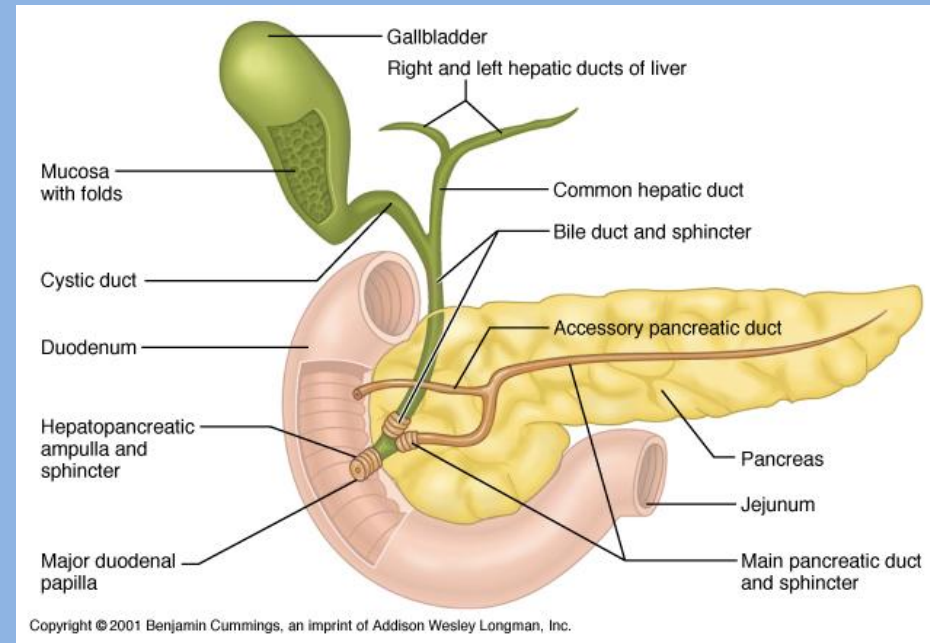
# Large Intestine

- Functions
  - Bacterial digestion
    - Ferment carbohydrates
    - Protein breakdown
  - Absorbs more **water**
  - Concentrate **wastes**



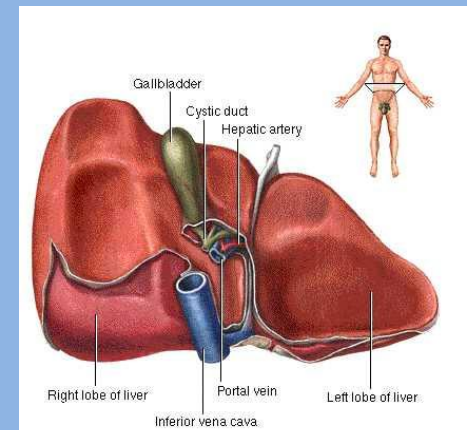
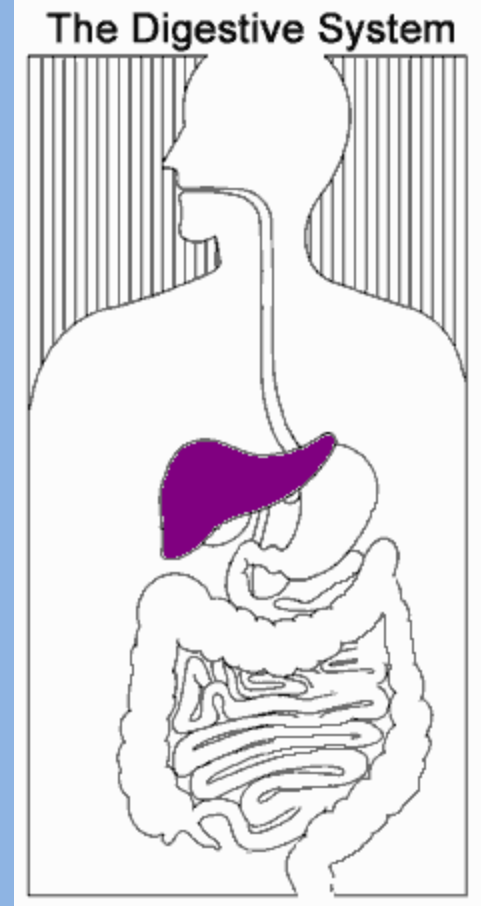
# Accessory Organs

- Not part of the path of food, but play a critical role.
- Include: Liver, gall bladder, and pancreas



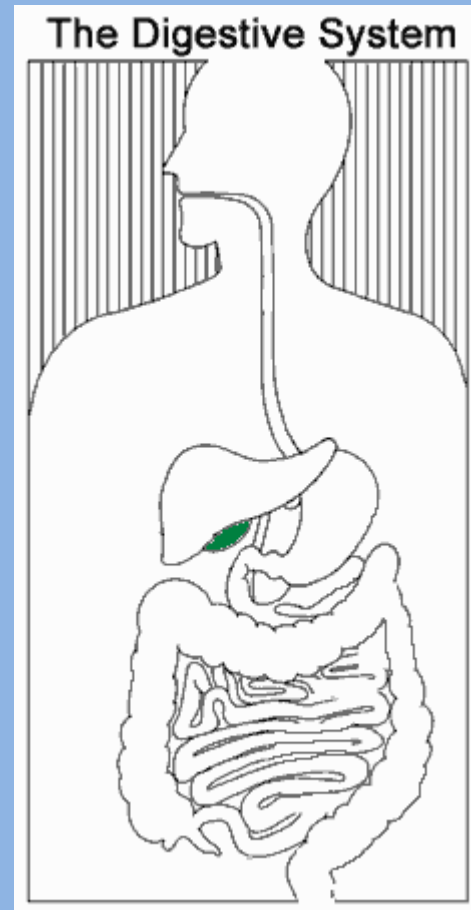
# Liver

- Directly affects digestion by producing **bile**
  - Bile helps digest **fat**
- filters out **toxins** and waste including **drugs** and **alcohol**



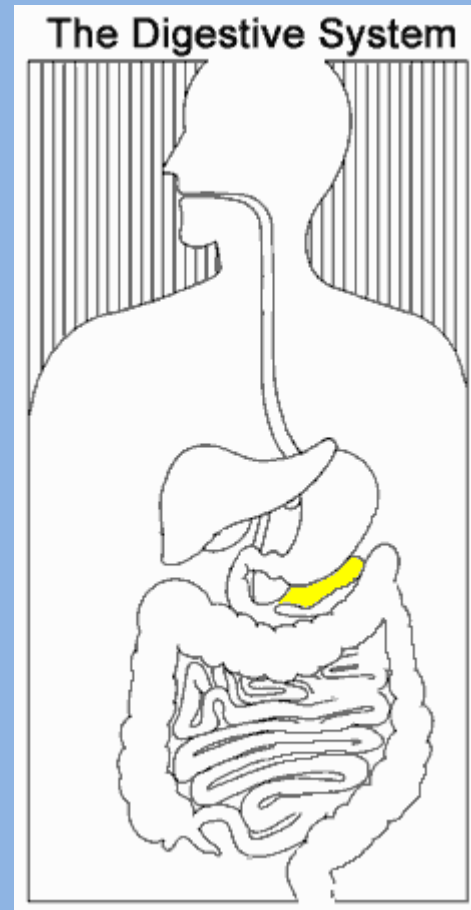
# Gall Bladder

- Stores bile from the liver, releases it into the small intestine.
- Fatty diets can cause gallstones

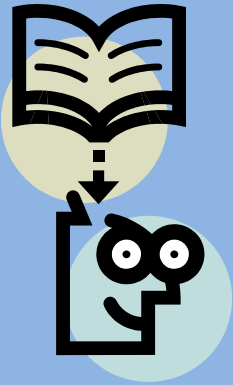


# Pancreas

- Produces digestive enzymes to digest **fats**, **carbohydrates** and **proteins**
- Regulates blood sugar by producing **insulin**







# Fun Facts

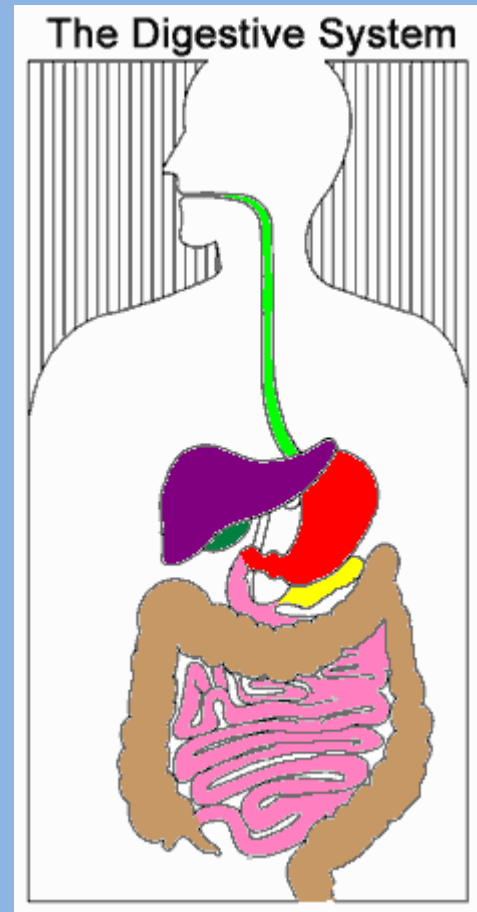
- HOW LONG ARE YOUR INTESTINES? At least 25 feet in an adult. Be glad you're not a full-grown horse -- their coiled-up intestines are 89 feet long!
- Food drying up and hanging out in the large intestine can last 18 hours to 2 days!
- In your lifetime, your digestive system may handle about 50 tons!!

Now it's...

QUIZ TIME!

On a sheet of paper, write the name of each colored organ:

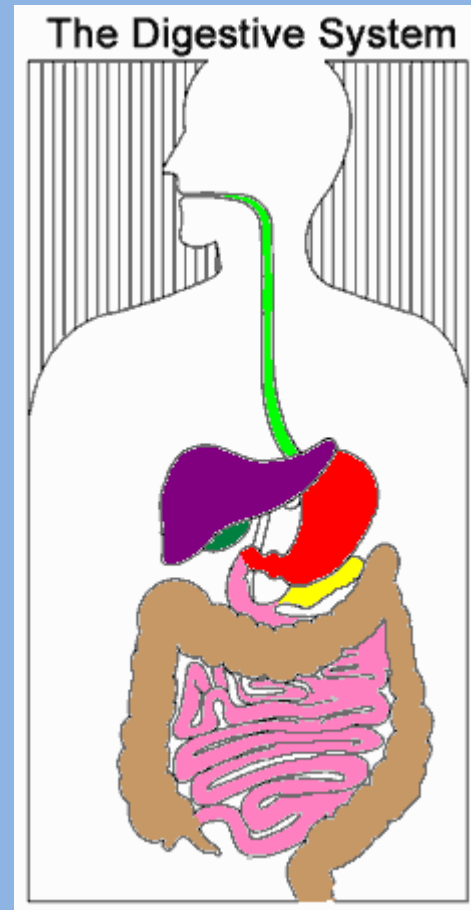
- Green:
- Red:
- Pink:
- Brown:
- Purple:
- Green:
- Yellow:



# How'd you do?

- Green: Esophagus
- Red: Stomach
- Pink: Small Intestine
- Brown: Large Intestine
- Purple: Liver
- Green: Gall Bladder
- Yellow: Pancreas

Great Job!



# References and Links

- [Your Digestive System and How It Works](#)
  - Digestive system diagram comes from this site
- [The Real Deal on the Digestive System](#)
- [Pancreas: Introduction and Index](#)
- [Your Gross and Cool Body - Digestive System](#)