# PEER Life Science Organ Systems Digestion Notes Outline

# **Why It Matters**

- The main purpose of the digestive system is to provide the body with <u>nutrients</u>, including
  - water
  - o proteins
  - o <u>carbohydrates</u>
  - lipids
  - o <u>vitamins</u>
  - o minerals
- The two main ways that the stomach breaks down proteins into amino acids are <u>acidic stomach juice</u> and <u>enzymes</u>
- <u>Bile</u> is secreted by the liver and helps separate fats so they can be broken down by enzymes and absorbed.
- Insulin is secreted by the <u>pancreas</u> and is involved in a disease called <u>diabetes</u>.

### **What We Know**

- Food first enters the body through the <u>mouth</u> where <u>saliva</u> begins to break down carbohydrates.
- The <u>esophagus</u> pushes food down into the stomach with muscular contractions.
- Bile is produced by the liver and is stored in the gall bladder.

- The <u>pancreas</u> helps digest carbohydrates, proteins, and fats as well as regulates blood sugar.
- The <u>small</u> intestine breaks down and absorbs proteins, carbohydrates, and fats. The <u>large</u> intestine absorbs moisture from what is left of the food.
- The final storage space before waste is removed is the rectum.
- Food stays in the <u>stomach</u> for 4-6 hours, the <u>small intestine</u> for 2-4 hours, and the <u>large intestine</u> for 24-48 hours
- The <u>pharynx</u> has openings that go into the lungs and to the esophagus/stomach.
- The <u>epiglottis</u> is the structure that covers the opening of the trachea and prevents food from entering the lungs.
- The body has a normal pH of <u>7.2</u>. The stomach has a pH of <u>2.5 or 2</u>.
- The stomach secretes <u>mucous</u> to protect the lining of the stomach and prevent ulcers.
- The pH of the small intestine is <u>higher</u> than the stomach.
- In addition to making bile, the liver:
  - Processes <u>carbohydrates</u>, <u>fats</u>, and <u>proteins</u> absorbed by the small intestine.
  - Breaks down hormones, <u>drugs</u>, and <u>toxins</u>
  - Makes the proteins in blood responsible for <u>clotting</u>
- The pancreas releases <u>insulin</u> when blood sugar is high and <u>glucagon</u> when blood sugar is low.

- The large intestine removes <u>fluid</u> and <u>salt</u> from solid waste and stores feces.
- The large intestine has many beneficial <u>bacteria</u> that aid in fermentation and produce vitamin K.

#### **How We Know**

- A cow's stomach has four (4) compartments.
- Enzymes in your saliva break down carbohydrates.
- Dr. Beaumont noted that <u>proteins</u> were especially degraded by acids in the stomach.
- The liver is a nutrient <u>storage</u> organ that releases stores as needed.
- The gall bladder is not necessary for life
- The pancreas secretes two hormones into blood
  - o <u>Insulin</u> triggers cells to absorb sugar from blood
  - Glucagon triggers cells to release sugar into blood
- There are two ducts that connect the pancreas and the <u>small</u> intestine.
- The <u>portal vein</u> collects all of the blood leaving the small intestine and has high amounts of carbohydrates and amino acids.
- Fats from the small intestine are absorbed through <u>lymphatic</u> vessels.
- Blood leaving the large intestine has more <u>water</u> and <u>salt</u> than the blood entering the large intestine.

- Bacteria can break down certain foods that humans cannot.
- Vitamin K is needed for normal blood <u>clotting</u>.

# **Common Hazards**

- Ulcers
  - A lesion in the mucus lining of the stomach or duodenum is called a peptic <u>ulcer</u>.
  - Causes of ulcers include
    - a <u>bacteria</u> called *Helicobacter pylori*
    - long term use of <u>NSAIDs</u>
    - a disease called Zollinger-Ellison syndrome that causes tumors that release hormones that causes large amounts of <u>acid</u> to be produced.
- Food Poisoning
  - Symptoms of food poisoning are
    - nausea
    - vomiting
    - abdominal cramps
    - fever
    - <u>diarrhea</u>

- Food poisoning can be avoided by
  - Washing your hands
  - <u>Cleaning</u> kitchen tools
  - Washing fruits and vegetables
  - Cooking food thoroughly
  - Refrigerating leftovers within 2 hours

Fill in the blanks labeling the digestive system. (Source: NIH NIDDK)

# The Digestive System

