

11-4 Details of Human Digestion

1. Name as many different organs found in the human digestion system as you can.

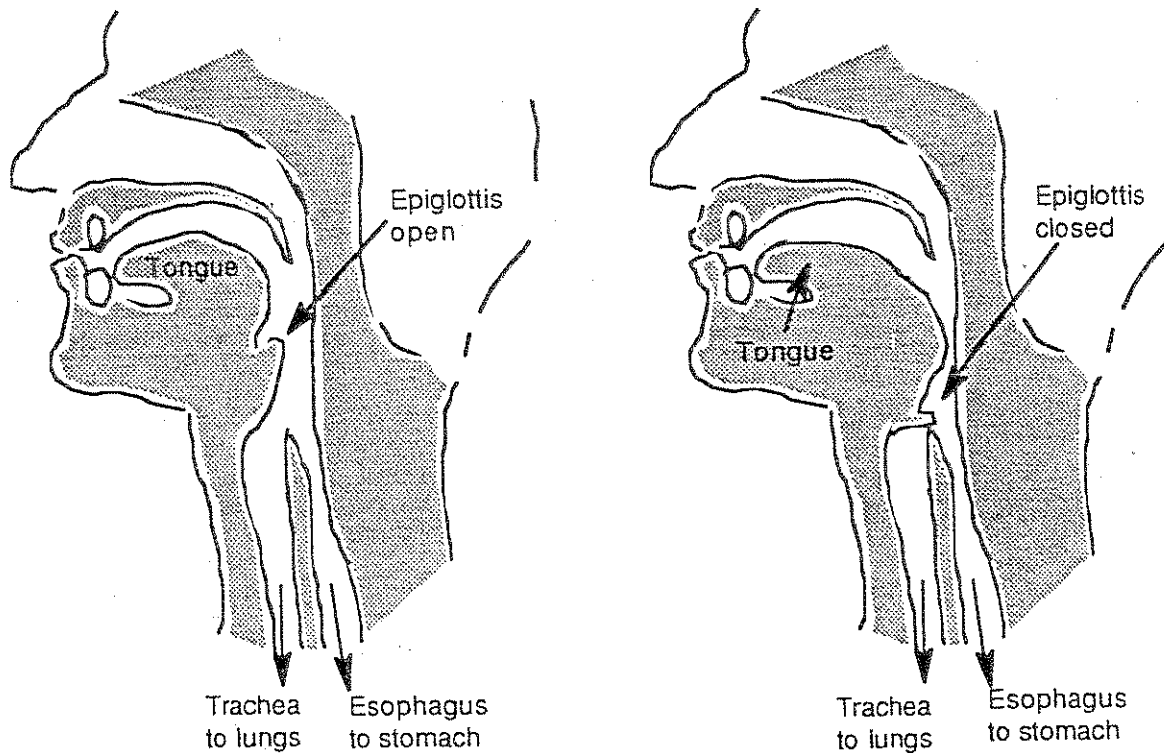
Objective

On a quiz you will be expected to list the names of all parts of the human digestive system, in order, and list the details of the functions of each part of the system.

In 11-3 you learned general functions for the human digestive system. Now you will look at the **details**. A **quiz** will follow and will cover both 11-3 and 11-4. First, spend 5 minutes reviewing the general functions for each part of the digestion system in the chart from 11-3 before going on. []

One term that is often used when studying digestion is the word "secretion". A secretion is a solution produced by a group of cells that acts outside of the cells that produced it. Digestive secretions often contain digestive enzymes. Read and carefully study the detailed chart below in order to answer the questions that follow:

| NAME OF STRUCTURE | NAME OF SECRETION | PURPOSE OF SECRETION | EQUATION SHOWING DIGESTIVE ACTION OF EACH SECRETION AND REQUIREMENTS & PRODUCTS |
|-------------------|--|---|--|
| MOUTH | - | - | The mouth receives saliva from the salivary gland (see below) |
| SALIVARY GLAND | (contains) saliva the enzyme amylase | to digest starch in the mouth | $\text{starch} \xrightarrow{\text{amylase}} \text{maltose}$ |
| ESOPHAGUS | none | - | - |
| STOMACH | gastric juice (contains HCl & the enzyme pepsin) | to digest protein in the stomach | $\text{protein} \xrightarrow[\text{HCl}]{\text{pepsin}} \text{shorter chains of proteins (polypeptides)}$ |
| SMALL INTESTINE | intestinal juice (contains the enzymes amylase, maltase, proteases, lipases, and carbohydrase) | to break down remaining fat, protein, and carbohydrates (like starch) | $\begin{aligned} \text{starch} &\xrightarrow{\hspace{1cm}} \text{maltose} \\ \text{maltose} &\xrightarrow{\hspace{1cm}} \text{glucose} \\ \text{double sugars} &\xrightarrow{\hspace{1cm}} \text{simple sugars} \\ \text{short protein chains} &\xrightarrow{\hspace{1cm}} \text{amino acids} \\ \text{fat} &\xrightarrow{\hspace{1cm}} 3 \text{ fatty acid mol.} + 1 \text{ glycerol mol.} \end{aligned}$ |



In the above drawing on the left, the **epiglottis** is shown as a small flap of tissue that is held open so that air entering the nose can move past the tongue into the trachea. The trachea, or windpipe, takes the air to the lungs. If the epiglottis stayed open while we were drinking liquid, the liquid would go into the trachea and lungs. This would cause choking and possibly death from suffocation. The drawing on the right shows what happens to the epiglottis when we are swallowing liquid or food. As we swallow, the tongue moves back and the epiglottis closes off the opening to the trachea. This prevents liquid and food from entering the lungs. Examine the drawing at the right again. Notice that the opening to the esophagus is still clear allowing food and liquid to enter the stomach. Sometimes we talk or laugh when swallowing. This forces the epiglottis to open for a moment, allowing liquid or food to get stuck in the trachea opening. This causes us to choke. We usually can cough up the material. Unfortunately, some people have died from such a blockage.

13. Name the tubes that lead to the lungs and stomach. Which is closest to the front of the throat?
14. Describe how the epiglottis prevents choking when we swallow food or liquid.
15. Why can we not breath while we are swallowing large quantities of liquid?
16. What is an ulcer?
17. Define peristalsis.

| NAME OF STRUCTURE | NAME OF SECRETION | PURPOSE OF SECRETION | EQUATION SHOWING DIGESTIVE ACTION OF EACH SECRETION AND REQUIREMENTS & PRODUCTS |
|-------------------|---|--|---|
| PANCREAS | pancreatic juice (contains the same enzymes as the intestinal juice does) | same as above pancreatic juice goes to the small intestine to do its work | SAME AS ABOVE |
| LIVER | bile | to break down fat so enzymes can digest it. (Emulsifies fat) | large fat pieces $\xrightarrow{\text{bile}}$ smaller fat particles |
| GALL BLADDER | stores bile | " | " |
| BILE DUCT | carries bile to the intestine | | the bile acts on fat in the small intestine |
| LARGE INTESTINE | - | - | - |
| ANUS | - | - | - |

Answer the questions that follow by referring to the chart above:

2. What is starch converted to in the mouth? What enzyme is involved?
3. Name the secretions from the stomach and describe their functions.
4. What is produced in the stomach when these 2 secretions finish their work?
5. Where is bile produced and where is bile stored?
6. Where does bile go to do its work?
7. What does bile act upon and what are the products?
8. What is the function of the bile duct?
9. What secretions (and enzymes) are produced by the pancreas?
10. These secretions travel to what other digestive system structure to do their work?
11. What other digestive system structure produces the same secretions (enzymes) as the pancreas?
12. List the food molecules acted upon by the enzymes of the pancreas and the small intestine. Also list the products produced, and which enzymes convert which requirements to what products?

REVIEW 11-3 & 11-4 for the quiz that follows this activity. You may find this quiz a little more difficult than earlier ones, since this material contains considerable detail and many new terms. It will be wise, therefore, to spend a little extra time reviewing.