

# Breakdown of food

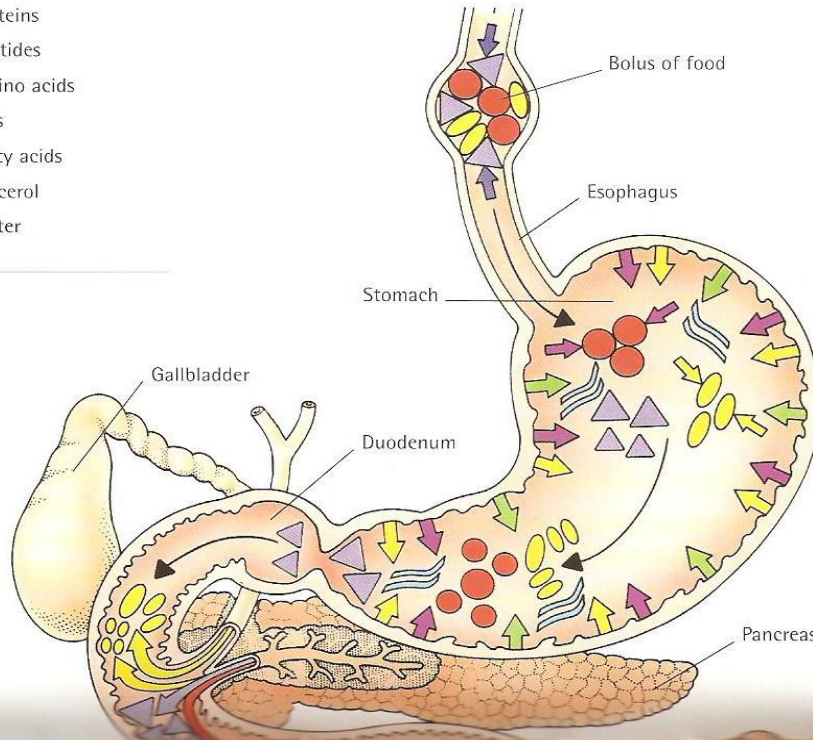
The digestive process breaks down food by chemical and mechanical action into substances that can pass into the bloodstream and be distributed to body cells. Certain nutrients, such as salts and minerals, can be absorbed directly into the circulation. Fats, complex carbohydrates, and proteins are broken down into smaller molecules before being absorbed. Fats are split into glycerol and fatty acids; carbohydrates are split into monosaccharide sugars; and proteins are split into linked amino acids called peptides, and then into individual amino acids.

## KEY

- |                                 |  |
|---------------------------------|--|
| ➔ Salivary amylase              | ▲ Disaccharides (maltose, sucrose, and lactose)      |
| ➔ Pancreatic amylase            | ⚡ Monosaccharides (glucose, fructose, and galactose) |
| ➔ Maltase, sucrase, and lactase | ● Proteins   |
| ➔ Pepsin                        | ● Peptides   |
| ➔ Trypsin and chymotrypsin      | ● Amino acids  |
| ➔ Peptidase                     | ● Fats   |
| ➔ Lipase                        | ● Fatty acids  |
| ➔ Bile salts                    | ● Glycerol   |
| ➔ Hydrochloric acid             | ⋯ Water  |
| ➔ Starch                        |  |

## 1 Mouth and Esophagus

Food is chewed with the teeth and mixed with saliva. The enzyme amylase, present in saliva, begins the breakdown of starch into sugar. Each lump of soft food, called a bolus, is swallowed and propelled by contractions down the esophagus to the stomach.



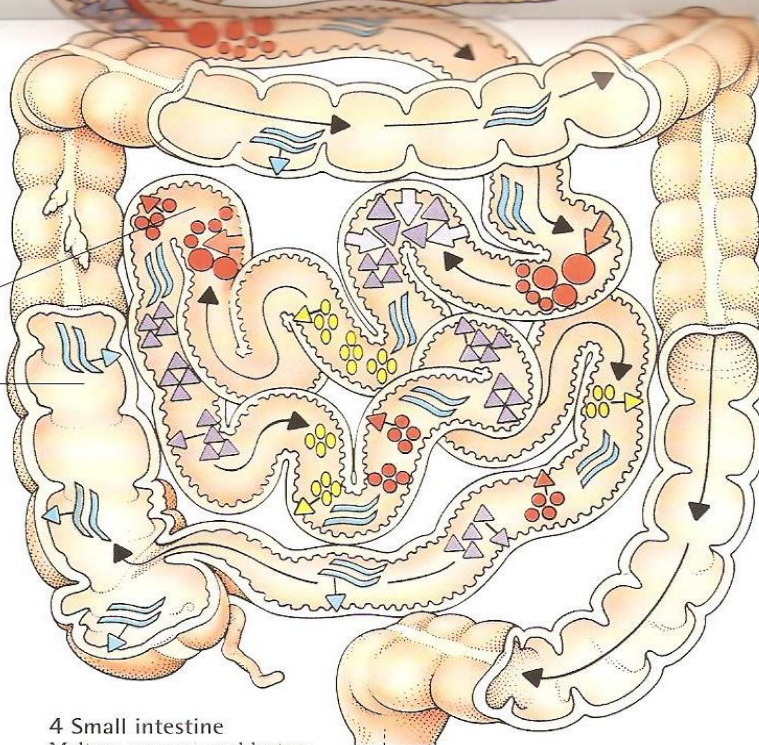
## 2 Stomach

Pepsin is an enzyme produced when pepsinogen, a substance secreted by the stomach lining, is modified by hydrochloric acid (also produced by the stomach lining). Pepsin breaks down proteins into smaller units called polypeptides and peptides. Lipase is a stomach enzyme that breaks down fats into glycerol and fatty acids. The acid produced by the stomach also kills bacteria.

## 3 Duodenum

Lipase, a pancreatic enzyme, breaks down fats into glycerol and fatty acids. Amylase, another enzyme produced by the pancreas, breaks down starch into maltose, a disaccharide sugar. Trypsin and chymotrypsin are powerful pancreatic enzymes that split proteins into polypeptides and peptides.

Small intestine  
Large intestine



## 4 Small intestine

Maltase, sucrase, and lactase are enzymes produced by the lining of the small intestine. They convert disaccharide sugars into monosaccharide sugars. Peptidase, another enzyme produced in the intestine, splits large peptides into smaller peptides and then into amino acids.

## 5 Large intestine

Undigested food enters the large intestine, where water and salt are absorbed by the intestinal lining. The residue, together with waste pigments, dead cells, and bacteria, is pressed into feces and stored for excretion.