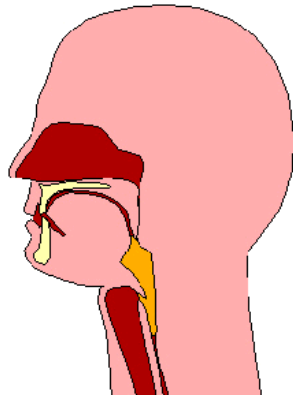


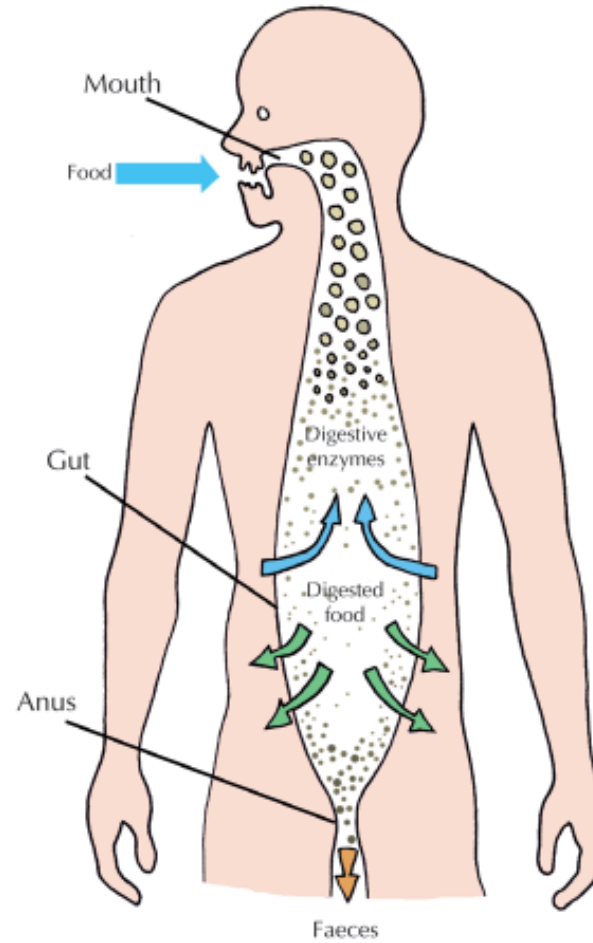
The Digestive System and Enzymes

What is Digestion?



Digestion is the breakdown of large, insoluble food molecules into small soluble food molecules.

How Digestion Works

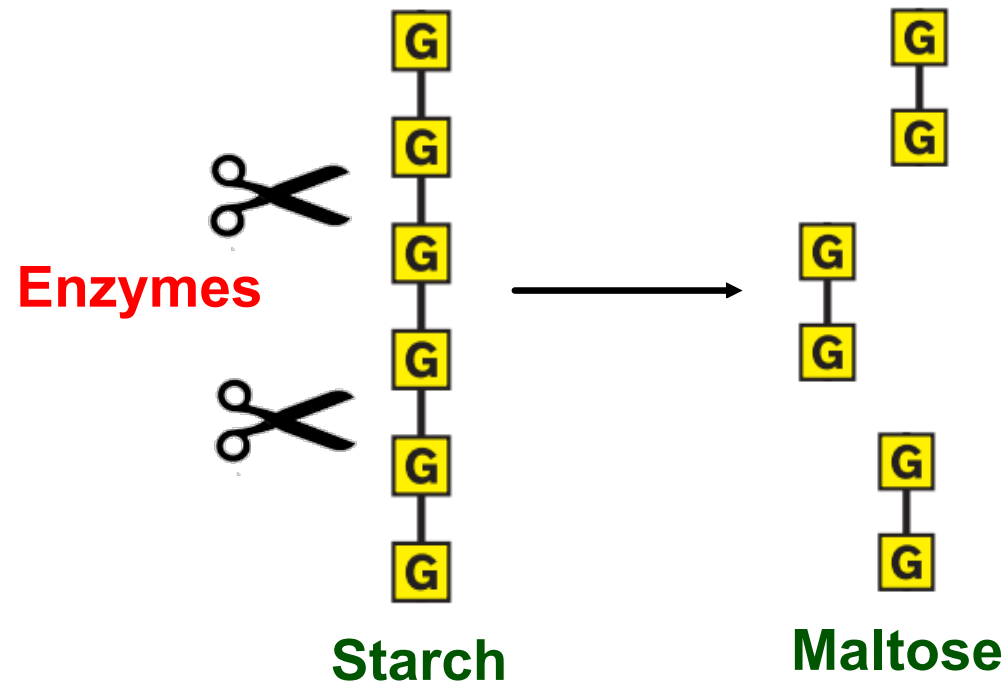


Types of Digestion

1. **Physical Digestion** - Food is broken down by teeth and the churning action of the muscular stomach.

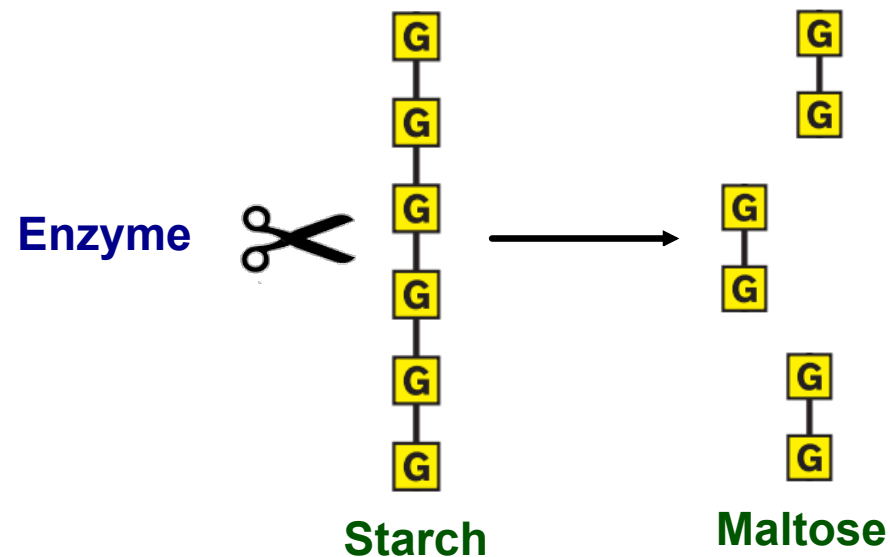


2. **Chemical Digestion**- Food is broken down by special chemicals called **enzymes**. These act like a scissors and cut food into smaller molecules.



Enzymes

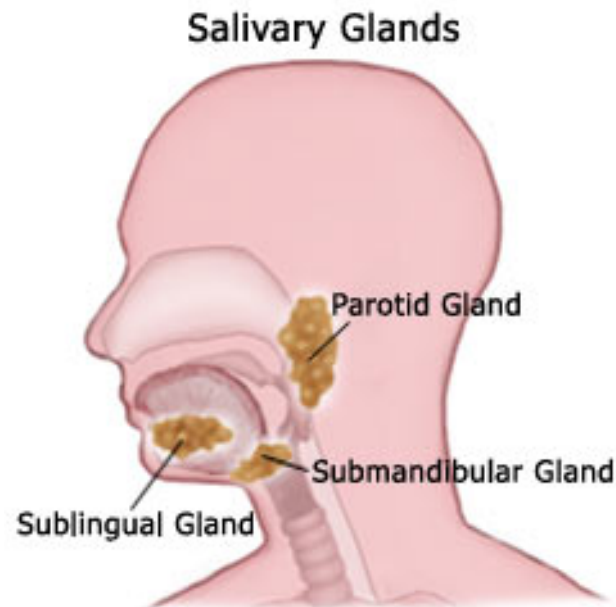
- Enzymes are biological catalysts. They speed up the reaction.
- Starch is broken down into **Maltose** (a 2 Glucose sugar).
- Starch is broken down in the mouth by an enzyme called **Amylase**.
- Amylase is found in **Saliva**.



You must learn:

Starch + Amylase → Maltose + Amylase

Substrate + Enzyme → Product + Enzyme



Experiment

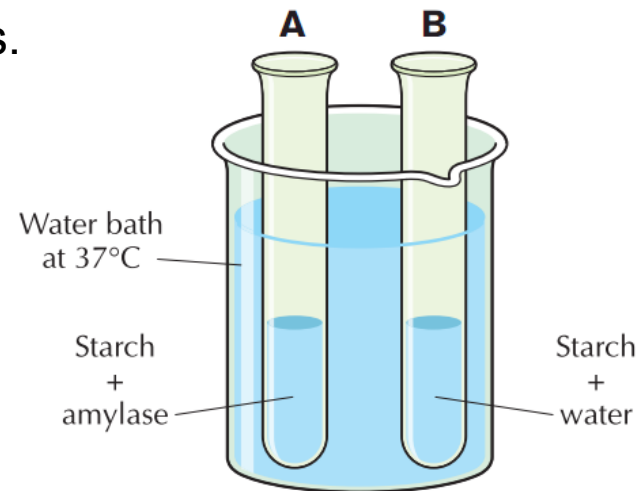
To investigate the action of Amylase on Starch:

In this experiment we want to see if amylase can break down starch.

To keep amylase working we have to keep it at 37°C, so we keep it in a **water bath**.

Our control (to compare against) is starch and water with no amylase. The control is test tube B.

We heat both test tubes to 37°C for 5 minutes.



continued...

We then add Iodine to both test tubes.

What happens?

Iodine turns a blue/black colour when starch is present.

Test tube A should turn Blue/Black while test tube B should turn brown.

After 5 minutes at 37°C the test tube with starch changed to a clear colour.

This shows that starch is broken down to Maltose by Amylase in our saliva.

Results

Test tube **A** stays brown when Iodine is added.

This is because the Amylase has broken down the Starch into **Maltose**.

This is put into test tube **C**.

When Benedicts solution is added the Maltose turns **Brick Red**.

Test tube **B** turns **Blue/Black** when Iodine is added.

This is because the starch is not broken down. (No Amylase)

This is put into test tube **D**.

When Benedicts solution is added the solution stays **Blue**. (No Maltose)

This shows that Amylase breaks down Starch into Maltose.

The Digestive System

Stages in Nutrition

1. Eating - Food is taken into the mouth (Ingestion).
2. Digestion - The food is broken down into smaller, soluble pieces.
3. Absorption - digested food enters the bloodstream and then cells.
4. Egestion - getting rid of undigested wastes.

The digestive system is a long tube that stretches from mouth to anus.

1. Mouth

Digestion begins with chemical digestion by enzymes and physical breakdown of food by the teeth.

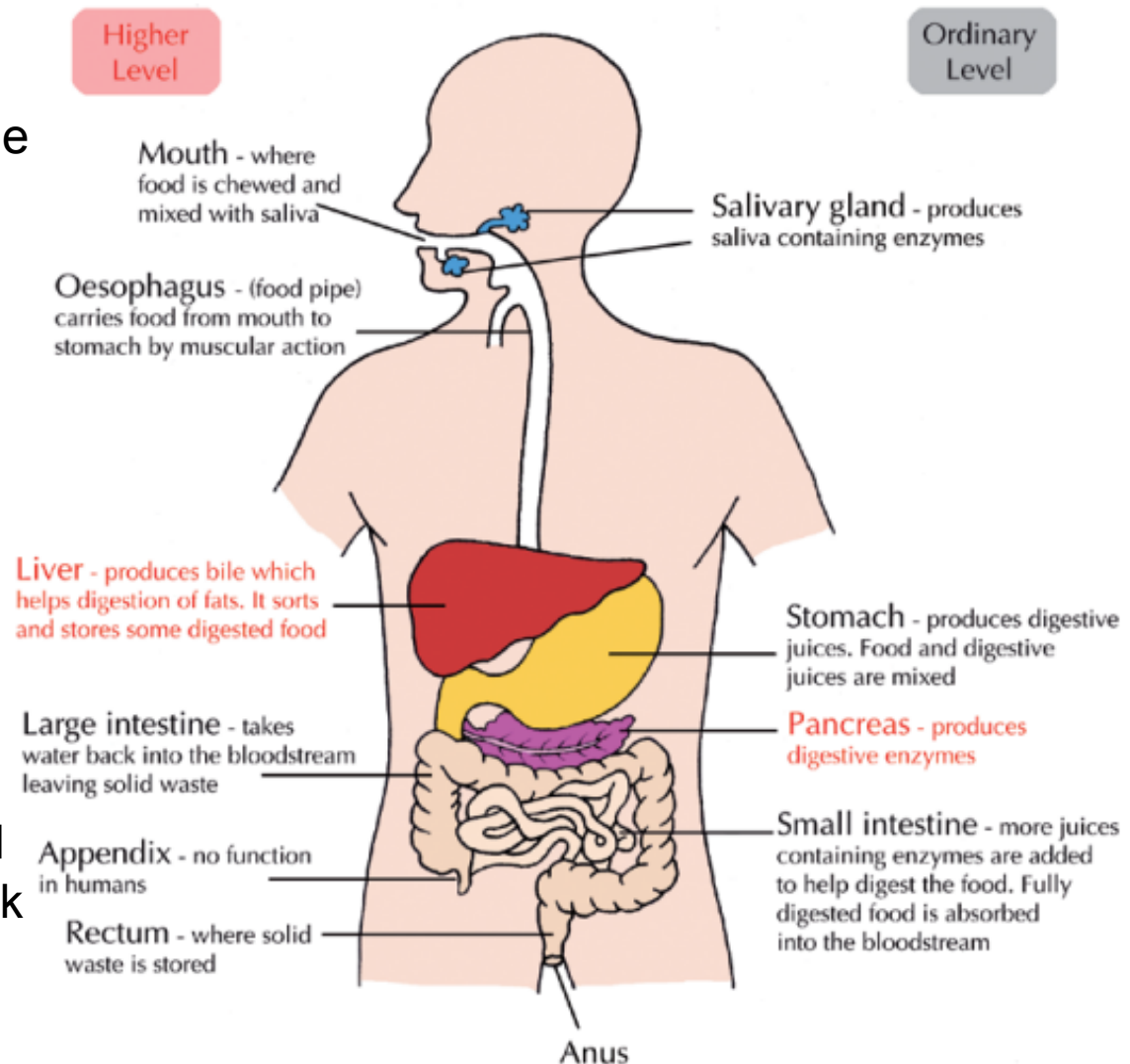
2. Oesophagus

This is a muscular tube that carries food to the stomach.

3. Stomach

This is a muscular bag that holds food for 3-4 hours.

It produces enzymes and Hydrochloric acid to break down foods. It also squeezes the food and helps break it down.



4. Small Intestine

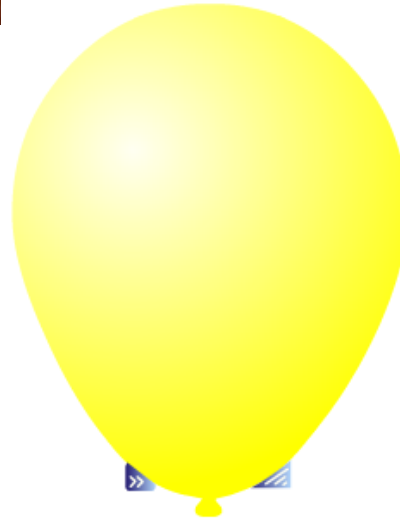
More enzymes are added here to breakdown food and then it is passed into the bloodstream. This is known as absorption.

5. Large Intestine

The large intestine removes any extra water from the leftover food and then it egests the food as faeces through the rectum and out of the anus.

Teeth

Teeth can tell you a lot about an animal.
What do you think these animals are and eat?



Human Teeth types

Did you know?

An adult human has 32 teeth.





Baby teeth are known as Milk teeth.

Incisor - used for cutting and biting food

Canine - used for tearing food

Premolar - used for crushing food

Molar - used for grinding food

TOOTH TYPE	SHAPE OF TOOTH	FUNCTION
Incisor		Cutting and biting food
Canine		Tearing food
Premolar		Crushing and grinding food
Molar		Crushing and grinding food