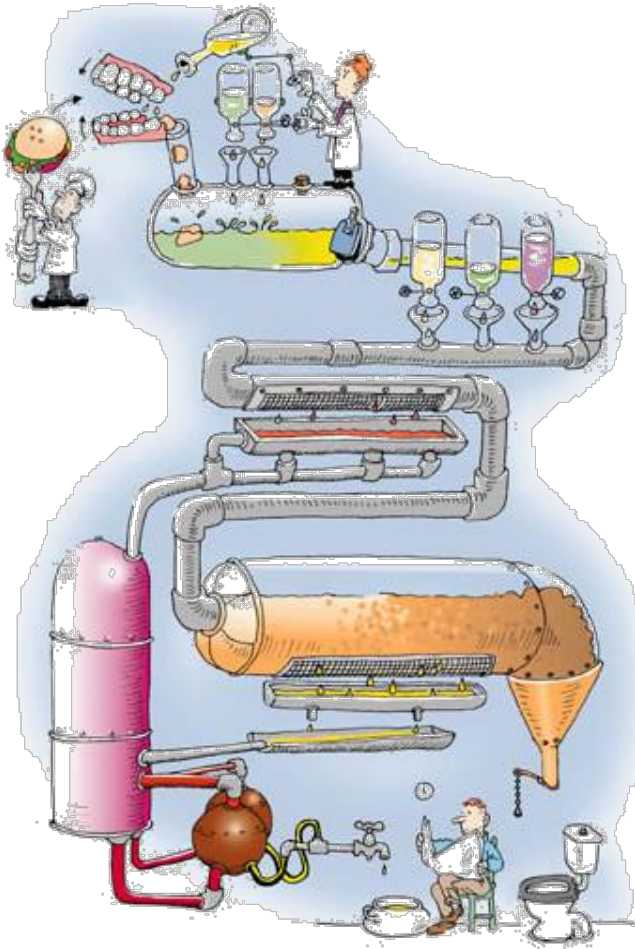




The Digestive system



The **digestive system** converts foods to simple substances that can be absorbed and used by the cells of the body. It is composed of the mouth, pharynx, oesophagus, stomach, small intestine and large intestine and is aided by several accessory organs (liver, gall bladder, and pancreas).

The journey of food through the body

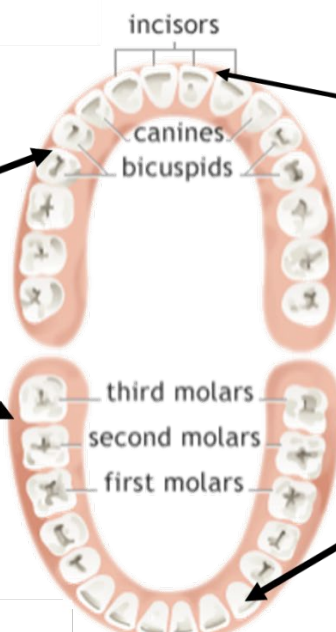
In summary the food enters the mouth (**ingestion**) and is broken into smaller pieces by the teeth and saliva then the stomach and various enzymes and acid (**digestion**). The small intestine is where most of the food passes into the blood stream (**absorption**) and further down in the large intestine the water is reclaimed. The waste products from the digestive system are then passed out of the body (**egestion**)

We also have numerous "helpful" bacteria which also help digest the food.

The teeth

There are 32 teeth in a full set of adult teeth.

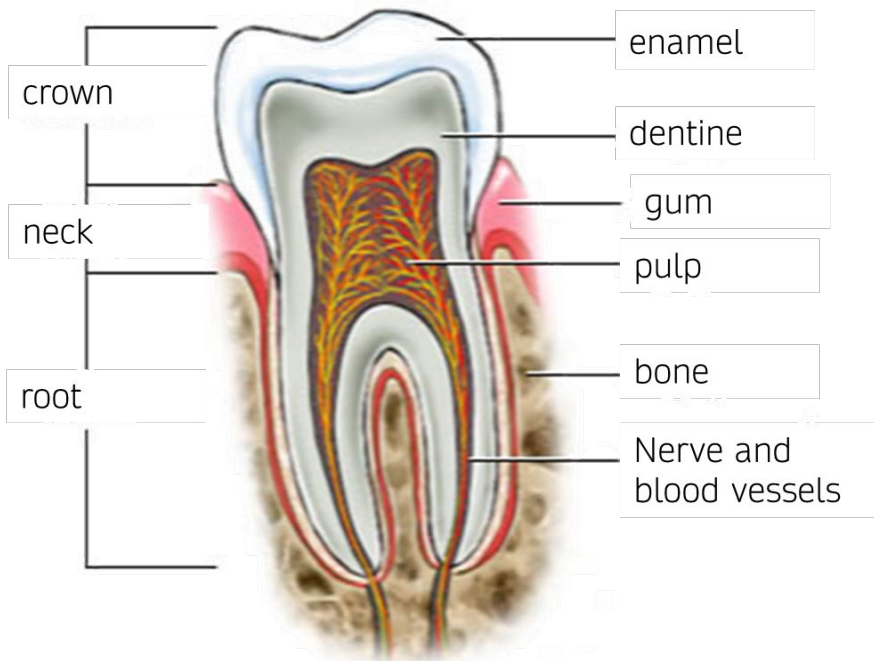
The bicuspid (also called premolars) and the molars at the back of the mouth are used to chew food.



The incisors at the front of the mouth are used to bite pieces of food.

The canines are bigger and used to tear food.

The internal structure of a human tooth.



The tooth has a hard covering of **enamel** which protects it and gives it strength to bite and chew food. When tooth decay occurs, the enamel is eaten away by bacteria and tooth pain occurs because acid and infection reach the **dentine** and tooth nerves. The tooth is embedded into the jaw bone by the **roots** which secure it.

The gut is a coiled tube and is the site of digestion and absorption.

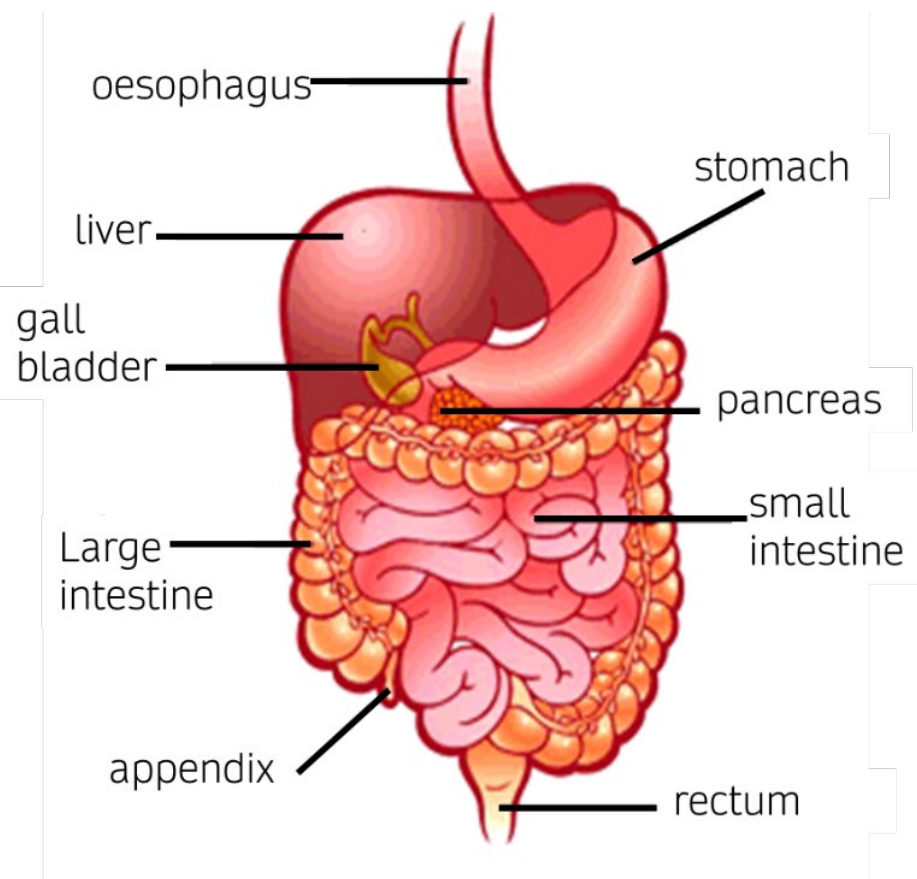
The second stage in food processing is digestion

Definition Digestion
Breaking food into smaller pieces

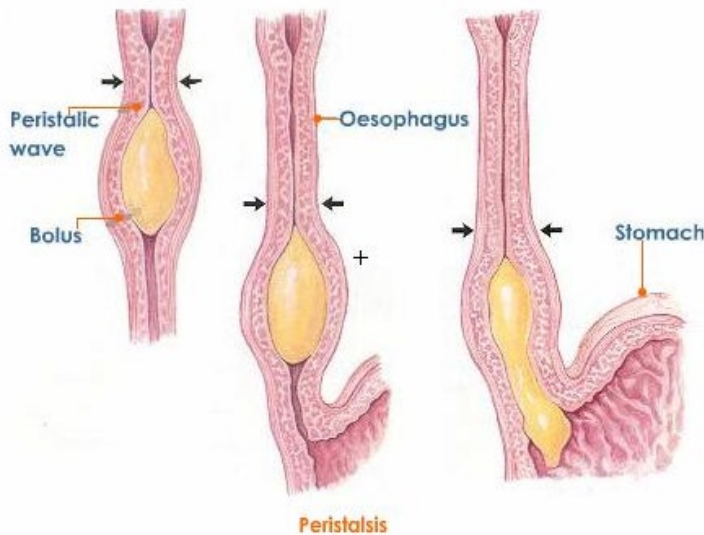
Once food is ingested it moves down into the oesophagus and then into the stomach

Definition Oesophagus
The tube that food travels from the mouth to the stomach through

Definition Stomach
Organ from the digestive system that digests food



Oesophagus.



The **oesophagus** is like a stretchy pipe that's about 25 centimeters long. It moves food from the back of your throat to your stomach. When you swallow a small ball of mashed-up food or liquids, a special flap called the **epiglottis** closes over the opening of your windpipe to make sure the food enters the oesophagus and not the windpipe.

Once food has entered the oesophagus, muscles in the walls move in a wavy way to slowly squeeze the food through the oesophagus (peristalsis) and into the stomach.

Stomach.

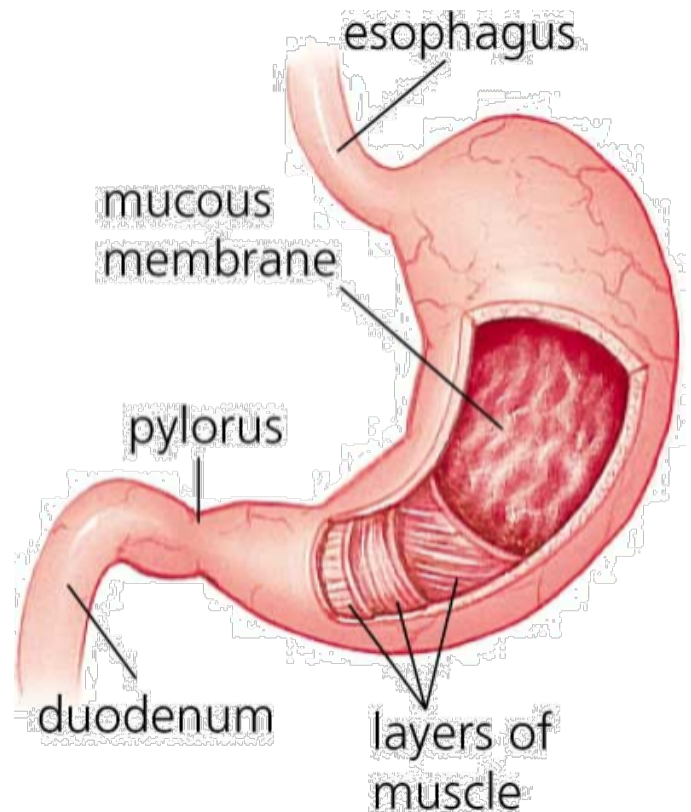
Your stomach is attached to the end of the oesophagus.

It has three important functions:

- ☐ to store the food you've eaten
- ☐ to break down the food into a liquid mixture
- ☐ to slowly empty that liquid mixture into the small intestine

The stomach mixes, churns and mashes together all the small pieces of food into smaller and smaller pieces – called digestion.

It does this with help from the strong muscles in the walls of the stomach and **gastric juices** that also come from the stomach's walls. In addition to breaking down food, gastric juices also help kill bacteria that might be in the eaten food.



Small intestine.

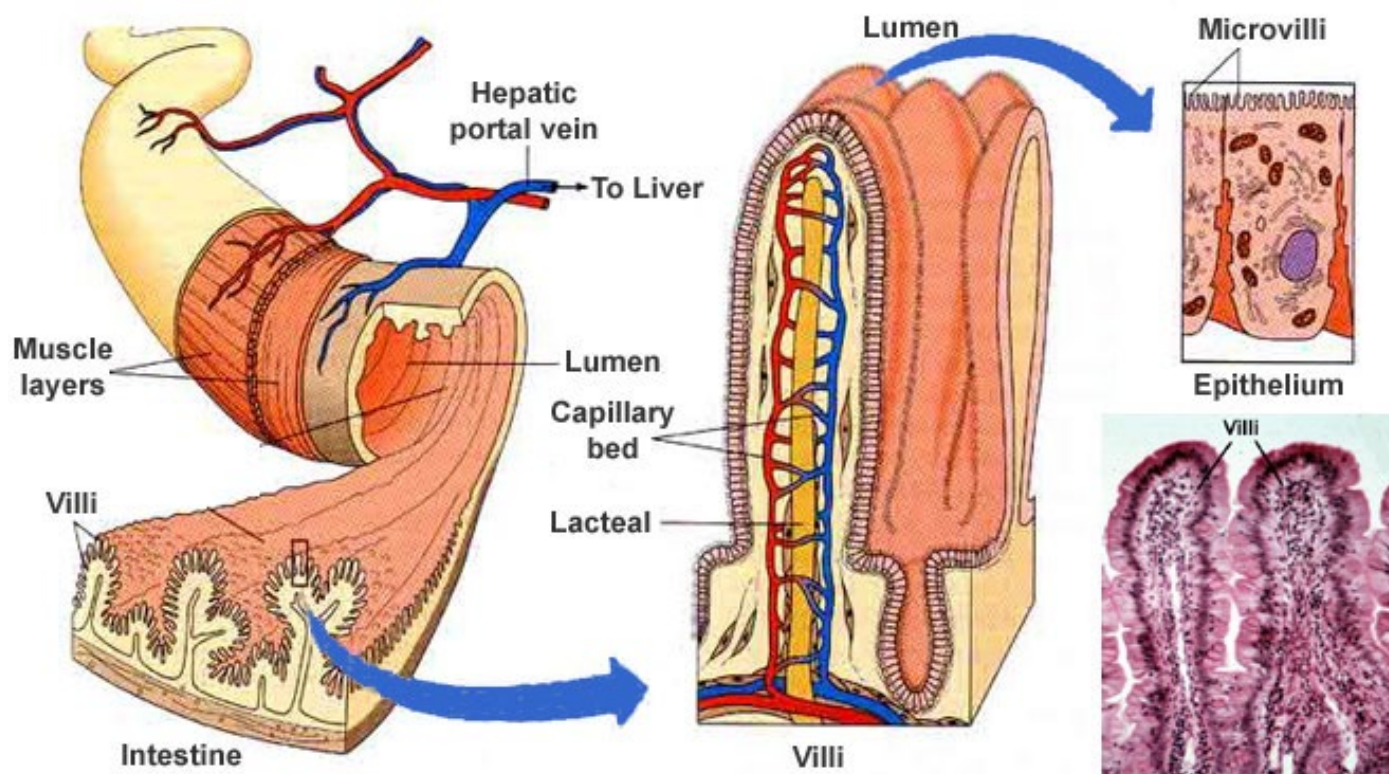
The **small intestine** is a long tube around 3.5 to 5 centimeters around, which connects from beneath your stomach and is about 7 meters long.

The small intestine breaks down the food mixture even more so your body can absorb all the vitamins, minerals, **proteins**, **carbohydrates**, and **fats**.

Food may spend as long as 4 hours in the small intestine and will become a very thin, watery mixture which can pass from the intestine into the blood.

The small intestine is the site of absorption of the products of digestion.

The walls of the small intestine are covered in protruding villi which increase the **surface area** and provide close contact for capillaries to absorb small food particles through the wall.



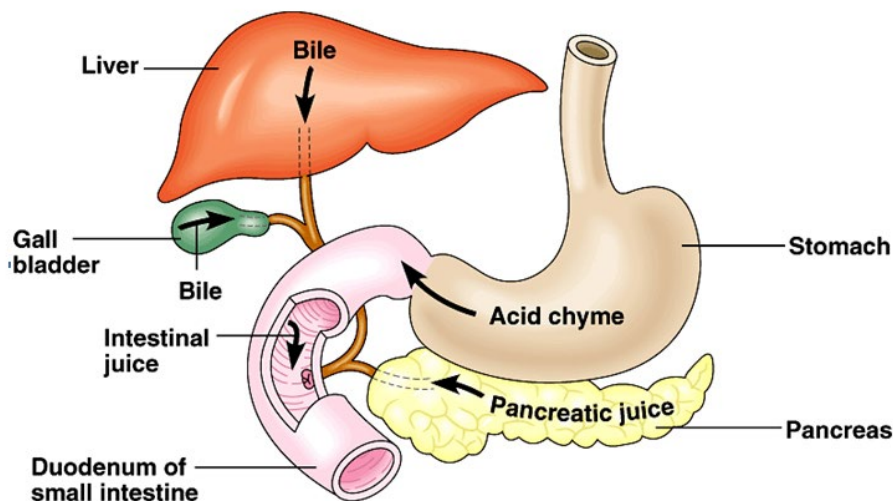
Large intestine.

The **large intestine** is about 7 to 10 centimeters, which is wider than the small intestine from which it joins on. It would measure about 1.5 meters long spread out.

Most of the nutrients have already been removed from the food mixture before it enters, but there is waste and water left over.

Before it leaves the large intestine, it passes through the part called the colon where the body can absorb the water and some minerals into the blood.

Pancreas, gall bladder and liver.



These organs send different juices to the first part of the small intestine. These juices help to digest food and allow the body to absorb nutrients. The **pancreas** makes enzymes that help the body digest fats and protein. Enzymes from the **liver** called **bile** helps to absorb fats into the bloodstream. The **gallbladder** serves as a warehouse for bile, storing it until the body needs it.

The Liver.

The nutrient-rich blood comes directly to the liver from the small intestine for **processing**. The liver filters out harmful substances or wastes, turning some of the waste into more bile. The liver sorts how many nutrients will be distributed to the body, and how many will stay behind in **storage**. The liver stores certain vitamins and a type of sugar your body uses for energy.

Rectum and Anus.

The final stage of food processing is **egestion**, where the waste food that hasn't been absorbed is moved through the rectum and out of the body through the Anus.

Definition Egestion

Removal of wastes from the anus

Definition Anus

Part of the digestive system through which wastes exit the body

The food we eat is divided into four main groups

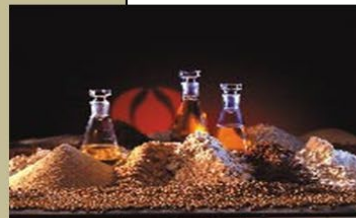
Carbohydrates

- ☐ Supply instant energy
- ☐ Include sugar and starches
- ☐ Are supplied by fruit (sugar) or cereals and some vegetables (Starch)



Lipids

- ☐ Act as energy stores
- ☐ Include fats and oils
- ☐ Are energy rich
- ☐ Are made of fatty acids



Proteins

- ☐ Are used for growth and repair
- ☐ Are found in meat and eggs
- ☐ Are made of amino acid chains
- ☐ Are an important source of iron



Minerals and vitamins

- ☐ Body needs them in small amounts
- ☐ Found in many foods
- ☐ Non-organic substances
- ☐ Needed for important body processes



Humans and most other animals need to eat a combination of all of the food types. Some foods contain more than one food type – for example dairy foods have a good supply of lipids, proteins and sugars, as well as essential vitamins like calcium. Fish contain lipids, protein and an important supply of vitamins

In order for our bodies to stay healthy and grow we need to eat a combination of the main food groups in suitable proportions, and in suitable amounts.

Healthy diet

Carbohydrates provide the body with its main source of energy. We should eat lots of starchy foods such as cereal grains, beans, and peas. They can be easily digested into simple sugars to provide quick energy, and they are also high in fibre.



Fats are also important in our diet as they provide us with energy and protect our vital organs from shock. But fats can be stored in the body when you eat more than your body requires. It stores them in special tissues. A proper diet and exercise will make sure that you have enough fat, so your body functions properly, but not more than you need.

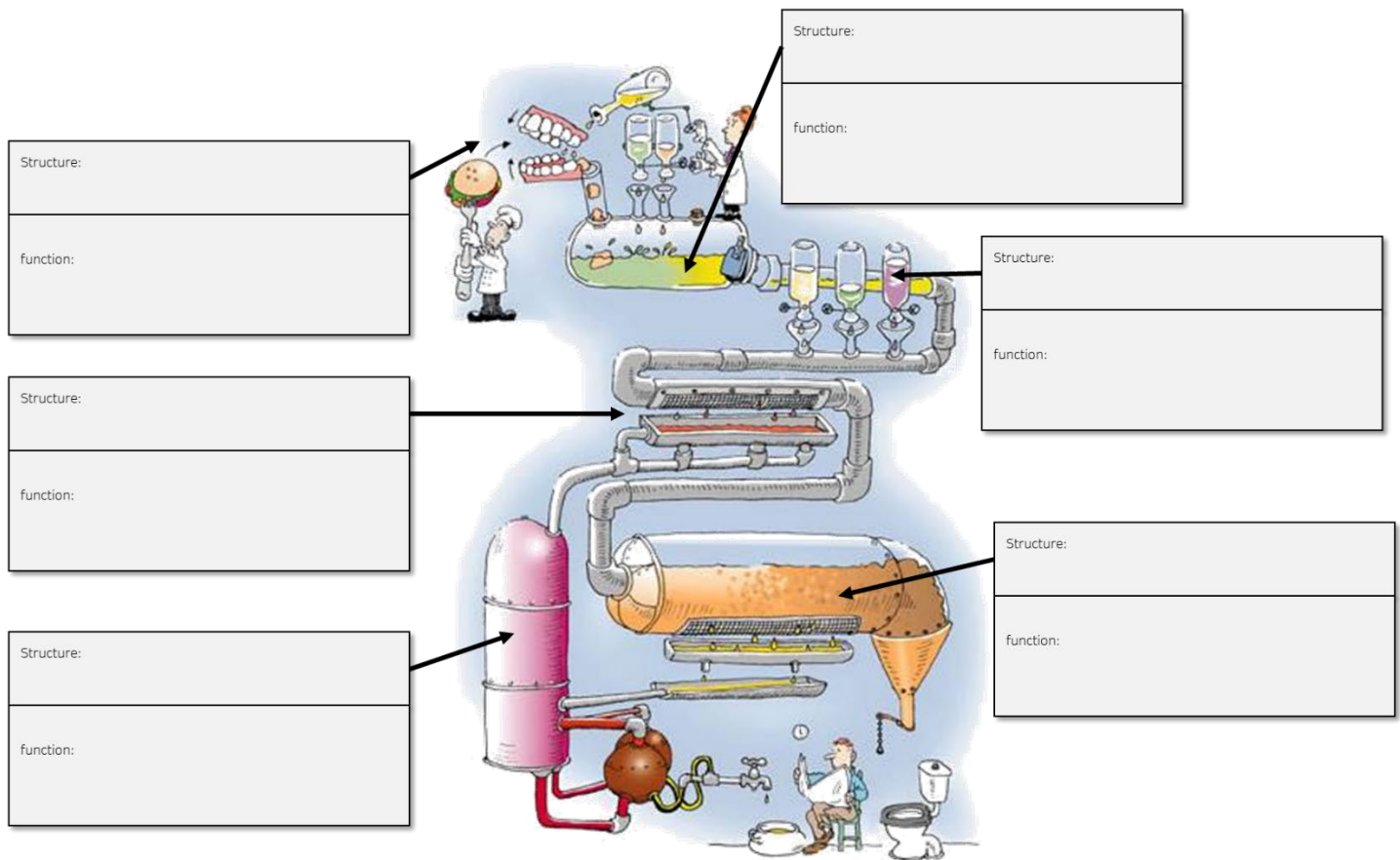
We also need **Proteins** found in foods such as meat, fish, and eggs, so our bodies can grow and repair themselves. Most meats have lots of protein, but it can also be found in plants, eggs and dairy foods. By having a healthy diet, you will also eat all the minerals and vitamins that a person needs

We use tests to determine which type of food is present.

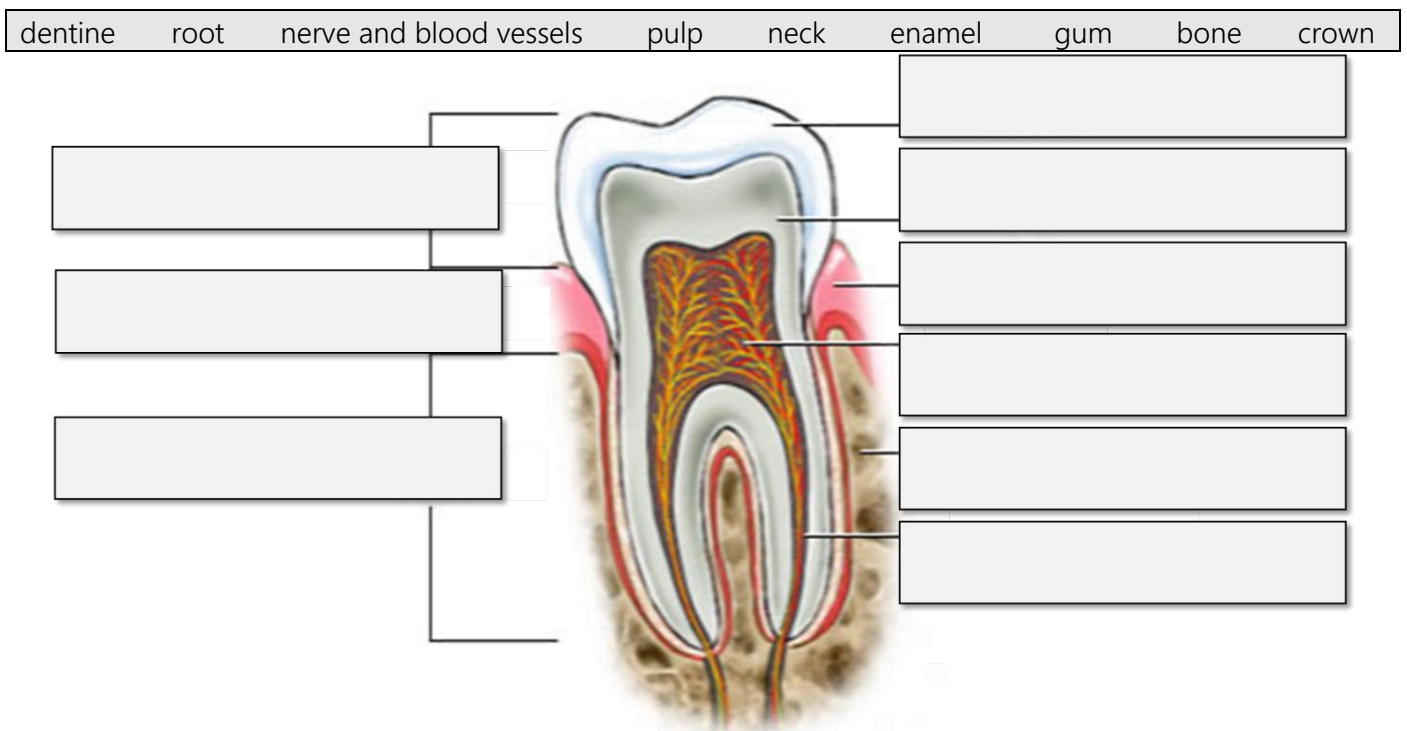
Lipids – present in fats and oils	Protein – present in meat and eggs	Starch – present in cereals	Glucose – type of sugar
Some of the food rubbed into filter paper. Remove food and allow to dry	<div> <div>Sodium hydroxide solution</div> <div>Add benedicts solution</div> </div>	Place a few drops of iodine on the food	<div>Add Benedict's solution</div> <div>Heat mixture gently</div>
A 'grease spot' is left where the food was rubbed in if lipid was present	<div>Broken up food particles</div> <div>Mixture turns purple if protein present</div>	Food will turn black if starch is present	<div>Broken up food particles in water</div> <div>Mixture turns orange if glucose present</div> <div>extension</div>



1. The **structures** and **functions** in the digestive system can be represented by the diagram below. Complete the diagram labels.



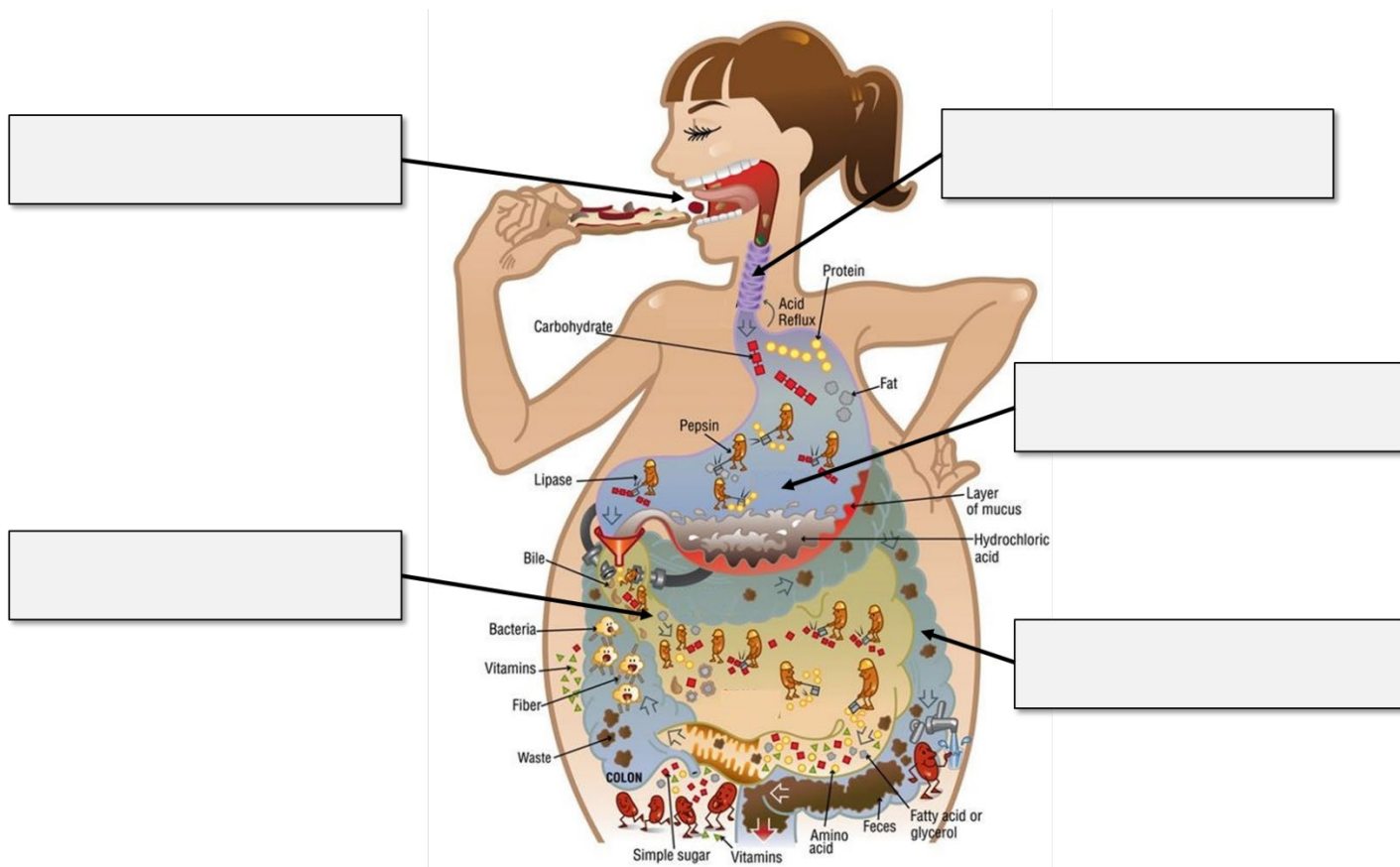
2. label the structure of a typical human tooth



3. The processes that take place in the digestive system can be grouped into four types. Use the chart to define, list the organs and structures involved, and add other relevant information.

ingestion	
digestion	
absorption	
egestion	

4. Label the structures of the digestive system.



5. The diagram above shows the movement of the three major food groups: fats, proteins and carbohydrates. Give as many food examples as you can for each of those major groups.



carbohydrates



fats



protein