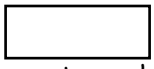
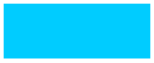
Intermediate 2 Biology - Unit 3: Mammalian Physiology
Chapter 11 – Mammalian Nutrition

Nutrients

Nutrient	***Function***	***Sub-units***	***Chemical Elements***
Carbohydrate (Starch and Sugars)	Provide energy	Simple sugars	Carbon Hydrogen Oxygen
Fat	Provide energy	Fatty acids and Glycerol	Carbon Hydrogen Oxygen
Protein	Growth and repair	Amino acids	Carbon Hydrogen Oxygen Nitrogen
Vitamins and Minerals	Maintain a healthy body and prevent disease		

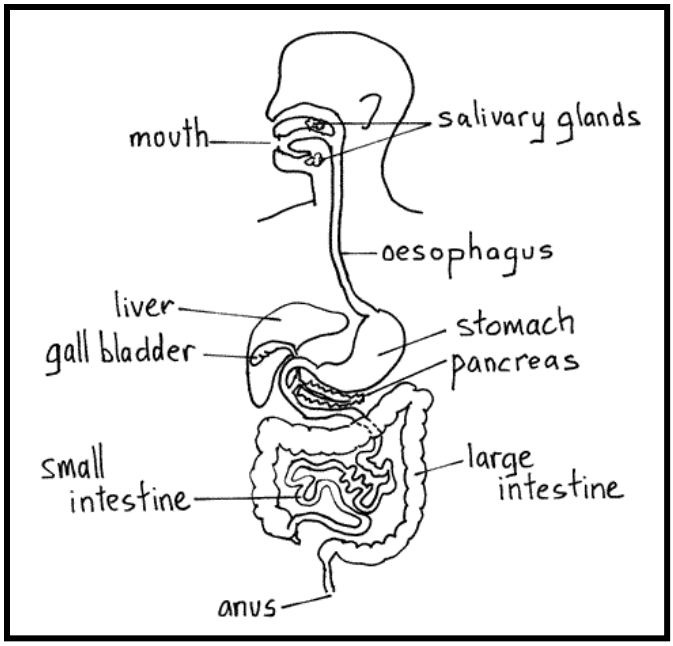
Food Tests

Nutrient	***Test***	***Negative Result***	***Positive Result***
Fat	Translucent spot	 Paper stays white	 Paper becomes translucent
Protein	Biuret's	 Stays blue	 Lilac layer forms
Starch	Iodine	 Stays orange-brown	 Turns blue-black
Sugar	Benedict's	 Stays blue	 Turns green/orange

Digestion

Digestion is the process during which large insoluble molecules such as starch and fat are broken down into small soluble molecules such as simple sugars, fatty acids and glycerol. Only these small soluble molecules can be absorbed into the bloodstream.

Digestive System

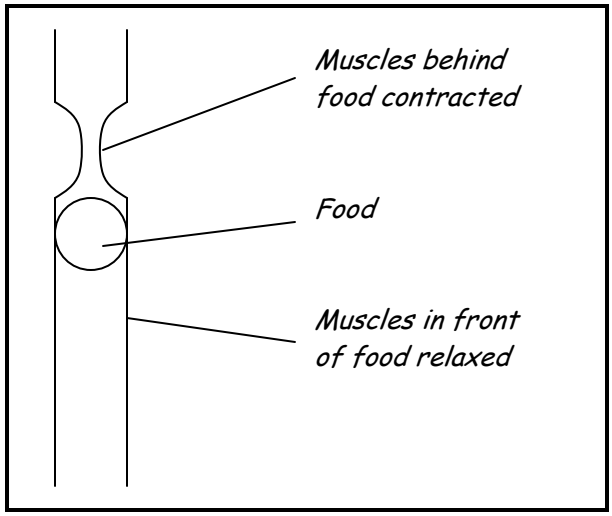


Part of digestive system	***Function***
Mouth	Breaks food down into swallowable pieces
Salivary glands	Produces saliva containing amylase enzyme
Oesophagus	Carries food from mouth to stomach by peristalsis
Stomach	Churns/digests food with acid and pepsin enzyme.
Pancreas	Produces enzymes for fat digestion
Liver	Produces bile
Gall bladder	Stores bile
Small intestine	Absorbs end-products of digestion
Large intestine	Removes water from undigested material

Peristalsis

Peristalsis is the wave-like contraction of muscles which results in food being pushed along the alimentary canal. Muscles behind the food contract whilst the muscles in front of the food relax.

Peristalsis occurs in the oesophagus and intestines.



Stomach

The stomach has two different types of muscle surrounding it – circular and longitudinal. As the stomach muscles contract and relax they mix the food inside the stomach with pepsin and hydrochloric acid.

This increases the rate of digestion.

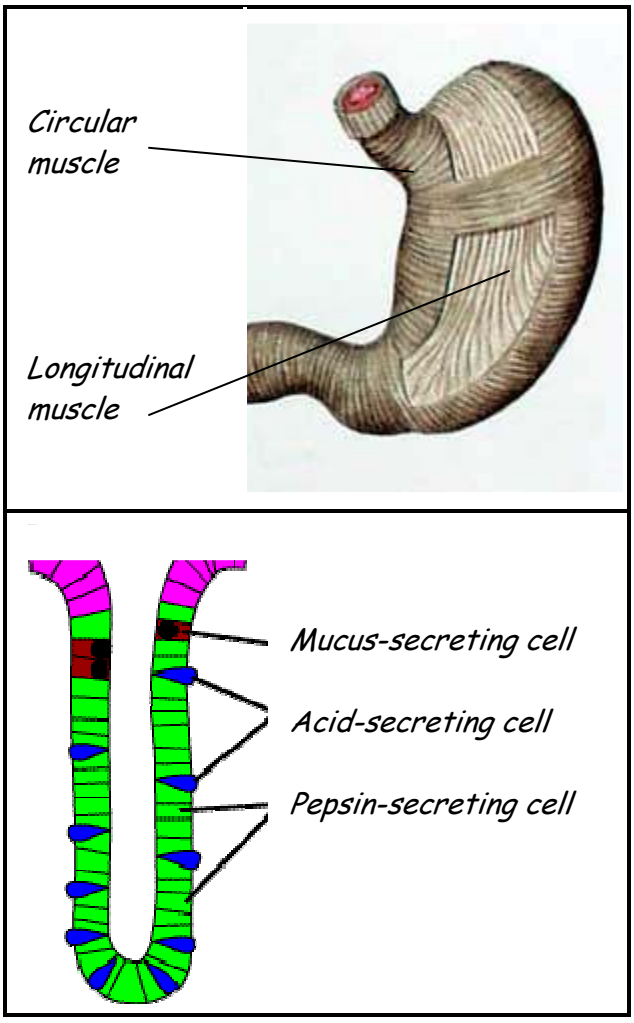
In the lining of the stomach are pits. Inside of these are gastric glands.

Gastric glands contain several types of cells.

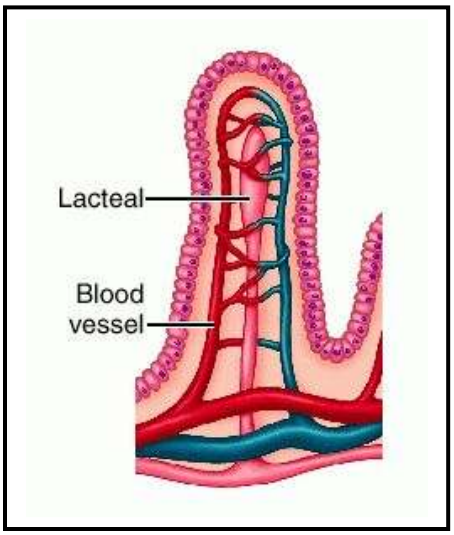
Mucus-secreting cells make mucus, which prevent the lining of the stomach from being digested.

Acid-secreting cells produce hydrochloric acid; this decreases the pH of the stomach contents to 1.5.

pH 1.5 is the optimum pH for pepsin enzyme, which is made by the third type of cell. Pepsin is a protein digesting enzyme.



Small intestine



In the small intestine the end products of digestion are absorbed. The small intestine is highly efficient due to:

Large surface area
Long Digestion
Capillary network
Presence of villi.

Villi are finger-like projections on the inside lining of the small intestine. Each villus contains a lacteal and blood vessels. The lacteal absorbs fatty acids and glycerol, whilst the blood vessels absorb amino acids and glucose.