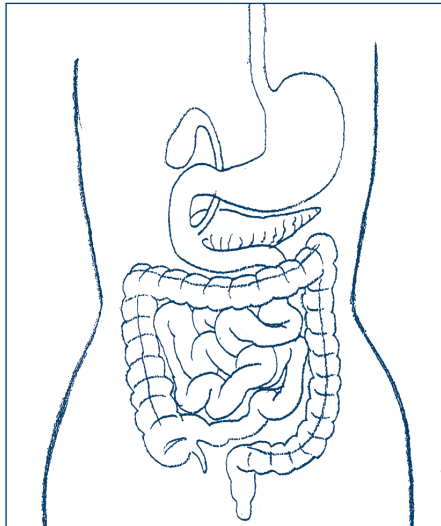




## Fitness and Nutrition – Theme 8: Fuel for the body

## Factsheet 8b

### The digestive system



Our digestive system consists of:

- The digestive tract (also called the alimentary canal) which includes the:
  - mouth
  - oesophagus
  - stomach
  - small intestine
  - large intestine
- Teeth, tongue and salivary glands
- The swallowing mechanism in the oesophagus
- The liver and the pancreas
- Enzymes that help with the digestive process.

The whole system of tubes that extend through the body from the mouth to the anus, is also known as the digestive tract. In adults, this tract is over 10 metres long! Different parts of the tract have different functions.

#### The mouth

Digestion begins when we start chewing food. Teeth help break food into small chunks, producing a greater overall surface for the enzymes to work on. Enzymes contained in saliva (called amylase) convert starches to sugars – that is why bread tastes sweet if you chew on it for a long time without swallowing.

#### Oesophagus

When we swallow food a series of muscular contractions push it down the oesophagus, also called the gullet. The oesophagus connects the throat to the stomach.

#### Stomach

In the stomach food is mixed with gastric juices and hydrochloric acid that begin to break it down to its component nutrients (hydrochloric acid also kills germs). The process is helped by rhythmic contractions of the stomach wall, while protease enzymes digest protein into small amino acid molecules. These enzymes prefer acidic conditions.

Some nutrients, like glucose and water, can be absorbed directly by the stomach wall and pass on to the bloodstream for immediate use. Other nutrients pass from the stomach into the small intestine, through the sphincter muscle.

If the food we have eaten was not good or has gone off, the sphincter muscle contracts and we vomit. This is our body's way to protect us from harmful substances.



## Small intestine

The lining of the small intestine produces intestinal juices and enzymes: amylase to turn carbohydrates into sugar, protease to turn protein into amino acids and lipase to turn fats and oils into fatty acids and glycerol.

Pancreatic juice also enters the small intestine – it contains further protease, amylase and lipase.

The gall bladder sends bile into the small intestines when fat needs to be digested. Bile emulsifies the fat breaking it into smaller droplets; bile is alkaline and neutralises the acid from the stomach.

Villi, which line the small intestine walls, absorb glucose and amino acids plus some fatty acids into the bloodstream and take them to the liver (fatty acids, amino acids and sugars) or to the muscles (mainly sugars and amino acids) where they are needed.

Fibre clears out the villi so the surface area is maximised.

By the time food leaves the small intestine, almost all of the usable nutrients have been absorbed.

## Large intestine

As food remains (mainly fibre) pass through the large intestine, bacteria decompose the food, a process that produces gas and some Group B vitamins.

By the time the leftovers are expelled from the body, they consist of approximately 75% water and 25% solids. Solids contain mainly fibre but also dead bacteria, fat, inorganic matter and a small amount of protein.

## About enzymes

Our body produces enzymes out of proteins. Enzymes work as catalysts - they alter molecule structures but are not used up in the process.

Enzymes can:

- make long chains of amino acid molecules
- break down chains of amino acids
- change one molecule into another molecule.

Each part of the digestive system releases particular enzymes into the digestive process.

There are many different enzymes and every enzyme has a particular function and works with one particular part of our food.