## Enzymes in digestion Homework 2

Many organisms need organic molecules (food) from the environment as building materials for growth and for the release of energy that can make it possible for other reactions to happen.

SB1e.6

Unicellular organisms, such as bacteria and some fungi, release enzymes into their surroundings to **digest** large biological molecules. The small digested molecules can then diffuse across the cell surface membrane into the organism.

Animals are multicellular and have digestive systems made up of different organs. They take food into their digestive systems to be broken up and absorbed into their bodies. Many animals have mechanisms that break food up into smaller pieces (such as teeth or beaks). This helps digestion and allows larger pieces of food to get into the digestive system. Some animals, such as starfish, don't have teeth and so food is partially digested outside the body; starfish stick their stomachs out of their mouths and into the food. Enzymes are released from the stomach surface onto the food. This breaks the food into smaller pieces that can be taken into the body. Other enzymes break the food down until the food molecules are small enough to be absorbed through the stomach wall.

Different enzymes are released in different digestive organs, as shown in the diagram of the human digestive system. Each kind of enzyme has a different **substrate** that it breaks down.

The effect of enzymes on digestion can be shown in experiments. For example, a protein can be broken down into amino acids by mixing it with a 20 per cent hydrochloric acid solution and boiling for 24 hours. Within the human digestive system, at body temperature, a range of proteases acting on the same amount of protein achieve the same result in less than 4 hours.



- 1 Explain as fully as you can why bacteria and fungi release enzymes into their surroundings.
- 2 a What happens to digested food molecules after they enter body cells?
  - **b** How do enzymes help this process?
- 3 Compare the breakdown of carbohydrates, proteins and fats in terms of the range of subunits formed.
- 4 Compare and contrast the digestion of proteins by chemical lab methods and in the digestive system. (Remember to identify how they are similar and different.)
- 5 a Suggest why chewing food into smaller pieces helps digestion by enzymes.
  - **b** Use your answer to part **a** to explain why enzymes are important for living organisms.

## Extra challenge

Edexcel GCSE (9-1)

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6 Suggest the advantage to humans of having bacteria in the large intestine.