

AS Level Biology A
H020/01 Breadth in Biology

Question Set 20

1. Fig. 25.1 represents the tertiary structure of the enzyme lysozyme.

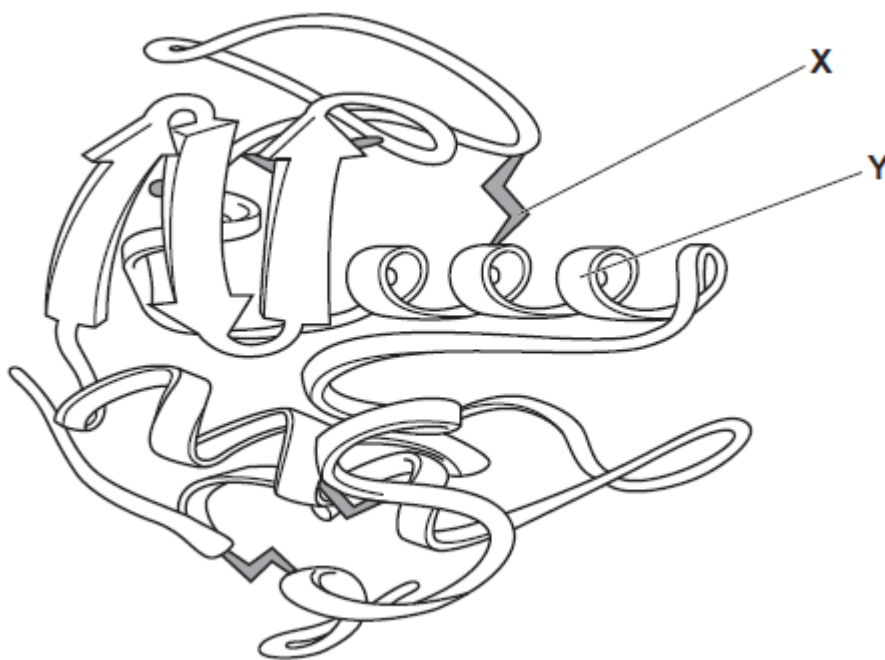


Fig. 25.1

(a) (i) Name the covalent chemical bond labelled X which links two cysteine amino acids. **Disulfide bond** [1]

(ii) Name the structure labelled Y which forms part of the secondary structure of lysozyme. **Alpha helix** [1]

(iii) Lysozyme consists of a single polypeptide chain of 129 amino acids.

State which level of protein structure is **not** shown by lysozyme.

Quaternary structure [1]

(b) The function of lysozyme is to break down the cell walls of bacteria.

(i) Name the molecule that is found in the cell walls of bacterial cells. **Peptidoglycan** [1]

(ii) Lysozyme is also known as a glycoside hydrolase.

Suggest the type of chemical bond that lysozyme breaks and name the molecule other than the substrate that is needed for this reaction.

Type of bond ... **Glycosidic bond**

Other molecule needed for this reaction ... **Water**

[2]

- (c) Enzymes are affected by temperature. Fig. 25.2 shows the time course of a mammalian enzyme reaction at different temperatures.

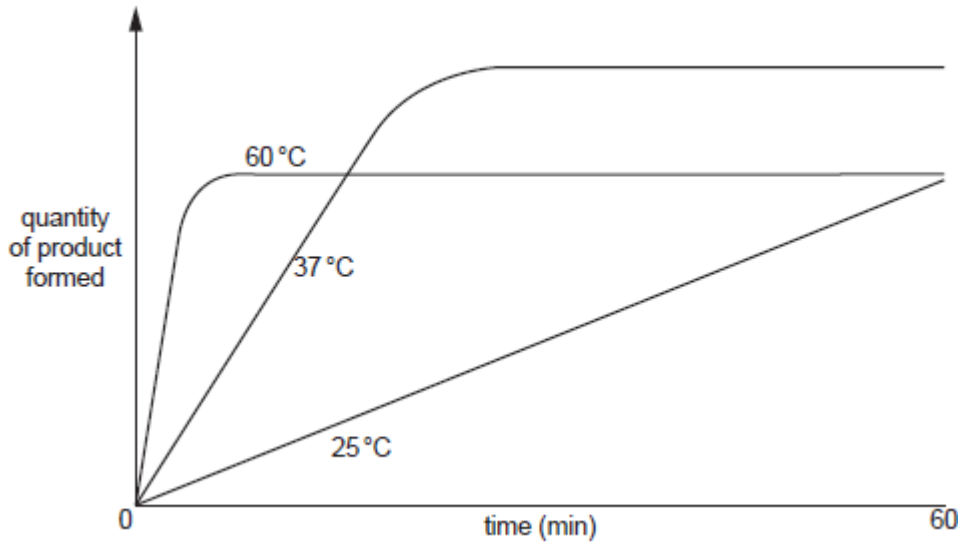


Fig 25.2

- (i) Explain why there is a difference in the shapes of the curves at 37°C and 60°C.

signified by the steeper gradient

At 60°C, the rate of reaction is higher. Molecules possess more kinetic energy so the random movement of molecules increases. There is a greater chance of collisions and a greater probability of successful collisions. However, the quantity of product formed at 60°C is less than that at 37°C. This is because many enzymes may be denatured at such a high temperature. Increased vibrations between atoms breaks bonds in the enzyme's tertiary structure. The active site changes shape. Thus, a lower quantity of the product is formed and the graph plateaus lower and earlier. [2]

- (ii) Explain why there is a difference in the shapes of the curves at 25°C and 37°C.

37°C is the optimum temperature for mammalian enzymes. Below this, enzymes possess less kinetic energy. The random movement of molecules decreases so there is a lower chance of a successful collision. The rate of reaction is therefore lower at 25°C so the gradient is less steep. [2]

Total Marks for Question Set 20: 10

OCR

Oxford Cambridge and RSA

Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact The OCR Copyright Team, The Triangle Building, Shaftesbury Road, Cambridge CB2 8EA.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge