

6.1 Digestion & Absorption

Question Paper

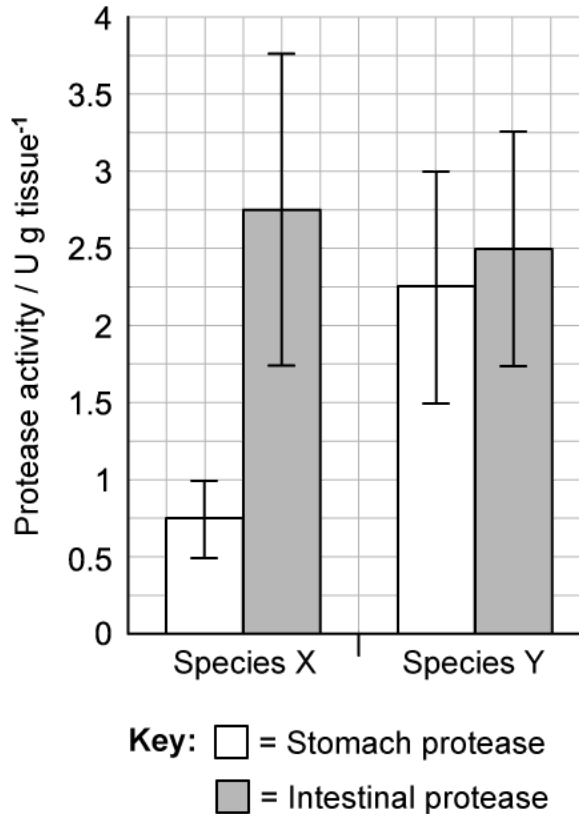
Course	DP IB Biology
Section	6. Human Physiology
Topic	6.1 Digestion & Absorption
Difficulty	Hard

Time allowed: 10
Score: /5
Percentage: /100

Question 1

The activity of two types of protease enzymes was measured in two different species of fish; species X and species Y. The results of the research are shown in the graph.

The unit U denotes the enzyme required for the production of 1 μmol of product per minute. The bars represent the standard deviation.



Which statement about protease enzymes is correct?

- A. The activity of the stomach protease of species Y is 2.5 times greater than that of species X.
- B. The activity of the intestinal protease of species X is significantly higher than the stomach protease of species X.
- C. Endopeptidase proteases hydrolyse peptide bonds at the ends of polypeptides.
- D. The activity of the intestinal proteases of both species X and Y are significantly higher than the stomach proteases.

[1 mark]

Question 2

Sucrase-isomaltase is a membrane-bound disaccharidase located in the cell surface membranes of the cells lining the small intestine. It digests the following molecules:

- Dextrins
- Glucose-glucose disaccharides
- Glucose-fructose disaccharides

A recessive mutation leads to congenital sucrase-isomaltase deficiency (CSID). Which of the following are likely to be symptoms of CSID?

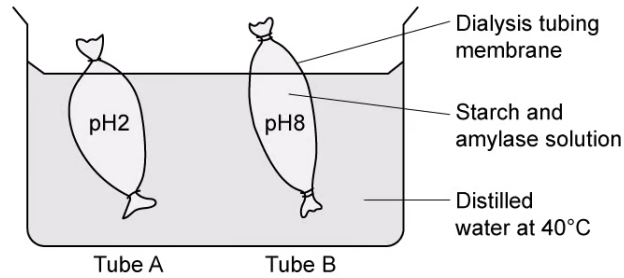
- I. Diarrhoea due to water retention in the digestive tract.
- II. Bacterial fermentation of undigested sucrose.
- III. Difficulty digesting dairy products.
- IV. Difficulty digesting starchy foods.

- A. I, II, and III only.
- B. I, II, and IV only.
- C. II, III, and IV only.
- D. II and IV only.

[1 mark]

Question 3

An experiment was set up to model the digestion of starch in the small intestine. It was set up as follows:



Tube A	Tube B
<ul style="list-style-type: none"> • 1 ml of 1% amylase solution • 10 ml of 1% starch solution • 5 ml of pH 2 buffer 	<ul style="list-style-type: none"> • 1 ml of 1% amylase solution • 10 ml of 1% starch solution • 5 ml of pH 8 buffer

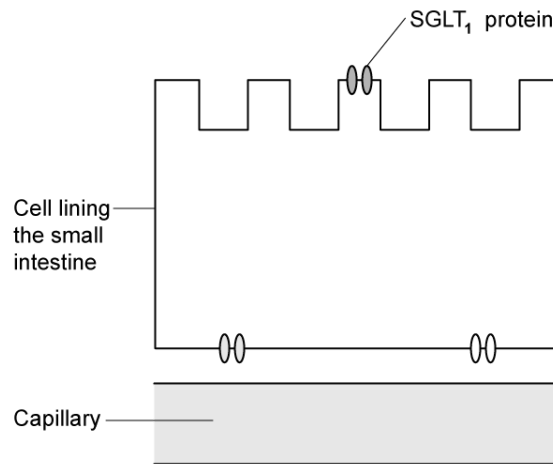
Which statements regarding the experiment shown are correct?

- I. The dialysis tubing perfectly represents the lining of the small intestine.
 - II. The iodine test in and around tube A would yield a blue-black colour inside the tubing and a brown-yellow colour outside the tubing.
 - III. The Benedict's test in and around tube B would yield an orange precipitate inside the tubing and a blue colour outside the tubing.
 - IV. The distilled water imperfectly represents the blood.
- A. I, II, and III only.
 B. II, III, and IV only.
 C. II and IV only.
 D. IV only.

[1 mark]

Question 4

Inhibition of a transport protein known as SGLT1 has been studied as a possible treatment option for the treatment of type 2 diabetes. The diagram shows the location of SGLT1, alongside two other types of transport protein.



Which statement regarding the impact of inhibiting SGLT1 is likely to be true?

- A. It will prevent the active transport of glucose into the epithelial cell.
- B. It will increase the release of insulin from the pancreas.
- C. It will prevent the formation of a glucose gradient between the epithelial cell and the capillary.
- D. It will prevent the formation of a sodium ion gradient between the intestine lumen and the epithelial cell.

[1 mark]

Question 5

The micrograph image below shows a transverse section through the wall of the small intestine.

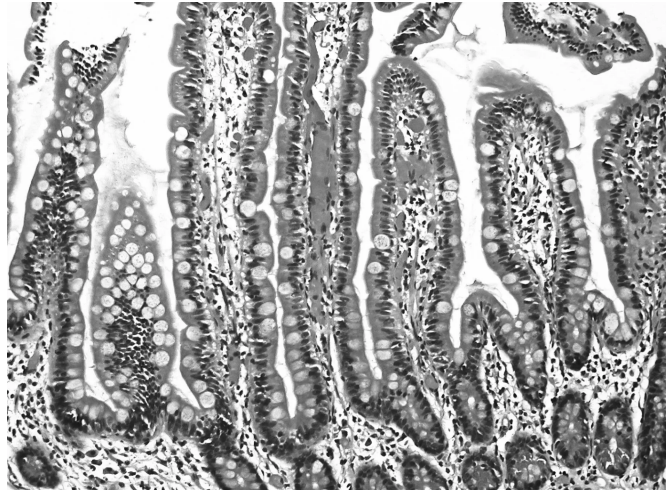


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Which tissue layers can be identified in the image?

- A. Mucosa and sub-mucosa only.
- B. Submucosa and muscle layer only.
- C. Mucosa, submucosa, and muscle layer only.
- D. Mucosa, submucosa, muscle layer, and serosa.

[1 mark]