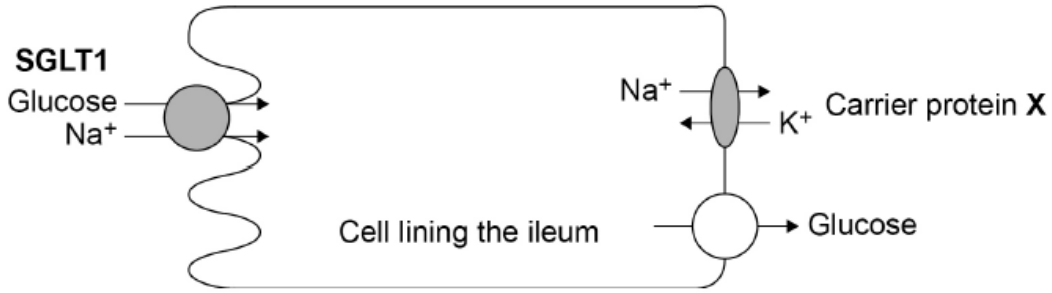
AQA – Biological Molecules – A2 Biology

1. June/2020/Paper_1/No.1

0 1 **Figure 1** shows a cell from the lining of the ileum specialised for absorption of products of digestion.

SGLT1 is a carrier protein found in the cell-surface membrane of this cell, it transports glucose and sodium ions (Na^+) into the cell.

Figure 1



0 1 . 1 The action of the carrier protein **X** in **Figure 1** is linked to a membrane-bound ATP hydrolase enzyme.

Explain the function of this ATP hydrolase.

[2 marks]

0 1 . 2 The movement of Na^+ **out** of the cell allows the absorption of glucose **into** the cell lining the ileum.

Explain how.

[2 marks]

0 1 . 3 Describe and explain **two** features you would expect to find in a cell specialised for absorption.

[2 marks]

1 _____

_____

_____

_____

2 _____

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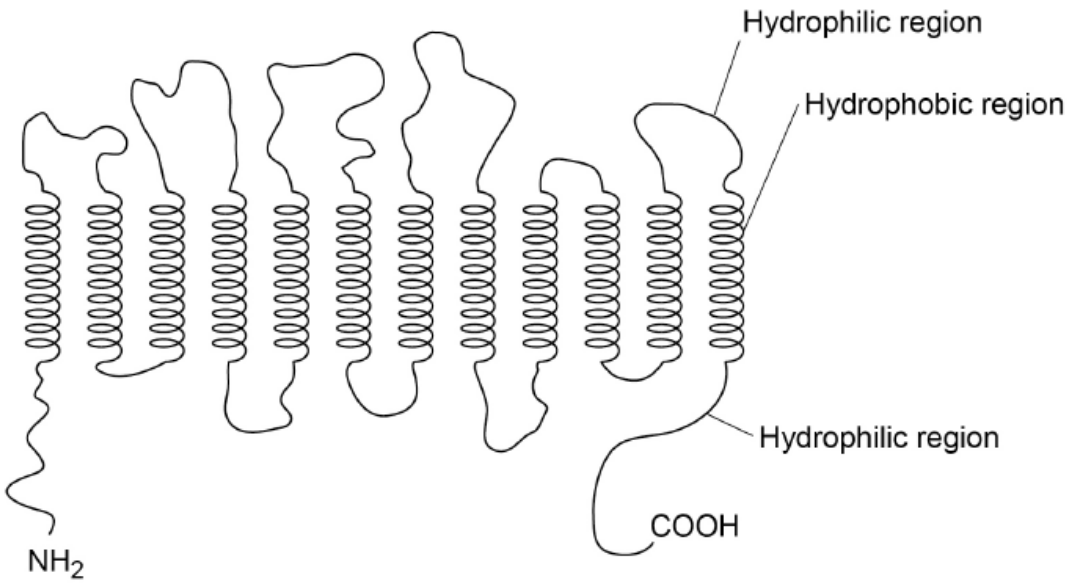
Figure 2 is a diagram of one SGLT1 carrier protein.

Figure 2



0 1 . 4 Draw phospholipids on **Figure 2** to show how the carrier protein, SGLT1, would fit into the cell-surface membrane.

Do **not** draw more than eight phospholipids.

[2 marks]

0 1 . 5 **Figure 2** shows the SGLT1 polypeptide with NH_2 at one end and COOH at the other end.

Describe how amino acids join to form a polypeptide so there is always NH_2 at one end and COOH at the other end.

You may use a diagram in your answer.

[2 marks]

Space for diagram:

2. June/2019/Paper_1/No.1

0 1 . 1 Describe how a **non-competitive** inhibitor can reduce the rate of an enzyme-controlled reaction.

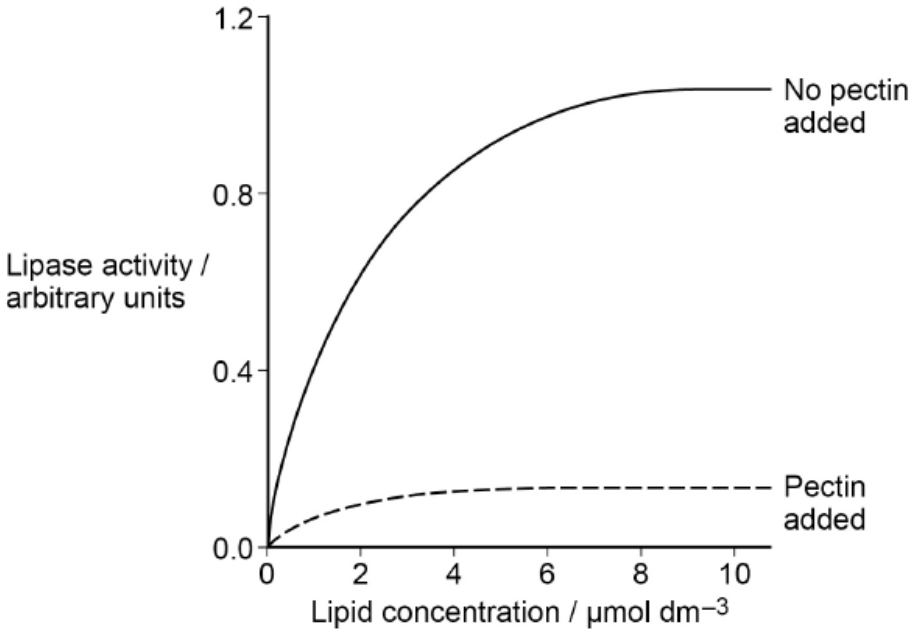
[3 marks]

Pectin is a substance found in some fruit and vegetables.

A scientist investigated the effect of pectin on the hydrolysis of lipids by a lipase enzyme.

His results are shown in **Figure 1**.

Figure 1



0 1 . 2 The scientist concluded that pectin is a non-competitive inhibitor of the lipase enzyme.

Use **Figure 1** to explain why the scientist concluded that pectin is a **non-competitive** inhibitor.

[1 mark]

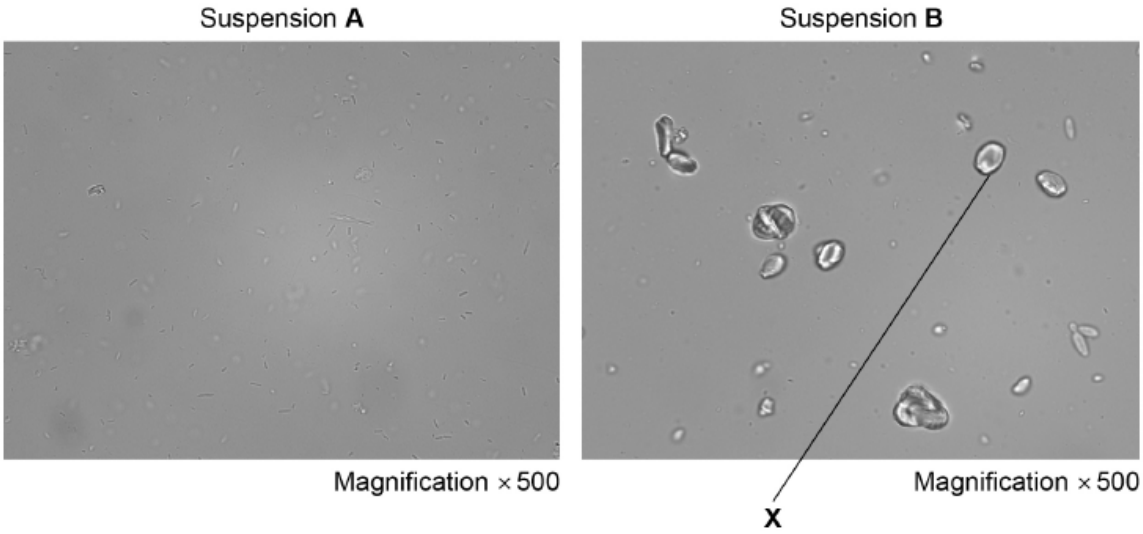
The scientist also found that pectin stops the action of bile salts. He prepared two suspensions:

- suspension **A** – lipid and bile salts
- suspension **B** – lipid, bile salts and pectin.

He did **not** add lipase to either suspension.

He observed samples from the suspensions using an optical microscope. **Figure 2** shows what he saw in a typical sample from each suspension.

Figure 2



0 1 . 3 Calculate the maximum length of the large lipid droplet marked **X** in **Figure 2**.

Using a ruler with millimetre intervals always includes an uncertainty in the measurement. Use the uncertainty in your measurement to determine the uncertainty of your calculated maximum length.

You can assume there is no uncertainty in the magnification.

[2 marks]

Maximum length = _____ µm

Uncertainty of your calculated maximum length = _____ µm

0 1 . 4 No large lipid droplets are visible with the optical microscope in the samples from suspension **A**.

Explain why.

[2 marks]

3. June/2019/Paper_1/No.10

1 0 . 1 Explain **five** properties that make water important for organisms.

[5 marks]

[Extra space]

1 0 . 2 Describe the biochemical tests you would use to confirm the presence of lipid, non-reducing sugar and amylase in a sample.

[5 marks]

[Extra space]

1 0 . 3 Describe the chemical reactions involved in the conversion of polymers to monomers and monomers to polymers.

Give **two** named examples of polymers and their associated monomers to illustrate your answer.

[5 marks]

[Extra space]