Bile and absorption at villi

Student activity • observation and reasoning

YEAR 10 / LESSON 54 / BIOLOGY + SCIENCE (DOUBLE AWARD)

The question

How do bile and villi help nutrients become available to cells?

Use the supplied examples, record your reasoning and correct it using evidence.

Equipment

- Student booklet, digestive-system and villus reference diagrams, drawing paper, pencil and ruler

Paper, modelling and written reasoning only. No chemicals or biological samples are handled.

Course coverage: Shared Biology / Double Award: 2.30–2.32. Bile and absorption.

Plan, model or apparatus sketch

Draw and label the apparatus or biological model; identify one limitation.

Method and reasoning

Read the whole sequence before starting

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1. Label liver, gall bladder and small intestine, showing where bile is produced, stored and released.

2. Distinguish neutralisation of acidic stomach contents from emulsification of large lipid droplets.

3. Explain that emulsification increases surface area for lipase but does not itself chemically digest lipid.

4. Draw a villus with thin epithelium, capillaries and a lacteal.

5. Link large surface area, short transport distance and blood supply to effective absorption.

6. Compare the routes of glucose/amino acids into blood with the transport of absorbed lipid products into lymph after processing in cells.

Cleanup

- Return models and keep the corrected work.

Record your evidence

Blank spaces are for your own work

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Reference and task data

Bile is made in the liver and stored in the gall bladder. It is not a digestive enzyme. Villi and microvilli increase absorptive surface area; a thin epithelium shortens transport distances. Capillaries carry away water-soluble nutrients, helping maintain gradients; lacteals receive much absorbed lipid in transported particles.

Example / trial	Observation / evidence	Explanation / limit
Evidence / comparison		
Explanation		
Limit / correction		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

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1. Where is bile made?

2. Where is it stored?

3. Does emulsification break lipid into fatty acids?

4. Why do small droplets help lipase?

5. Give two villus adaptations.

6. What is a lacteal?