

Absorption

Revision notes · Where nutrients and water are absorbed, and how the structure of a villus is adapted for absorption in the small intestine.

For Cambridge IGCSE Biology 0610 (and 0970, which has the same content). **Supplement** is Extended content, only examined on Papers 2 and 4.

Absorption Spec 7.5

Absorption in the small intestine and colon Spec 7.5.1, 7.5.2

Absorption is the movement of nutrients from the intestines into the blood. The **small intestine** is the region where nutrients are absorbed, mostly in the ileum.

Water is also absorbed. **Most water** is absorbed from the small intestine, but some is also absorbed from the **colon**. What is left in the large intestine is the undigested food, which is stored in the rectum as faeces and removed by egestion.

Where absorption happens	
Region	What is absorbed
Small intestine	Nutrients (e.g. glucose, amino acids, fatty acids and glycerol, vitamins and mineral ions) and most of the water
Colon	Some water

Exam tip: If asked where water is absorbed, say 'mostly in the small intestine and some in the colon'. 'Colon only' loses the mark.

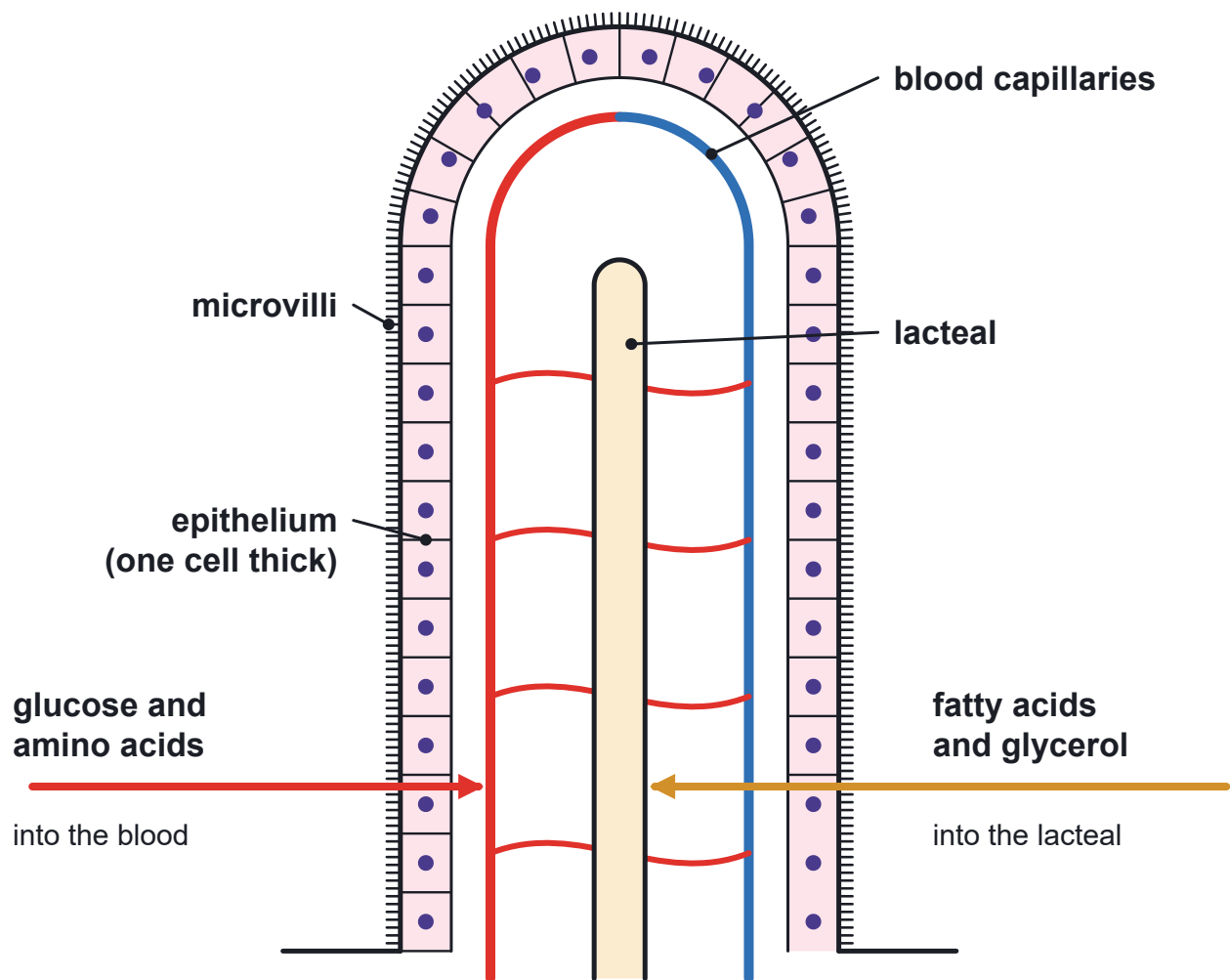
Villi and microvilli Spec 7.5.3, 7.5.4, 7.5.5 **Supplement**

The inside of the small intestine is covered in tiny finger-like projections called **villi** (singular: villus). The cells on the surface of each villus have even smaller projections called **microvilli**.

Villi and microvilli greatly increase the **internal surface area** of the small intestine. A larger surface area means more nutrients can be absorbed into the blood in a given time.

Structure of a villus

- The wall is a single layer of epithelial cells, so the distance for nutrients to travel is short.
- The epithelial cells have microvilli, which increase the surface area further.
- Inside the villus there is a network of **capillaries** and a **lacteal**.



A villus: **microvilli** and a thin epithelium give fast absorption; **glucose and amino acids** enter the capillaries, **fatty acids and glycerol** enter the lacteal.

Roles of capillaries and lacteals

Capillaries and lacteals	
Structure	Role
Capillaries	Absorb glucose and amino acids (and other nutrients) into the blood; the flowing blood carries them away, which keeps absorption going
Lacteal	A lymph vessel in the centre of the villus that absorbs fatty acids and glycerol and carries them away in the lymph

Exam tip: For a 'how is a villus adapted' question: large surface area (villi and microvilli), thin wall (one cell thick) and a good blood supply (capillaries). Always link the feature to absorption.

Quick check

1. Where are nutrients absorbed?
2. Where is most water absorbed?
3. **Supplement** What is the role of villi and microvilli?
4. **Supplement** What does the lacteal absorb?

Quick check answers

Absorption

1. The small intestine.
2. The small intestine (some is absorbed in the colon).
3. They increase the internal surface area of the small intestine.
4. Fatty acids and glycerol.