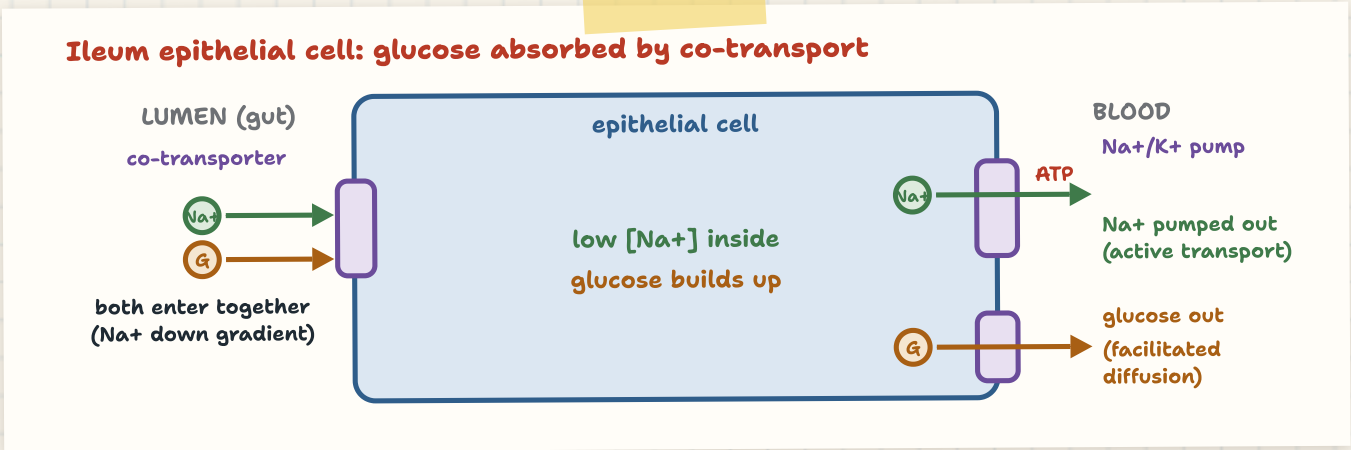
Active Transport and Co-transport (Ileum)

Sodium is actively pumped out, then its gradient pulls glucose in by co-transport.



Key terms

active transport	movement against a concentration gradient using a carrier protein and energy from ATP hydrolysis.
sodium-potassium pump	a carrier protein that uses ATP to move Na+ out of the cell (and K+ in), keeping intracellular sodium low.
co-transport	sodium and glucose enter together through one protein; sodium moves down its gradient, bringing glucose in.
ATP hydrolysis	splitting ATP to release energy for active transport.
ileum epithelium	the cells lining the small intestine; they absorb glucose from the lumen into the blood.
glucose exit	glucose leaves into the blood by facilitated diffusion down its gradient.

I can...

- ☐ Active transport involving carrier proteins and hydrolysis of ATP
- ☐ Co-transport illustrated by absorption of sodium ions and glucose by cells lining the mammalian ileum

EXAM TRAP

ATP is used by the sodium-potassium pump, not directly for glucose entry. Sodium enters by facilitated diffusion (co-transport) down its gradient; the pump is what maintains that gradient.

5 marks: what earns them

1. Sodium ions are actively transported out of the epithelial cell into the blood by the sodium-potassium pump / carrier protein, using ATP (hydrolysis)
   Not: glucose is actively transported using ATP; sodium diffuses out
2. This lowers the concentration of sodium ions inside the cell (creating a sodium gradient between lumen and cell)
   Not: no sodium in the cell; sodium ions are used up
3. Sodium ions enter the cell from the lumen down their concentration gradient by facilitated diffusion through a co-transporter protein, bringing glucose into the cell with them
   Not: sodium enters by active transport; glucose enters by simple diffusion
4. Glucose accumulates inside the cell, so its concentration is higher than in the blood
   Not: glucose is stored in the cell
5. Glucose moves out into the blood by facilitated diffusion through a carrier / channel protein
   Not: glucose leaves by active transport; glucose leaves by osmosis

Remember

Pump Na+ out with ATP.
Na+ comes in, glucose rides along.
Glucose out by facilitated diffusion.

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