

3.3 Active transport

Name: _____ Class: _____ Date: _____

Total: 9 marks

Objective

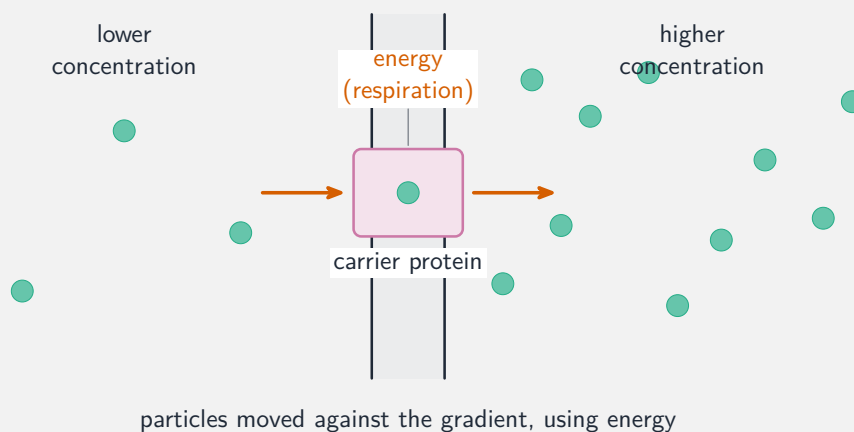
Build the skills to answer exam questions on **active transport** 主动运输—the definition, why it needs energy, and the role of **carrier proteins** 载体蛋白.

You must be able to:

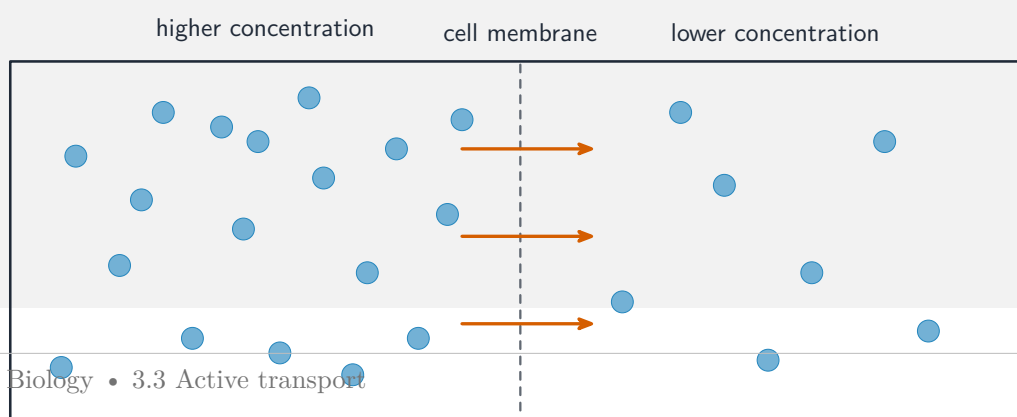
- define active transport (movement against the gradient, using energy)
- explain why it needs energy from respiration
- give an example (root hairs taking up mineral ions)

1 Worked examples

■ Active transport



Active transport: against the gradient, using energy from respiration and a carrier protein



Process	Direction	Energy?
diffusion	high $\rightarrow$ low	no
osmosis	high $\rightarrow$ low water potential	no
active transport	low $\rightarrow$ high (against)	yes

2 Practice

2.1 Define active transport. [2]

2.2 State the source of energy for active transport. [1]

3 Exam-style questions

3.1 Which process moves particles **against** the concentration gradient? [1]

- **A** diffusion
- **B** osmosis
- **C** active transport
- **D** evaporation

3.2 Root hair cells take up mineral ions from the soil.

(a) Name the process used when the ions are more concentrated inside the cell. [1]

(b) Explain why this process needs energy. [2]

3.3 Explain the role of carrier proteins in active transport. [2]

4 Go further

You are now ready for the real exam questions on this subtopic. Open the **3.3 Active transport** past-paper sheet in the Library, or try these in **Practice mode**:

- 0610/21 N25 —Q6 (active transport)
- 0610/21 N25 —Q18 (transport processes)

Solutions

2.1 the movement of particles through a membrane from a lower to a higher concentration (against the gradient), using energy from respiration.

2.2 respiration.

3.1 C. Active transport moves particles against the gradient.

3.2 (a) active transport.

(b) the ions move against the concentration gradient (uphill), which requires energy.

3.3 carrier proteins in the membrane pick up the ions/molecules and carry them across the membrane using energy.