

3 Active transport and plant cells — Part 2

Name: _____ Class: _____ Date: _____

Vocabulary 词汇

Write each word three times. 把每个单词抄写三遍。

English	中文	Write it 3 times (English)
Active transport	主动运输	_____
energy	能量	_____
respiration	呼吸作用	_____
carrier protein	载体蛋白	_____
root hairs	根毛	_____
turgid	膨胀	_____
flaccid	松软	_____
plasmolysis	质壁分离	_____

Recall

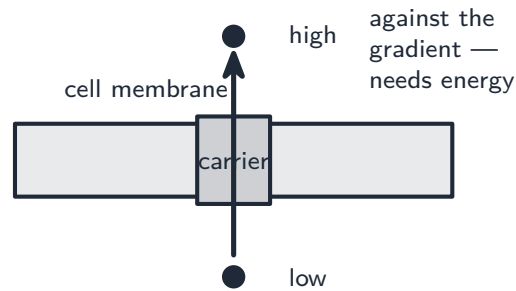
Diffusion and osmosis move particles **down** a gradient and need no energy. But cells sometimes need to move substances the other way.

New ideas

Read these first, then do the Practice.

■ 1 Active transport

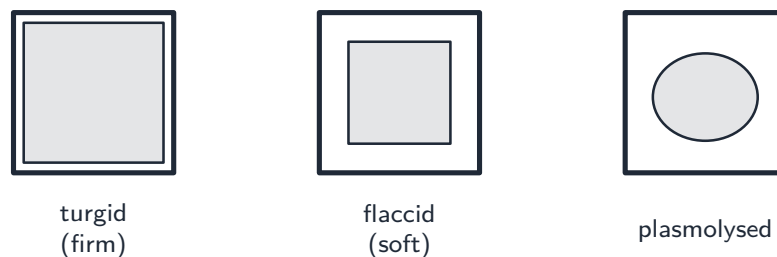
Active transport 主动运输 moves particles through the cell membrane from a **lower** to a **higher** concentration — **against** the gradient. Because it is “uphill”, it needs **energy** 能量 from **respiration** 呼吸作用, and a **carrier protein** 载体蛋白.



For example, **root hairs** 根毛 take up mineral ions from the soil this way.

■ 2 Osmosis and plant cells

Water entering or leaving a plant cell changes how firm it is:



- in water, cells take in water and become **turgid** 膨胀 (firm) — this supports the plant;
- in a concentrated solution, cells lose water and become **flaccid** 松软 (soft);
- if much more water leaves, the membrane pulls away from the wall — **plasmolysis** 质壁分离.

■ 3 Comparing the three

Process	Direction	Needs energy?
diffusion	high → low	no
osmosis	water, dilute → concentrated	no
active transport	low → high (against)	yes

Watch out: **active transport** moves particles *against* the gradient (low → high) and **needs energy** from respiration — diffusion and osmosis are passive and need

none. A cell in pure water becomes **turgid** (firm), not flaccid.

Practice

Try these in order.

3.6 How is active transport different from diffusion? [2]

3.7 Where does the energy for active transport come from? [1]

3.8 Give one example of active transport in a plant. [1]

3.9 A plant cell is put in pure water. Will it become turgid or flaccid? [1]

3.10 Which of the three processes moves **water only**? [1]

3.11 Challenge. Root cells take in mineral ions even when the soil has a *lower* ion concentration than the cells. Name the process they use, and explain why it needs energy. [3]