

# 2 Moving substances across the mem- brane – 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) |
|------------------|------|----------------------------|
| Diffusion        | 扩散   | _____                      |
| Osmosis          | 渗透   | _____                      |
| tonicity         | 张力   | _____                      |
| Active transport | 主动运输 | _____                      |
| endocytosis      | 内吞   | _____                      |
| exocytosis       | 外排   | _____                      |

## Recall

In Part A you met the selectively permeable cell membrane. Now see how things cross it:

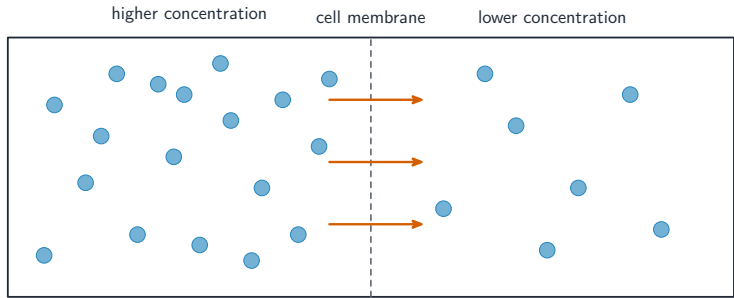
- You have watched a drop of dye spread through water (diffusion).
- You know water moves in and out of cells (osmosis).
- Some things need energy to move; others move on their own.

Each idea has a short worked example before the Practice.

## New ideas

### ■ 1 Diffusion

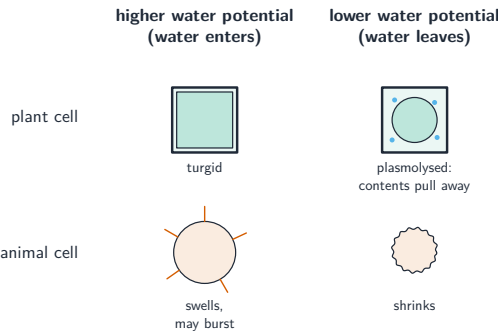
**Diffusion** 扩散 is the spreading of particles from where they are **crowded** (high concentration) to where they are **spread out** (low concentration). It needs **no energy**.



net movement of particles down the concentration gradient

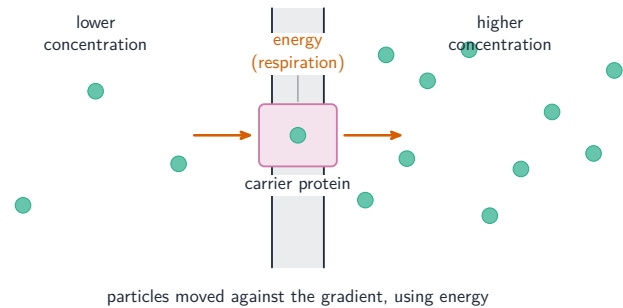
### ■ 2 Osmosis and tonicity

**Osmosis** 渗透 is the diffusion of **water** across a membrane. Comparing the solution's strength (**tonicity** 张力): in a weaker (hypotonic) solution a cell gains water; in a stronger (hypertonic) one it loses water.



### ■ 3 Active transport

**Active transport** 主动运输 moves particles the “wrong” way – from low to high concentration – so it needs **energy** (ATP) and a carrier protein.



#### ■ 4 Moving big things

Very large items cross in bulk: **endocytosis** 内吞 brings material **in** (the membrane wraps around it), and **exocytosis** 外排 sends material **out**.

**Watch out:** diffusion and osmosis need **no** energy (particles move down their gradient on their own); active transport needs energy because it pushes particles **against** the gradient.

### Practice

Try these in order. The methods are all above.

2.1 State the direction (high to low, or low to high) that particles move during diffusion.<sup>[1]</sup>

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2.2 Explain what osmosis is. <sup>[2]</sup>

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2.3 A cell is placed in a very strong (hypertonic) sugar solution. State what happens to it and why. <sup>[2]</sup>

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2.4 State the two things active transport needs that diffusion does not. <sup>[2]</sup>

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2.5 Name the process that a cell uses to take in a large particle from outside. <sup>[1]</sup>

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