

2 Cells and their membranes – Part 1

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)		
organelles	细胞器	_____	_____	_____
nucleus	细胞核	_____	_____	_____
mitochondria	线粒体	_____	_____	_____
chloroplasts	叶绿体	_____	_____	_____
surface-area-to-volume ratio	表面积与体积比	_____	_____	_____
phospholipid bilayer	磷脂双分子层	_____	_____	_____
fluid mosaic model	流动镶嵌模型	_____	_____	_____
selectively permeable	选择透过性	_____	_____	_____

Recall

You already know that cells are the building blocks of life:

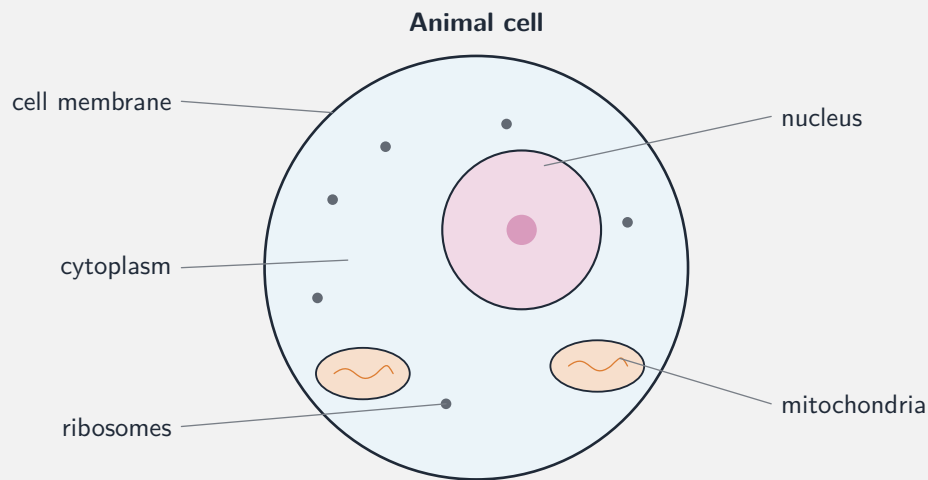
- You have seen animal and plant cells and named their parts.
- A **nucleus** holds the DNA; **mitochondria** release energy; plant cells have **chloroplasts**.
- A membrane surrounds every cell.

This sheet lines up cell structure for AP. Each idea has a short worked example.

New ideas

■ 1 Organelles

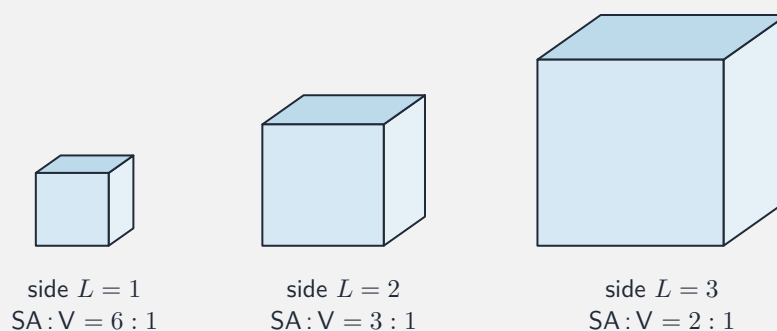
A cell divides its work among **organelles** 细胞器:



- the **nucleus** 细胞核 holds the DNA,
- **mitochondria** 线粒体 carry out respiration (release energy),
- **chloroplasts** 叶绿体 carry out photosynthesis (in plants).

■ 2 Why cells stay small

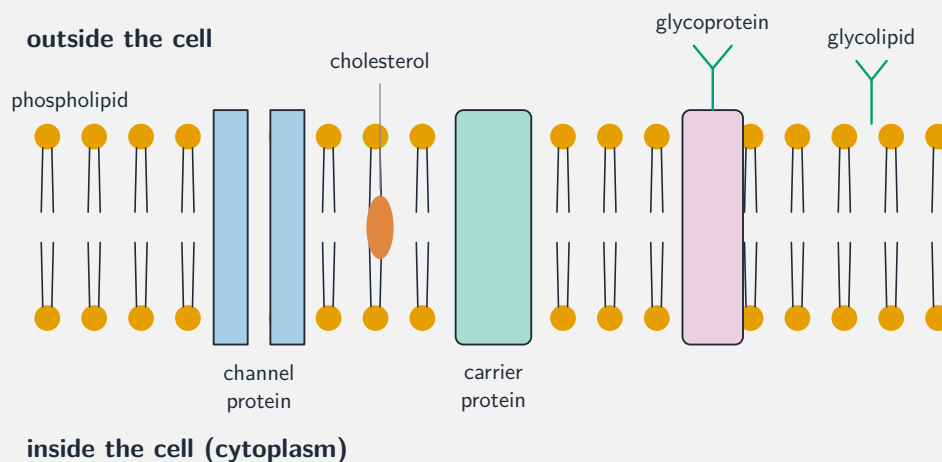
As a cell grows, its volume rises faster than its surface area, so its **surface-area-to-volume ratio** 表面积与体积比 falls. A small cell has enough surface to exchange materials fast enough for its inside.



a bigger cube (or cell) has a **smaller** surface area : volume ratio

■ 3 The cell membrane

The membrane is a **phospholipid bilayer** 磷脂双分子层—a double sheet with water-loving heads outside and water-hating tails inside—studded with proteins. This **fluid mosaic model** 流动镶嵌模型 pictures it as a fluid sheet in which the parts drift.



■ 4 A selective barrier

The membrane is **selectively permeable** 选择透过性: small non-polar molecules pass easily, but large or charged particles need help. This lets the cell control what goes in and out.

Watch out: a bigger cell is worse at exchange, not better –its volume grows faster than its surface, so the surface-area-to-volume ratio drops and it cannot supply its interior fast enough.

Practice

Try these in order. The methods are all above.

2.1 State the job of (a) the nucleus, (b) the mitochondria.

[2]

2.2 Explain why cells stay small, using the surface-area-to-volume ratio.

[2]

2.3 Name the type of molecule that makes up most of the cell membrane.

[1]

2.4 State what "selectively permeable" means.

[2]

2.5 Name one organelle found in a plant cell but not an animal cell, and state its job.[2]
