

# 7 Populations, speciation, and evidence

## – 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) |
|------------------------------|------------|----------------------------|
| allele frequency             | 等位基因<br>频率 | _____                      |
| gene flow                    | 基因流        | _____                      |
| genetic drift                | 遗传漂变       | _____                      |
| Speciation                   | 物种形成       | _____                      |
| reproductively iso-<br>lated | 生殖隔离       | _____                      |

### Recall

In Part A you met natural selection. Now see it acting on whole populations:

- Bacteria can become resistant to antibiotics.
- Over long times, populations can split into new species.
- Fossils and DNA give evidence for evolution.

Each idea has a short worked example before the Practice.

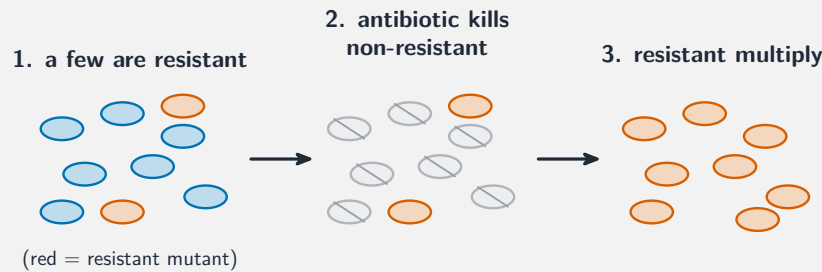
### New ideas

#### ■ 1 Evolution changes allele frequencies

A population's gene pool holds many **alleles**. Evolution is a change in how common each allele is –its **allele frequency** 等位基因频率. Besides natural selection, this changes through mutation, **gene flow** 基因流 (migration), and **genetic drift** 遗传漂变 (random change, strongest in small populations).

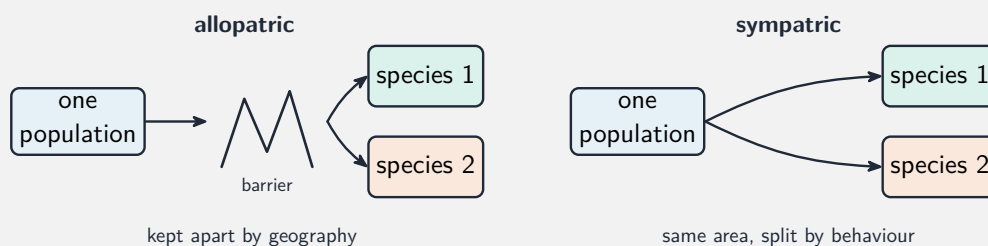
## ■ 2 Antibiotic resistance

Antibiotic resistance is natural selection in fast-forward: a few bacteria happen to survive the drug, then reproduce, so the whole population becomes resistant.



## ■ 3 Speciation

**Speciation** 物种形成 is the origin of a new species. It usually happens when populations become **reproductively isolated** 生殖隔离 (often by a geographic barrier) and slowly diverge until they can no longer interbreed.



## ■ 4 Evidence for evolution

Many independent lines support evolution: the fossil record, shared anatomy between related species, and matching DNA sequences.

**Watch out:** individuals do **not** evolve – **populations** do. A single bacterium doesn't "become resistant"; rather, resistant ones survive and multiply, shifting the whole population.

## Practice

Try these in order. The methods are all above.

**2.1** State what evolution is, in terms of alleles in a population.

[2]

**2.2** Explain how a population of bacteria becomes resistant to an antibiotic.

[3]

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**2.3** State what usually must happen for two populations to become separate species. [2]

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**2.4** Give two kinds of evidence that support evolution. [2]

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**2.5** Explain why it is wrong to say a single individual "evolves". [2]