A-LEVEL BIOLOGY • HOLIDAY HOMEWORK 假期作业

11 Immunity – 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)		
antibodies	抗体			
antigen	抗原			
vaccine	疫苗			
memory cells	记忆细胞			
primary response	初次免疫反应			
secondary response	二次免疫反应			
long-term immunity	长期免疫			
active immunity	主动免疫			
passive immunity	被动免疫			
herd immunity	群体免疫			

Recall

From Part 1 you know **antibodies** 抗体 are made against a pathogen's **antigen** 抗原. Here we see how the body *remembers* a pathogen, and how a **vaccine** 疫苗 uses that memory.

- The first time you meet a germ you may get ill; the second time you often do not.
- That is because of special **memory cells** 记忆细胞.

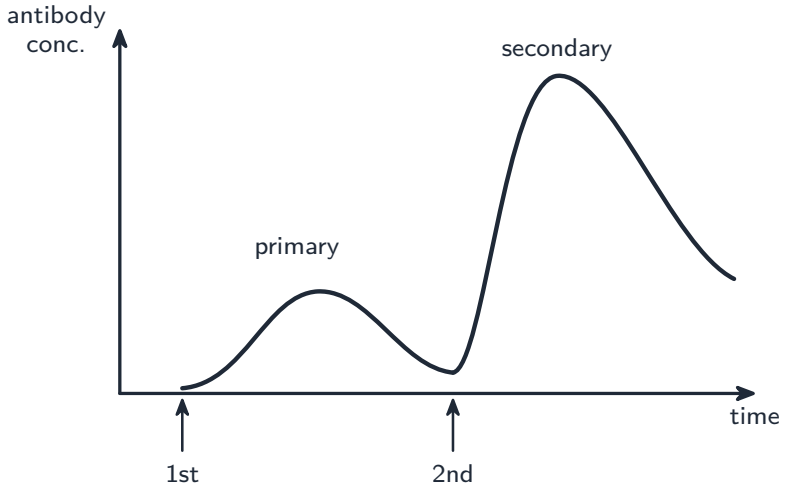
New ideas

Read these first, then do the Practice.

1 Memory cells and the secondary response

The first time a pathogen enters, the body makes a slow **primary response** 初次免疫反应. It also makes long-lived **memory cells** 记忆细胞.

If the **same** pathogen enters again, the memory cells start a **secondary response** 二次免疫反应 that is **faster and larger**, so the pathogen is destroyed before it makes you ill. This is **long-term immunity** 长期免疫.



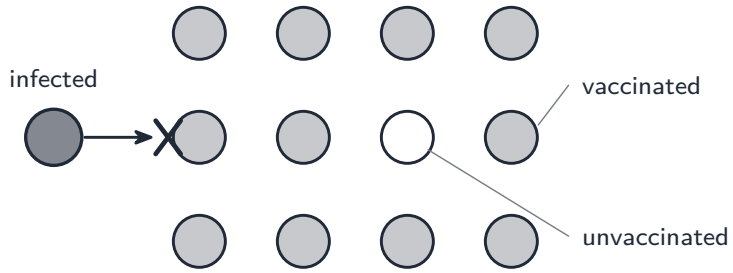
2 Active and passive immunity

- **active immunity** 主动免疫 — your own body meets an antigen and makes its own antibodies and memory cells. Slow to start but **long-lasting**.
- **passive immunity** 被动免疫 — ready-made antibodies are given from outside (e.g. mother to baby). Works **at once** but does **not** last (no memory cells).

3 Vaccination and herd immunity

A **vaccine** 疫苗 contains antigens — often a dead or weakened pathogen. It triggers a primary response and makes memory cells, so you gain immunity **without** becoming ill.

If enough people are vaccinated, the pathogen cannot pass easily from person to person. This protects even the unvaccinated — an effect called **herd immunity** 群体免疫.



Watch out: the secondary response is *faster* and *larger* (thanks to memory cells). Active immunity (your own antibodies) *lasts*; passive immunity (ready-made antibodies, e.g. from breast milk) is *instant* but does *not* last — there are no memory cells.

Practice

Try these in order.

11.1 Which cells allow the body to respond faster the second time it meets a pathogen? [1]

11.2 State two ways the secondary response differs from the primary response. [2]

11.3 Explain the difference between active and passive immunity. [2]

11.4 What does a vaccine contain, and what does it make the body produce? [2]

11.5 Explain how vaccinating most of a population protects the few who are not vacci-

nated. [2]

11.6 A baby gets antibodies in its mother's milk. Is this active or passive immunity? Explain. [2]

11.7 Challenge. A vaccine gives long-lasting immunity without making you ill. Explain how it achieves both. [2]