

Diseases & Immunity

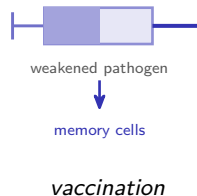
IGCSE Biology ■ Topic 10

IGCSE Biology



What we will cover

- 1 Pathogens & transmission
- 2 The body's defences
- 3 Antigens & antibodies
- 4 Vaccination
- 5 Active vs passive immunity
- 6 Cholera



Pathogens and transmission

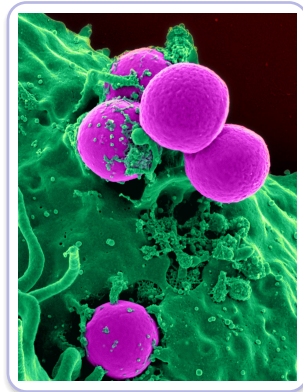
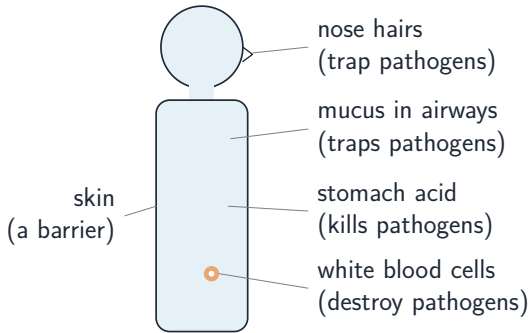


indirect: through food, water or air



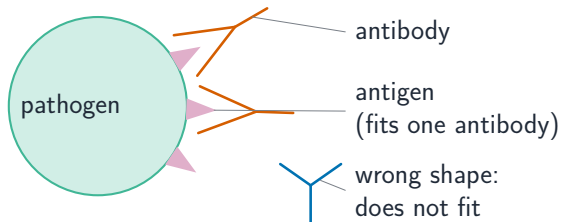
Vectors can transmit pathogens

The body's defences



*White cells
defend against infection*

Antigens and antibodies

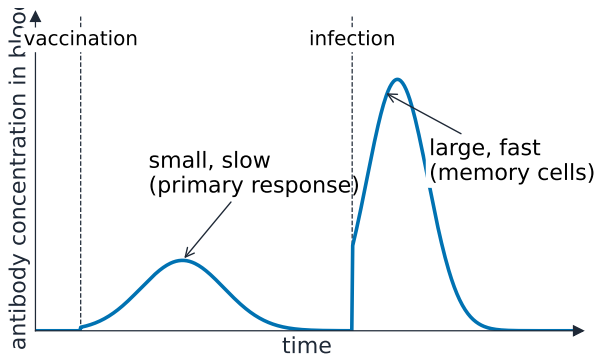


Each pathogen carries
antigens 抗原.

Lymphocytes 淋巴细胞 make
antibodies 抗体 (proteins).

An antibody's shape is **complementary** 互补 to one antigen – it fits only that pathogen.

Vaccination



Vaccination 疫苗接种 puts in weakened pathogens/antigens.

- lymphocytes make antibodies
- **memory cells** 记忆细胞 stay for years
- next time: a fast, large response

Active vs passive immunity

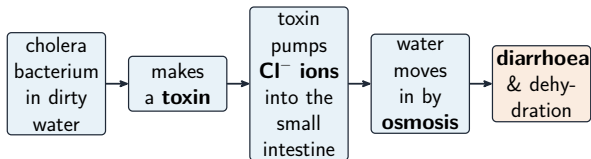
active immunity 主动免疫

your own antibodies (infection/vaccine); **memory cells** → long-term

passive immunity 被动免疫

antibodies from another (placenta, breast milk); **no memory** → short-term

Cholera



Cholera 霍乱 spreads in dirty water. Its **toxin** 毒素:

- pumps chloride ions into the gut
- water follows by **osmosis** 渗透
- → **diarrhoea** 腹泻 & **dehydration** 脱水

Worked example – active or passive immunity?

A traveller is given an injection of ready-made antibodies. Is this active or passive immunity, and how long does it last?

- The antibodies were **not made by the traveller** – they were given.
- So it is **passive immunity** 被动免疫: protection starts **immediately**.
- But no **memory cells** are made.
- When the antibodies break down the protection is gone $\Rightarrow$ **short-lived**.

Active: you make your own antibodies (vaccine or infection) – slow to start, **long-lasting** (memory cells). **Passive:** given to you – instant, **short**.

Topic 10 – key takeaways

1

Defences

skin, mucus, stomach acid, white cells

2

Antibodies

complementary shape to one antigen

3

Immunity

active makes memory cells;
passive does not

4

Cholera

toxin → osmosis → diarrhoea

Check yourself

- 1 Name two of the body's defences.
- 2 What cell makes antibodies?
- 3 Which immunity makes memory cells?
- 4 Why does cholera cause water loss?



Answers 1. e.g. skin & stomach acid 2. a lymphocyte 3. active immunity 4. water moves into the gut by osmosis