

Week 14

IGCSE Biology

Homework bundle for this week

本周作业合集

exercises.lol

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IGCSE Biology

Name: _____ Score: _____

1. A pathogen is:

- ☐ a microbe that causes disease
- ☐ a type of white blood cell
- ☐ a vaccine
- ☐ a harmless gut bacterium

2. Phagocytes defend the body by:

- ☐ engulfing and digesting pathogens
- ☐ making antibodies
- ☐ carrying oxygen
- ☐ clotting blood

3. Which can be pathogens? (Select all that apply.)

- ☐ bacteria
- ☐ viruses
- ☐ fungi
- ☐ red blood cells

Tick every correct option.

4. Antibodies are made by:

- ☐ lymphocytes
- ☐ red blood cells
- ☐ platelets
- ☐ phagocytes

5. A pathogen spread by coughs and sneezes travels through the:

- ☐ air
- ☐ soil only
- ☐ bones
- ☐ nerves

6. A vaccine protects you by:

- ☐ triggering antibodies and memory cells ut causing the disease

☐ killing all bacteria in the body

☐ giving you the full disease

☐ replacing your blood

7. Memory cells let the body respond faster to a pathogen it has met before.

☐ True ☐ False

8. Swallowed pathogens are killed by the _____ in the stomach.

9. Antibodies recognise the markers on a pathogen called _____.

10. Which is a physical barrier to pathogens?

☐ the skin

☐ a vaccine

☐ an antibody

☐ a hormone

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1. a microbe that causes disease

Pathogens are disease-causing microbes.

2. engulfing and digesting pathogens

Phagocytes engulf pathogens; lymphocytes make antibodies.

3. bacteria; viruses; fungi

Bacteria, viruses, fungi and protoctists can cause disease; red blood cells cannot.

4. lymphocytes

Lymphocytes produce antibodies.

5. air

Airborne droplets carry pathogens.

6. triggering antibodies and memory cells without causing the disease

It safely primes the immune system.

7. True

This is the basis of immunity.

8. acid

Stomach acid destroys many pathogens in food.

9. antigens

Each antibody fits a specific antigen.

10. the skin

The skin physically blocks pathogens.

10.1 Diseases and immunity

Name: _____ Class: _____ Date: _____

Total: 9 marks

KEY WORDS pathogen 病原体 • antibodies 抗体 • active immunity 主动免疫 • passive immunity 被动免疫
• disease 疾病

Objective

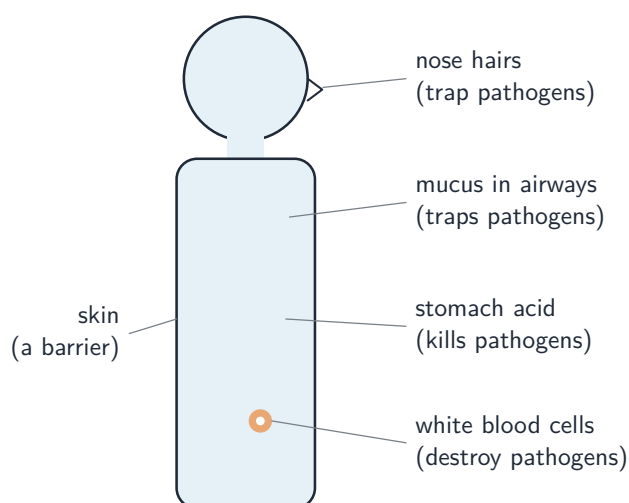
Build the skills to answer exam questions on **diseases and immunity** 疾病与免疫 — **pathogens** 病原体, the body's **defences** 防御, **antibodies** 抗体, **vaccination** 疫苗接种, and active vs passive immunity.

You must be able to:

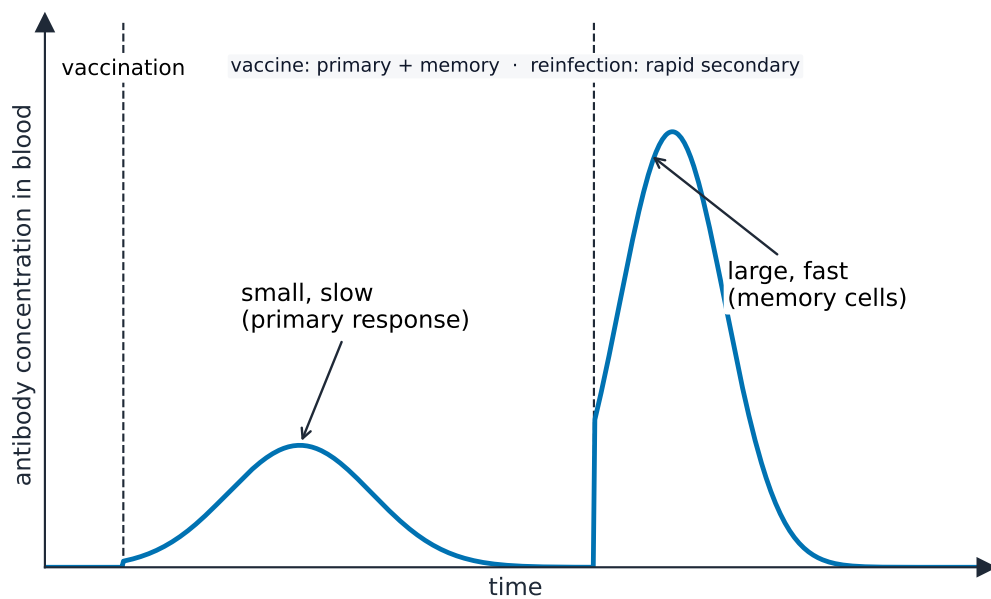
- define pathogen and transmissible disease; list the body's defences
- explain antigens/antibodies and how vaccination works
- compare active and passive immunity

1 Worked examples

■ Defences and vaccination



Defences: skin, nose hairs, mucus, stomach acid, white blood cells



Vaccination makes memory cells → a fast, large response if the real pathogen arrives (active immunity)

- **passive immunity** (placenta, breast milk): short-term, no memory cells.

2 Practice

2.1 Define a pathogen.

[1]

2.2 State two of the body's defences against pathogens.

[2]

3 Exam-style questions

3.1 An antibody is able to bind to one pathogen because its shape is:

[1]

- **A** the same as the antibody
- **B** complementary to the pathogen's antigen
- **C** larger than the pathogen
- **D** always changing

3.2 A child is vaccinated against measles.

(a) Describe how the vaccine gives long-term protection. [3]

(b) State the difference between active and passive immunity. [2]

Solutions

2.1 an organism that causes disease.

2.2 any two of: skin; nose hairs; mucus; stomach acid; white blood cells.

3.1 B. An antibody's shape is complementary to the pathogen's antigen.

3.2 (a) the vaccine's antigens make lymphocytes produce antibodies; and memory cells form; if the real pathogen arrives, the memory cells make antibodies fast, so you don't become ill.

(b) active immunity is made by your own body (long-term, memory cells); passive immunity comes from another body's antibodies (short-term, no memory cells).

14 Which statements are correct descriptions of methods of preventing pathogens from entering the body?

- 1 Fibrin is converted to fibrinogen to form a mesh.
- 2 Phagocytes produce antibodies.
- 3 Platelets clot blood.
- 4 Lymphocytes engulf pathogens.

A 1, 3 and 4 **B** 1 and 3 only **C** 2 and 4 **D** 3 only

16 Three statements about immunity are listed.

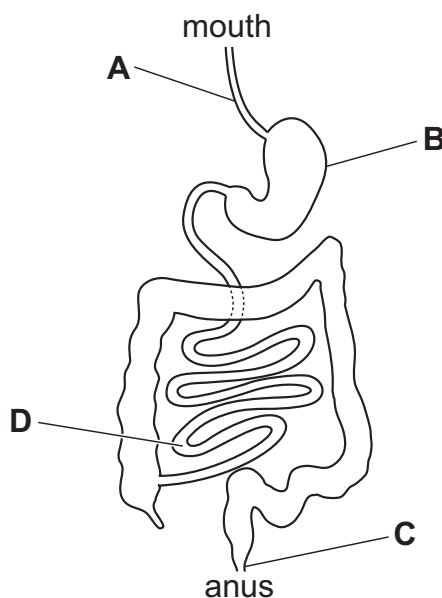
- 1 Specific antibodies are produced in response to specific antigens.
- 2 Pathogens have specific antigens.
- 3 A vaccination stimulates an immune response.

Which statements are correct?

A 1, 2 and 3 **B** 1 and 3 only **C** 1 only **D** 2 and 3 only

15 The diagram shows the human digestive system.

Where do cholera bacteria cause the secretion of chloride ions?



22 Which action would help to limit the development of antibiotic resistance in bacteria?

- A** Use antibiotics frequently to prevent infection by antibiotic-resistant bacteria.
- B** Use antibiotics only to treat bacterial infections.
- C** Use antibiotics to treat all types of infections.
- D** Use antibiotics to treat only viral infections.

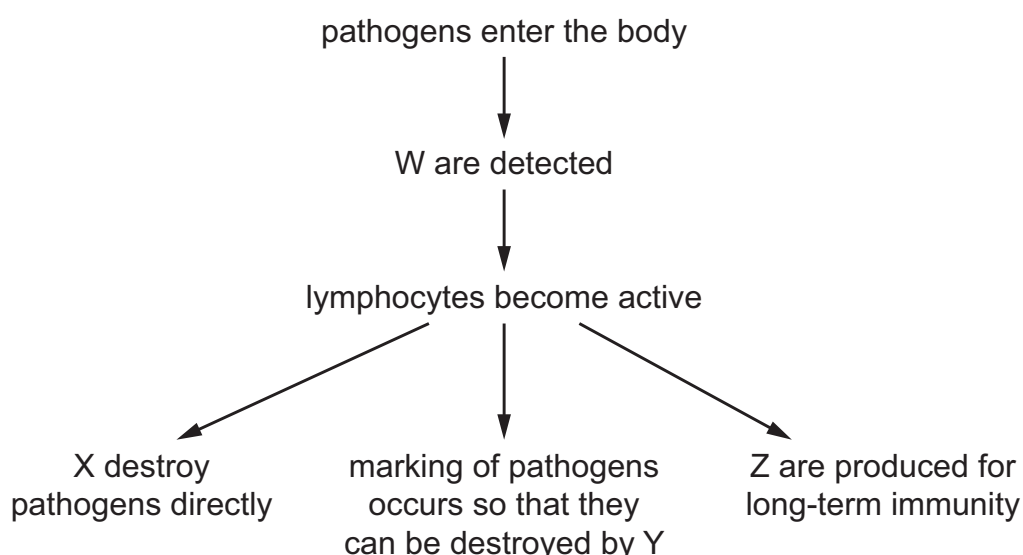
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17 What is an example of active immunity?

- A** antibody production after infection
- B** antibody transfer from mother to baby in breast milk
- C** antibody transfer from mother to fetus across the placenta
- D** an injection of antibodies that were produced by another individual

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16 The diagram shows what happens in the body during active immunity.



Which structures or cells represent W, X, Y and Z?

	antibodies	antigens	memory cells	phagocytes
A	W	X	Y	Z
B	W	X	Z	Y
C	X	W	Y	Z
D	X	W	Z	Y

- 17** Cholera is a disease caused by a bacterium called *Vibrio cholerae* which produces a toxin in the infected person's gut.

What is the effect of this toxin?

- A** The toxin causes loss of water from the gut into the blood.
- B** The toxin causes loss of water from the gall bladder into the blood.
- C** The toxin causes water to enter the gut from the blood.
- D** The toxin causes water to enter the gall bladder from the blood.

- 19** Three statements about immunity are listed.

- 1 The transfer of antibodies from mother to baby in breast milk is an example of passive immunity.
- 2 Passive immunity results in long-term immunity because of the production of memory cells.
- 3 Active immunity is gained after vaccination with antigens.

Which statements are correct?

- A** 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

5 Penicillin is an antibiotic.

- (a) (i)** State the type of organism that antibiotics are used to kill.

..... [1]

- (ii)** It is important to try and limit the development of antibiotic resistance.

Describe ways of limiting the development of antibiotic resistance.

.....
.....
.....
.....
..... [2]

- (b)** Penicillin is produced by an organism called *Penicillium chrysogenum*.

Fig. 5.1 is a diagram of *Penicillium chrysogenum*.

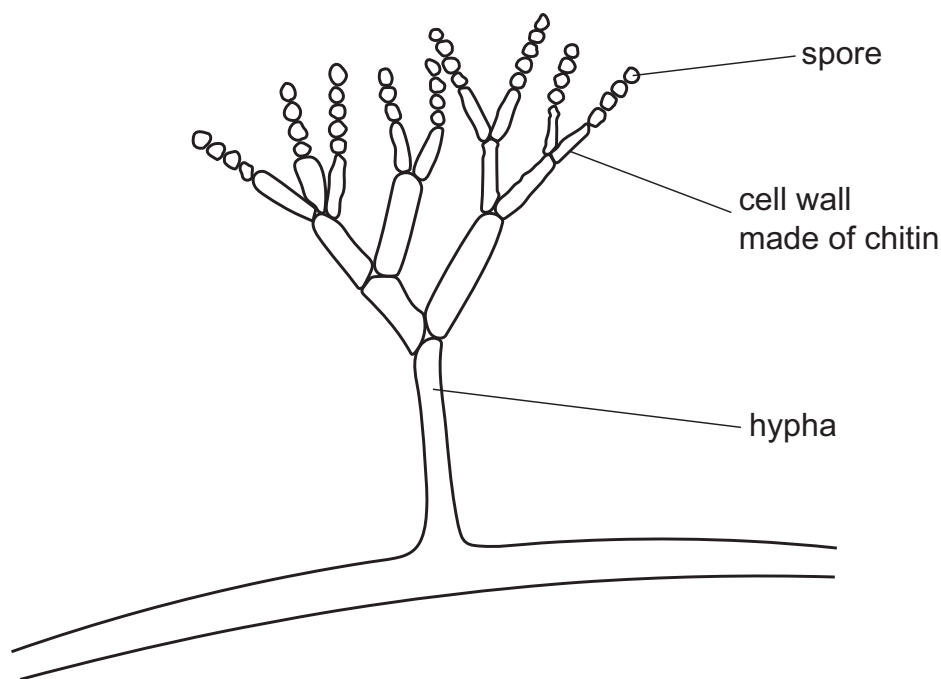


Fig. 5.1

- (i)** State what *Penicillium* in the scientific name of *Penicillium chrysogenum* represents in the binomial system.

..... [1]

- (ii)** Using the information in Fig. 5.1, identify the kingdom that contains *Penicillium chrysogenum*.

..... [1]

(c) Penicillin can be made in a fermenter.

(i) State the name of **one other** product made in a fermenter.

..... [1]

Fig. 5.2 shows a fermenter.

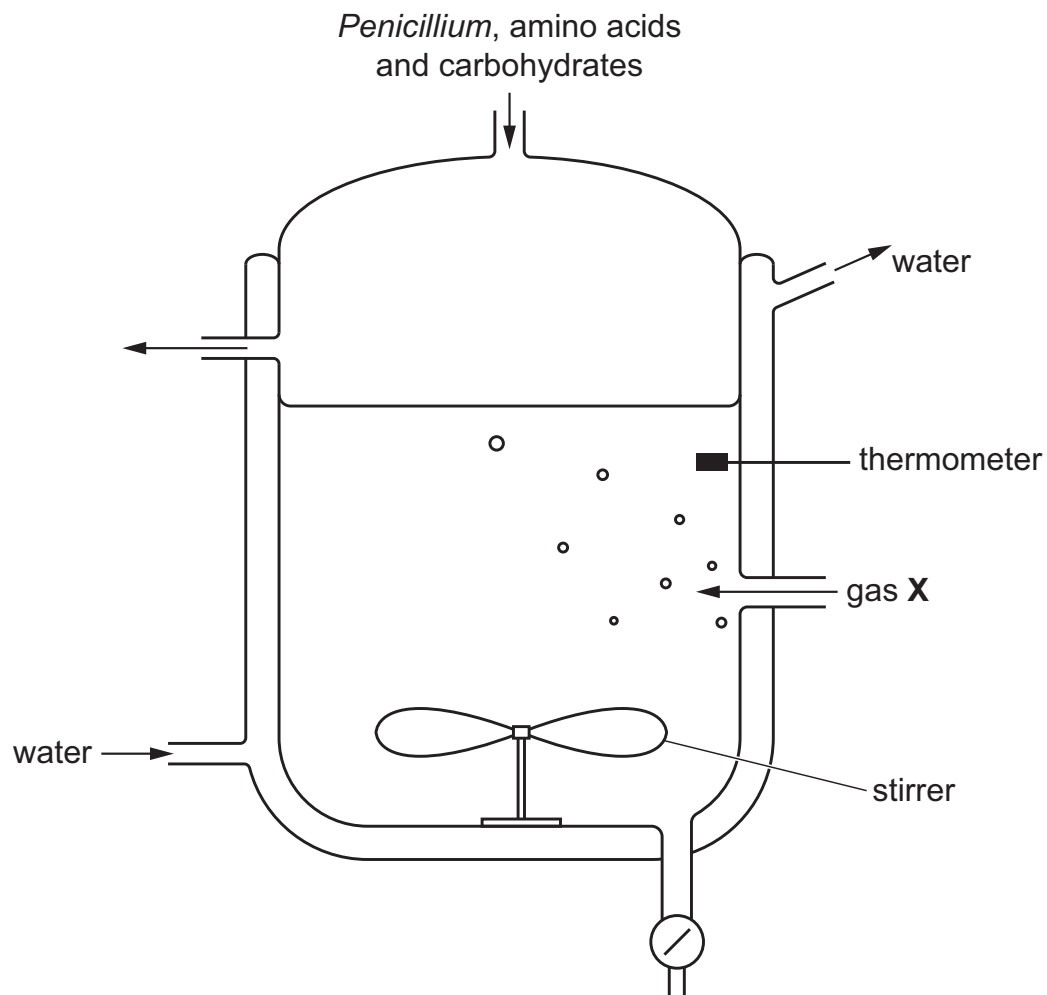


Fig. 5.2

(ii) Gas **X** in Fig. 5.2 is needed for the production of penicillin.

State the name of gas **X**.

..... [1]

- (iii) The concentration of gas **X** is one of the conditions that must be controlled to ensure that penicillin is produced.

State the **other** conditions required to produce penicillin **and** describe how they are controlled in the fermenter.

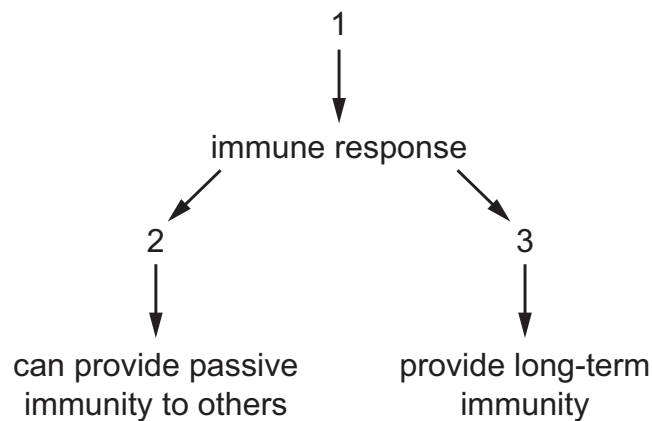
[5]

- (d)** State the name of the organism that is used in bread-making **and** in biofuel production.

..... [1]

[Total: 13]

- 17** The diagram shows the effect of vaccination on the human body. Three components in the diagram are represented by numbers.



Which components are memory cells?

- A** 1 only **B** 2 and 3 **C** 2 only **D** 3 only