

APOLLO

Defence against disease

SL

Biology

First assessment 2025

9 questions | questions

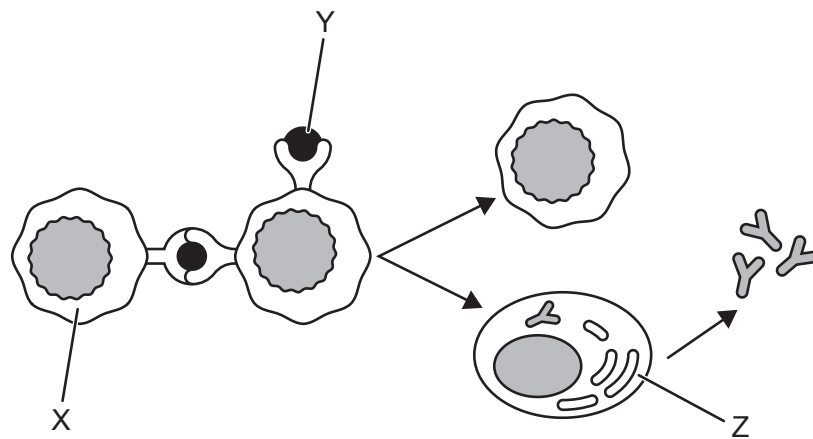
18. Which cell type is part of the innate immune system?

- A. Phagocytes
- B. B-lymphocytes
- C. T-lymphocytes
- D. Helper T-cells

Turn over

- 18.** What do rabies, tuberculosis and Japanese encephalitis have in common?
- A. They are all infectious diseases caused by bacteria.
 - B. They are all infectious diseases caused by viruses.
 - C. They are all zoonoses.
 - D. They are all infecting red blood cells.

18. The diagram shows stages in an immune response.



What is represented by labels X, Y and Z?

	X	Y	Z
A.	helper T-cell	antibody	plasma cell
B.	B-cell	antigen	memory B-cell
C.	helper T-cell	antigen	plasma cell
D.	B-cell	antibody	memory B-cell

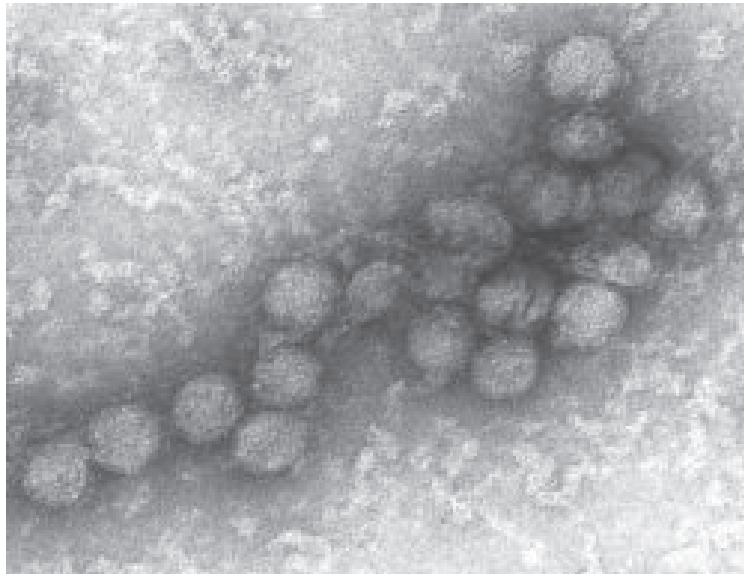
19. Which illness is an example of a zoonosis?

- A. Common cold
- B. Rabies
- C. Cholera
- D. Coronary heart disease

Turn over

- 17.** Which function is primarily associated with helper T-cells in the immune system?
- A. Phagocytosis of pathogens
 - B. Activation of other cells in the immune system
 - C. Antibody production
 - D. Retention as memory cells

18. The electron micrograph shows the Japanese encephalitis virus.



Why are some diseases, such as Japanese encephalitis, known as zoonoses?

- A. They can be directly transferred from an animal to humans.
- B. They are transferred from human to human.
- C. They are only found in animals in captivity (zoos).
- D. They can directly transfer antigens into animal cells.

- 16.** Which of the following will cause the production of antibodies during an infection?
- A. Conversion of fibrinogen to fibrin by thrombin
 - B. B-cell activation by helper T-cells and antigens
 - C. Plasma cell activation by platelets
 - D. Activation of phagocytes by infected body cells

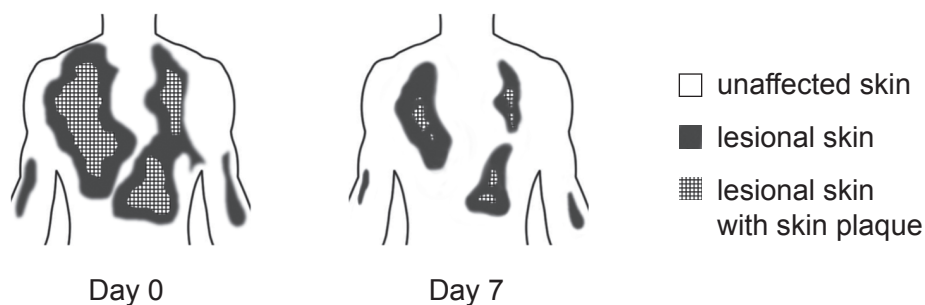
Section A

Answer **all** questions. Answers must be written within the answer boxes provided.

1. Psoriasis is a disorder characterized by inflammation of the skin. It causes the formation of red patches (lesional skin), which often have flaky, silver–white surfaces (skin plaques).

Some drugs are available to treat psoriasis. During treatment, the changes in psoriasis severity can be measured by taking daily photographs of the affected region(s) of the body.

In one study, five males of a similar age and with similar psoriasis severity were provided with the same dose of a medicinal drug for seven days. The skin maps show the change in psoriasis severity on the back of **one** of the males during this study.



- (a) Distinguish between the appearance of the skin of this male on Day 0 and Day 7 of treatment.

[2]

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(This question continues on the following page)



(Question 1 continued)

- (b) Explain how quantitative data could be obtained from all males to assess the success of the treatment. [2]

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- (c) Comment on the reliability of this investigation. [1]

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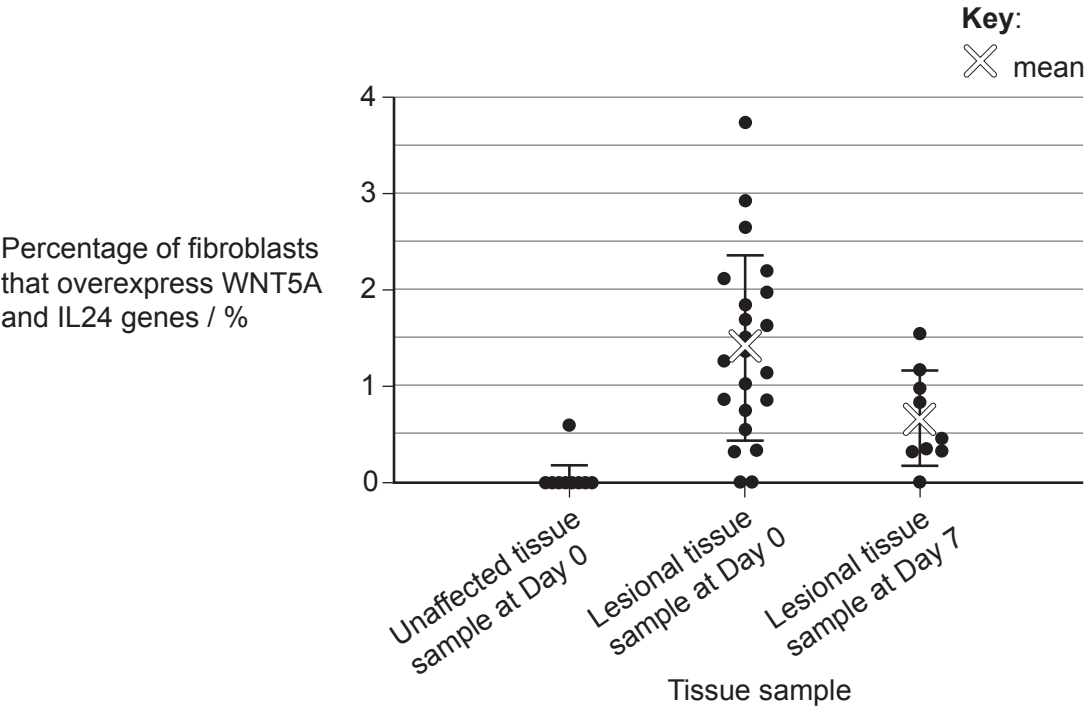
Turn over

(Question 1 continued)

One drug commonly used to treat psoriasis is called guselkumab. It reduces inflammation in affected regions of skin.

Tissue samples of lesional skin were taken from people with psoriasis before treatment with guselkumab (Day 0) and after one week of treatment (Day 7). Tissue samples of unaffected skin were also taken from these people before treatment with guselkumab. The numbers of samples were different for the three groups.

Skin cells called fibroblasts were extracted from all tissue samples. The scientists measured the expression of two genes that are known to cause inflammation, WNT5A and IL24. They calculated the percentage of fibroblasts that overexpress (express more than normal) **both** the WNT5A and IL24 genes. The graph shows the data. The crosses on the graph represent mean percentages.



Statistical significance levels

Unaffected tissue sample at Day 0	Lesional tissue sample at Day 0	Lesional tissue sample at Day 0	Lesional tissue sample at Day 7
p < 0.001		p < 0.05	

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(Question 1 continued)

- (d) State the highest percentage of fibroblasts that overexpress WNT5A and IL24 in the lesional tissue sample at Day 0. [1]

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- (e) Calculate the decrease in the mean percentage of fibroblasts in lesional tissue that overexpress WNT5A and IL24 after treatment with guselkumab. [1]

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- (f) Suggest the reason for including unaffected tissue samples in this investigation. [1]

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- (g) Explain the conclusions that can be drawn from the data in the graph. [2]

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20. Which cell is a component of the innate immune system?

- A. T lymphocyte
- B. Phagocyte
- C. B lymphocyte
- D. B memory cell