

Communicable diseases, disease prevention & the immune system

Question Paper 3

| | |
|------------|---|
| Level | A Level |
| Subject | Biology |
| Exam Board | OCR |
| Module | Biodiversity, evolution and disease |
| Topic | Communicable diseases, disease prevention & the immune system |
| Booklet | Question Paper 3 |

Time allowed: 51 minutes

Score: /38

Percentage: /100

Grade Boundaries:

| A* | A | B | C | D | E |
|------|-----|-----|-----|-----|-----|
| >69% | 56% | 50% | 42% | 34% | 26% |

Question 1

(a) Lymphocytes are important components of the immune system and can be classified into B lymphocytes and T lymphocytes.

For each of the statements in the table below, identify whether the description applies to:

- only B lymphocytes
- only T lymphocytes
- both B and T lymphocytes
- neither.

You may use each response once, more than once, or not at all. The first one has been done for you.

| statement | can be applied to ... |
|--|-----------------------|
| form part of immune response | both |
| matured in thymus | |
| secrete substances which kill infected cells | |
| manufacture antibodies | |
| undergo clonal expansion | |
| activate other lymphocytes | |

[5]

CHEMISTRY ONLINE
— TUITION —

(b) Fig. 7.1 shows the concentration of antibodies in a patient's blood following an initial infection with a pathogen. This is known as the primary response.

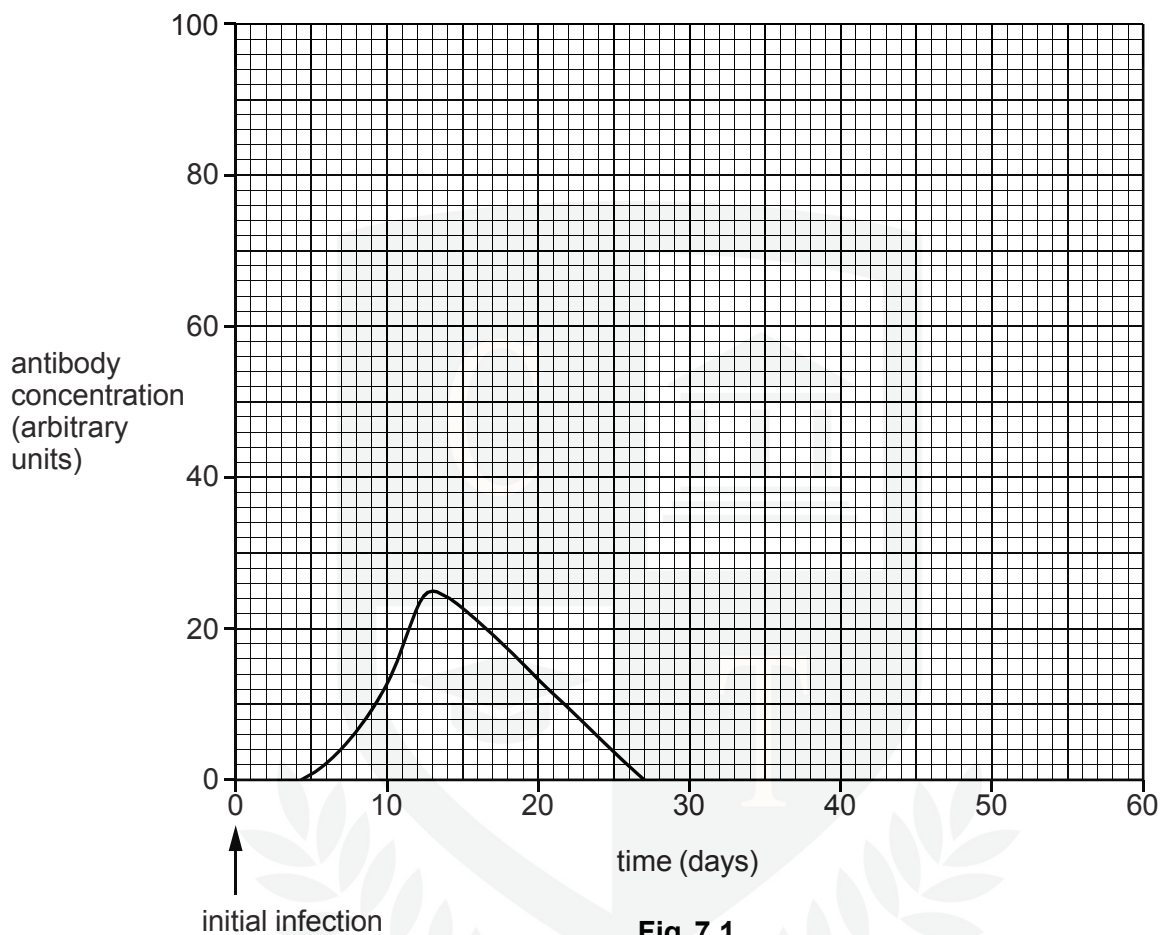


Fig. 7.1

- (i) Describe the changes in antibody concentration that occur in the patient's blood during the primary response. [3]

- (ii) The patient was subsequently infected with the same pathogen 30 days after the initial infection.

Draw a line **on the graph** to show the likely concentration of antibodies in the patient's blood from 30 days onwards. [2]

(c) Fig. 7.2 shows the structure of an antibody.

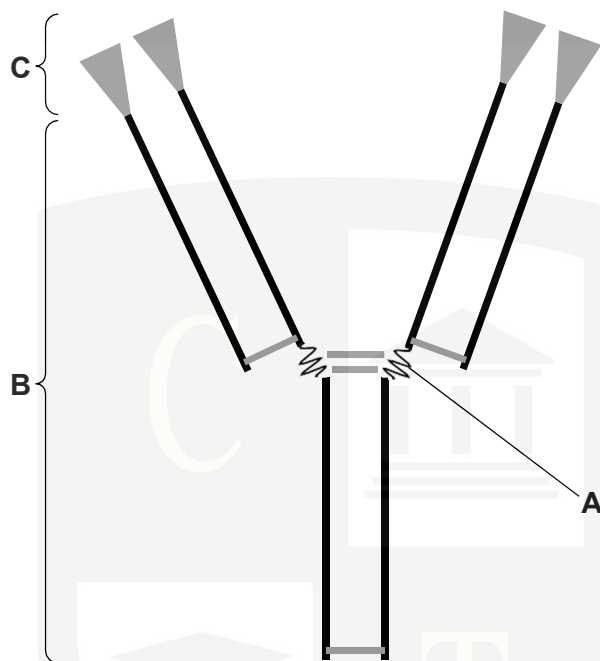


Fig. 7.2

Complete the table below by stating the name and function of each of the regions **A**, **B** and **C**.

| region | name | function |
|----------|------|----------|
| A | | |
| B | | |
| C | | |

[6]

[Total: 16]

Question 2

(a) Each winter, the UK government recommends that vulnerable members of the public are vaccinated against the influenza (flu) virus.

(i) State **two** groups of people that the government would consider as being vulnerable. [2]

(ii) Suggest why the influenza vaccine has to be changed each year. [2]

Fig. 4.1 shows the concentration of antibodies in a patient's bloodstream following an influenza vaccination and then infection with the influenza virus.

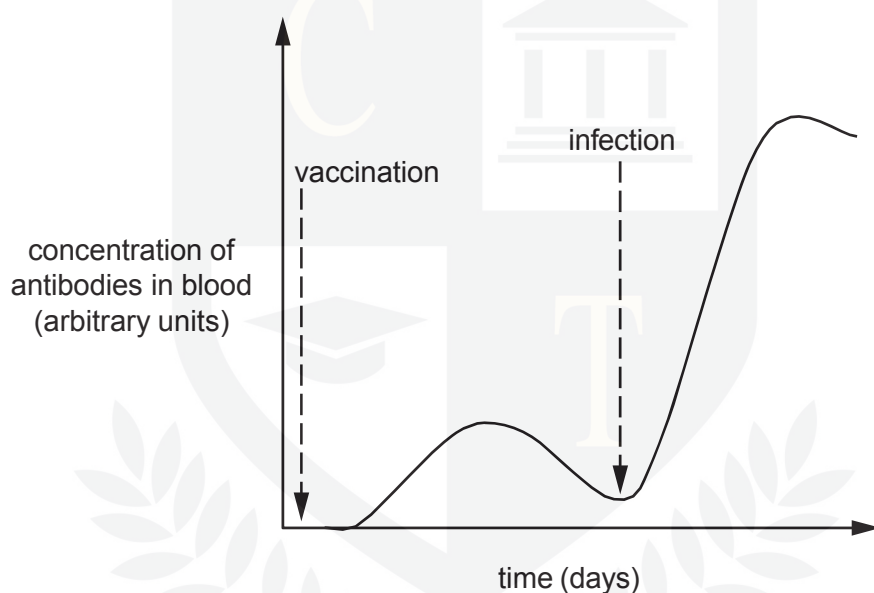


Fig. 4.1

(iii) Using the information from Fig. 4.1, state **two differences** between the primary and secondary immune responses. [2]

(iv) Memory cells are produced when a patient is vaccinated against influenza.

Describe the role of these memory cells when the influenza virus enters the body. [3]

(b) Tamiflu® is an antiviral drug that can be used to treat influenza patients.

(i) State why a doctor would **not** prescribe antibiotics to treat influenza. [1]

(ii) Neuraminidase is an enzyme which is present on the protein coat of the influenza virus.

This enzyme is used to break down the host cell membrane and allow the influenza viruses to leave the infected cell. Tamiflu® is a neuraminidase inhibitor.

Suggest how Tamiflu® could inhibit neuraminidase. [2]

(iii) Suggest how Tamiflu® could help to reduce the spread of influenza. [2]

(c) In an effort to find new drugs to combat a possible new influenza pandemic, researchers have investigated plants used in traditional medicine in Nepal. Two plants, an onion, *Allium oreoprasmum*, and an asparagus, *Asparagus filicinum*, have been found to show antiviral properties.

Suggest why researchers in Nepal concentrated their research on plants that had been used in traditional medicine. [2]

[Total: 16]

Question 3

Complete the following passage by selecting the most suitable term from the list below.

Each term may be used once, more than once or not at all.

antibiotics

natural

antibodies

non-specific

antibody

specific

antigen

vaccination

artificial

vaccines

The body can acquire immunity in a number of different ways.

In passive immunity,are introduced directly into the body. This may occur via breast milk or the placenta, in which case it is described as immunity. This immunity provides the growing child with valuable protection until its immune system has developed fully. It is sometimes important to provide immediate protection, such as when a person has a wound that could be contaminated with tetanus bacteria. In this case, suitable blood serum from another individual is injected into the bloodstream to provide immunity.

Edward Jenner pioneered the technique of stimulating the immune system into action so that the body develops immunity without developing the symptoms of the disease. Jenner's technique mimics the way in which the body would develop immunity from direct contact with the pathogen and the stimulation of the primary response. Nowadays, a harmless form of the is injected so that the body develops antibodies and memory cells for future defence. This technique is known as

.....

[6]

[Total: 6]