

SECTION A

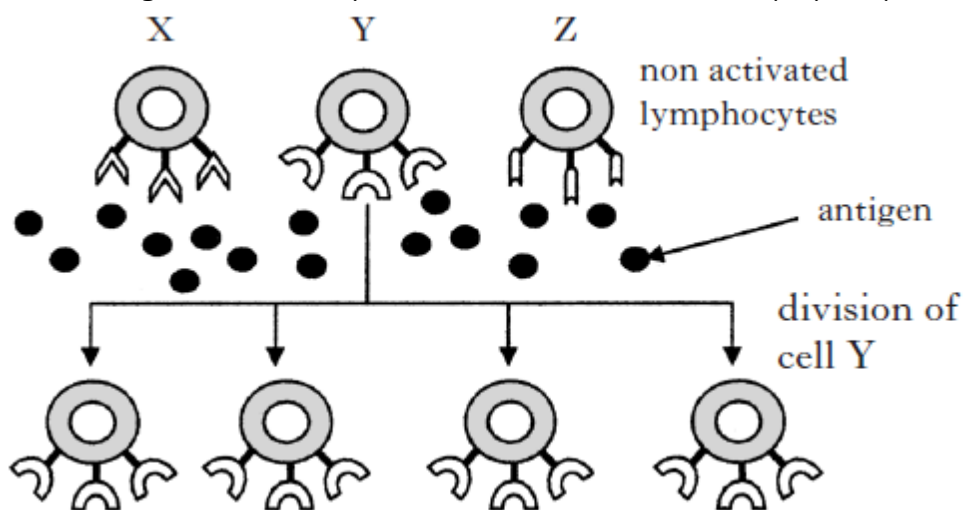
1. Which of the following is **not** part of the inflammatory response?

- A Vasodilation
- B Release of histamine
- C Production of antibodies
- D Increased capillary permeability

2. Phagocytes contain many lysosomes so that

- A enzymes which destroy bacteria can be stored
- B toxins from bacteria are neutralised
- C antibodies can be released in response to antigens
- D bacteria can be engulfed into the cytoplasm.

3. The diagram below represents clonal selection in lymphocytes



What stimulates the division of cell Y?

- A The presence of lymphocytes X and Z
- B The presence of antigen in the blood
- C The binding of antibodies to receptors on the cell membrane
- D The binding of antigens to receptors on the cell membrane.

4. Which of the following types of white blood cell is involved in a non-specific immune response which causes apoptosis in invading pathogens?

- A Phagocytes
- B B lymphocytes
- C T lymphocytes
- D Natural killer cells

5. Lymphocytes act in defence of the body by

- A ingesting toxins
- B ingesting pathogens
- C producing lysosomes
- D producing antibodies

6. Which of the following secrete antibodies?

- A B lymphocytes
- B T lymphocytes
- C Red blood cells
- D Macrophages

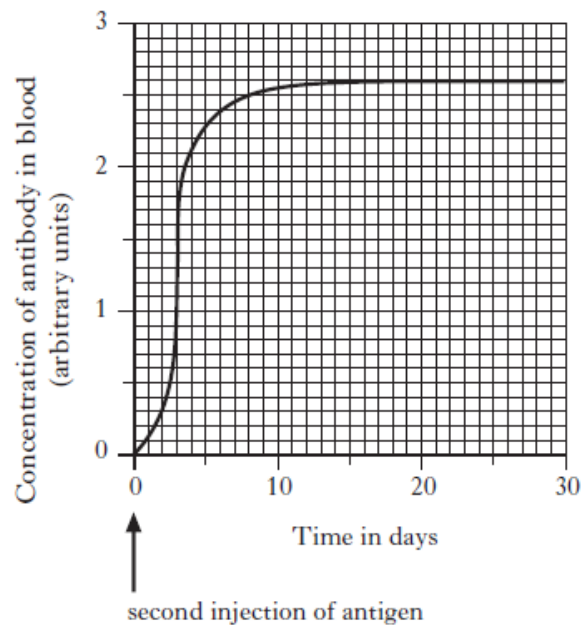
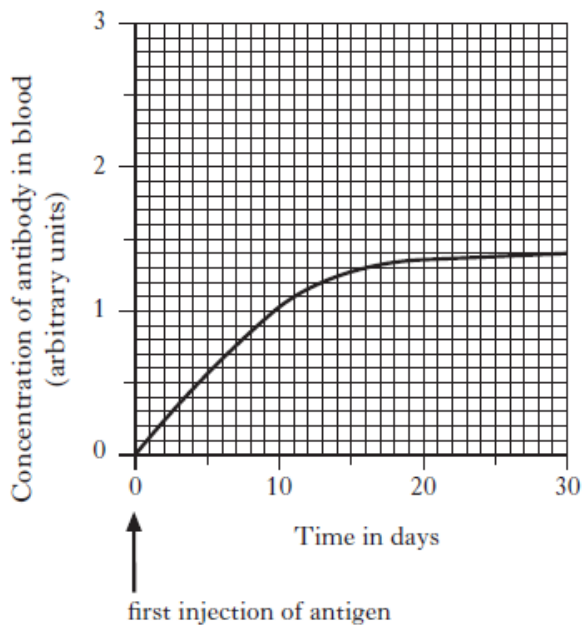
7. Which of the following is an immune response?

- A T lymphocytes secreting antigens
- B T lymphocytes carrying out phagocytosis
- C B lymphocytes combining with foreign antigens
- D B lymphocytes producing antibodies

8. When a disease occurs regularly in an area it is classified as being

- A endemic
- B epidemic
- C pandemic
- D sporadic

9. The graphs below show the effect of two injections of an antigen on the formation of an antibody.



How many days after the second injection does the concentration of antibody in the blood reach the maximum achieved after the first injection?

- A 3 days
- B 6 days
- C 20 days
- D 30 days

10. Adjuvants are often added to vaccines to

- A make the vaccine safer
- B enhance the immune response
- C make immunity last for a longer time
- D ensure the vaccine contains no live pathogens.

11. Two groups of students were used when carrying out clinical trials of a vaccine. One group was given the vaccine while the other group was given a placebo. The purpose of the placebo was to

- A reduce experimental error
- B ensure a valid comparison can be made
- C allow a statistical analysis of the results to be made
- D ensure that researchers are unaware who has been vaccinated.

12. On which of the following does the herd immunity threshold **not** depend?

- A Type of disease
- B Quarantine of non-immune individuals
- C Population density
- D Effectiveness of the vaccine.

13. The table below contains data about a worldwide infection in 2009.

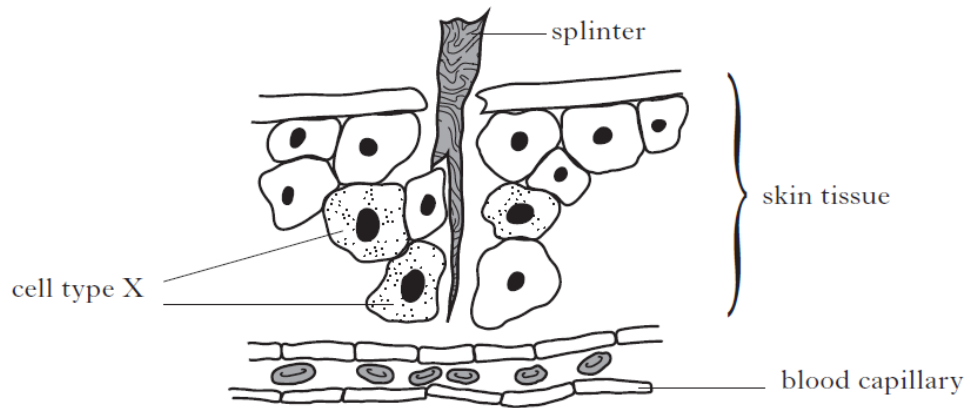
	Number of adults	Number of children
Had infection at start of 2009	30.8×10^6	2.5×10^6
Contracted infection during 2009	2.2×10^6	0.4×10^6
Died from infection during 2009	1.6×10^6	0.2×10^6

How many people in the world had this infection at the start of 2010?

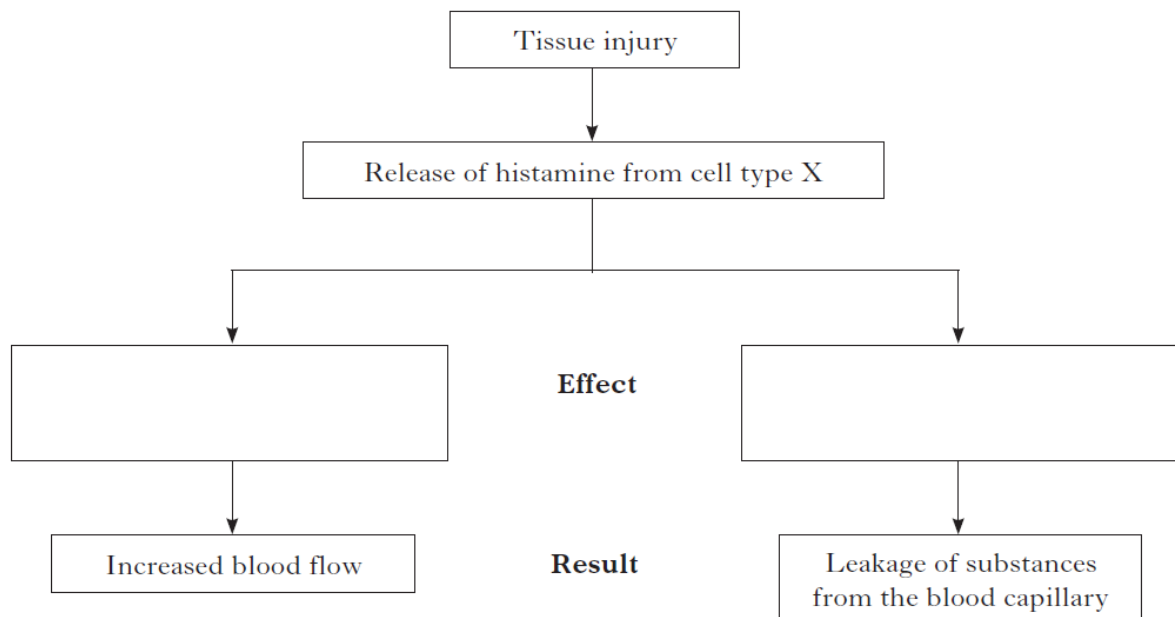
- A 35.9×10^6
- B 33.3×10^6
- C 34.1×10^6
- D 31.5×10^6

SECTION B

1. The diagram shows an injury where a splinter has pierced the skin.



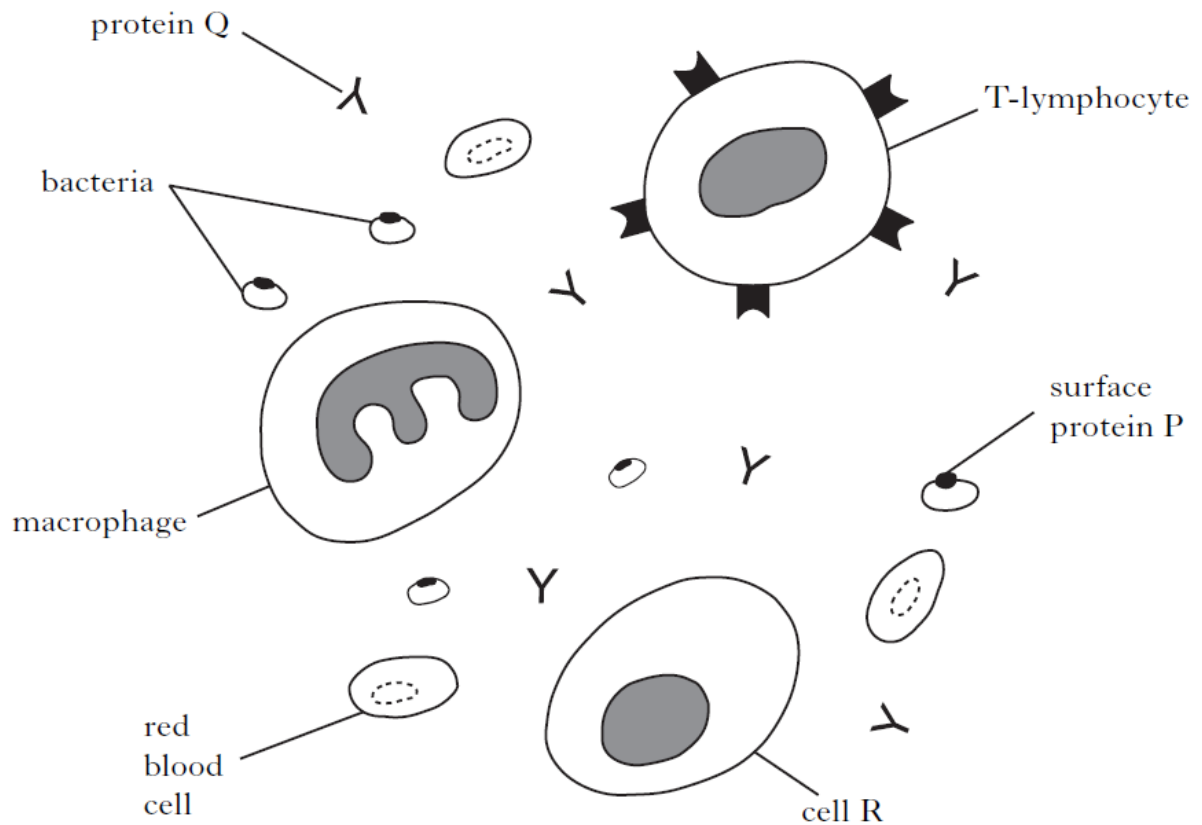
The flow diagram shows some of the events which result from this injury.



- Identify cell type X. (1)
- Describe the effects of histamine release. (2)
- Name one substance that leaks from the blood capillary AND describe how it protects against infection. (2)

2. The diagram shows blood infected by bacteria that have triggered an immune response.

The diagram is not drawn to scale.



- Identify proteins P and Q. (1)
- What type of cell produced protein Q. (1)
- Describe the role of **T-lymphocytes** and **macrophages** (phagocytes) in combating infection. (2)
- What happens during an autoimmune response? (1)

3. Give an account of infectious disease under the following headings;

- The classification of the spread of diseases; (3)
- The transmission of disease; (3)
- The control of disease transmission. (4)

4. The diagrams below contain information about the causes of death and survival rates in two countries in 2010.

Figure 1 - Causes of death in countries A and B during 2010

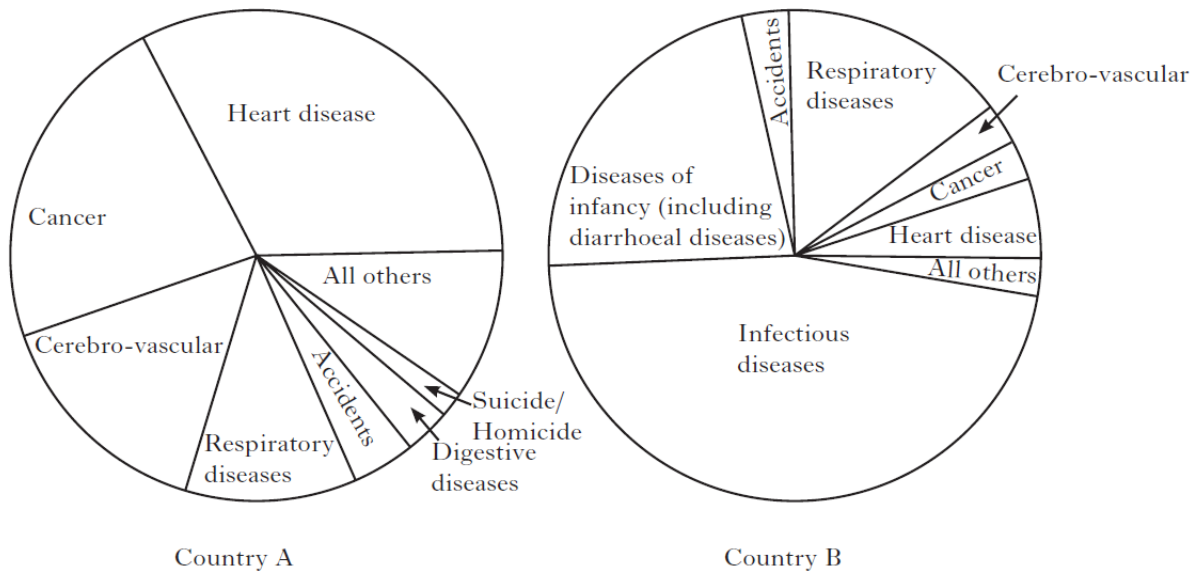
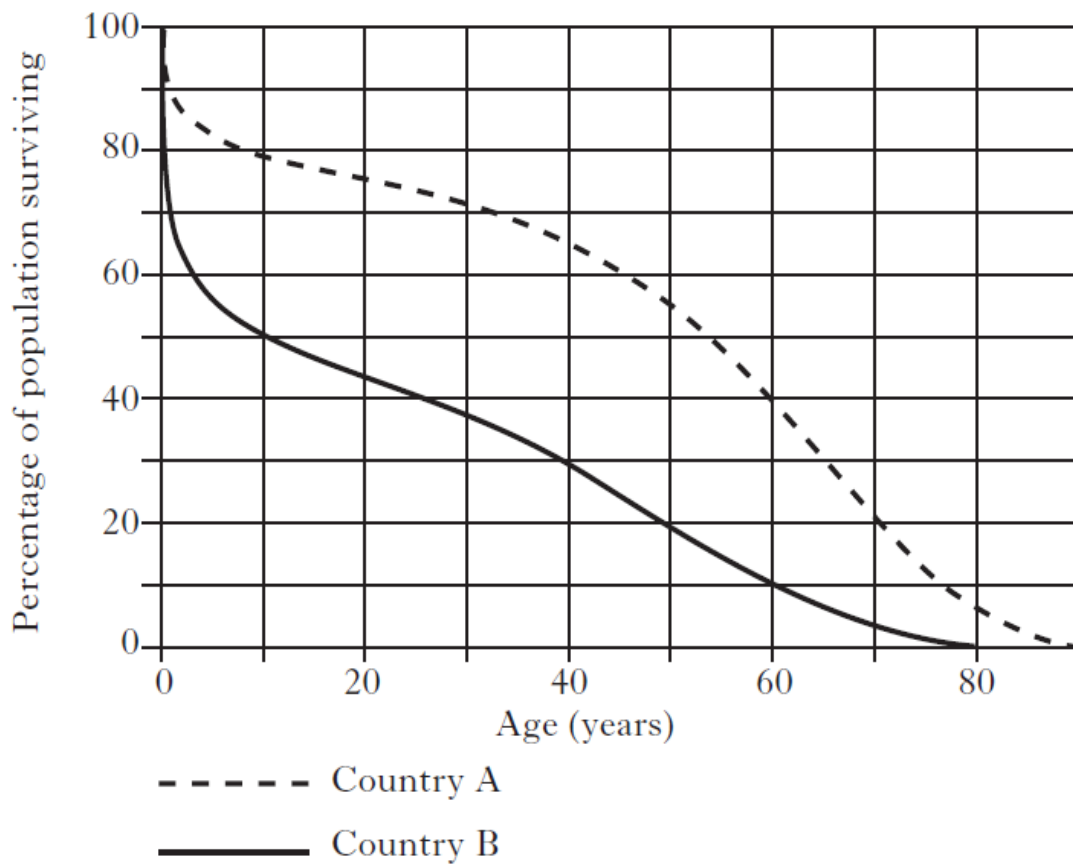


Figure 2 - Percentage survival rates in countries A and B in 2010

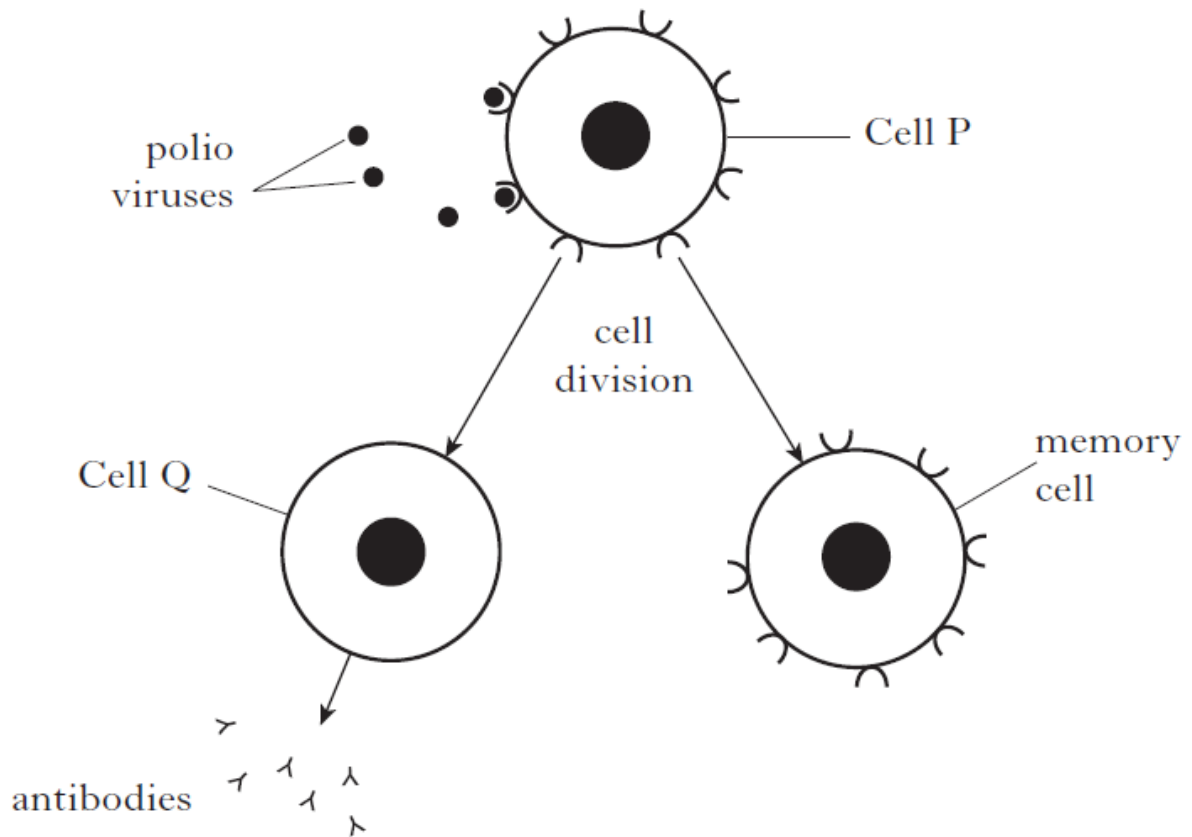


- a. Identify the main cause of death in each country. (1)
 - b. Country B has no public health measures to control the incidence of heart disease. Suggest a reason for the low incidence of heart disease in country B. (1)
 - c. What percentage of the population of country A die before age 20? (1)
 - d. In 1950, 3 million babies were born in country B. Assuming no emigration, how many of these babies were still alive in 2010? (1)
 - e. Malaria is endemic in country B. What does this mean? (1)
-
5. The immune system protects the body from infection.
 - a. Copy and complete the table about cells of the immune system. (2)

<i>Cell type</i>	<i>Function</i>
	Releases cytokines
B lymphocyte	
	Induces apoptosis

b. What is meant by the term **active immunity**? (1)

6. The diagram shows how the immune system responds to a polio virus in a vaccine.

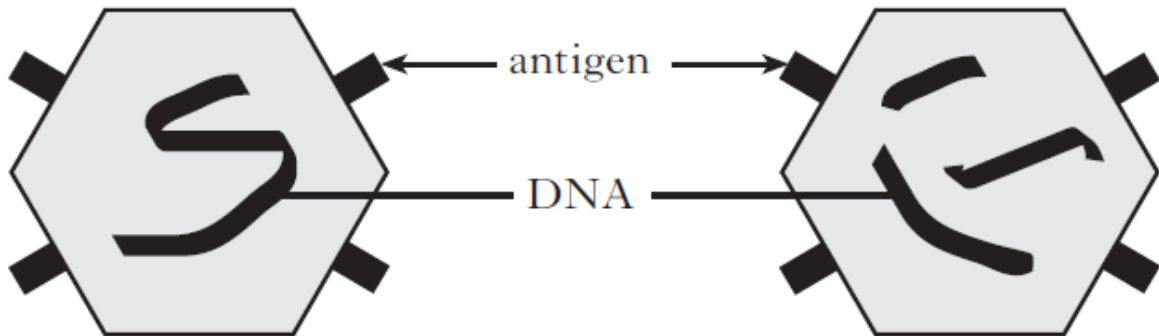


- Name the type of immunity which results from vaccination with infectious pathogens like the polio virus. (1)
- Name cell type Q. (1)
- Describe **two** functions of cell P shown in the diagram. (2)
- Describe the role of memory cells in the immune system. (1)
- Explain why polio vaccination is ineffective against measles. (1)
- Explain why an adjuvant is usually mixed with the pathogen when a vaccine is produced. (1)
- Clinical trials of vaccines often use a double blind protocol. Describe what is meant by the term 'double blind'? (1)

7. The diagrams below show a disease causing virus and a weakened form of the same virus which is less harmful.

Disease-causing virus

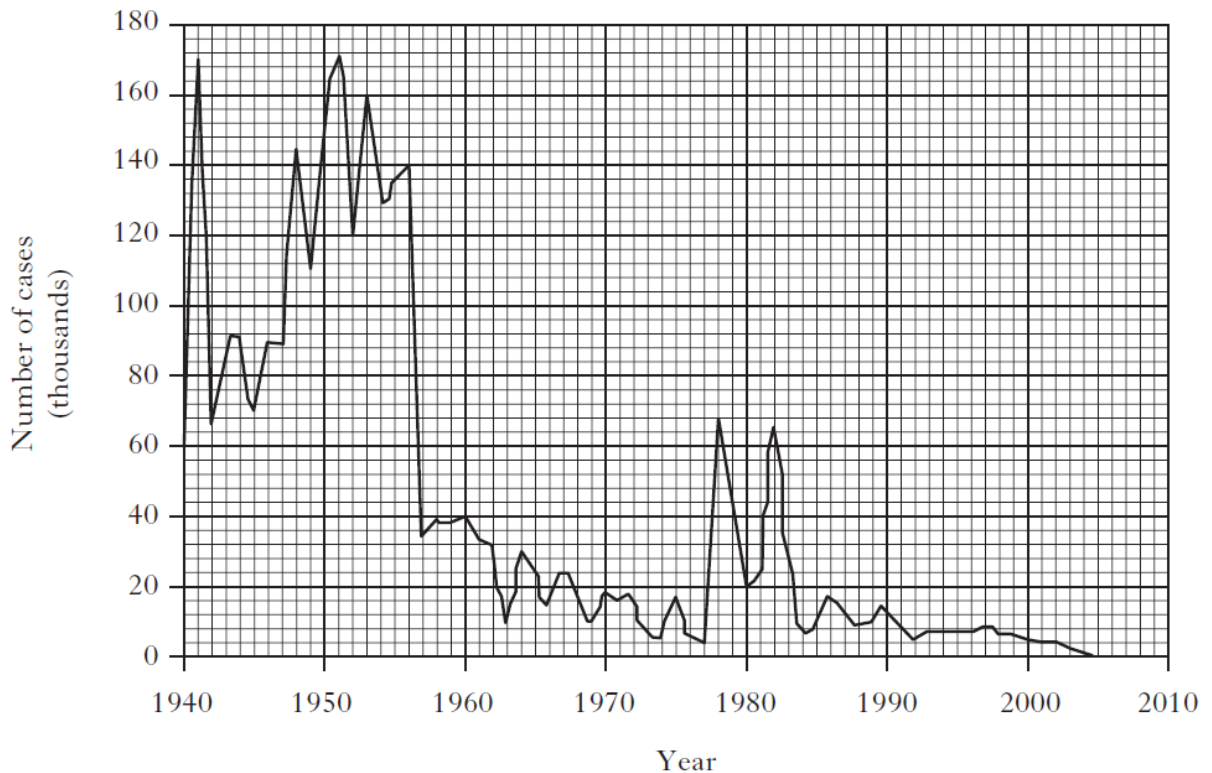
Weakened virus



- To be infectious, a virus must be able to synthesise new protein coats. Why will the weakened form of the virus not cause infection if introduced into the blood via a vaccine? (2)
- What feature of the weakened virus will result in immunity being formed? (1)
- Give a description of the sequence of events that would take place following vaccination with the weakened form of the virus that will result in immunity. (4)

8. Write an account of the spread of swine flu during 2009 and the public health measures taken by the UK government.

9. The graph shows the number of whooping cough cases over 65 years.



- a. The graph would suggest a vaccine was introduced in which year? (1)
- b. The sudden rise in cases between 1977 and 1978 was a result of negative headlines about the safety of the vaccine. What was the percentage increase in cases from 1977 to 1978? (1)
- c. It has been suggested that the drop in number of cases after the year 2000 owes much to herd immunity. Explain what is meant by herd immunity. (2)

10. Make notes, using examples, on the responses of pathogens to immune systems under the following headings:

- (i) Direct attack; (2)
- (ii) Antigenic variation. (4)