

Cambridge International AS & A Level

BIOLOGY (9700) P1

TOPIC WISE QUESTIONS + ANSWERS | COMPLETE SYLLABUS



Chapter 11

Immunity

11.1 The immune system

1494. 9700_m20_qp_12 Q: 38

Which row correctly describes B-lymphocytes?

	processed in the thymus	release antibodies immediately after formation
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = correct

✗ = incorrect

1495. 9700_s20_qp_11 Q: 39

Which row correctly describes the type of immunity gained from being injected with an antitoxin?

	active	artificial	passive	natural
A	✓	✓	✗	✗
B	✓	✗	✗	✓
C	✗	✓	✓	✗
D	✗	✗	✓	✓

key

✓ = correct

✗ = not correct

1496. 9700_s20_qp_12 Q: 38

A blood cell count can indicate how many white blood cells there are in the blood.

Where else in the body are white blood cells found?

- 1 bone marrow
- 2 lymph
- 3 lungs

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

1497. 9700_s20_qp_12 Q: 39

Myasthenia gravis is a disease that results from the immune system failing to distinguish between self and non-self. Antibodies bind to a component of the junctions between a muscle and its nerve.

What correctly describes Myasthenia gravis?

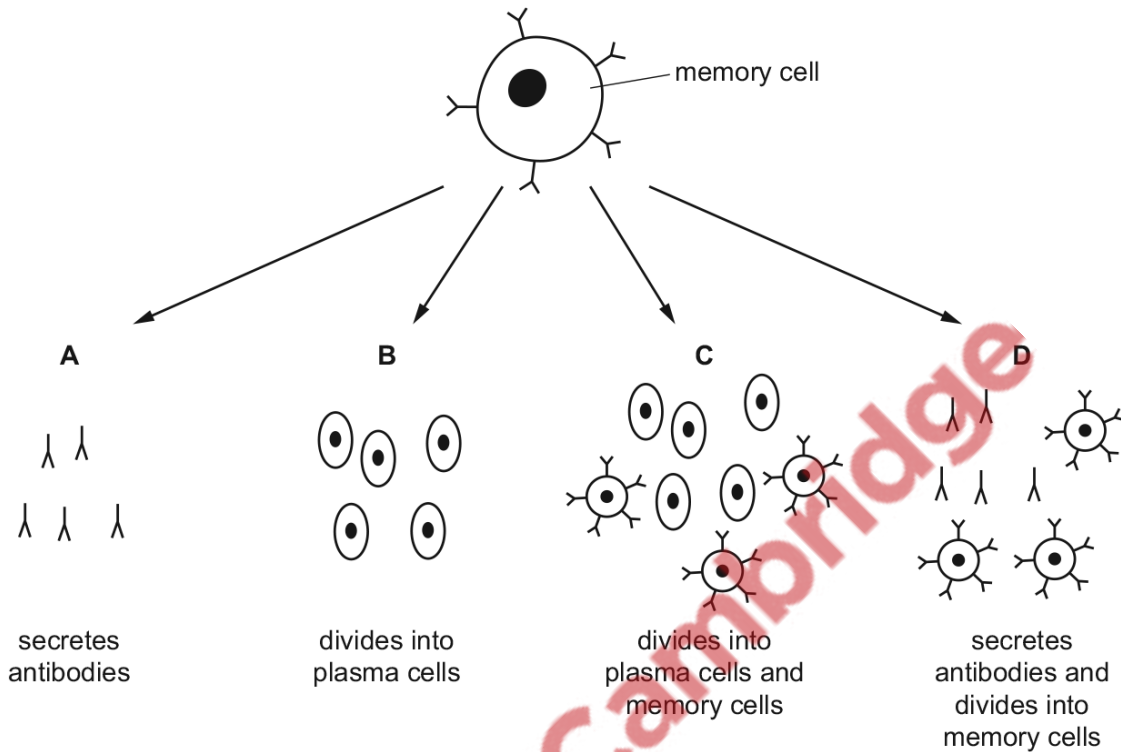
- A** Impulses in the nerve to the affected muscle cannot be blocked.
 - B** The affected muscle cannot be repeatedly stimulated.
 - C** The affected muscle is permanently stimulated.
 - D** The nerve to the affected muscle does not carry any nerve impulses.
-



1498. 9700_w20_qp_11 Q: 38

When exposed to an antigen for a second time, memory cells stimulate a secondary immune response.

Which correctly shows the secondary immune response?



1499. 9700_w20_qp_11 Q: 40

Which row describes passive immunity?

	triggered by an antigen	involves an immune response	memory cells produced	permanent protection
A	✓	✓	✓	✓
B	✓	✓	x	x
C	x	x	✓	✓
D	x	x	x	x

key
✓ = correct
x = not correct

1500. 9700_w20_qp_12 Q: 38

Which row is correct for neutrophils and B-lymphocytes?

	neutrophil	B-lymphocyte
A	can change shape	activated by contact with antigens
B	found in organs rather than in blood	kill virus-infected cells
C	may be long-lived cells	always short-lived cells
D	their lysosomal enzymes digest bacteria	secrete cytokines

1501. 9700_w20_qp_12 Q: 40

A graft of tissue, such as skin, from a different person is usually rejected by the body.

Which statement about graft rejection is correct?

- A** The graft is rejected by B-lymphocytes because they make and release antibodies which react with the surface antigens on the graft cells.
- B** The graft is rejected by B-lymphocytes because T-lymphocytes are not stimulated to produce antibodies.
- C** The graft is rejected by T-lymphocytes because the graft tissue causes T-lymphocytes to release antibodies.
- D** The graft is rejected by T-lymphocytes because they circulate in the blood and can gather at the graft site.

1502. 9700_w20_qp_13 Q: 38

Muscle cells have cell surface receptors for the neurotransmitter, ACh. These receptors allow the muscle to respond to a nerve impulse.

In the condition myasthenia gravis, the helper T cells stimulate a clone of B cells to become plasma cells and secrete antibodies that bind to and block these ACh receptors. The muscles cannot be stimulated and begin to break down.

A short-term treatment for myasthenia gravis is to inject monoclonal antibodies into the blood.

What is the target of these monoclonal antibodies?

- A** antibodies that bind to ACh receptors
- B** muscle cell surface ACh receptors
- C** plasma cells secreting anti-ACh receptor antibodies
- D** the stimulating neurotransmitter ACh

1503. 9700_m19_qp_12 Q: 38

Why does the white blood cell count increase in people with leukaemia?

- A** More antibodies are required so there are more B-lymphocytes.
- B** More lymphocytes are produced in bone marrow.
- C** More memory cells are produced in plasma.
- D** More T-lymphocytes are required to stimulate the immune system.

1504. 9700_m19_qp_12 Q: 39

Where are antibodies found during an immune response?

	on the surface of pathogens	on the surface of memory cells
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = antibodies found

✗ = antibodies not found

1505. 9700_s19_qp_11 Q: 39

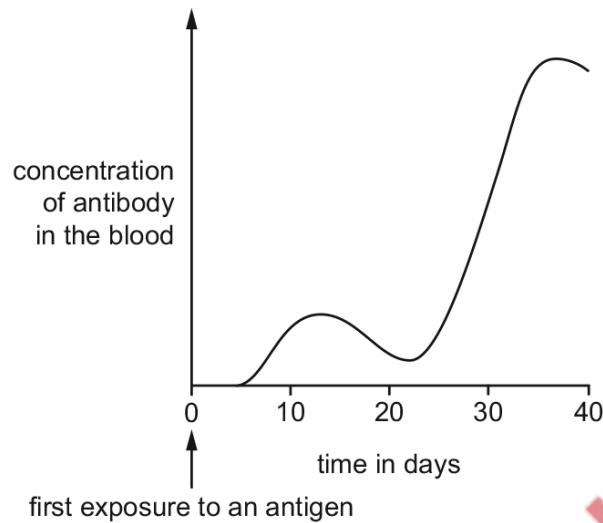
Which statements describe myasthenia gravis?

- 1 Antibodies attack proteins within the body.
- 2 T-lymphocytes are involved in an inflammatory response.
- 3 The immune system blocks receptors at the neuromuscular junction.
- 4 The immune system attacks the central nervous system.

- A** 1 and 3
- B** 1 and 4
- C** 2 and 3
- D** 2 and 4

1506. 9700_w19_qp_11 Q: 38

The graph shows the amount of antibody produced in response to an antigen.



From the graph, which statement is correct?

- A It takes 25 days to achieve active immunity.
- B Memory cells for this antigen are present in the body within 20 days.
- C T-helper lymphocytes are activated on day 12.
- D The second exposure to the antigen occurred on day 25.

1507. 9700_w19_qp_12 Q: 39

The enzyme telomerase prevents loss of telomeres after many mitotic cell cycles.

Which types of white blood cell involved in an autoimmune condition will contain active telomerase?

	mature B-lymphocyte plasma cells	neutrophils	helper T-lymphocyte memory cells
A	✓	✓	✓
B	✓	✓	✗
C	✗	✗	✓
D	✗	✓	✓

key

✓ = contain active telomerase

✗ = do not contain active telomerase

1508. 9700_s18_qp_11 Q: 39

Which statement about the properties of the antigen binding sites in antibody molecules is correct?

- A They are located on the light chains only.
- B They have a hinge region to give flexibility for different antigens.
- C They have binding sites for receptors on phagocytes.
- D They have variable amino acid sequences for different antigens.

1509. 9700_s18_qp_12 Q: 39

Where are antigens found?

	on the surface of pathogen	on the surface of macrophage
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = antigens found

✗ = antigens not found

1510. 9700_s18_qp_12 Q: 40

When an organ is transplanted from one person to another, rejection of the non-self organ must be avoided. At the same time, the immune system of the recipient must be maintained to prevent death from infections.

What prevents rejection of the transplanted organ?

- A continued activity of B-lymphocytes
- B natural active immunity
- C natural passive immunity
- D suppression of T-lymphocyte activity

1511. 9700_w18_qp_11 Q: 39

Which statements correctly describe lymphocytes?

- 1 Each B-lymphocyte has the ability to make several types of antibody molecules.
- 2 Some B-lymphocytes and T-lymphocytes become memory cells.
- 3 Plasma cells secrete antibodies into the blood plasma.
- 4 Some T-lymphocytes stimulate macrophages to kill infected cells.

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

1512. 9700_w18_qp_11 Q: 40

Addison's disease can occur when antibodies are produced in response to an enzyme found in some organs of the body.

Which statements correctly describe Addison's disease?

- 1 It is a non-infectious disease.
- 2 It is a type of auto-immune disease.
- 3 Antibodies are produced against a self-antigen.

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

1513. 9700_w18_qp_12 Q: 38

Where are antigens found?

	on the surface of macrophages	in blood plasma
A	✓	✓
B	✓	x
C	x	✓
D	x	x

key

✓ = antigens found

x = antigens not found

1514. 9700_w18_qp_13 Q: 39

Where are antigens found?

	on surface of pathogen	in blood plasma
A	✓	✓
B	✓	x
C	x	✓
D	x	x

key

✓ = antigens found

x = antigens not found

1515. 9700_m17_qp_12 Q: 39

 Which of the statements could describe **both** B-lymphocytes and T-lymphocytes?

- 1 They contain specific protein receptors in their cell surface membranes.
- 2 They differentiate into plasma cells.
- 3 They divide by mitosis.

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

1516. 9700_s17_qp_11 Q: 40

B-lymphocytes and T-lymphocytes are often unable to respond to the antigens on pathogens that are intracellular parasites.

What is the reason for this?

- A** The antigens are constantly mutating.
- B** The antigens can destroy the lymphocytes.
- C** The lymphocytes do not encounter the antigens.
- D** The lymphocytes do not recognise the antigens.

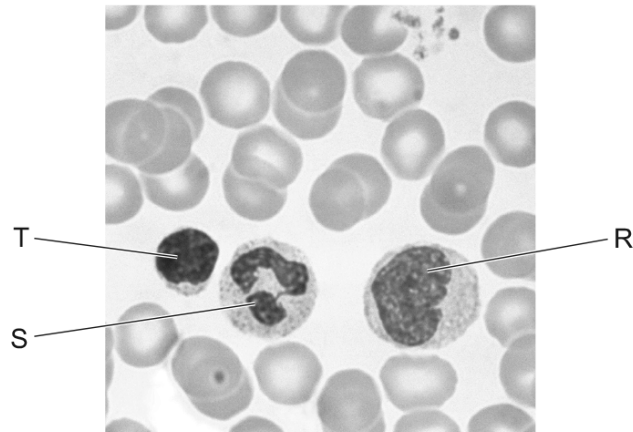
1517. 9700_s17_qp_12 Q: 40

What is the first response by the immune system to a pathogen?

- A** ingestion of the pathogen by phagocytes
- B** production of antibodies
- C** production of antigens
- D** stimulation of B memory cells

1518. 9700_s17_qp_13 Q: 39

The photomicrograph shows human blood, with three types of white cell labelled.



Which row correctly identifies these white cells?

	cell R	cell S	cell T
A	lymphocyte	lymphocyte	lymphocyte
B	lymphocyte	phagocyte	phagocyte
C	phagocyte	lymphocyte	phagocyte
D	phagocyte	phagocyte	lymphocyte

1519. 9700_w17_qp_11 Q: 39

Which statements about endocytosis are correct?

- 1 It is part of phagocytosis.
- 2 It is a passive process.
- 3 Materials are taken into the cell.
- 4 Vesicles form within the cytoplasm.

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

1520. 9700_w17_qp_12 Q: 39

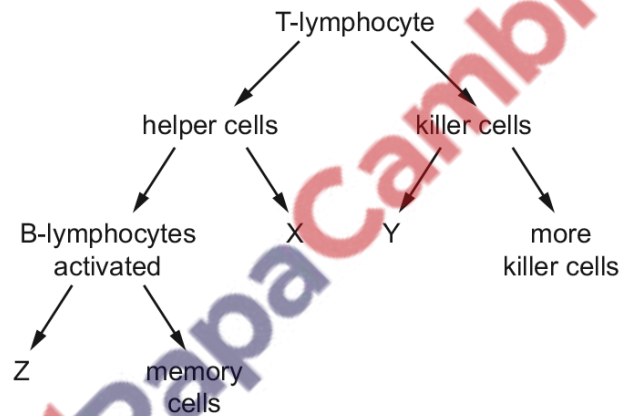
Which sequence of events occurs during an immune response?

- 1 development of plasma cells
- 2 mitosis of B-lymphocytes
- 3 recognition of non-self antigens
- 4 secretion of antibodies

- A** 2 → 3 → 4 → 1
B 2 → 4 → 3 → 1
C 3 → 1 → 2 → 4
D 3 → 2 → 1 → 4

1521. 9700_w17_qp_13 Q: 39

The flow diagram shows the events following activation of a T-lymphocyte by binding to antigens on an infected cell.



Which row correctly identifies X, Y and Z?

	X	Y	Z
A	memory cells	macrophages	antibodies
B	memory cells	memory cells	plasma cells
C	neutrophils	memory cells	plasma cells
D	plasma cells	neutrophil	memory cells

1522. 9700_m16_qp_12 Q: 38

Which row correctly identifies the roles of B-lymphocytes and T-lymphocytes?

	secrete antibodies	secrete cytokines	provide humoral response
A	B-lymphocytes	T-lymphocytes	B-lymphocytes
B	B-lymphocytes	T-lymphocytes	T-lymphocytes
C	T-lymphocytes	B-lymphocytes	B-lymphocytes
D	T-lymphocytes	B-lymphocytes	T-lymphocytes

1523. 9700_s16_qp_11 Q: 40

What are the functions of T-lymphocytes during an immune response?

- 1 destroy infected body cells
- 2 differentiate into memory cells
- 3 secrete antibodies

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

1524. 9700_s16_qp_12 Q: 39

What describes a non-specific immune response?

- A** activation of killer T-lymphocytes by infected cells
- B** cloning of B-lymphocytes to form plasma cells
- C** ingestion of a bacterial cell by a neutrophil
- D** presentation of antigens on the cell surface of macrophages

1525. 9700_w16_qp_11 Q: 38

What describes a function of a T-lymphocyte?

- A** They are only found in blood and secrete cytokines in response to infection.
- B** They can leave the blood and accumulate at sites of inflammation.
- C** They can leave the blood and secrete cytotoxins when exposed to bacteria.
- D** They circulate in the blood and always present antigens in response to infection.

1526. 9700_w16_qp_12 Q: 39

The following are all responses made by cells of the immune system to a pathogen.

- 1 mitosis
- 2 bind to infected cell
- 3 produce memory cells
- 4 secrete antibodies

Which of the responses is correct for β -lymphocytes?

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

1527. 9700_w16_qp_13 Q: 14

Which molecules, found in cell surface membranes, help the immune system to identify cells?

- 1 cholesterol
- 2 glycolipids
- 3 glycoproteins
- 4 proteins

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

1528. 9700_w16_qp_13 Q: 38

Which event will occur following antigen-antibody binding?

- A** agglutination of bacteria to reduce their spread
B decreased susceptibility to phagocytosis
C more helper T cells are activated by the release of cytokines
D more plasma cells are cloned to produce more antigens
-

1529. 9700_w16_qp_13 Q: 39

Which statements about macrophages are correct?

- 1 More are found in tissues such as the lungs, than in the blood.
- 2 They have a role in antigen presentation.
- 3 They can engulf pathogens, dust particles and damaged body cells.

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

1530. 9700_s15_qp_11 Q: 37

Which cells become memory cells in the immune response?

- 1 B-lymphocytes
- 2 T-lymphocytes
- 3 phagocytes

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

1531. 9700_s15_qp_12 Q: 36

Which action is taken by a B-lymphocyte activated by an antigen?

- A** It attaches to the infected cell displaying the antigen and destroys it.
 - B** It divides repeatedly to form a clone of genetically identical plasma cells.
 - C** It engulfs the infected body cell which displays the antigen.
 - D** It secretes cytokines which stimulate T-lymphocytes to produce plasma cells.
-

1532. 9700_s15_qp_13 Q: 37

What happens when people are injected with dead bacteria?

- A** B-lymphocytes produce antibodies.
 - B** B-lymphocytes produce antigens.
 - C** T-lymphocytes produce antibodies.
 - D** T-lymphocytes produce antigens.
-

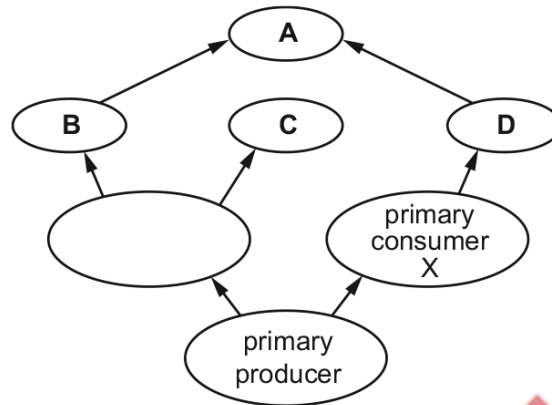


1533. 9700_s15_qp_13 Q: 39

A primary consumer, X, is lost from a community due to a lethal viral infection.

After a time, the size of the populations of some of the organisms shown in the food web changed.

Which population of organisms increased?



1534. 9700_w15_qp_11 Q: 36

What describes a function of a macrophage?

- A They are found in tissues and secrete cytokines in response to infection.
- B They can leave the blood and accumulate at sites of inflammation.
- C They can leave the blood and secrete cytotoxins when exposed to damaged cells.
- D They circulate in the blood and produce antigens in response to infection.

1535. 9700_w15_qp_12 Q: 35

Which statement is correct for a neutrophil?

- A They are found in tissues and secrete cytokines in response to infection.
- B They can leave the blood and accumulate at sites of inflammation.
- C They can leave the blood and secrete cytotoxins when exposed to damaged cells.
- D They circulate in the blood and present antigens in response to infection.

1536. 9700_w15_qp_12 Q: 37

Which statements correctly describe lymphocytes?

- 1 Each B-lymphocyte has the ability to make several types of antibody molecules.
- 2 Some B-lymphocytes and T-lymphocytes become memory cells.
- 3 Plasma cells secrete antibodies into the blood plasma.
- 4 Some T-lymphocytes stimulate macrophages to kill infected cells.

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

11.2 Antibodies and vaccination

1537. 9700_m20_qp_12 Q: 39

Which features of monoclonal antibodies are important to their use in the treatment of cancer?

- 1 They can bind to tumour-associated antigens.
- 2 They can distinguish between different strains of pathogens.
- 3 They can deliver drugs to specific targets.

	1	2	3
A	✓	✓	✗
B	✓	✗	✓
C	✗	✓	✓
D	✓	✗	✗

key

✓ = is important

✗ = is not important

1538. 9700_m20_qp_12 Q: 40

A student was asked to explain why vaccination has successfully eradicated smallpox but not other diseases, such as measles, malaria and sickle cell anaemia. These are the statements made by the student.

- 1 The antigens of the virus causing smallpox did not change, unlike the antigens of the virus causing measles.
- 2 Sickle cell anaemia has many different types of mutation, unlike smallpox, so each would require a vaccine.
- 3 Unlike smallpox, malaria involves animals as part of the transmission cycle and this makes the cycle harder to break.
- 4 The vaccine against measles often causes a poor primary immune response so that booster vaccines are required, unlike the vaccine against smallpox.

Which statements are possible explanations?

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

1539. 9700_s20_qp_11 Q: 40

Where are antibodies found during an immune response?

	on surface of pathogen	in blood plasma
A	✓	✓
B	✓	x
C	x	✓
D	x	x

key

✓ = antibodies found

x = antibodies not found

1540. 9700_s20_qp_12 Q: 40

A monoclonal antibody, specific for a virus, was treated with an enzyme to break the bonds between the variable and constant regions.

The separated variable and constant regions were then added to cells infected with the virus.

Which statements are correct?

- 1 The constant regions would bind to different parts of the virus antigens.
- 2 The viruses could be engulfed by phagocytes if they were present.
- 3 The variable regions would all bind to the same part of the virus antigens.

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

1541. 9700_s20_qp_13 Q: 39

Which method of gaining immunity can be described as natural active immunity?

- A feeding on colostrum
- B inhaling the chicken pox virus
- C injection with antibodies
- D through the placenta

1542. 9700_s20_qp_13 Q: 40

Which statements correctly explain why smallpox has been eradicated, but not malaria or cholera?

- 1 Cholera vaccines provide only short-term immunity.
- 2 Plasmodium antigens change during the life cycle.
- 3 Smallpox antigens remain stable.
- 4 Vaccines only work against viruses.

- A 1, 2 and 3 B 1, 2 and 4 C 1, 3 and 4 D 2, 3 and 4

1543. 9700_w20_qp_11 Q: 39

Monoclonal antibodies are produced for use in diagnosis or treatment of disease. To obtain the antibodies for an antigen, a mouse is injected with the antigen.

Some of the events in the production of the monoclonal antibody are listed.

- 1 Plasma cells are fused with cancer cells to form a hybridoma.
- 2 Hybridomas that secrete the required antibody are identified and cloned.
- 3 B-lymphocytes that recognise the antigen multiply and become plasma cells.
- 4 Hybridomas divide by mitosis and secrete antibodies.
- 5 Plasma cells are removed from the mouse spleen.

What is the sequence of the first four events in the production of the monoclonal antibody?

- A 3 → 5 → 1 → 2
- B 3 → 5 → 1 → 4
- C 5 → 1 → 2 → 4
- D 5 → 1 → 4 → 2

1544. 9700_w20_qp_12 Q: 39

Rabies is usually a fatal disease. Rabies is transmitted to people in the saliva of infected animals.

A person who has been bitten by an infected animal needs immediate treatment.

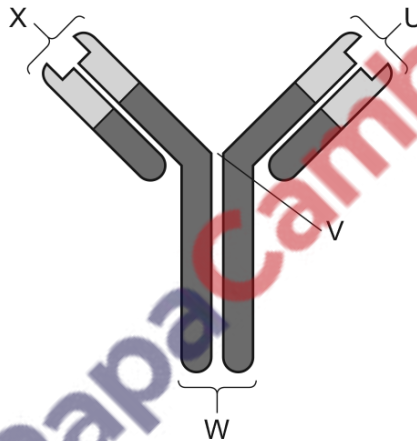
The treatment is a vaccination against rabies **and** an injection containing antibodies to the rabies antigen.

What type of immunity is given by the injection of antibodies?

- A artificial active
- B artificial passive
- C natural active
- D natural passive

1545. 9700_w20_qp_13 Q: 39

The diagram shows the simplified structure of an antibody.



Which statement is correct?

- A U and X allow the antibody to bind to two different antigens.
- B V allows the antibody to fit around the antigen.
- C W can bind to one specific antigen.
- D X can bind with a specific phagocyte receptor.

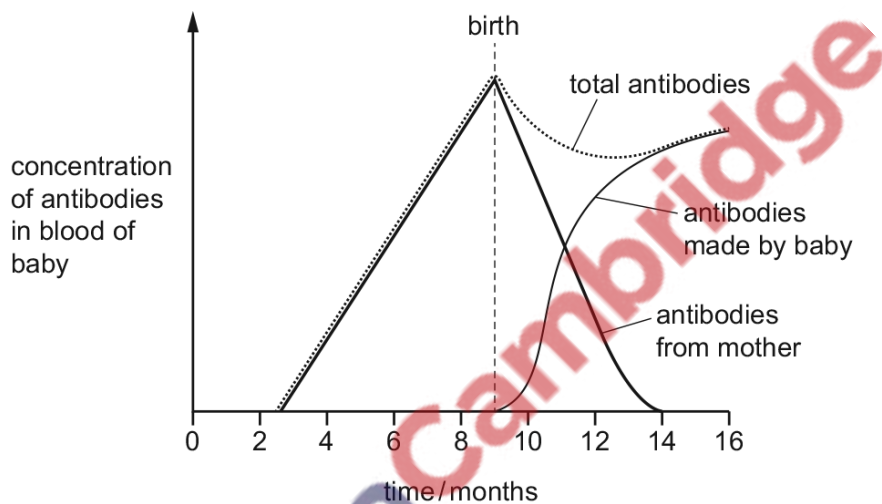
1546. 9700_w20_qp_13 Q: 40

Why have vaccination programmes eradicated smallpox but not TB?

- A Vaccination can provide immunity only for smallpox but not for TB.
- B Only TB is associated with poor living conditions.
- C The smallpox virus showed little variation of antigens.
- D The TB pathogen is a bacterium and the smallpox pathogen is a virus.

1547. 9700_m19_qp_12 Q: 40

The graph shows the changes that occur in the concentration of antibodies in the blood of a baby before birth and during the first few months after birth.



Which description about the changes in immunity during the first few months after birth is correct?

- A active artificial immunity decreases, active natural immunity increases
- B active natural immunity decreases, active artificial immunity increases
- C passive artificial immunity decreases, active natural immunity increases
- D passive natural immunity decreases, active natural immunity increases

1548. 9700_s19_qp_11 Q: 40

Which row shows the cells that are able to divide continuously and are involved in monoclonal antibody production?

	cancer cells	mouse B-lymphocyte plasma cells	hybridoma cells
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key
✓ = correct
✗ = not correct

1549. 9700_s19_qp_12 Q: 38

Which are specific immune responses?

- 1 phagocytosis
- 2 production of antibodies
- 3 production of memory cells

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

1550. 9700_s19_qp_12 Q: 39

Newborn babies have natural passive immunity.

What is correct for this type of immunity?

	immunity is temporary	antibodies are broken down
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

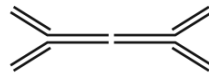
key
✓ = correct
✗ = not correct

1551. 9700_s19_qp_12 Q: 40

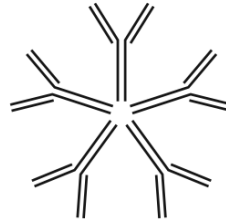
The diagrams show three different types of antibody structure.



IgG



IgA



IgM

Which row is correct?

	IgG	IgA	IgM
A	one binding site for an antigen molecule	two light chains	two heavy chains
B	two heavy chains	four binding sites for antigen molecules	five hinge regions
C	two hinge regions	four heavy chains	five light chains
D	two light chains	four hinge regions	ten binding sites for antigen molecules

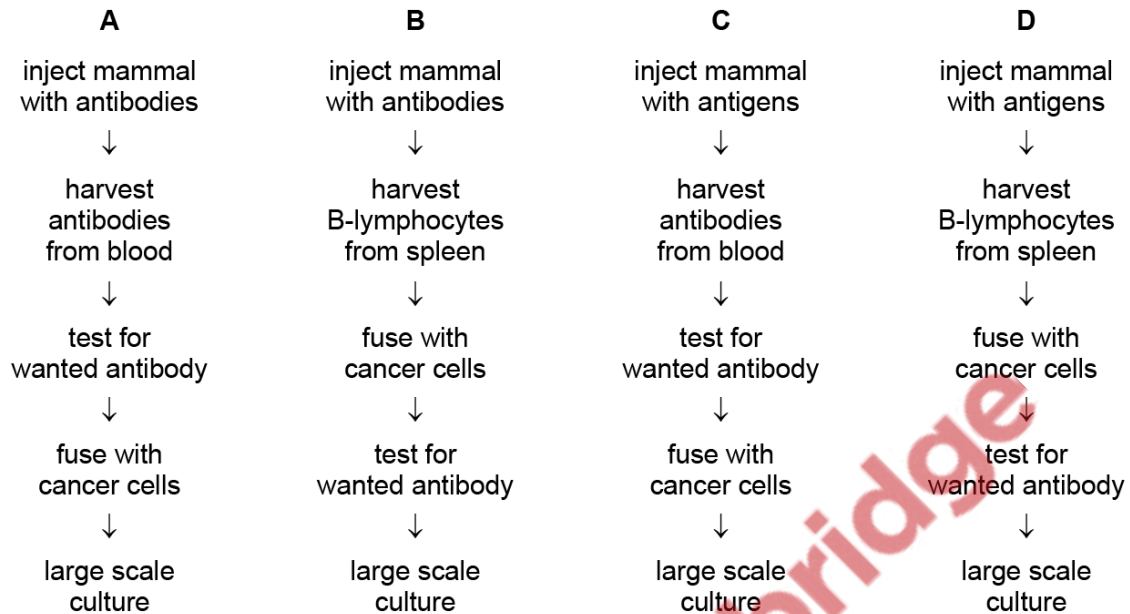
1552. 9700_s19_qp_13 Q: 40

What describes artificial active immunity?

- A** protection against a pathogen by an injection of antibodies
- B** protection against a pathogen by drinking colostrum containing antibodies
- C** stimulation of lymphocytes by antigens contained in a vaccine
- D** stimulation of lymphocytes by antigens on the surface of invading pathogens

1553. 9700_w19_qp_11 Q: 39

Which sequence summarises the hybridoma method for the production of monoclonal antibodies?



1554. 9700_w19_qp_11 Q: 40

The vaccination programme for smallpox was a medical success story which resulted in the World Health Organisation finally declaring the world free from smallpox in 1980.

Which statement correctly identifies the reasons for the success of the smallpox vaccination programme?

- A** The virus also infected animals making it easy to stop the transmission cycle.
- B** The virus remained in the body following infection and could become active later.
- C** The virus was stable and not prone to mutations.
- D** The virus was unstable and prone to mutations.

1555. 9700_w19_qp_12 Q: 38

Immune response to a vaccination against a virus can be assessed by making three measurements:

- 1 the concentration of anti-virus antibody in the blood
- 2 the time taken to increase the antibody concentration significantly after a booster vaccination
- 3 the number of virus-specific lymphocytes per cm^3 blood.

What describes the immunity of an individual when the values of 1, 2 and 3 are all low ten years after vaccination?

- A active immunity due to the presence of memory cells
- B low immunity due to the absence of antibodies
- C low immunity due to the absence of memory cells
- D passive immunity due to the presence of antibodies

1556. 9700_w19_qp_12 Q: 40

Which features of monoclonal antibodies make them useful in the diagnosis and treatment of disease?

- 1 A particular monoclonal antibody attaches to a specific antigen.
- 2 Identical monoclonal antibodies can be produced in large numbers.
- 3 Binding a monoclonal antibody to its specific antigen may mark that antigen for destruction by white blood cells.
- 4 Fluorescent or radioactive markers can be attached to a monoclonal antibody to show where the antigen is in the body.

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

1557. 9700_w19_qp_13 Q: 37

Scientists studied the multidrug resistant bacterial infections in children, caused by one type of bacteria, between 2007 and 2015. The percentage of multidrug resistant infections rose from 0.2% to 1.5%.

What was the percentage increase in multidrug resistant infections between 2007 and 2015?

- A 1.3%
- B 87%
- C 130%
- D 650%

1558. 9700_w19_qp_13 Q: 38

Why is it necessary for a person with a bacterial infection to take antibiotics at evenly spaced time intervals?

- A** to increase the concentration of antibiotic slowly to a level which is lethal to the bacteria
- B** to maintain a concentration of antibiotic in the body which is lethal to the bacteria
- C** to prevent the development of resistant strains of bacteria
- D** to select and kill the resistant strains of bacteria

1559. 9700_w19_qp_13 Q: 39

The enzyme telomerase prevents loss of telomeres after many mitotic cell cycles. Three types of cell are used to produce monoclonal antibodies.

- 1 cancer cells undergoing uncontrolled cell division
- 2 mature B-lymphocytes
- 3 hybridoma cells

Which cells involved in this technique contain active telomerase enzyme?

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

1560. 9700_w19_qp_13 Q: 40

What explains why monoclonal antibodies are useful in the diagnosis of disease?

- A** They bind to and neutralise one type of antibody.
- B** They bind to and neutralise one type of pathogen.
- C** Their shape is complementary to one specific antibody.
- D** Their shape is complementary to one specific antigen.

1561. 9700_m18_qp_12 Q: 38

Some children are born with severe combined immunodeficiency (SCID).

Children with this inherited disease do not normally have any T-lymphocytes and suffer from many infectious diseases.

How may these children be cured from SCID?

- A** transfusion of antibodies
- B** treatment with stem cells
- C** use of different antibiotics
- D** vaccination against all diseases

1562. 9700_m18_qp_12 Q: 39

The hybridoma method is used for the production of monoclonal antibodies.

Which two types of cell are used in this method?

- A stem cell and B-lymphocyte
- B stem cell and T-lymphocyte
- C tumour cell and B-lymphocyte
- D tumour cell and T-lymphocyte

1563. 9700_m18_qp_12 Q: 40

A vaccine is used to create artificial active immunity. After being given a vaccine, it will take a period of time before a person develops long-term immunity against the disease.

Which statement about this period of time explains this delay?

- A No memory cells have been produced from B-lymphocytes.
- B No plasma cells have been produced from B-lymphocytes.
- C The primary immune response has not produced enough antibodies.
- D The secondary immune response has not produced enough antibodies.

1564. 9700_s18_qp_11 Q: 38

Hybridomas are used as a basis for the production of large numbers of monoclonal antibodies.

Which statement describes how hybridomas are made?

- A fusing activated T-lymphocytes with cancer cells
 - B fusing B-lymphocytes with cancer cells
 - C fusing memory cells with cancer cells
 - D fusing T-lymphocytes with cancer cells
-

1565. 9700_s18_qp_11 Q: 40

The statements describe ways in which different types of monoclonal antibodies can work.

- 1 binding to proteins on cell surfaces and triggering the immune system
- 2 blocking molecules on cell surfaces that inhibit T-cells
- 3 blocking cell signalling receptors that trigger cell division
- 4 blocking cell signalling receptors that trigger the immune response

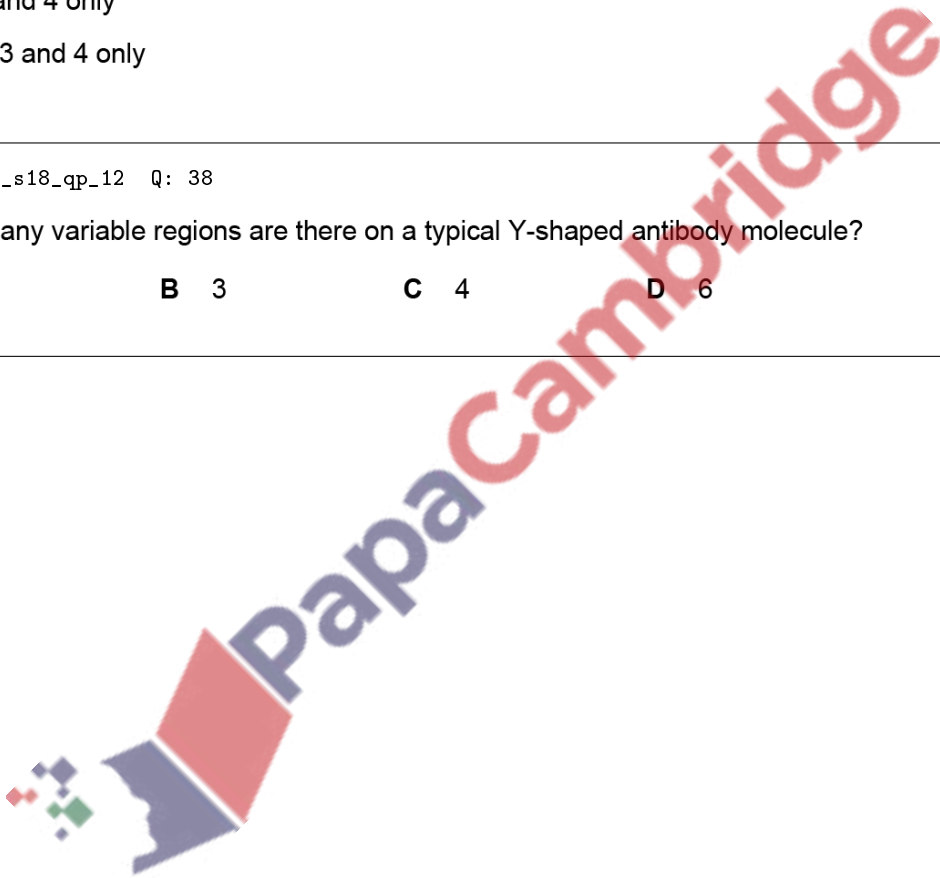
Which types of monoclonal antibody could be used to treat cancer?

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

1566. 9700_s18_qp_12 Q: 38

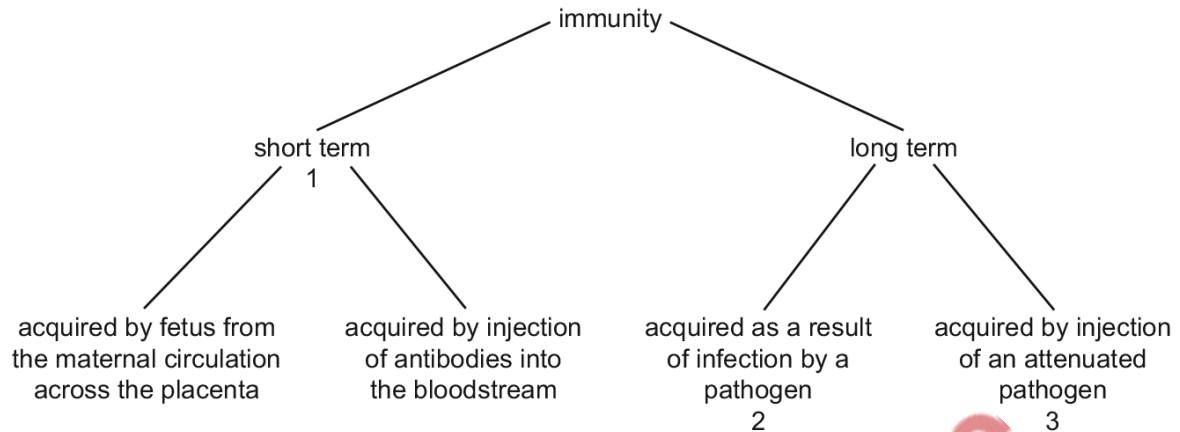
How many variable regions are there on a typical Y-shaped antibody molecule?

- A 2
 - B 3
 - C 4
 - D 6
-



1567. 9700_s18_qp_13 Q: 40

The diagram allows the identification of different types of immunity.



Which row correctly identifies the types of immunity labelled 1, 2 and 3?

	1	2	3
A	active	artificial	natural
B	active	natural	artificial
C	passive	artificial	natural
D	passive	natural	artificial

1568. 9700_w18_qp_11 Q: 38

A vaccine is available against most common strains of the influenza virus.

The virus that causes influenza often undergoes mutation in the gene coding for its antigenic protein.

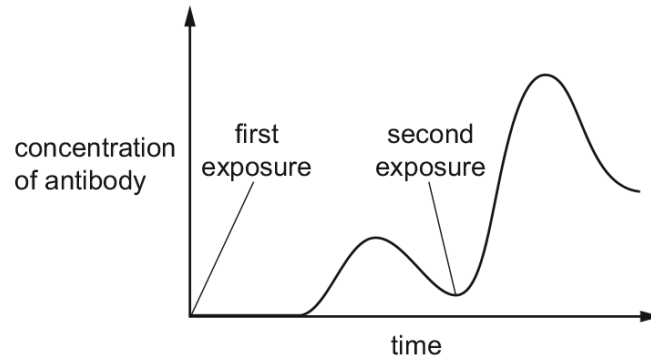
Which statements explain why vaccinated people are not immune to a mutated influenza virus?

- 1 They will not have primary immune response to the mutated antigen.
- 2 They will not have a secondary immune response to the mutated antigen.
- 3 Their memory cells do not recognise the mutated antigen.

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

1569. 9700_w18_qp_12 Q: 39

The graph shows how the body reacts following exposure to an antigen for the first and second time.



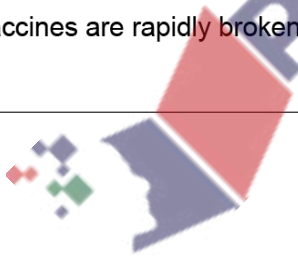
What is the direct cause of the increase in antibody production after the second exposure to antigens?

- A B-memory cells
- B macrophages
- C plasma cells
- D T-memory cells

1570. 9700_w18_qp_12 Q: 40

Why has it proved difficult to develop an effective vaccine against malaria?

- A Mosquitoes have many stages in their life cycles.
- B The human immune system does not recognise the antigens of the parasite.
- C The parasites can only be attacked when outside the liver cells and red blood cells.
- D Vaccines are rapidly broken down by proteases in the stomach.



1571. 9700_w18_qp_13 Q: 37

A West African country introduced a measles vaccination during a measles epidemic.

Later, it was realised that vaccinated children were more likely to survive childhood than unvaccinated children, even when there were no measles epidemics.

The vaccine had given the children some protection against other pathogenic infections.

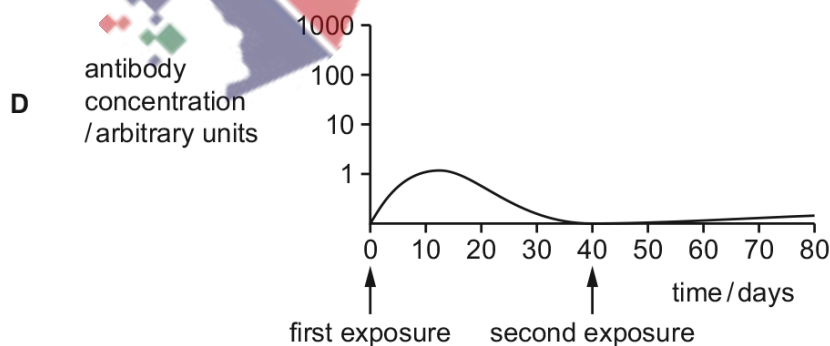
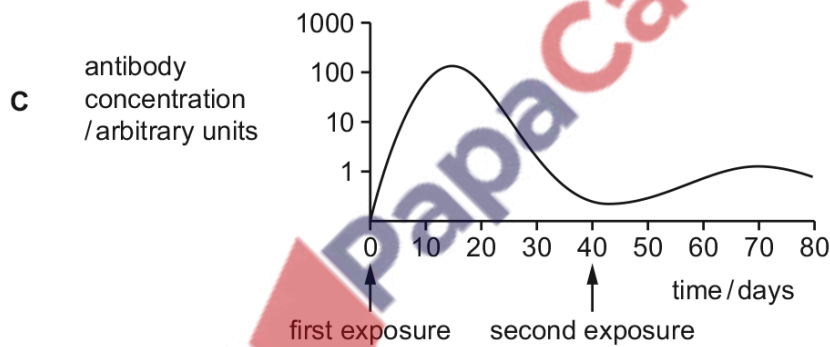
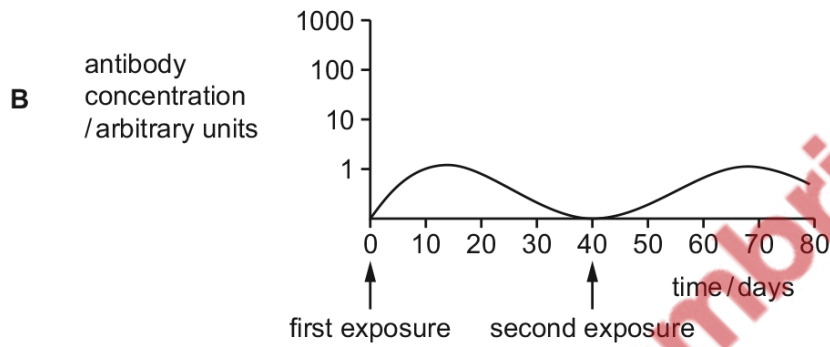
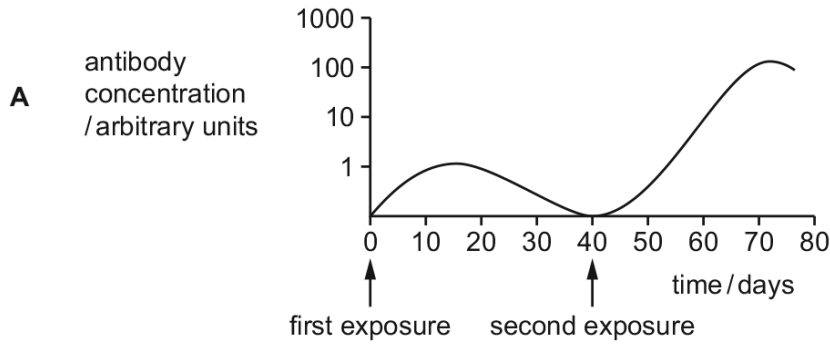
Which statement could account for this extra protection?

- A B-lymphocytes produced memory cells which gave the children passive immunity to these infections.
 - B Memory cells produced plasma cells which secreted anti-measles antibodies that bound to antigens that closely resembled measles antigens.
 - C Memory cells produced plasma cells which secreted anti-measles antibodies that bound to any antigen.
 - D T-lymphocytes produced memory cells which gave the children natural immunity against these other infections.
-

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1572. 9700_w18_qp_13 Q: 38

Which graph shows the changes in antibody concentration following a second exposure to the same infection?



1573. 9700_w18_qp_13 Q: 40

Whooping cough is a highly infectious disease of the gas exchange system, caused by the bacterium *Bordetella pertussis*.

Which method provides protection to infants against whooping cough and reduces the chance of developing this disease later in life?

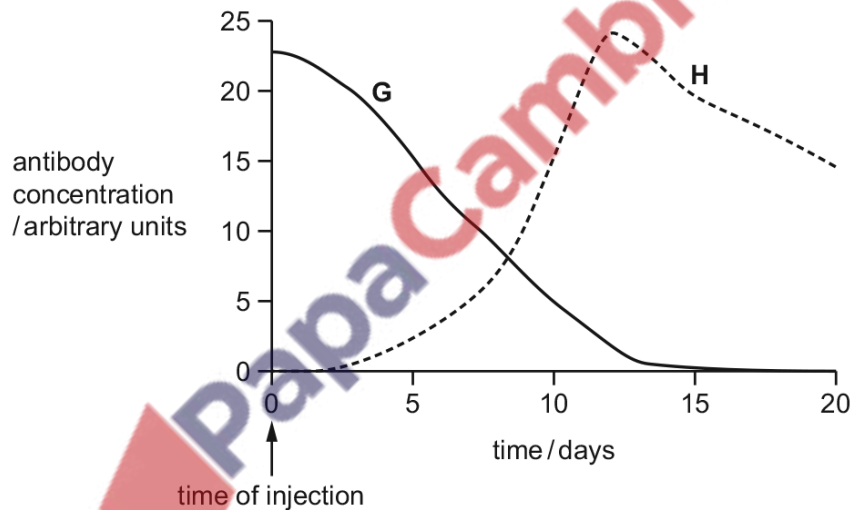
- A a short course of more than one type of antibiotic
- B a six month course of one type of antibiotic
- C injections of antibody specific to *Bordetella pertussis*
- D injections of dead *Bordetella pertussis* bacteria

1574. 9700_m17_qp_12 Q: 40

Two people, **G** and **H**, were each given an injection to protect them against a particular pathogen.

One person was injected with antibodies. The other person was injected with a vaccine.

The graph shows the concentrations of the antibody against this pathogen in the blood of the two people, **G** and **H**, over a period of 20 days following the injection.



Which row correctly describes the type of immunity shown by **G** and **H**?

	G	H
A	artificial active immunity	artificial passive immunity
B	artificial passive immunity	artificial active immunity
C	natural active immunity	natural passive immunity
D	natural passive immunity	artificial active immunity

1575. 9700_s17_qp_12 Q: 39

When a person is given a vaccination immunity to certain pathogens develops.

Which of the effects of vaccination are correct?

- 1 production of antibodies to protect against future infections
- 2 results in artificial active immunity
- 3 stimulation of appropriate lymphocytes

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

1576. 9700_s17_qp_13 Q: 38

Which type of new vaccine production would be most important in the fight to eradicate measles in **developing** countries?

- A** a combined vaccine to combat it and other diseases
 - B** a single vaccine, without the need for boosters
 - C** a vaccine containing only live measles pathogens
 - D** a vaccine containing monoclonal antibodies
-

1577. 9700_s17_qp_13 Q: 40

A monoclonal antibody specific for a virus was produced.

This antibody was treated with an enzyme to break the bonds between the variable and constant regions.

The separated variable and constant regions were then added to cells infected with the virus.

Which statements are correct?

- 1 The **constant** regions would bind to different parts of the virus antigens.
- 2 The **viruses** could be engulfed by phagocytes if they were present.
- 3 The **variable** regions would all bind to the same part of the virus antigens.

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

1578. 9700_w17_qp_11 Q: 36

Which factors contribute to outbreaks of measles after natural disasters?

- 1 contamination of drinking water with untreated sewage
- 2 lack of effective vaccination coverage in the population before the disaster
- 3 people living in overcrowded accommodation

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

1579. 9700_w17_qp_11 Q: 37

Which of these statements explain why some vaccines can be taken by mouth but tuberculosis (TB) vaccine has to be injected?

- 1 Macrophages present antigens in vaccines to stimulate an immune response.
- 2 The TB antigens necessary to produce an immune response are proteins which would be digested in the stomach and small intestine.
- 3 There are no B-lymphocytes and T-lymphocytes in the stomach.

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

1580. 9700_w17_qp_11 Q: 38

Which method of gaining immunity can be described as natural active immunity?

- A** feeding on colostrum
 - B** inhaling the chicken pox virus
 - C** injection with antibodies
 - D** through the placenta
-

1581. 9700_w17_qp_11 Q: 40

The statements refer to vaccination programmes for each of the diseases cholera, measles, smallpox and tuberculosis (TB).

Which statement is correct for TB?

- A** Most children are vaccinated before their first birthday.
 - B** The pathogen has not mutated or changed its antigens.
 - C** The pathogen lives in the intestine where antibodies cannot get to it.
 - D** The vaccine is not effective against some strains of the pathogen.
-

1582. 9700_w17_qp_12 Q: 40

An influenza vaccine can be made by growing the viruses in chicken eggs.

The viruses are extracted in liquid from the eggs and inactivated. The purified egg extract containing the viruses is then used as the vaccine.

What is a side-effect of using this vaccine in some people?

- A An auto-immune condition could occur.
- B An immune response to egg antigens could occur.
- C The egg antigens could cause infections.
- D The influenza viruses could cause infections.

1583. 9700_w17_qp_13 Q: 40

Smallpox was eradicated from the human population by a worldwide preventative programme.

Which type of immunity was triggered in people who were treated as part of this programme?

- A artificial active immunity
- B artificial passive immunity
- C natural active immunity
- D natural passive immunity

1584. 9700_m16_qp_12 Q: 39

A person's blood group is determined by antigens present on the red blood cells. The table shows the antigens and antibodies in the blood of people with different blood groups.

blood group	antigens on red blood cells	antibodies in plasma
A	A	anti-B
B	B	anti-A
AB	A and B	neither
O	neither	anti-A and anti-B

During a blood transfusion, it is essential that the recipient's blood does **not** contain antibodies to the donor's blood.

Which blood groups can be given to a person with blood group B?

- A A and B
- B AB and B
- C AB and O
- D B and O

1585. 9700_m16_qp_12 Q: 40

An enzyme hydrolyses the two heavy polypeptide chains of an antibody molecule. The hydrolysis occurs at the hinge region and breaks the antibody into three fragments.

How many of these fragments are able to bind to antigens?

- A** 0 **B** 1 **C** 2 **D** 3
-

1586. 9700_s16_qp_11 Q: 39

Rabies is a viral disease which can be spread to humans by a bite from an infected animal.

One method of treatment is to inject the patient with antibodies specific to the rabies virus.

Which statements about this treatment are correct?

- 1 The patient will have natural passive immunity to rabies.
- 2 The injected antibodies will be broken down by the patient.
- 3 The patient's memory cells will be able to produce this antibody more rapidly in the future.
- 4 The immunity provided will only be of short duration.

- A** 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4
-

1587. 9700_s16_qp_12 Q: 38

Which statement describes how passive natural immunity is obtained?

- A** A vaccination containing dead microorganisms is given.
B An immunisation containing specific antigens is given.
C Antibodies are passed from mother to developing baby.
D Antibodies from another individual are injected.
-

1588. 9700_s16_qp_12 Q: 40

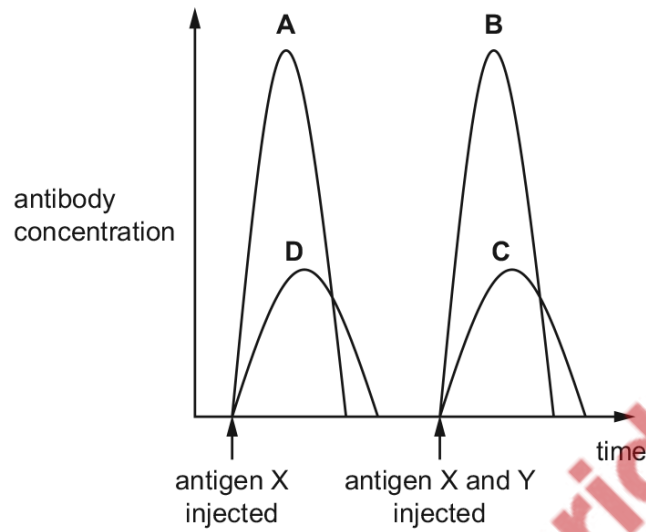
What explains why monoclonal antibodies can be used to target cancer cells?

- A** Cancer cells have different antigens from normal body cells.
B Specific cancer drugs can be attached to the monoclonal antibody.
C They are one type of a specific antibody that binds to an antigen.
D They are secreted by hybridomas of cancer cells and B-lymphocytes.
-

1589. 9700_s16_qp_13 Q: 39

The graph shows the antibody response when a person is injected first with antigen X and later with antigens X and Y.

Which curve shows the primary response to antigen Y?



1590. 9700_s16_qp_13 Q: 40

Which row describes passive immunity?

	triggered by an antigen	involves an immune response	memory cells produced	permanent protection
A	✓	✓	✓	✓
B	✓	✓	x	x
C	x	x	✓	✓
D	x	x	x	x

key

✓ = true

x = false

1591. 9700_w16_qp_11 Q: 39

A person's blood group is determined by antigens present on the red blood cells.

The table shows the antigens and antibodies in the blood of people with different blood groups.

blood group	antigens on red blood cells	antibodies in plasma
A	A	antibodies to B
B	B	antibodies to A
AB	A and B	neither
O	neither	antibodies to A and B

During a blood transfusion, it is essential that the recipient's blood does not contain antibodies to the donor's blood.

Which blood group can be given to a person with blood group AB?

- A AB only
- B O only
- C B and A only
- D A, B, AB and O

1592. 9700_w16_qp_11 Q: 40

Which statement about immunity is correct?

- A Antibody donation, but not antibody production, occurs with artificial active and artificial passive immunity.
- B Artificial active immunity lasts for a greater length of time than natural passive immunity.
- C Natural active immunity provides a faster response to infection than artificial active immunity.
- D Recognition and binding by specific B-lymphocytes only occurs with natural immunity.

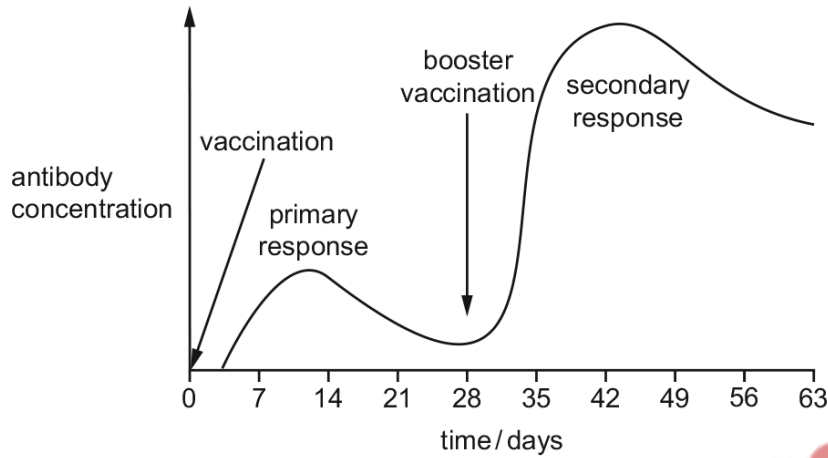
1593. 9700_w16_qp_12 Q: 40

What occurs when active immunity is artificially induced?

- A Non-self antibodies attack self antigens.
- B Non-self antigens attack self antibodies.
- C Self antibodies attack non-self antigens.
- D Self antigens attack non-self antibodies.

1594. 9700_w16_qp_13 Q: 40

The graph shows the antibody concentration in blood following vaccination and a booster vaccination 28 days later.



Which statements about the changes in antibody concentration are correct?

- 1 Antibody concentration falls after the primary response because antibodies are broken down and are no longer being produced.
- 2 The secondary response is more rapid due to memory B cells produced from activated B cells in the primary response.
- 3 The secondary response lasts longer than the primary response because memory B cells live longer than plasma B cells.

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

1595. 9700_s15_qp_11 Q: 36

During an outbreak of a very infectious disease, vulnerable people need immediate protection.

Which type of immunity would be given to these people?

	natural	artificial
active	A	B
passive	C	D

1596. 9700_s15_qp_12 Q: 37

The synthesis of specific antibodies in response to vaccination is an example of which type of immunity?

	natural	artificial
active	A	B
passive	C	D

1597. 9700_s15_qp_13 Q: 36

What describes natural passive immunity?

- A** protection against a pathogen by an injection of antibodies
- B** protection against a pathogen by drinking colostrum containing antibodies
- C** stimulation of lymphocytes by antigens contained in a vaccine
- D** stimulation of lymphocytes by antigens on the surface of invading pathogens

1598. 9700_w15_qp_11 Q: 37

There has been an increase in the number of cases of the disease whooping cough.

A pregnant woman is vaccinated against whooping cough to protect the new born baby from this disease.

How does the immune response of the mother help to protect a new born baby from whooping cough?

	before birth, baby receives from mother	type of protection gained by baby
A	antibodies	natural passive
B	antigens	artificial active
C	memory cells	artificial passive
D	pathogens	natural active

1599. 9700_w15_qp_12 Q: 36

What describes artificial passive immunity?

- A** protection against a pathogen by an injection of antibodies
- B** protection against a pathogen by drinking colostrum containing antibodies
- C** stimulation of lymphocytes by antigens contained in a vaccine
- D** stimulation of lymphocytes by antigens on the surface of invading pathogens

1600. 9700_w15_qp_13 Q: 36

What describes natural active immunity?

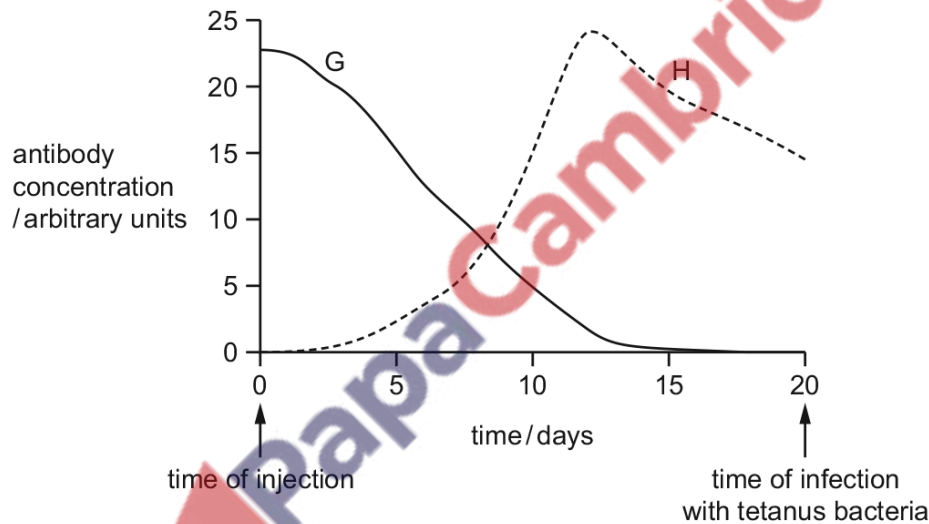
- A protection against a pathogen by an injection of antibodies
- B protection against a pathogen by drinking colostrum containing antibodies
- C stimulation of lymphocytes by antigens contained in a vaccine
- D stimulation of lymphocytes by antigens on the surface of invading pathogens

1601. 9700_w15_qp_13 Q: 37

The bacterium that causes the disease tetanus produces a toxin that acts as an antigen.

The graph shows the concentration of an antibody in the blood of two people, G and H.

On day 0, G was injected with antibodies to the tetanus toxin and H was injected with the vaccine for tetanus.



What would be the result after G and H were infected with the tetanus bacteria on day 20?

- A concentration of antibodies in H would remain constant
- B G would fail to produce tetanus antibodies
- C G would peak in antibody production 12 days after infection
- D H would produce a new antibody peak 12 days after infection

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