Immunity – AS 9700 Biology June 2022

1. June/2022/Paper_11/No.38

T-lymphocytes have a protein, PD-1, on their surface. Some cancer cells have a receptor molecule on their surface which binds with PD-1, inactivating the T-lymphocyte.

A monoclonal antibody, lambrolizumab, has been produced against this receptor.

Trials showed that in 54 of 135 people with advanced skin cancer who were given lambrolizumab the tumours more than halved in volume. In six of the 57 people who were given the highest dose the tumours disappeared.

What may be correctly concluded from this information?

1 Lambrolizumab binds with a receptor on the surface of skin cancer cells.

2 Cancer cells to which lambrolizumab is bound cannot inactivate T-lymphocytes.

3 Lambrolizumab targets and kills skin cancer cells.

4 Lambrolizumab allows a patient's own immune system to kill cancer cells.

A 1, 2, 3 and 4

B 1, 2 and 4 only

C 1 and 3 only

D 2, 3 and 4 only

2. June/2022/Paper_11/No.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	presence of A or B antigens on red blood cells	presence of antibodies to A or B in plasma
A	A only	anti-B only
B	B only	anti-A only
AB	A and B	neither
O	neither	anti-A and anti-B

During a blood transfusion, it is essential that the person receiving the blood does not have antibodies to the donor's blood.

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

A AB only

B O only

C A and B only

D A, B, AB and O

3. June/2022/Paper_11/No.40

Which types of cell are stimulated to divide by the cytokines produced by T-helper cells?

A macrophages

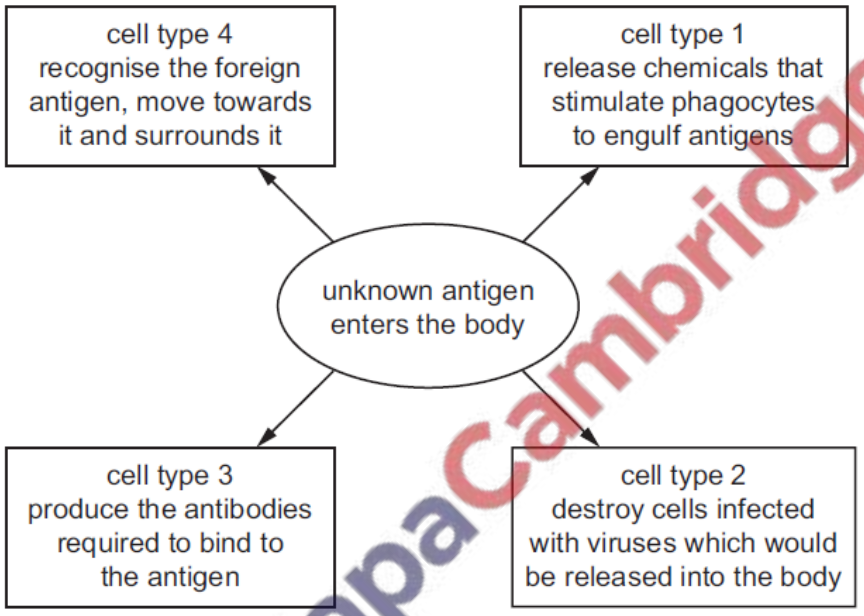
B B-lymphocytes only

C T-killer cells only

D B-lymphocytes and T-killer cells

4. June/2022/Paper_12/No.40

A student used a diagram to show four types of cells involved in the primary immune response.



Which row is correct?

	cell 1	cell 2	cell 3	cell 4
A	B-lymphocyte	macrophage	T-killer cell	T-helper cell
B	macrophage	B-lymphocyte	T-helper cell	T-killer cell
C	T-helper cell	T-killer cell	B-lymphocyte	macrophage
D	T-killer cell	T-helper cell	B-lymphocyte	macrophage

5. June/2022/Paper_13/No.38

Rheumatoid arthritis is a disease which causes the body's immune system to attack its own cells. The disease can be treated using monoclonal antibodies.

The table shows how five different monoclonal antibodies can work.

monoclonal antibody	mode of action
1	binding to proteins on cell surfaces and triggering the immune system
2	blocking molecules on cell surfaces that inhibit T-lymphocytes
3	blocking cell signalling receptors that trigger cell division
4	binding to antigens on cell surfaces and releasing a drug
5	blocking cell signalling receptors that trigger the immune response

Inflammation and swelling of joints are symptoms of rheumatoid arthritis. The cytokine, TNFalpha, activates cells in the immune system leading to death of cells in the joint.

Which types of monoclonal antibody could be used to treat rheumatoid arthritis?

A 1, 2, 3, 4 and 5

B 1, 2, 3 and 4 only

C 2, 3 and 5 only

D 4 and 5 only

6. June/2022/Paper_13/No.40

Some of the events during the primary immune response are listed.

1 phagocytosis of a foreign microbe by a macrophage and antigen presentation

2 some T-lymphocytes will become T-killer cells which kill infected body cells

3 the T-helper cell divides by mitosis to produce T-lymphocyte clones

4 a T-helper cell with the complementary receptor binds to the antigens being presented

What is the correct sequence of events during the primary immune response?

A 4 → 1 → 3 → 2

B 1 → 4 → 3 → 2

C 3 → 1 → 4 → 2

D 3 → 4 → 1 → 2

7. June/2022/Paper_21/No.2

B-lymphocytes are activated to form plasma cells during immune responses.

Fig. 2.1 is a drawing of a plasma cell made from a transmission electron micrograph.

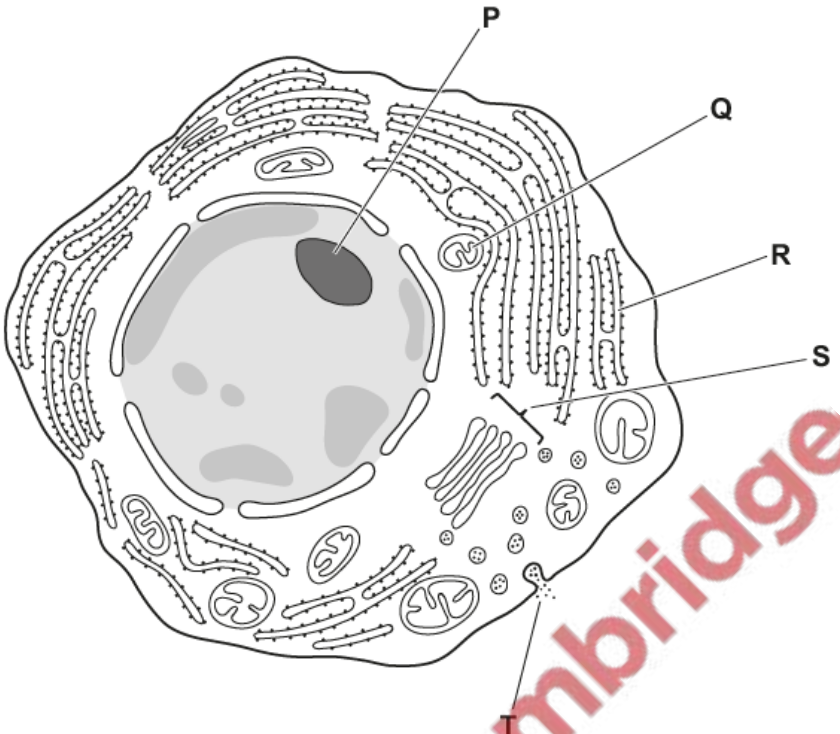


Fig. 2.1

(a) (i) State the name of the process that is occurring at **T**.

..... [1]

(ii) Complete Table 2.1 to show the names and functions of the cell structures labelled **P**, **Q**, **R** and **S** in the plasma cell shown in Fig. 2.1.

Table 2.1

cell structure in Fig. 2.1	name of cell structure	function of cell structure in plasma cell
P		
Q		
R		
S		

[4]

(b) Plasma cells can be used in the commercial production of some monoclonal antibodies.

The method of production is known as the hybridoma method.

Outline the steps in the production of monoclonal antibodies by the hybridoma method.

.....

.....

.....

.....

.....

.....

..... [3]

(c) Antibodies can be collected from human blood donors and used to treat people that may have been infected with a pathogen. This prevents them becoming ill with the disease.

Explain why this treatment does not prevent people becoming ill if they are infected again with the same pathogen.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 12]