

Immune System

Total marks: 18

Q1.

Answer the question with a cross in the box you think is correct . If you change your mind about an answer, put a line through the box and then mark your new answer with a cross .

Monoclonal antibodies are proteins.

Figure 16 shows the process of monoclonal antibody production.

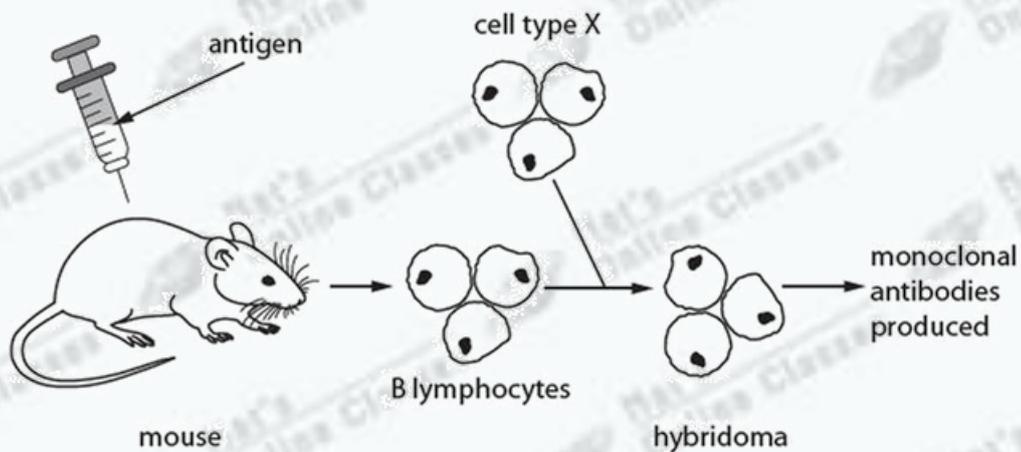


Figure 16

(i) Which type of cell is added to the B lymphocytes to produce the hybridoma?

- A phagocytic cell
- B red blood cell
- C cancer cell
- D epithelial cell

(1)

(ii) A person with blood group A has the A antigen on the surface of their red blood cells.

Monoclonal antibodies can be used to detect the A antigen on red blood cells to determine the blood group of a person.

Explain why monoclonal antibodies, used to detect blood group A, would not react with the blood of a person with blood group B.

(3)

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(Total for question = 4 marks)

Q2.

Cancer Research UK found that many people do not realise that obesity is linked to an increased risk of developing cancer.

In the body, fat tissue sends signals that cause other cells to divide.

Obesity can also cause cardiovascular disease to develop.

Describe the different treatments available for cardiovascular disease.

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(Total for question = 3 marks)

Q3.

Most cases of scarlet fever occur in children.

Adults have usually developed immunity to a toxin that the Streptococcus bacteria produce during infection.

Explain how an adult develops immunity to the toxin.

(3)

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(Total for question = 3 marks)

Q4.

The wire loop used to spread bacteria on an agar plate was heated in a Bunsen burner flame before being used.

Explain why this aseptic precaution was used.

(2)

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(Total for question = 2 marks)

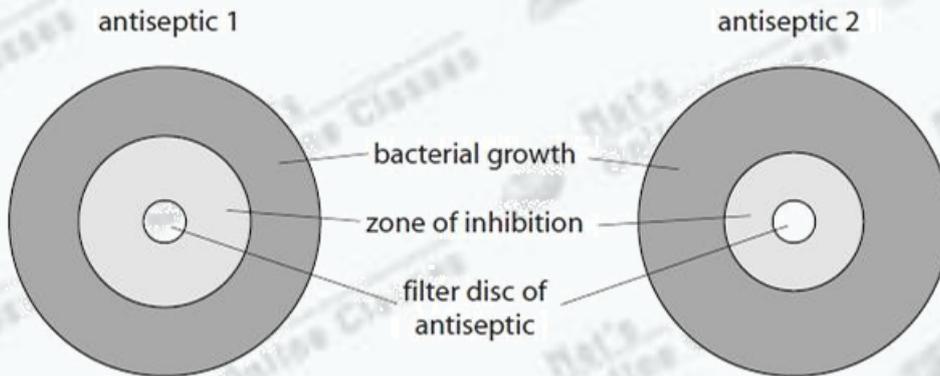
Q5.

Streptococcus pyogenes is a bacterium that causes communicable infections.

Scientists tested the ability of two antiseptics to kill *Streptococcus pyogenes* bacteria.

They spread *Streptococcus pyogenes* bacteria on two agar jelly plates and placed a small disc of filter paper containing antiseptic in the centre of each dish.

Figure 3 shows the results of the test after 24 hours of incubation.



(i) Calculate the area of the zone of inhibition for antiseptic 2.

Give the answer to 3 significant figures.

($\pi = 3.14$)

(3)

zone of inhibition for antiseptic 2 = mm²

(ii) Explain which antiseptic is the most effective.

(2)

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(iii) After the bacteria were spread on the plates, both plates were incubated for 24 hours at 37°C.

Give a reason why the plates were incubated at 37°C.

(1)

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(Total for question = 6 marks)