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Level: SL IB in Biology
Subject: Biology
Topic: IB SL Biology
Type: Topic Question

2002



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All International Baccalaureate IB Topic Questions SL Biology

BIOLOGY

SL - IB

Key skills

Question 1.

Which of the following are considered primary defence against infectious disease?

- A. Skin and mucous membranes.
- B. Hair and skin.
- C. Phagocytes and fever.
- D. Lymphocyte production of antibodies.

[1 mark]



Question 2.

Bacteria and viruses are the main pathogens in humans. Antibiotics can be used to treat bacterial infections but not viral infections

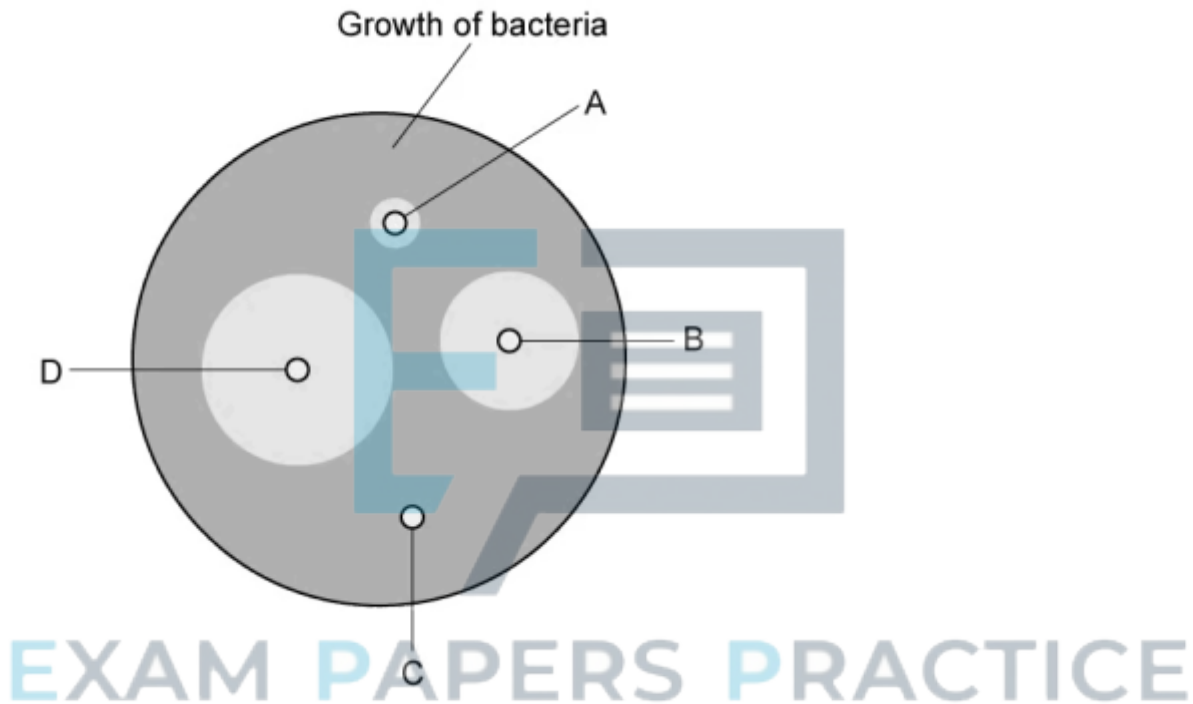
Which of the following statements explains why?

- A. Viruses need a host to survive.
- B. Viruses consist of just nucleic acid and a protein coat.
- C. Bacteria have peptidoglycan cell walls.
- D. Viruses are significantly smaller than bacteria.

[1 mark]

Question 3.

An antibiotic sensitivity test was performed on bacteria isolated from a patient's throat. The diagram shows the results of the four antibiotics tested.



Which one should be used to treat the disease?

[1 mark]

Question 4.

When a phagocyte responds to the presence of a pathogen the following events happen:

- I. Enzymatic digestion.
- II. Endocytosis.
- III. Phagocyte membrane extends out.
- IV. Vacuole formation.

Which of the following would be the correct order of events?

	first	→	→	last
A	III	I	IV	II
B	III	II	IV	I
C	II	IV	I	III
D	II	III	IV	I

[1 mark]



Question 5

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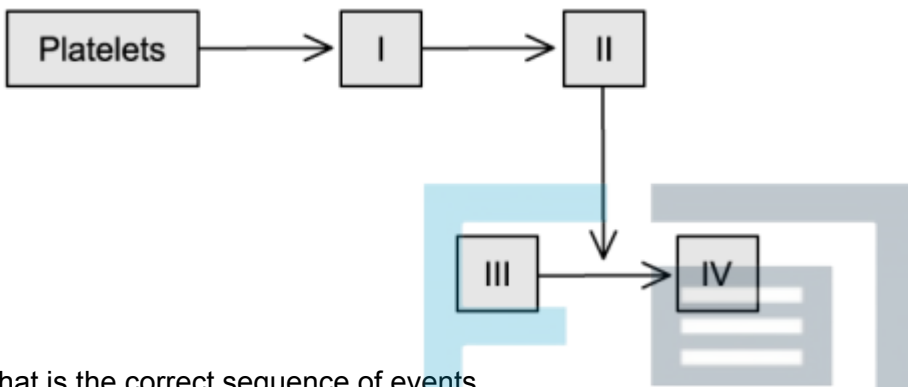
Which of these statements correctly describes a lymphocyte?

- A. They have many mitochondria to produce ATP to allow endocytosis of pathogens.
- B. They have many lysosomes containing hydrolytic enzymes to digest pathogens.
- C. They provide specific defence against disease-causing organisms.
- D. They are white blood cells with a lobed nucleus.

[1 mark]

Question 6.

The diagram represents the process of blood clot formation.



What is the correct sequence of events

	I	II	III	IV
A	Prothrombin	Thrombin	Fibrin	Fibrinogen
B	Clotting factors	Thrombin	Fibrinogen	Fibrin
C	Fibrin	Fibrinogen	Thrombin	Clotting factors
D	Clotting factors	Thrombin	Fibrin	Fibrinogen

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[1 mark]

Question 7.

What is adaptive immunity?

- A. Treating a specific disease through use of antibiotics.
- B. Production of monoclonal antibodies.
- C. Production of antibodies by lymphocytes.
- D. Endocytosis of pathogens by phagocytes.

[1 mark]

Question 8.

Which of the following is not a contributing factor towards the development of antibiotic resistance in bacteria?

- A. Stopping a course of antibiotics once symptoms improve.
- B. Development of new antibiotics.
- C. Natural selection which favours mutations in bacteria.
- D. Overuse of antibiotics in agriculture

[1 mark]

Question 9.

The following statements are about people infected with HIV/AIDS.

- I. They will have symptoms.
- II. They can be treated and completely cured.
- III. They may live for many years after infection.

Which ones are correct?

- A. I only
- B. I and II
- C. I and III
- D. III only

[1 mark]

Question 10.

The bacterium *Staphylococcus aureus* (*S. aureus*) is one of the main human pathogens and can cause many serious infectious diseases. Mutations in the *mec A* gene has allowed *S. aureus* to become resistant to many antibiotics. The table below shows a (Clustal W) partial nucleotide sequence alignment of *mec A* for different isolates of *S. aureus*. The drug resistant strain has a base substitution mutation (shown in bold) which changes the amino acid residue from serine to threonine.

<i>S. aureus</i> isolate 1	AAC GGA ACC GGT AAG GAC GCG ATC ACC AGC
<i>S. aureus</i> isolate 2	AAC GGA ACC GGT AAG GAC GCG ATC ACC AGC
<i>S. aureus</i> isolate 3	AAC GGA ACC GGT AAG GAC GCG ATC ACC AGC
Drug resistant strain	AAC GGA ACC GGT AAG GAC GCG ATC ACC ACC

Which of the following statements **most likely** explains how an amino acid change can cause antibiotic resistance?

- A. Alteration of the drug target site which prevents binding
- B. Prevents the bacterial cell from synthesising the target protein
- C. Bacteria produce less of the target protein
- D. Can introduce a stop codon

[1 mark]

Question 11.

Which of the following statements are true for antigens?

- I. Antigens are proteins, glycolipids or glycoproteins found on the surface of the cell membrane
- II. The symptoms of allergies, such as a runny nose or itchy eyes, are directly caused by antigens
- III. Blood cells have antigens which determine blood type

- A. All of the above
- B. I and II only
- C. I and III only
- D. II only

[1 mark]

Question 12.

Identify which of the combinations of blood types are compatible for a blood transfusion from donor to recipient.

	Donor	Recipient
A	A	B
B	AB	B
C	O	AB
D	A	O

[1 mark]

Question 13.

What is required to initiate a specific immune response?

- A. Phagocytes engulf pathogens
- B. T-helper cells are activated
- C. B-cells mature
- D. Signalling proteins are released

[1 mark]

Question 14.

Which of the following statements about plasma cells is incorrect?

- A. Plasma cells contain large amounts of rough endoplasmic reticulum
- B. Plasma cells originate from B-cells
- C. Plasma cells divide by mitosis to produce memory cells
- D. Plasma cells produce specific antibodies

[1 mark]



Question 15.

Which words or phrases can be used to fill spaces (I) and (II) in the following sentence?

Scientists have particular concerns about the spread of diseases in animals that may result in.....(I).....transfer of pathogens to humans. Examples of these diseases include tuberculosis and(II).....

	I	II
A	Zoonotic	Rabies
B	Species-specific	COVID-19
C	Zoonotic	Measles
D	Mutated	Japanese encephalitis

[1 mark]

Question 16.

Which of the following would reduce the likelihood of antibiotic resistance evolving?

- I. Reducing the use of antibiotics.
- II. Taking measures to reduce the spread of infectious bacteria.
- III. Researching new antibiotics.

- A. I only
- B. I and II only
- C. I and III only
- D. I, II, and III



[1 mark]

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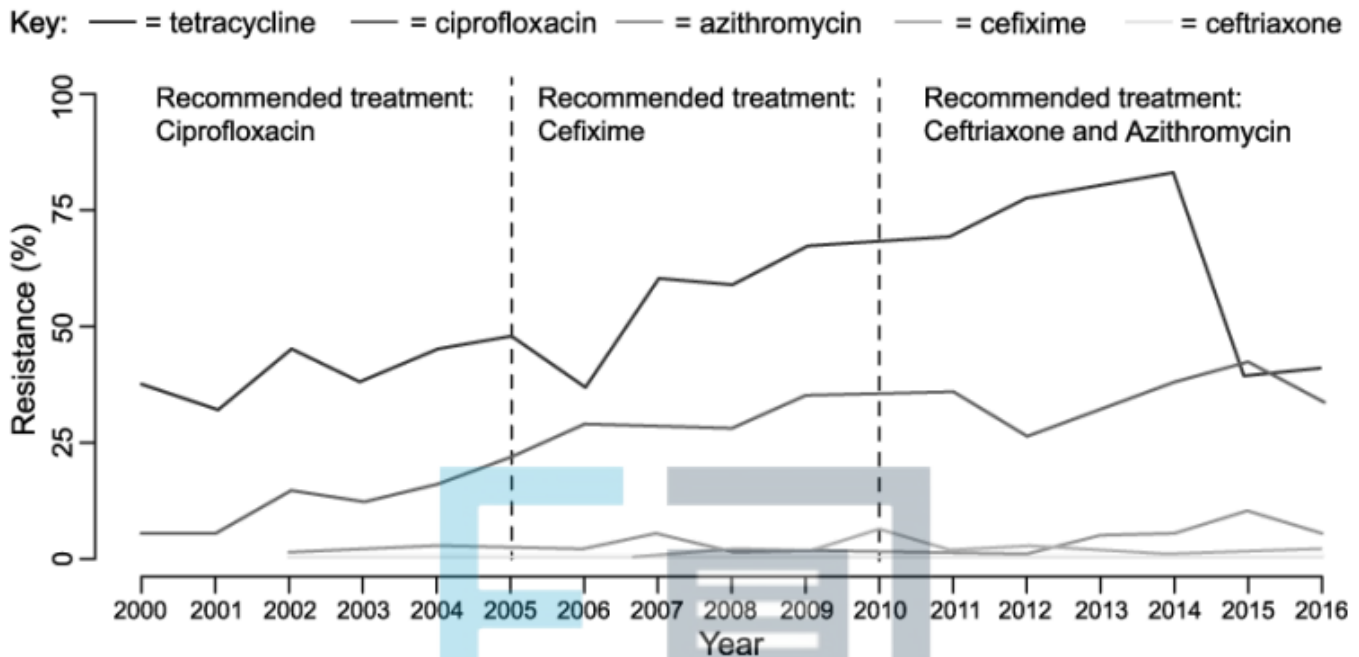
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Question 17.

Research was carried out into the emergence of antibiotic resistance in the antibiotics used to treat infection X between the years 2000-2016.

Different antibiotics were recommended during different time periods due to concerns about developing resistance. Note that ciprofloxacin is used to treat a range of infections and not just infection X, while tetracycline is not used to treat infection X but is used to treat many other mild infections.

Some of the results of the research are shown below.



What conclusion can be drawn from these results?

- A. Resistance evolves when the use of an antibiotic increases.
- B. Ceftriaxone should be used to treat all infections.
- C. Infection X should not be treated with antibiotics.
- D. Tetracycline should no longer be used.

[1 mark]