

1 The scientific document you have studied is adapted from articles in New Scientist. Use the information from the article and your knowledge to answer the following questions.

(a) Outline the process by which 'more molecules of the enzymes' are produced (last paragraph on page 7).

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(b) Explain how the fluid mosaic model of membrane structure makes it possible to change the number of adrenoceptors (first paragraph on page 9).

(2)

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(c) Explain, using examples from the text, how scientific opinion can be 'deeply divided' when based on the same evidence.

(3)

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* (d) (i) Discuss the treatments for Parkinson's disease described in the article. Include particular benefits and any ethical issues and possible problems associated with these treatments.

(7)

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(ii) Compare the changes in brain chemistry that are linked to Parkinson's disease with those that are linked to depression.

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(e) Suggest similarities between nerve cells in *Caenorhabditis elegans* expressing the ChR2 gene and cells of the mammalian retina.

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(f) Using an example from the text, explain how a virus can introduce genes into specific cells.

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(g) Suggest how the presence of bradykinin could affect tissues.

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(h) Suggest the factors that need to be accounted for in the design of drug trials of painkillers.

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(Total for Question 1 = 30 marks)

2 Various non-specific responses of the body are involved in resistance to bacterial infections.

(a) Histamine, interferon and lysozyme are three substances involved in non-specific responses to infection.

For each of the following statements, put a cross ☒ in the box next to the name of the substance involved.

(i) Enzyme released in secretions that break down the cell walls of bacteria.

(1)

A Histamine

B Interferon

C Lysozyme

(ii) Inflammation caused by a chemical released by white cells in connective tissue.

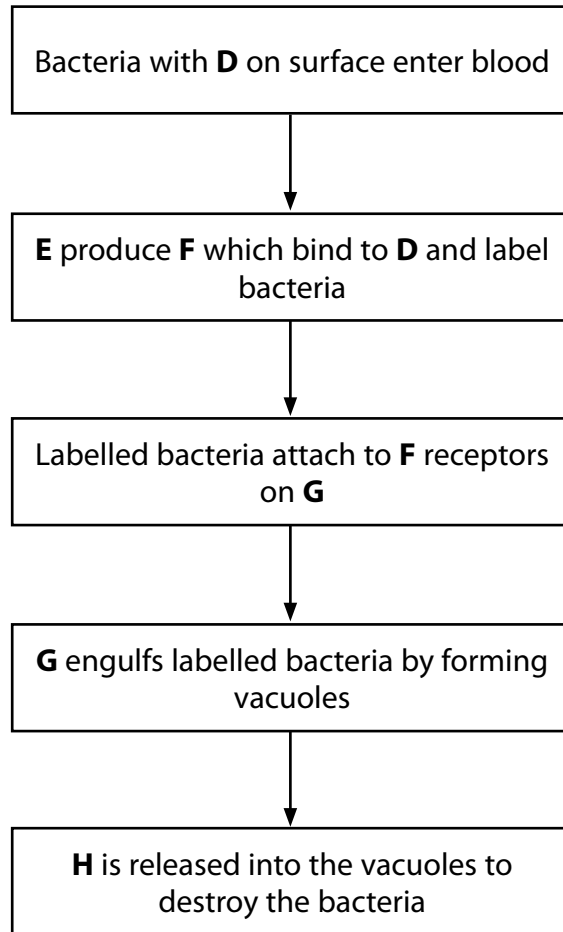
(1)

A Histamine

B Interferon

C Lysozyme

(b) The flow diagram below summarises some of the stages of phagocytosis, a non-specific response to a bacterial infection.



(i) Identify **D**, **E**, **F**, **G** and **H** by writing appropriate terms in the spaces below.

(5)

- D**
- E**
- F**
- G**
- H**

(ii) Explain why the processes shown in the flow diagram will only happen in response to some types of bacteria.

(3)

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(Total for Question 2 = 10 marks)