

Antibiotics

Question Paper 4

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Infectious disease
Sub Topic	Antibiotics
Booklet	Theory
Paper Type	Question Paper 4

Time Allowed : 68 minutes

Score : / 56

Percentage : /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

- (c) One of the many mutations for CF results in the amino acid arginine being replaced by histidine in the polypeptide encoded by the CF gene.

Explain how a mutation may cause such a change in the amino acid sequence of a polypeptide.

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- (d) A genetic test was performed on two individuals, **D** and **E**, to find the base sequences of a small part of the CF gene. The different base sequences are shown diagrammatically in Fig. 3.1. Individual **E** has CF.

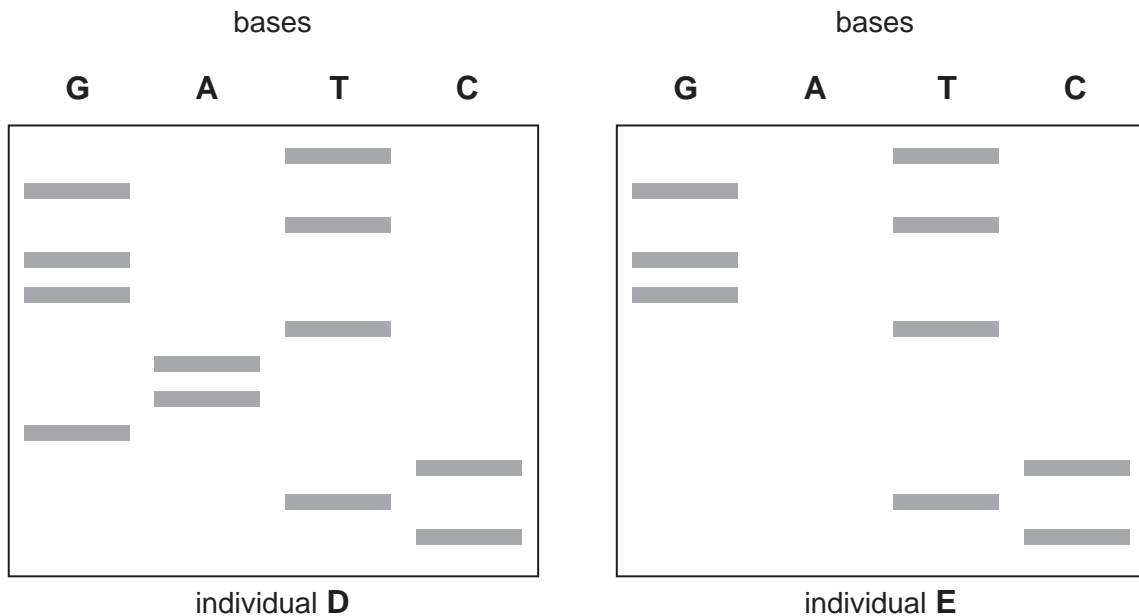


Fig. 3.1

With reference to Fig. 3.1, state,

- (i) how the base sequence of **E** differs from that of **D**

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(ii) the effect of this difference in the polypeptide produced by the two individuals.

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[Total: 15]

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A series of horizontal dotted lines for writing.

3 Fig. 4.1 shows the two base pairs in a DNA molecule.

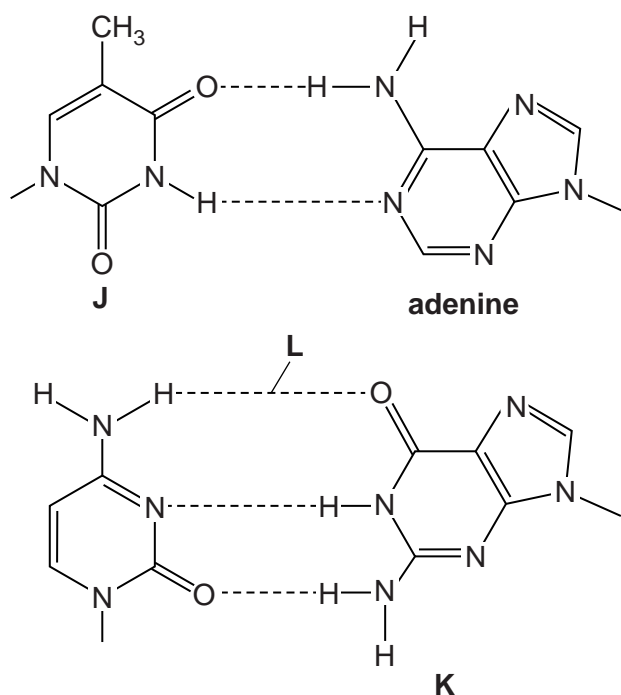


Fig. 4.1

(a) Name the bases labelled J and K and the bond labelled L.

J

K

L [3]

HIV enters T-lymphocytes by a form of endocytosis. Two of the enzymes in HIV are:

- reverse transcriptase, which uses viral RNA as a template to make DNA to incorporate into the chromosomes of the host's cells
- protease, which is used to break a polypeptide into smaller molecules. These molecules are used to make the protein coat of new viral particles, which will infect other cells.

Various drugs have been developed to treat HIV infections. Table 4.1 gives information about some of these drugs.

Table 4.1

drug	enzyme inhibited	mode of action
zidovudine	reverse transcriptase	occupies active site
tenofovir	reverse transcriptase	occupies active site
efavirenz	reverse transcriptase	occupies sites other than the active site
atazanavir	protease	occupies active site

(b) Explain the difference between the mode of action of zidovudine and efavirenz.

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(c) People who receive drug treatment for HIV take a mixture of drugs that act in different ways.

Suggest the advantage of taking a mix of the drugs shown in Table 4.1.

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(d) Antibiotics are prescribed to people who have HIV/AIDS for the treatment of secondary infections, but not to treat the HIV infection.

Explain why this is so.

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[Total: 11]

