

GCSE Biology B (Twenty First Century Science)
J257/02 Depth in Biology (Foundation)

Question Set 4

1 Warfarin is a medicine that helps to prevent the formation of blood clots.
 It is given to people who are at risk from a blood clot blocking one of their veins.
 Warfarin interferes with an enzyme involved in the blood clotting process.

(a) (i) Which statement about enzymes is true?

Tick (✓) **one** box.

An enzyme blocks a chemical reaction.

An enzyme recognizes many different substrates.

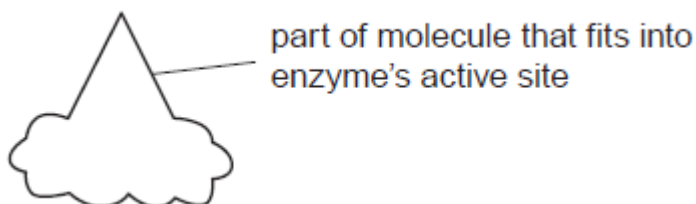
An enzyme speeds up a chemical reaction.

An enzyme is used up during a chemical reaction.

[1]

(ii) Warfarin blocks the active site of the blood clotting enzyme.

The diagram represents a molecule of warfarin.



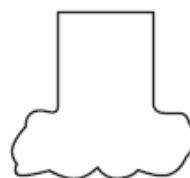
Which **one** of the following diagrams, **A**, **B**, **C** or **D**, could represent the enzyme's normal substrate?



A



B



C



D

[1]

(b) Warfarin helps to prevent the formation of blood clots when it is given to a patient in the correct amount.

The amount of medicine given to a patient is called the dose.

However, there is not one correct dose of warfarin that works for everybody.

Different patients need a different dose.

- (i) Doctors usually start by giving a low dose of warfarin to a patient. They then increase the dose if necessary.

Explain why it is better to start with a low dose of warfarin **and** suggest what could happen if the dose is too high.

[3]

- (ii) Doctors think that different people need a different dose of warfarin because of differences in their genomes.

Explain how differences in the genome could cause a person to need a different dose of warfarin.

[2]

- (iii) Explain how gene technology could be used to help a doctor to give the correct dose of warfarin to a patient.

[2]

- (c) Warfarin has also been used as rat poison since 1948.

However, many populations of rats are now resistant to warfarin.

Explain how a population of rats could have become resistant to warfarin.

[6]

Total Marks for Question Set 4: 15

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