

AS Level Biology B

H022/02 Biology in depth

Question Set 9

1 Quinine is a drug that occurs naturally in the bark of cinchona trees. It is used to treat malaria caused by the parasite, *Plasmodium falciparum*, which infects human erythrocytes.

- The medicinal properties of cinchona bark were first realised by the Quechua people of South America.
- The use of cinchona bark in treating fever was documented in Europe during the 17th century.
- In the 1800s, researchers isolated quinine from cinchona bark and identified it as the medicinally active compound.

(a) (i) Suggest why researchers concentrated on studying cinchona bark when looking for a treatment for malaria.

[2]

(ii) Quinine interferes with the ability of *P. falciparum* to completely digest haemoglobin resulting in the death of the parasite.

Suggest how incomplete digestion of haemoglobin results in the death of *P. falciparum*.

[2]

(b) Quinine has been used to treat muscle cramps associated with a neurological condition known as restless leg syndrome. A clinical trial to assess the effectiveness of quinine in treating restless leg syndrome was carried out on a large number of volunteers divided into two groups. One group was given oral quinine and the other group was given a placebo.

(i) Explain what is meant by a placebo in this context.

[1]

(ii) Describe how the volunteers could have been allocated to each group for this trial.

[2]

(c) The dose required to treat a patient with malaria using oral quinine is 10 mg kg^{-1} every eight hours.

Calculate the mass of quinine required in the first four days of treatment for a patient who weighs 75 kg.

..... g [2]

Total Marks for Question Set 9: 9

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