

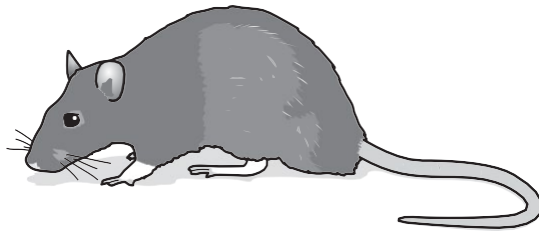
GCSE Biology A (Gateway)

J247/02 B4-B6 and B7 Foundation (Foundation Tier)

Question Set 21

1

Rats are a major pest in many areas of the world. They can reduce food security and spread diseases.



- (a) Warfarin is a chemical that is used as a rat poison. It stops platelets working in the blood.

Describe the function of platelets in the blood.

[2]

Platelets help the blood to clot, to stop internal & external bleeding.

- (b) Some rats are resistant to warfarin. When fed with large amounts of warfarin the rats do not die.

Scientists found that the resistance is due to the dominant allele **R**.

Two resistant rats (**Rr**) mate.

Complete this genetic diagram to find the ratio of resistant rats to non-resistant rats that would be expected to be produced.

		mother		Rr	resistant: RR, Rr	
			R			r
father	R		RR	Rr	Rr	non-resistant: rr
	r		Rr	rr		

Ratio = 3 : 1

[3]

- (c) After several years, the percentage of resistant rats in the population had increased.

Use Darwin's theory of natural selection to explain this observation.

Rats resistant to warfarin will survive the poison. So, they are able to reproduce and pass on their favourable allele for resistance to the next generation. Whilst non-resistant rats die, the allele for warfarin resistance is more and more widespread. [3]

- (d) Scientists are now trying to find another poison to use on rats.

They have introduced a chemical called phosphine. This blocks the action of mitochondria in rat cells.

Explain why this might kill rats.

Mitochondria is the site of aerobic respiration, so phosphine stops this process. So, the rat is not able to release energy, so it cannot carry out metabolic processes. This causes it to die. (as body functions for survival) → can't respire [3]

Total Marks for Question Set 21: 11

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