

GCSE Biology A (Gateway)

J247/04 Biology A B4-B6 and B7 (Higher Tier)

Question Set: 20

1

Some people get very painful headaches called migraines.

Scientists think that this is caused by a protein in the brain called CGRP.

Levels of the CGRP protein are higher in the brains of people who get migraines.

Doctors are trying to find a treatment to prevent migraines.

They have produced an antibody against the CGRP protein.

(a) Describe how antibodies are usually made in the human body.

(b) *Antibodies are produced by B cells. When an antigen binds to the B cell surface, it stimulates the B cell to divide and mature into plasma cells which secrete antibodies.* [2]

The doctors test the antibody treatment on migraine patients.

The patients are divided into two groups:

- One group is given an injection of the antibody
- The second group receives an injection of a placebo.
- They record the mean number of days each patient had migraines before and after treatment.

The table shows their results.

Treatment	Mean number of migraine days per patient before treatment	Mean number of migraine days per patient after treatment	Percentage decrease in migraine days per patient
antibody injection	9.1	4.4	
placebo	9.1	6.4	29.7

(i) Explain why a placebo group is used in drug testing.

As a comparison group - proves they are safe and effective. Placebo should give no effect. [3]

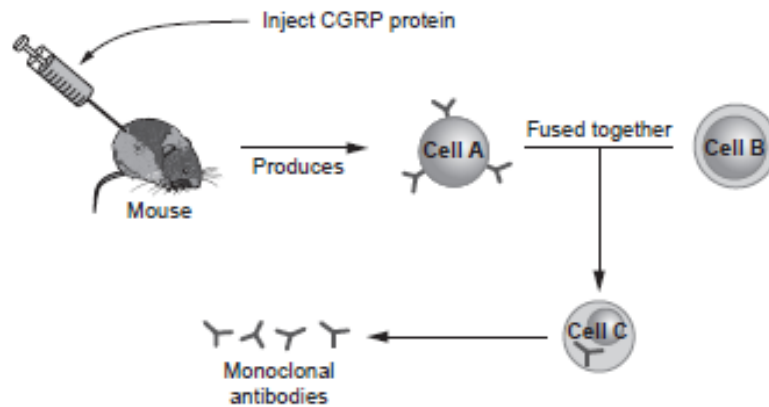
(ii) Calculate the percentage decrease in migraine days in the patients that had the antibody injection.

Give your answer to 1 decimal place.

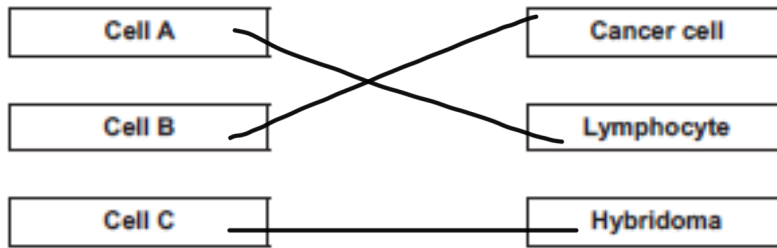
[3]

$$\frac{9.1 - 4.4}{9.1} \times 100 = 51.6\%$$

- (c) The antibodies used in the investigation were monoclonal antibodies. They can be made by injecting CGRP protein into a mouse. The diagram shows this process.



Draw lines to identify each type of cell shown in the diagram.



[2]

Total Marks for Question Set 20: 10

OCR

Oxford Cambridge and RSA

Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact The OCR Copyright Team, The Triangle Building, Shaftesbury Road, Cambridge CB2 8EA.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge