

8 The phenotype of an organism may be affected by both genotype and the environment.
For example, the risk of developing skin cancer is affected by the activity of the p53 gene and exposure to ultraviolet (UV) light.

(a) The p53 gene plays an important role in the cell cycle in humans.

Explain the role of the cell cycle.

(2)

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(b) The p53 gene is called a 'tumour suppressor gene'. Cancers can form when the p53 gene does not function properly. UV light can cause mutations in this gene. The mutant gene results in the production of p53 mutant cells which may become cancerous.

(i) Name **one** environmental factor, other than UV light, that can cause a cell to become cancerous.

(1)

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(ii) Suggest how the cell cycle will be affected in cells that have become cancerous.

(2)

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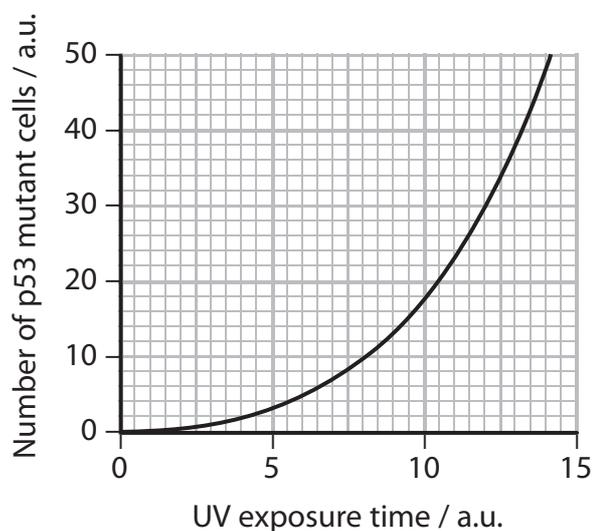
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(c) In an investigation, isolated skin cells were exposed to UV light for different lengths of time. The number of p53 mutant cells produced was recorded.

The graph below shows the effect of UV light on the number of p53 mutant cells produced.



(i) Use the graph to find the number of p53 mutant cells produced after an exposure time of 12 a.u.

(1)

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(ii) Using the information in the graph, describe the effect of exposure to UV light on the number of p53 mutant cells produced.

(3)

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(iii) Name the type of cell division responsible for the increase in number of the p53 mutant cells.

(1)

(d) When cells divide out of control to produce a tumour, the cells may not become specialised.

Describe the process by which cells usually become specialised following cell division.

(3)

(Total for Question 8 = 13 marks)

TOTAL FOR PAPER = 80 MARKS

