AQA, OCR, Edexcel

A Level

A Level Biology

Mutations and Cancer Answers

Name:



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Total Marks: /42

Mutations and Cancer

Answer	Marks
 a) i) Thr - Ser - Tyr ii)a. Substitution/Point mutation: A nucleotide is substituted for a different nucleotide Effects one amino acid (or none if same amino acid is coded for) 	2 marks
b.Insertion/addition mutation: - Where an extra base is added - the whole code after the new base is shifted one place to the right - all the amino acids after this point are potentially affected - Thr - Gln - Leu c. Deletion mutation:	9 marks (3 marks for a, b and c).
- A nucleotide base is deleted -Entire chain after this point is shifted to the left - Potentially changes all the amino acids that are coded for - Thr - Ser - Gly iii) - means that some amino acids are coded for by more than one codon - mutation may result in a silent mutation/not alter the amino acid coded for/protects against	2 marks
mutation	

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Visit http://www.mathsmadeeasy.co.uk/ for more fantastic resources. 3) a) i) - uncontrolled cell division that forms a tumour which invades and 2 marks destroys surrounding tissues/loss of function of infected tissue. ii) - two different genes control cell division; the proto-oncogene and the tumour suppressor gene - mutation in the tumour suppressor gene can cause it to deactivate -Tumour suppressor gene produces a protein that controls cell division 6 marks -The mutation prevents the protein from being produced causing cells to divide uncontrollably forming a tumour - The proto-oncogene stimulates the cell to divide, a mutation can cause it to become over active - uncontrolled cell division occurs -A tumour is formed iii) Prevention: - Acquired: vaccine/sun cream etc. - **Hereditary:** avoiding mutagenic agents (cigarettes, UV etc. 4 marks Diagnosis: - **Acquired**: cancer is usually diagnosed later once symptoms have appeared - **Hereditary**: preventative surgery/early or more frequent screening.

- iv) treatment must be specific to the mutation that causes the cancer
 - mutations interact with cells in different ways (e.g. produce proteins/inactivate genes/cause different size tumours to grow

2 marks

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b)	
i) Strong positive correlation; as	
the number of cigarettes per	
day increases so does the risk of	1 mark
developing cancer	
::) C:	
ii) -Cigarettes contain	
carcinogens/mutagenic agents	
-The graph shows a strong	
positive correlation	
 Correlation does not prove 	
causation	
 Only one factor(cigarettes) 	
was taken into account	4 marks
- Individuals in the study have	
different lifestyle/health issues	
that could have been a factor	
(age, weight, genetics etc.)	