

AQA, OCR, Edexcel

A Level

A Level Biology

Mutations and Cancer Answers

Name:

M M E

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Total Marks: /42

<p>iv)</p> <p>Yes if the substitution mutation replaces C with a T which codes for a stop codon so the protein is incomplete/non-functional</p> <p>No – the mutation could be silent so the same amino acid is coded for</p> <p>No – in strands B and C all the amino acids after the mutation are effected (greater number of amino acids changed) so protein is non functional</p> <p>Yes/No – for all strands the more disruption occurs if mutation occurs close to the start of the nucleotide chain.</p>	<p>3 marks</p> <p>(3 of 4 points required)</p>
<p>2.</p> <p>a)</p> <p>i)- Polysomy – non-disjunction of chromosomes/chromosomes don't separate properly in anaphase. -Means that cells have an extra chromosome (21)</p> <p>b)</p> <p>i) – UV, radiation, chemicals, viruses, medication, foods, alcohol, cigarettes etc.</p> <p>ii) – Hereditary: abnormal genes are passed on during fertilisation Acquired: Mutation occurs after fertilisation</p>	<p>3 marks</p> <p>2 marks</p> <p>2 marks</p>

<p>3) a) i) – uncontrolled cell division that forms a tumour which invades and destroys surrounding tissues/loss of function of infected tissue.</p> <p>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 - 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</p> <p>iii) <u>Prevention:</u> - Acquired: vaccine/sun cream etc. - Hereditary: avoiding mutagenic agents (cigarettes, UV etc.</p> <p><u>Diagnosis:</u> - Acquired: cancer is usually diagnosed later once symptoms have appeared - Hereditary: preventative surgery/ early or more frequent screening.</p> <p>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</p>	<p>2 marks</p> <p>6 marks</p> <p>4 marks</p> <p>2 marks</p>
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<p>b)</p> <p>i) Strong positive correlation; as the number of cigarettes per day increases so does the risk of developing cancer</p> <p>ii) -Cigarettes contain carcinogens/mutagenic agents</p> <ul style="list-style-type: none">-The graph shows a strong positive correlation- Correlation does not prove causation- Only one factor(cigarettes) was taken into account- Individuals in the study have different lifestyle/health issues that could have been a factor (age, weight, genetics etc.)	<p>1 mark</p> <p>4 marks</p>
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