

4 Meiosis is involved in the formation of human gametes.

(a) Explain the importance of meiosis in the formation of human sperm and egg cells.

(3)

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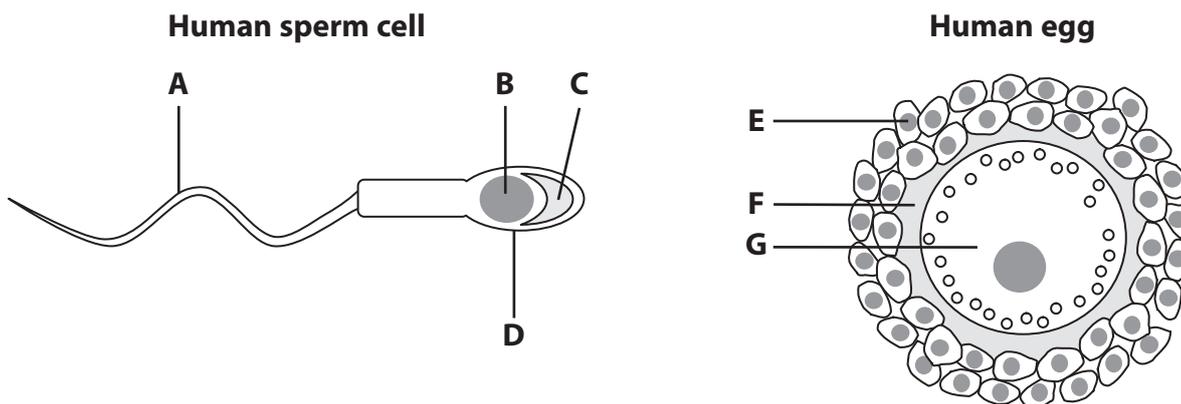
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(b) Sperm cells release acrosin, an enzyme found in the acrosome. This enzyme is involved in digesting the zona pellucida (jelly layer) during fertilisation.

The diagrams below show a human sperm cell and a human egg.



(i) The table below describes four sites. Place a cross  in the box below the letter that correctly links the statement to one of the labels on the diagrams above.

(4)

Statement	A	B	C	D	E	F	G
Site containing acrosin	<input checked="" type="checkbox"/>						
Site where acrosin works	<input checked="" type="checkbox"/>						
Site containing the haploid number of chromosomes	<input checked="" type="checkbox"/>						
Site containing mitochondria	<input checked="" type="checkbox"/>						



(ii) Describe how the acrosin is released from the acrosome.

(2)

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(c) An investigation was carried out to study the effect of acrosin activity on fertilisation success. Sperm cells with different levels of acrosin activity were mixed with human eggs in a glass container. The number of eggs fertilised was then counted and the percentage of eggs fertilised was calculated.

The results are shown in the table below.

Acrosin activity / arbitrary units	Percentage of eggs fertilised (%)
2.5	33
3.0	66
4.0	85
5.0	100

(i) A student stated that acrosin needs to be active for the eggs to be fertilised and that the higher the acrosin activity, the greater the percentage of eggs fertilised.

Give **one** piece of evidence from the table that supports some of his statement.

(1)

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(ii) Using the data in the table, suggest why the student could **not** support all of his statement.

(1)

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**Total for Question 4 = 11 marks**

