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# 2009

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- 5 Which one of the following statements is true about the members of a clone?
- A Members of a clone will always show identical features at maturity.
  - B Multiple births, such as twins, are always members of a clone.
  - C They are produced only during genetic engineering.
  - D They are the result of a mutation.
  - E They contain identical DNA.



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2013

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- 13 Which of the following is **not** needed in order to genetically engineer bacterial cells to produce a fluorescent protein from a jellyfish?
- A ligase enzyme
  - B a plasmid or viral vector
  - C fluorescent protein from a jellyfish
  - D enzymes to cut DNA molecules



## Gene Technologies

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# 2014

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- 9 Insulin is a protein involved in the regulation of human blood glucose levels.

Genetic engineering can be used to allow the large-scale production of human insulin.

Which statement describes the process of genetic engineering in this case?

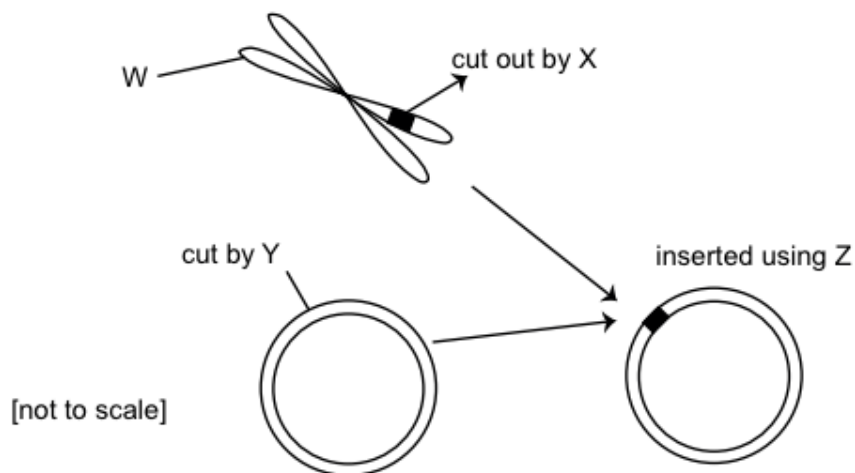
- A** Taking insulin from a human and inserting it into the DNA of a bacterium. As the bacterium reproduces, it makes large quantities of insulin DNA that can be used to treat human diabetes.
- B** Taking insulin from a human and inserting it into the DNA of a bacterium. As the bacterium reproduces, it makes large quantities of insulin that can be used to treat human diabetes.
- C** Taking the insulin gene from a human chromosome and inserting it into the DNA of a bacterium. As the bacterium reproduces, it makes large quantities of insulin DNA that can be used to treat human diabetes.
- D** Taking the insulin gene from a human chromosome and inserting it into the DNA of a bacterium. As the bacterium reproduces, it makes large quantities of insulin that can be used to treat human diabetes.
- E** Taking the insulin gene from a human chromosome and replacing it in another human chromosome in the same human, so that it will work better to produce large quantities of insulin.



Gene Technologies

2016

- 5 The diagram shows some of the stages of how a length of DNA can be removed from one organism and introduced into another organism.



Which row is correct?

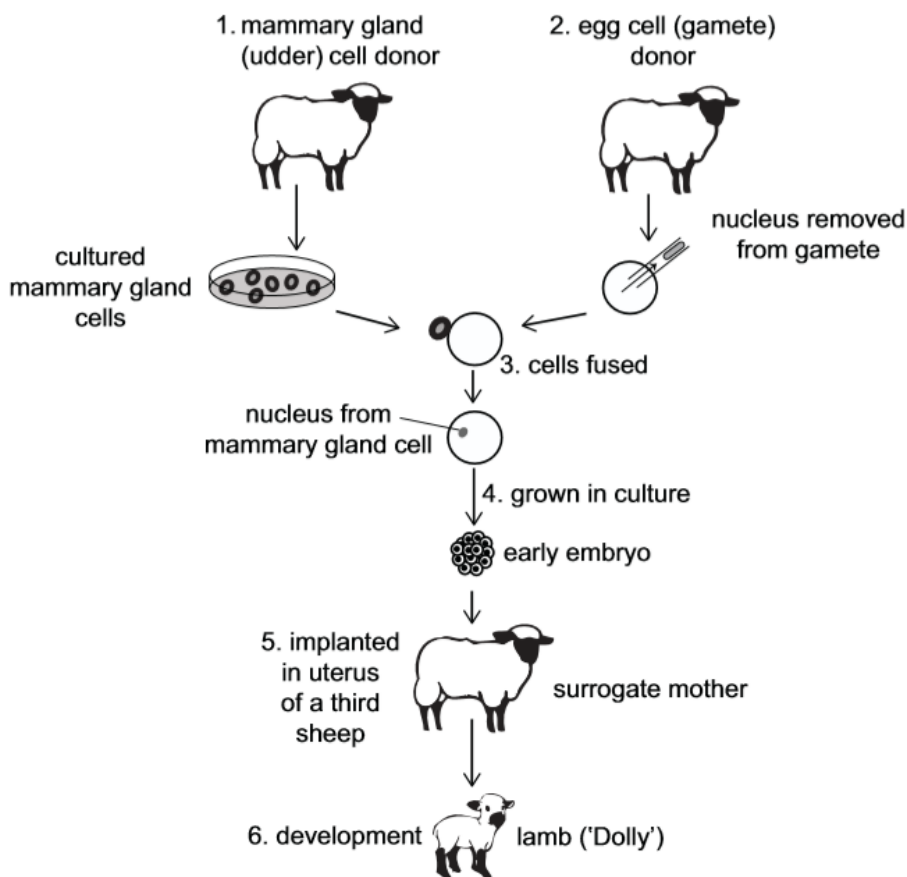
	<i>W is a</i>	<i>X is a</i>	<i>Y is a</i>	<i>Z is a</i>
<b>A</b>	chromosome	restriction enzyme	restriction enzyme	restriction enzyme
<b>B</b>	chromosome	restriction enzyme	restriction enzyme	ligase
<b>C</b>	chromosome	ligase	ligase	ligase
<b>D</b>	gene	ligase	restriction enzyme	ligase
<b>E</b>	gene	ligase	ligase	restriction enzyme
<b>F</b>	gene	restriction enzyme	ligase	restriction enzyme



Gene Technologies

2017

- 13 Dolly the sheep was born in 1996. She was unusual because she had no biological father. Sheep have a diploid number of 54 chromosomes in their body cells. The diagram shows the process of how she was produced.



Which of the following statements about this process is/are correct?

- 1 The gamete cell nucleus contained 27 chromosomes.
- 2 The cells produced in step 4 had the same properties as stem cells.
- 3 None of the cells involved in the process were produced by meiosis.



## Gene Technologies

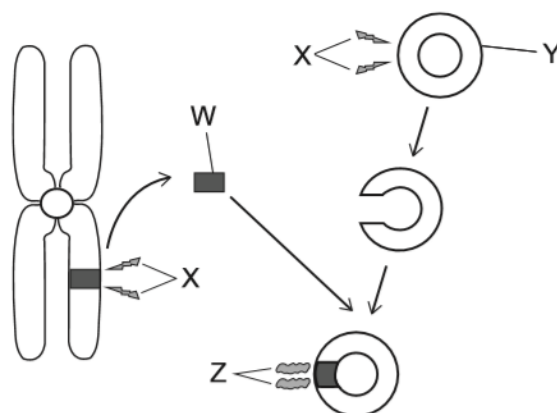
- A none of them
- B 1 only
- C 2 only
- D 3 only
- E 1 and 2 only
- F 1 and 3 only
- G 2 and 3 only
- H 1, 2 and 3



Gene Technologies

2019

1 The diagram shows some stages involved in genetic engineering.



Which row correctly identifies W, X, Y and Z?

	W	X	Y	Z
<b>A</b>	chromosome	restriction enzyme	plasmid	ligase
<b>B</b>	chromosome	ligase	bacterium	restriction enzyme
<b>C</b>	chromosome	restriction enzyme	bacterium	ligase
<b>D</b>	chromosome	ligase	plasmid	restriction enzyme
<b>E</b>	gene	restriction enzyme	plasmid	ligase
<b>F</b>	gene	ligase	bacterium	restriction enzyme
<b>G</b>	gene	restriction enzyme	bacterium	ligase
<b>H</b>	gene	ligase	plasmid	restriction enzyme