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1

A horse breeder wants to clone his successful race horse.

Describe how adult cell cloning could be used to produce a clone of the race horse.

[4 marks]

The nucleus / DNA / chromosomes / genetic material is removed [1]
from (unfertilised) egg / ovum. [1]

The nucleus from body cell of race horse or wanted race horse [1]
is inserted into egg / ovum or an empty/enucleated egg. [1]

An electric impulse is given [1]
to make cell divide or develop into embryo. [1]

Embryo inserted into womb / host / another /surrogate horse. [1]

TOP TIP : This is a case of remembering the key parts in this process. Often a big question when it comes up. Remember, there is no fertilisation going on here.

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2

Suggest why some people might be against the idea of a horse breeder cloning race horses.

[1 mark]

Idea of unfairness [1]

TOP TIP : You can mention ethical reasons here to do with cloning as well, but avoid saying 'playing God'. Use terms like 'morally wrong'

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3

Cloning can be described as a form of asexual reproduction.

What is meant by asexual reproduction?

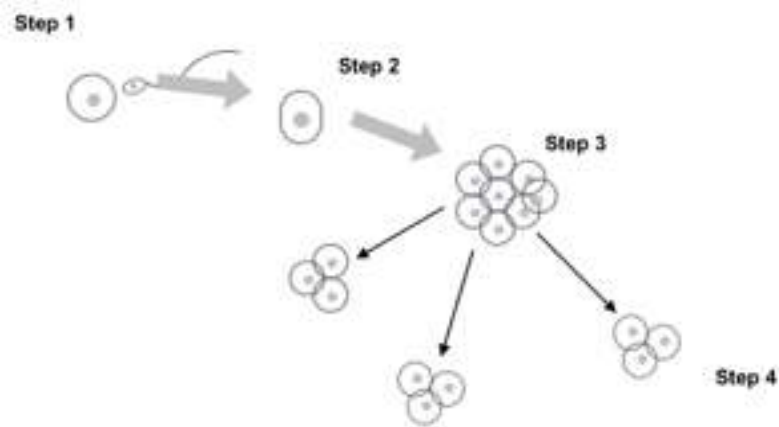
[3 marks]

No fusion or joining of gametes. [1]

Only one individual is needed as the parent. [1]

No mixing of genetic information and so no genetic variation in the offspring. [1]

The diagram below shows another way that clones can be made of animals



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Name the process that is occurring in **step 1**.

[1 mark]

fertilisation [1]

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Name the structure in **step 3**.

[1 mark]

embryo [1]

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Describe what is done next with the three structures in **step 4** in order to produce clones.

[2 marks]

implanted or put into the womb of [1]
host mother/surrogate mother [1]

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It is important to carry out **step 4** within a few days of **step 1**.

Suggest why.

[1 mark]

Embryo cells become specialised or differentiate [1]

Embryo can no longer grow into a clone [1]