

Lab:Cloning

HONORS BIOLOGY: UNIT 7

DIRECTIONS: Log onto Learn.Genetics at <http://learn.genetics.utah.edu/> (Under the "Cell Biology" Menu, Click on "Cloning")

Browse the articles at the site to find the answers to the following questions.

What is Cloning?

1. Define Cloning:

The creation of an organism that is an exact genetic copy of another

2. What is the difference between natural twinning and artificial twinning?

Natural twinning is done naturally by an egg splitting, while artificial twinning is done in a lab.

3. What is SCNT?

Somatic Cell Nuclear Transfer

4. To make Dolly the clone, they first isolated a cell from where?

An adult Female Sheep

5. They transferred the nucleus of this cell to where?

A serogent mother's egg cell

Click and Clone

6. List all the materials needed to clone a mouse.

3 Mice, Microscope, Petri dishes, Sharp pipette, Blunt pipette, and a Chemical to stimulate cell division

7. Place the following steps in the correct order.

4 Stimulate cell division

6 Deliver baby

2 Remove and discard the nucleus from the egg cell

1 Isolate donor cells from egg donor and germ cell donor

3 Transfer the somatic cell nucleus into the egg cell

5 Implant embryo into a surrogate mother

8. Explain how the nucleus is removed from the donor egg:

A blunt pipette holds the egg while a sharp pipette sucks out the nucleus

9. What color will the cloned mouse be? Brown What is the name of this mouse? Mini-Mimi

The History of Cloning

10. What was the first organism ever cloned using artificial embryo twinning?

A Sea Urchin

11. How did Hans Sermann separate cells from a salamander embryo?

He used a tiny makeshift noose to separate the eggs by slicing them with the string.

12. What happened to the tadpoles that were cloned from more advanced embryos?

They still created a tadpole even though they came from an adult frog.

16. Where did John Gurdon obtain cells for his cloned frogs?

Full developed frog's somatic cells

17. What was the first mammal embryo cloned?

Rabbit

18. What were the names of the two cloned calves?

Fusion and Copy

19. Cultured sheeps cells were used to create two lambs named Megan and Morag.

20. What as the first mammal created using somatic cell nuclear transfer?

Sheep

Where did the DNA come from for this clone?

Another sheep named Dolly

21. Out of 29 primate clones attempted, how many were born? Two

22. How was the clone "Polly" different from the first sheep clone named "Dolly?"

She produced Factory 9 protein in her milk

23. What was the first extinct animal cloned?

Spanish Mountain Goat

Why Clone?

24. List four reasons given on the page for justifying cloning:

1. medical purposes
2. reviving an endangered or extinct species
3. reproducing a deceased pet
4. cloning humans in the future

25. What is a stem cell?

Body's building blocks, responsible for developing, maintaining and repairing the body

26. Why did CC look different from Rainbow even though they were both clones?

Different cells activate at random, some patches are orange and some are black

27. What two things would you need to clone a dinosaur?

28. Why would a farmer want to clone livestock?

If, for example, a cow was immune to a disease, or a sheep grew its wool faster, the farmer could clone the animal to keep these desired traits.

29. What are two reasons a person might want to clone a human?

If a person was immune to an otherwise incurable disease, or had a longer lifespan, or had other desirable traits.

Is it Cloning or Not?

30. For each of the following scenarios, indicate **YES** (it is cloning) or **NO** (it is not cloning)

No Sperm taken from a male goat is combined with a female's egg in a petri dish. The resulting embryo is implanted into the female's uterus to develop

Yes A sheep embryo, composed of 16 cells, is removed from the mother's uterus and separated into individual cells. Each cell is allowed to multiply, creating 16 separate embryos, which are then implanted in different female sheep to develop to maturity.

No A cow with many desirable traits is stimulated with hormones to produce a number of egg cells. Each of these eggs is fertilized and implanted into a surrogate mother.

No In vitro fertilization

Yes Cell nuclei from an extinct woolly mammoth are placed into enucleated cow cells.

Cloning Myths

31. Why is it impossible to make instant clones?

Because the egg would have to sit and allow for the cells to divide and produce enough cells for the organism to grow

32. Why would Frankie #2 be different from Frankie #1?

She will not be exposed, or experience the same things as Frankie # 1

33. Give an example of a natural clone:

When an egg cell splits in the mother's womb, produces two identical cells with identical DNA

34. Humans have been cloning Plants for thousands of years.

35. Why does cloning have such a high failure rate?

The enucleated egg and the transferred nucleus may not be compatible, An egg with a newly transferred nucleus may not begin to divide or develop properly, Implantation of the embryo into the surrogate mother might fail, The pregnancy itself might fail