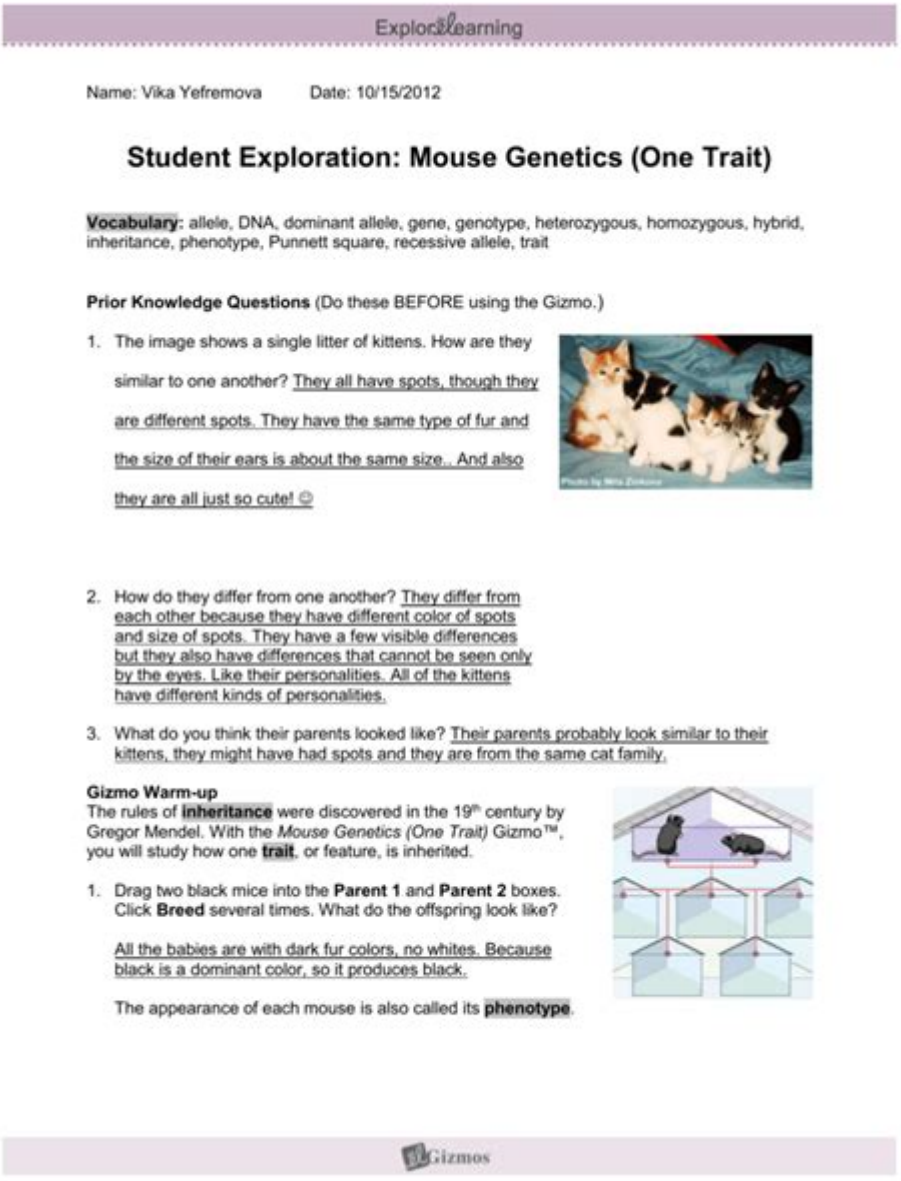
Lets Clone A Mouse Mouse Mouse Activity Answers



Explore Learning

Name: Vika Yefremova Date: 10/15/2012

Student Exploration: Mouse Genetics (One Trait)

Vocabulary: allele, DNA, dominant allele, gene, genotype, heterozygous, homozygous, hybrid, inheritance, phenotype, Punnett square, recessive allele, trait

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

1. The image shows a single litter of kittens. How are they similar to one another? They all have spots, though they are different spots. They have the same type of fur and the size of their ears is about the same size.. And also they are all just so cute! ☺

2. How do they differ from one another? They differ from each other because they have different color of spots and size of spots. They have a few visible differences but they also have differences that cannot be seen only by the eyes. Like their personalities. All of the kittens have different kinds of personalities.

3. What do you think their parents looked like? Their parents probably look similar to their kittens, they might have had spots and they are from the same cat family.

Gizmo Warm-up

The rules of **inheritance** were discovered in the 19th century by Gregor Mendel. With the *Mouse Genetics (One Trait)* Gizmo™, you will study how one **trait**, or feature, is inherited.

1. Drag two black mice into the **Parent 1** and **Parent 2** boxes. Click **Breed** several times. What do the offspring look like?

   All the babies are with dark fur colors, no whites. Because black is a dominant color, so it produces black.

   The appearance of each mouse is also called its **phenotype**.

Gizmos

Lets clone a mouse mouse mouse activity answers provide a fascinating glimpse into the world of genetics and biotechnology, specifically focusing on the cloning process and its implications. Cloning, particularly in the context of mammals, has been a subject of intense scientific research and ethical debate. This article will delve into the science behind cloning mice, the methods used, the implications of such activities, and the answers to common questions associated with the "Lets clone a mouse" activity.

Understanding Cloning in Mice

Cloning refers to the process of creating a genetically identical copy of an organism. In the case of

mice, this scientific endeavor has been primarily motivated by research purposes, including the study of genetic diseases, drug testing, and understanding developmental biology.

What is Cloning?

Cloning can be categorized into several types, including:

1. Natural Cloning: This occurs in nature through asexual reproduction, such as in plants and some animals.
2. Artificial Cloning: This involves human intervention and can be further divided into:
- Reproductive Cloning: Creating an organism that is genetically identical to the donor organism.
- Therapeutic Cloning: Producing cells for use in medical treatments.

History of Mouse Cloning

The history of cloning mice began in the late 20th century. The most notable breakthrough came in 1996 with the cloning of Dolly the sheep, the first mammal to be cloned from an adult somatic cell. Following this, researchers aimed to replicate the success in mice, leading to significant advancements in the field.

- 1997: The first cloned mouse, named Cumulina, was born using a technique known as somatic cell nuclear transfer (SCNT).
- 2002: Researchers successfully cloned multiple generations of mice, demonstrating the viability of the technique.
- 2004: A breakthrough in producing genetically modified cloned mice was achieved, allowing for the study of specific gene functions.

The Cloning Process

The most common method used to clone mice is somatic cell nuclear transfer (SCNT). This process involves several steps, which can be broken down as follows:

Steps in Cloning Mice

1. Cell Collection:
- Somatic cells are collected from a donor mouse. These cells are not sperm or egg cells and contain the full set of genetic information.

2. Oocyte Preparation:
- Oocytes (egg cells) are harvested from a female mouse. The nucleus of each oocyte is removed, creating an enucleated egg.

3. Nuclear Transfer:

- The nucleus from the somatic cell is inserted into the enucleated egg. This step is crucial as it reprograms the egg to develop into a new organism.

4. Activation:
- The egg is stimulated to divide and develop into an embryo. This can be accomplished via chemical or electrical stimulation.

5. Embryo Culturing:
- The developing embryo is cultured in a laboratory setting for a few days until it reaches a suitable stage for implantation.

6. Implantation:
- The embryo is implanted into a surrogate mother, where it can develop into a full-term mouse.

Ethical Considerations

Cloning mice raises numerous ethical questions and considerations. The implications of cloning extend beyond scientific curiosity into areas that affect public perception and regulation.

Pros of Cloning Mice

- Research Advancements: Cloning allows for controlled studies on genetic diseases and the impacts of specific genes.
- Drug Development: Cloned mice can be used to test new drugs, providing insights into their efficacy and safety.
- Conservation: Cloning can potentially aid in the conservation of endangered species.

Cons of Cloning Mice

- Welfare Concerns: The cloning process can result in high rates of failure, leading to suffering among many embryos.
- Genetic Diversity: Cloning reduces genetic diversity, which can have long-term implications for populations.
- Ethical Dilemmas: The moral implications of cloning animals for research purposes raise significant concerns.

Common Questions About Cloning Mice

As the "Lets clone a mouse" activity gains traction in educational settings, several questions frequently arise. Here are some common queries and their answers:

1. What are the main objectives of cloning mice?

The primary objectives include:

- Studying genetic diseases and their treatments.
- Developing models for human health issues.
- Understanding developmental processes and gene functions.

2. How successful is the cloning process?

While significant advancements have been made, the success rate of cloning remains relatively low. For instance, only a small percentage of cloned embryos result in live births, and many cloned animals may experience health issues.

3. Are cloned mice identical to their donor?

Yes, cloned mice are genetically identical to the donor mouse from which the somatic cell was taken. However, environmental factors and epigenetic differences can lead to variations in phenotype.

4. What is the future of cloning technology?

The future of cloning technology is promising, with potential applications in medicine, agriculture, and conservation. Advances in gene editing, such as CRISPR, may enhance the capabilities and ethical considerations of cloning.

Conclusion

The lets clone a mouse mouse mouse activity answers provides a unique educational opportunity to explore the complexities of genetics and biotechnology. Cloning mice serves as a vital tool in research, offering insights that could lead to breakthroughs in understanding human health and disease. While the scientific community continues to navigate the ethical landscape surrounding cloning, the advancements made thus far underscore the importance of this field in modern biology. As we look to the future, the potential for cloning technology promises exciting developments, albeit accompanied by careful ethical scrutiny and consideration.

Frequently Asked Questions

What is the primary objective of the 'Let's Clone a Mouse'

activity?

The primary objective is to teach participants about the process of cloning and the ethical considerations involved in genetic engineering.

What scientific technique is commonly used to clone a mouse?

Somatic cell nuclear transfer (SCNT) is the technique commonly used to clone a mouse.

What are some ethical concerns associated with cloning animals like mice?

Ethical concerns include animal welfare issues, the potential for suffering in cloned animals, and implications for biodiversity.

How can cloning contribute to medical research?

Cloning can help in the study of genetic diseases, drug testing, and the development of personalized medicine.

What are the steps involved in the 'Let's Clone a Mouse' activity?

The steps typically include selecting a donor cell, extracting the nucleus, transferring it to an egg cell, and stimulating cell division.

What is a famous example of a cloned mouse?

A well-known example is 'Cc', the first cloned mouse, created in 2002 at the University of Hawaii.

How does the cloning process affect the genetic diversity of mouse populations?

Cloning can reduce genetic diversity as it produces genetically identical individuals, potentially leading to vulnerabilities in populations.

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