ANIMAL CLONING

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Abstract: 25 years after the first animal was cloned, the practice still remains restricted to a few devisions and countries. Despite all the potential implications, cloning remains contentious. In this article, we will look at the history of cloning, some of the arguments surrounding it, and its potential future applications.

Key terms:Transgenic, surrogate ewes, selective breeding, somatic cell, mammary cell.

What is cloning?

In biology, cloning is the process of producing similar populations of genetically identical individuals that occurs in nature when organisms such as bacteria, insects, or plants reproduce asexually. Cloning in biotechnology refers to processes used to create copies of DNA fragments (molecular cloning), cells (cell cloning), or organisms.

History of cloning

On July 5, 1996, Dolly the sheep—the first mammal to have been successfully cloned from an adult cell—was born at the Roslin Institute in Scotland.

Originally code-named "6LL3," the cloned lamb was named after singer and actress Dolly Parton. The name was reportedly suggested by one of the stockmen who assisted with her birth after he learned that the animal was cloned from a mammary cell. The cells had been taken from the udder of a six-year-old ewe and cultured in a lab using microscopic needles, in a method first used in human fertility treatments in the 1970s. After producing a number of normal eggs, scientists implanted them into surrogate ewes; 148 days later, one of them gave birth to Dolly.

However, Dolly was not the first cloned mammal. That honor belongs to another sheep, which was cloned from an embryonic cell and born in 1984 in Cambridge, UK. Two other sheep, Megan and Morag, had also been cloned from embryonic cells grown in the lab at the Roslin Institute in 1995, and six other sheep, cloned from embryonic and foetal cells, were born at Roslin at the same time as Dolly. What made Dolly so special was that she had been made from an adult cell, which no one at the time thought was possible.

Implications

Some scientists would like to clone endangered species to protect them from extinction.

scientists hope that cloned cells will be used to treat serious diseases such as heart problems, diabetes and spinal injuries.

Cloning could help reduce the time needed to make a transgenic animal model, and the result would be a population of genetically identical animals for study.

Cloning to make stem cells

Drug reproduction

General controversies

The aim of cloning farm animals is to produce replicas of the animals with the highest economic value, for example, the fastest-growing pigs or the highest-yielding dairy cows. However, the process of cloning itself causes animal suffering, and the animals with the highest economic value are prone to developing severe health problems. Pushed to their physical limits, they are condemned to a lifetime of suffering.

The Cloning = Cruelty campaign highlights the intrinsic animal welfare issues of selective breeding in animals for food, i.e., meat and dairy. Research also shows that many cloned farm animals are born with deformed organs and live short and miserable lives.

The cloning of farm animals can involve great suffering. A cloned embryo has to be implanted in a surrogate mother, who carries it to birth. Cloned embryos tend to be large and can result in painful births that are often carried out by Caesarean section. Many clones die during pregnancy or birth. Of those that survive, a significant proportion die in the early days and weeks of life from problems such as heart, liver, and kidney failure.

Future of cloning

The birth of viable offspring from somatic cell nuclear transfer (SCNT) in mammals caused a major re-examination of our understanding of the commitment of cells to specific tissue lineages during differentiation. The questions of whether cells undergo dedifferentiation or transdifferentiation during the development of offspring and how these changes are controlled are a source of ongoing debate that is yet to be resolved. Irrespective of the outcome of this debate, it is clear that cloning using SCNT has a place and purpose in the future of research and animal breeding. The future uses of SCNT could include the production of transgenic mice, the production of transgenic livestock, and assisting with the re-establishment of endangered species. Human medicine would also benefit from the future use of SCNT because it would allow the production of patient-specific embryonic stem cells.

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