Genomes Can Be Cloned, Individuals Cannot

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Abstract

This document explores the potential impact of human cloning on biodiversity. It considers whether clones can promote genetic advancement without negatively impacting biodiversity and highlights the need for careful consideration of the potential risks and benefits of cloning, the ethical implications of creating clones, and the impact of cloning on the environment. The document also discusses the history of animal cloning and the current state of human cloning technology, as well as the potential long-term repercussions of cloning on evolution. Ultimately, the author argues that cloning has changed society's perception of the value of human uniqueness and that the cloning debate is far from being decoded.

If classic science fiction writers such as Isaac Asimov, Ray Bradbury or H.G. Wells were to visit us today, they might be amazed by the technological advancements of the modern world. They would be surprised by the ubiquitous presence of computers, the internet, and smartphones. They would see how we have been able to clone animals and even grow human organs in laboratories. However, they might still wonder where all the clones of humans are, a topic that has been explored in many of their works of fiction. Cloning has demonstrated that it is feasible to make a limitless number of humans of identical genotypes from differentiated cell lines that have been frozen and thawed. These advancements have been made possible by recognizing the significance of interactions between the stages of the cell cycle of both the oocyte and the donor cell for the success of nuclear transfer (Lanza, 1999).

Biological progress has had an enormous impact on healthcare applications, with new treatments and therapies being developed every day. However, the impact of biological progress on human replication is less evident. One question that arises is whether clones can promote genetic advancement without negatively impacting biodiversity. This question requires careful consideration of multiple factors, including the potential risks and benefits of cloning, the ethical implications of creating clones, and the impact of cloning on the environment.

Human cloning may become a practical possibility in the near future. It is no longer a fascinating science fiction wisdom. The method is readily available. The challenging question is whether it would be ethically and socially acceptable, considering the potential risks linked with human cloning and its effect on evolution. Dolly, the world's most famous and controversial sheep, was the first animal to be born as a result of a reproductive cloning procedure, marking a significant scientific milestone. Ian Wilmut, Keith H. S. Campbell, and colleagues at the Roslin Institute and PPL Therapeutics, succeeded in cloning Dolly, from a single adult cell (Paul, 2016). Researchers at the Scottish Institute used a procedure known as somatic cell nuclear transfer that involves transferring DNA from the nucleus of a conventional cell to an enucleated oocyte from a different animal. The somatic nucleus is reprogrammed by egg cytoplasmic components to become a zygote nucleus once within the egg. In Dolly's case, the controlled mixture was implanted into the uterus of a surrogate mother, where it grew until term. SCNT (*Somatic cell nuclear transfer*), method proposed by American scientist Robert Lanza, produces a creature with nearly the same genetic potential as the one who supplied the nuclear DNA. (Stocum, 2022) It is thus a potent and generally successful method of animal cloning. The impact of Dolly's birth may still be observed in cutting-edge science today, 26 years later. Dolly's birth demonstrated that scientists could turn back the clock on a fully developed adult cell to make it behave like a cell from a newly fertilized embryo, prompting researchers in Edinburgh and around the world to look into other methods of reprogramming adult cells, eventually leading to revolutionary discoveries (induced pluripotent stem cells).

Although the prospect of entirely reversing somatic cell differentiation is widely accepted, the fundamental mechanisms remain unknown. As a result, progress has been largely empirical and relatively gradual. In some species, efficiency is slowly growing while in others, it is stalling, and the technology is too expensive for most practical applications. Cloning laboratories are few and far between, and those that are productive are even more unusual. Moreover, because of the cloud of suspicion that surrounds cloning and the cloners' tainted reputation, SCNT research is underfunded. Certain signals, on the other hand, point to a more prosperous decade ahead. Technical advancements have resulted in a significant reduction in developmental abnormalities in several animals.

Human cell cloning technology has the ability to change the cure of a wide range of diseases in the future. However, there are certain reservations regarding this upcoming genetic marvel. Even if it became practical and harmless, the long-term repercussions of fertilization bypass, particularly on evolution, would be noteworthy. Some skeptics fear that cloning would have a larger social impact, or perhaps an impact on our species if it limited the diversity of children born, presumably because parents and physicians would select donors with a small set of qualities, such as high intelligence and physical attractiveness. In other words, scientists will be able to govern natural selection by disregarding all bio-evolutionary concepts.

Besides creating a social, political, and ethical stigma, cloning drew out individuals and their uniqueness. The fertilization of an ovum by sperm is the essential event that gives birth to a new life in humans. Both cells have 23 haploid chromosomes, which unite during fertilization to form a diploid zygote with 46 chromosomes. The human somatic cells retain their usual diploid chromosomal state as a result of this. The critical process of crossing over happens at the four-strand stage of meiosis I when non-sister chromatids of a pair of homologous chromosomes exchange homologous regions. However, only two of the four chromatids are involved in each crossing-over event, leading to four products for each recombination event; two of which are recombinant and two of which are non-recombinant. When this concept is applied to the whole karyotype, human genetic identity becomes self-evident. The child would acquire many genetic mutations and epigenetic alterations during his or her lifespan, which would be passed down to the children via the gamete. Two gametes with differing chromosomal features would unite during fertilization to generate a new person. Thus, compared to a natural embryo, which contains a genome derived from six different sources, a cloned genome would only have one source. This would obliterate the distinct qualities that a real child possesses. Its short-and long-term consequences, on the other hand, are unknown.

While human cloning would help us to advance our technology and knowledge of humans, it could end up like every other cloning or AI movie (*Replicas, 2018)*. After all the work of cloning someone you've lost, they may not be anything like you remember them being, because personality is not a part of DNA. Even when utilized as trauma therapy, the individual becomes attached to the person who is supposed to be dead. Though bringing someone back from the dead may offer pleasant memories, it is not worth allowing technology to get into the hands of those who would misuse it for genetic manipulation or wrongful genetic improvement. Likewise, creating the same genetics again and over might result in several diseases being passed on, as well as a rise in the prevalence of certain recessive genes.

To address the question posed earlier, cloning has changed society's perception of the value of human uniqueness. We have moved from having unique offspring to producing replicas of them. We can safely proclaim to sci-fi writers the cloning debate is far from being decoded. The suggestion to improve human genetic endowment through the genetic cloning of famous people is unwarranted. While it might not be noticeable with cloning a handful of individuals, it would be intriguing to see what would occur in the case of mass production.

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