

# 16 Human Reproductive Cloning

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Recently, Dr. Severino Antinori was reported as saying that he helped bring into existence by cloning an eight-week fetus. I am not certain what we should make of this report because it was not well-documented and Dr. Antinori has neither confirmed nor substantiated it. Where cloned mammals are concerned, the distance between eight weeks and full-term birth is a great one. So, whether we will actually see a cloned child this year is still a serious question.

The bigger question is whether we should legally ban human reproductive cloning. I want to approach this issue as a forensic debate, looking first at arguments in favor of a legal prohibition and then at arguments against such a ban.

## Arguments Favoring a Ban

One argument is more prevalent in public discussions than in serious considerations of this issue. It is the fear that cloning somehow threatens to bring catastrophic risks. If we open this “cloning door” even a crack, multiple harms will follow. The analogy often used here is the case of nuclear energy, where we went in a few years from the research laboratory to a world threatened with nuclear disaster. The perceived risks of cloning include the massive replacement of sexual reproduction with cloning and grave misuses of cloning for war or domination. Lurking in many people’s minds, perhaps as a result of fictional literature and Hollywood, is the *Brave New World* vision of a repressive society where the family has vanished and

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where cloning is used to mass-produce human beings for slavery, war, or other forms of control. You do not have to go too far to find an identifiable candidate for people's fears in this regard, be it Saddam Hussein, Osama bin Laden, or some other fanatic.

This argument can be dismissed. I do not believe it is a serious concern. The fears of a race of cloned superwarriors simply do not hold up. Even if it were possible to define what "superhuman" means in the ever-changing context of modern warfare, the production of an army of cloned warriors would take years. Despite Hollywood's fantasies, cloning does not instantly produce adult human beings. It produces embryos that require gestation, birth, and years of upbringing. If Saddam Hussein chose to pursue this path, he would likely be dead by the time his first generation of cloned superwarriors came to maturity.

A second argument frequently voiced against cloning is that it threatens grave psychological harm to cloned offspring. If a cloned child is brought into being to replicate the genome of a parent or an admired celebrity—Tiger Woods, for example—will the child be forced to live his or her life under a cloud of imposed expectations? Some ask whether the parents of a cloned child would be able to love their child with a love that does not depend on the extent to which he or she measures up to some preconceived standard of excellence.

Almost 30 years ago, philosopher Hans Jonas put this concern in more general terms when he identified what he believed to be a new human right. "The ethical command here," he said, is "never to violate the right to that ignorance which is the condition of the possibility of an authentic act." In other words, Jonas said, "respect the right of every human life to find its own way and be a surprise to itself."<sup>1</sup> Jonas' assumption is that replicating a genome limits the child's freedom.

A single chapter does not give enough space to develop all the sources of my discomfort with these psychological arguments, but a central criticism has to do with their lack of scientific foundation. All of these concerns assume genetic determinism, the belief that the genome makes the person. Yet, as Richard Lewontin observes, this view is fundamentally mistaken:

The fallacy of genetic determinism is to suppose that the genes "make" the organism, but it is a basic principle of developmental biology that organisms undergo a continuous development from conception to death, a development that is a unique consequence of the interaction of the genes in

their cells, the temporal sequence of environments through which the organisms pass, and random cellular processes that determine the life, death, and transformation of cells. As a result, even the fingerprints of identical twins are not identical. Their temperaments, mental processes, abilities, life choices, disease histories, and deaths certainly differ, despite the determined efforts of many parents to enforce as great a similarity as possible.<sup>2</sup>

This means that, despite the misapprehensions of some parents, every cloned child will be distinctive and unique. We will learn that quickly enough and, as we do, fears that cloned children will lose their individuality will dissipate.

One of my favorite cartoons in *The New Yorker* has the headline, "The world's first genetically engineered human hits adolescence." A teenager in the center says, "so I got my nose pierced, so *what*, man?" To his left his dad, head in hands, wails, "We buy you the best genes in the world—*for this?*" Mom, on the right says, "I know I checked genius on the order form, *and now look!*" The wisdom of this cartoon applies to cloning as well.

A third concern voiced in this area is that cloning threatens grave physiological risks to cloned offspring. Rudolf Jaenisch and Ian Wilmut published an article in *Science* a year ago in which they argued that we should not permit the cloning of human beings at this time. They remark:

Since the birth of Dolly, the sheep, successful cloning has been reported in mice, cattle, goats, and pigs. Enough experience has accumulated to realize the risks. Animal cloning is inefficient and is likely to remain so for the foreseeable future. Cloning results in gestational or neonatal developmental failures. At best, a few percent of the nuclear transfer embryos survive to birth and of those, many die within the perinatal period. There is no reason to believe that the outcomes of attempted human cloning will be any different. The few cloned ruminants that have survived to term and appear normal are often oversized, a condition referred to as "large offspring syndrome." Far more common are more drastic defects that occur during development. Placental malfunction is thought to be the cause of the frequently observed embryonic death during

gestation. Even apparently healthy survivors may suffer from immune dysfunction or kidney or brain malformation which can contribute to death later.<sup>3</sup>

So, if human cloning is attempted, they argue, those embryos that do not die early may live to become abnormal children and adults. These are troubling outcomes. In the same article, Jaenisch and Wilmut state that they believe that the problem has to do with the reprogramming of the genome. In normal sexual reproduction this takes place over months or years during gametogenesis. In cloning, the reprogramming must often take place within minutes or hours, leading to inefficiencies and epigenetic malfunctions in the regulation of the genome. The genes are transmitted, but the switches that turn them on and off appropriately may not be. Some recent empirical evidence supports these claims. Tamashiro *et al.* report that cloned mice appear to have an obese phenotype in the initial generation and beyond. Remarkably, when these mice are mated with normal wild-type mice they revert to normality.<sup>4</sup> In terms of the first argument, therefore, we may not be doing irreparable damage to our entire species, but there is a risk to the first generations of cloned individuals.

Doctors Antinori and Panos Michael Zavos have claimed in print that adequate prenatal testing and monitoring will prevent the birth of a child with serious birth defects. But I want to say strongly that these claims are either naïve or deliberately misleading. As Jaenisch and Wilmut observe, “There are not methods now or in the foreseeable future to examine the overall epigenetic state of the genome. We just do not have those tests and they are misleading people when they suggest testing can be done.”<sup>5</sup>

One footnote to this argument, however, is that there have been reports that the problems may be overstated. Robert Lanza of Advanced Cell Technology and others recently published an article in which they surveyed bovine cloning. They found that apart from placental difficulties, many of the animals that survive to birth appear otherwise completely normal.<sup>6</sup>

Clearly, we are slowly learning our way here. I suspect that sometime in the future we will master these problems, but they are not yet under control. This leaves us with just one strong anti-cloning argument—the one that focuses on the physiological risks to the child.

### Arguments against a Ban

One relevant consideration here is that some people might benefit from being able to clone a child. The most immediately identifiable groups are infertile couples, one or both of whom lack gametes but who wish to have a child biologically related to themselves, and lesbian couples.

In the case of lesbian couples, one partner can donate the egg. The other can donate the somatic cell. The egg donor can then be the gestational mother. Since the egg carries a small measure—about three percent—of our genetic material, the couple will achieve a facsimile of sexual reproduction. I think this reproductive benefit constitutes an important argument in favor of permitting cloning. There is a population of people who want to have children. Satisfying reasonable human needs and respecting people's free choices are always reasons for allowing something.

A second pro-argument that has been advanced in the bioethics literature is that even if a cloned child were grievously injured through the process of cloning, it would not be harmed, so long as its life was worth living—that is, so long as the child would not prefer to die. This argument has been put forth in a number of publications by bioethicist/lawyer John Robertson.<sup>7</sup> He notes that the first transfer into a uterus of a cloned human embryo will occur before we know whether it will succeed. Some have argued, therefore, that the first transfers will somehow be unethical experimentation on the resulting children, because of the physiological risks. “But,” says Robertson, “the child who would result would not have existed but for the procedure at issue.” In other words the child of an infertile or lesbian couple would not have existed but for cloning. If the intent is actually to benefit that child by bringing it into being, he maintains, this should be classified as experimentation for the child's benefit. Thus, it would fall within recognized exceptions permitting the infliction of harm in medical contexts. We have a very different set of rules for experimentation intended to benefit the experimental subject. Robertson further argues that so long as the child is happy being alive and would not prefer to die, the benefit outweighs the harm.

This is a remarkably interesting argument. It has been voiced by others over the years, and actively discussed in the philosophical literature. Nevertheless, I believe it is wrong.<sup>8</sup> A principal reason is because coming into

being cannot be considered a "benefit." If it were, we would be failing to benefit the many children we avoid having whenever we use contraception. We would be denying benefit to millions of people every day.

It follows that coming into being is not a benefit that can be thought of as compensation for serious congenital harms. As a consequence, premature cloning experiments that lead to birth defects or developmental problems can, I think, be thought of as causing serious harm to the resulting child with no resulting benefit, despite Robertson's claims. For this and other reasons, I would strike this whole argument off our list.

Those opposed to a ban on cloning sometimes also argue that a ban is pointless because it could easily be evaded. They note that it requires only about \$100,000 worth of micromanipulation equipment and modest skills in cell biology and reproductive medicine to attempt human cloning. If scientists like Zavos and Antinori were forbidden to work in the United States, they could easily go elsewhere. Although well-founded, this argument against a ban presumes that we must achieve 100 percent success in halting cloning, because otherwise we would face a catastrophe.

This returns us to my first argument. I do not believe that cloning a child will be a catastrophe, except (possibly) for the child or its parents. So, I think that reasonable success with a ban might in fact be worthwhile if it would significantly reduce the incidence of cloning attempts.

Finally, some argue that such a ban would create a worrisome research precedent and ultimately impede related research of value. I could discourse at length on this topic. I will not, other than to say that I think it is a reasonable concern. We have technologies in use now (such as oocyte reconstruction) to assist infertile women by means of transferring cytoplasm. In the near future, this could lead to using nuclear transfer for assisted reproductive purposes or to avoid mitochondrial genetic defects. These areas are worthy of exploration, and there are other areas yet to be discovered. A ban would create a chilling effect on all of these responsible research directions.

## Discussion

Where does this leave us? We are left with one good argument for a legal ban on cloning, one against, and a concern. One very powerful argument for a legal ban on cloning is that at this time cloning poses grave physiological risks to cloned offspring. One modest argument against a ban is that some infertile people or homosexual couples could use cloning to have a biologically related child. A reasonable concern is that such a ban would create a worrisome research precedent and ultimately impede valuable related research. These are the considerations that we must balance.

In 1997, looking at a similar array of concerns, the National Bioethics Advisory Commission (NBAC) argued for a federal legislative ban. NBAC assumed that a voluntary moratorium by scientists would not work and that state laws would provide only patchwork coverage. The Commission added, "It is critical, however, that such legislation include a sunset clause to ensure that Congress will review the issue after a specified time period (three to five years) in order to decide whether the prohibition continues to be needed."<sup>9</sup>

In other words, we may overcome the physiological problems in time and then the positive arguments for freedom in this respect begin to bulk larger in our thinking. Unfortunately, the best legislation now in prospect, a bill introduced by Senators Arlen Specter (R-PA), Diane Feinstein (D-CA), Orrin Hatch (R-UT), Edward Kennedy (D-MA), and others does not contain a sunset provision like this.<sup>10</sup>

Even with its limitations, this bill is far better than a bill introduced by Senator Sam Brownback (R-KA), or any of the proposed state laws that would ban both reproductive *and* therapeutic cloning. Therapeutic cloning is the deliberate creation of a human organism by nuclear-transferred cloning technology in order to produce a stem cell line that will not provoke an immune response and rejection. This is an extraordinarily promising technology.

Using this technology, an individual with kidney disease could donate a somatic cell. A cloning procedure would use this cell to produce a blastocyst. The inner cell mass would then be removed and cultured in vitro. The resulting pluripotent stem cells could be induced to become specific cell types, including, in this case, renal cells. Such cells could then be lay-

ered on various artificial scaffolds to produce organoids that could be reinserted back into the original cell donor. Since the DNA here would be substantially the same as that of the individual donor, this material would not be rejected, bypassing the entire immune rejection problem. In my view, this is the most promising direction for stem cell research today.<sup>11</sup>

I think it would be terrible if a global ban on cloning also shut down research on therapeutic cloning. Unfortunately, such prohibitions are very much in prospect. The Brownback bill would do this, as well as bills on the state level. Seventeen bills have been introduced in states around the country as part of a national movement to ban all cloning.

I see a danger in these bills. For example, on the first page of "An Act to Prohibit Human Cloning in New Hampshire," a provision states, "Regardless of its ultimate destiny, all human embryos are simultaneously human beings." This is the hidden agenda of these anticloning bills. They are not in fact primarily directed against cloning. That can be accomplished by banning reproductive cloning, as Specter-Feinstein would do. These bills aim to insert into U.S. legislation at the state and federal levels the proposition that life begins at conception. The New Hampshire bill (and others) is fundamentally a right-to-life initiative, not an anticloning bill. When we understand this, we can be wary and pick and choose among the initiatives that we are responding to, and construct arguments accordingly.

## Conclusion

As hesitant as I am about the chilling effect on research, I would support a prohibition on reproductive cloning, especially one that has a sunset provision that makes it go out of existence or that requires Congress to justify its continuation. From an ethical perspective, I would support that at this time, but nothing more.

## Endnotes

1. *Philosophical Essays: From Ancient Creed to Technological Man*, Hans Jonas (Englewood Cliffs, NJ: Prentice-Hall, Inc, 1974), p. 163.
2. "The Confusion over Cloning," Richard Lewontin, *New York Review of Books*, October 23, 1997, p. 18.
3. "Don't Clone Humans!" Rudolf Jaenisch and Ian Wilmut, *Science* 291 (March 30, 2001), p. 2552.
4. "Cloned Mice Have an Obese Phenotype Not Transmitted to Their Offspring," KLK Tamashiro *et al.*, *Nature Medicine* 8:3 (March 2002), pp. 262-267.
5. *Op. cit.*
6. "Cloned Cattle Can Be Healthy and Normal," R.P. Lanza *et al.*, *Science* 294 (Nov 30, 2001), pp. 1893-4.
7. *Children of Choice*, John Robertson (Princeton, NJ: Princeton University Press, 1994); "Wrongful Life, Federalism, and Procreative Liberty: A Critique of the NBAC Cloning Report," *Jurimetrics* 38 (Feb. 1997), pp. 69-82; "Liberty, Identity, and Human Cloning," *Texas Law Review* 76/6 (May 1998), pp. 1436-37.
8. For a more extensive discussion of this topic, see my book *The Human Embryo Research Debates: Bioethics in the Vortex of Controversy* (New York: Oxford University Press, 2001), Ch. 6, and my "Parental Autonomy and the Obligation Not to Genetically Harm One's Child: Implications for Clinical Genetics," *The Journal of Law, Medicine and Ethics* 25:1 (1997), pp. 5-15.
9. *Cloning Human Beings: Report and Recommendations of the National Bioethics Advisory Commission* (Rockville, MD: National Bioethics Advisory Commission, June 1997).
10. Senate 2439, titled the "Human Cloning Prohibition Act of 2002."
11. For recent proof of the principle of this approach, see Lanza *et al.*, "Generation of Histocompatible Tissues Using Nuclear Transplantation," *Nature Biotechnology* 20 (July 2002), 1-8.