

Playing God: Cloning poses host of ethic dilemmas

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This is the fourth part in a series.

[Part 1](#)

[Part 2](#)

[Part 3](#)

Seventeen years have passed since the milestone birth of Dolly the Sheep, the first mammal successfully cloned from an adult cell, which launched worldwide speculation as to whether humans were next.

Scientists applied the technique in attempts to achieve human embryos, but were unsuccessful in reaching their central aim – obtaining embryonic stem cells for research – until May, when a research team in Oregon led by biologist Shoukhrat Mitalipov announced it had accomplished the feat.

Some scientists hailed the work as groundbreaking, opening a new route to the creation of patient-specific stem cells and unlocking the potential for new therapies and cures.

Not everyone, however, applauds the development.

Like all embryonic stem-cell research, cloning research necessitated the intentional destruction of human embryos, which the Catholic Church always finds morally impermissible. Cloning itself is also morally problematic, but some fear myriad ethical quandaries aren't enough to squelch scientific curiosity and the profit motive.

The concerns are vast, including:

- The creation of human life with the intention of destroying it
- The creation of human clones solely for scientific experimentation
- The creation of human clones for “spare parts”
- The creation of human clones in an attempt to “re-create” one’s self, a loved one or famous figure
- Risks involved in female egg donation, which is necessary to the process
- Potential health risks to a woman gestating a clone and the clone itself
- Issues surrounding participants’ consent to be cloned.

Two aims, one method

When most people think of cloning, they envision sci-fi movies such as 2005’s “The

Island,” “where you have all these cloned people walking around or being slaves,” said Rebecca Taylor, a genetic researcher who writes on Catholic bioethics. They also imagine it as something futuristic, she said.

They’re wrong on both accounts. Cloning is a thing of the present, even if currently confined to the laboratory, said Taylor, who lives in Washington state and blogs at Mary Meets Dolly.

“If we don’t want that science-fiction idea of cloned persons walking around, this is something we have to deal with right now,” she said.

Cloning is achieved through the process of somatic cell nuclear transfer, or SCNT. All body cells besides sperm and eggs are somatic cells, containing all of an individual’s 46 chromosomes in their nuclei. With SCNT, the nucleus of a female’s reproductive egg is removed and replaced with the nucleus of a somatic cell, creating a cloned embryo.

Although the method is the same, scientists categorize cloning in two ways, based on the research’s aim – either “therapeutic cloning” or “reproductive cloning.” In therapeutic cloning, researchers allow the cloned embryo to grow for several days before harvesting its stem cells, ultimately killing the embryo. In reproductive cloning, the cloned embryo would be implanted in a surrogate mother and allowed to develop normally.

Currently, human cloning efforts are limited to therapeutic research, where embryos live only days before they are destroyed. Experts insist that successful human reproductive cloning is impossible with current technology. While efforts to birth cloned mice, cattle and other mammals have succeeded, efforts to gestate a monkey embryo cloned through SCNT to birth have failed.

Cloning primates – a biological order that includes human beings – seems to be more difficult than other mammals, said Jesuit Father Kevin T. FitzGerald, who holds doctorates in both molecular biology and bioethics.

A research associate professor at Georgetown University in Washington, D.C., in the division of biochemistry and pharmacology of the department of oncology, Father FitzGerald has been following cloning since Dolly’s birth, he said.

Despite the new advances, Father FitzGerald thinks SCNT is nearly obsolete, given the promise of other types of stem-cell research.

“This (Mitalipov’s research) doesn’t really change the landscape at all,” he said. “I don’t think therapeutic cloning will suddenly rise from the ashes. I can imagine some researchers saying ‘I’m going to try this, if there’s funding to do it,’ but I don’t see anyone rushing to fund this stuff.”

Creating ‘cures’ or people?

SCNT is viewed as an alternative to other methods of obtaining human embryos for stem-cell research, which include donated embryos left over from in vitro

fertilization treatments.

Efforts to obtain stem cells from these embryos have been underway for more than a decade. Many scientists point to SCNT breakthroughs made in 2001 by California-based Advanced Cell Technology as the advent of the first cloned human embryo, although others say Mitalipov's recent research is the first certain example of human cloning.

Before Mitalipov's development, the cells in other studies stopped dividing in an early stage, making it impossible to harvest stem cells and calling into question whether the egg and nucleus had actually merged into an embryo - which directs its own development - or if the cells were dividing solely through the mechanics of the egg, according to Edward Furton, ethicist at the National Catholic Bioethics Center in Philadelphia.

In 1998, John Haas, president of the NCBC, authored a paper titled "Begotten Not Made: A Catholic View of Reproductive Technology," which listed some of the situations that could arise with the advent of human cloning.

Among them: parents who wanted to re-create a dying or dead child; people who wanted to achieve pregnancy without a partner, or, for a lesbian couple, achieve pregnancy with biological connections to both mothers without male gametes; and people who would want to clone themselves, perhaps as a means of extending their life in some way.

Most disconcerting, he wrote, is the possibility of creating cloned people solely for the extraction of their organs for transplants.

The concerns persist. David Prentice, a senior fellow at the Washington, D.C.-based Family Research Council and stem-cell research expert, said scientists would likely promote cloning as "creating cures," failing to mention that therapeutic cloning requires the destruction of human life. He fears that cloning could also lead to cloned fetuses grown solely for their organs, which would be patients' genetic matches. These fetuses would gestate through a surrogate mother or artificial uterus, but never be born.

Cloned embryos and fetuses could also be viewed as desirable control subjects in scientific studies, said Prentice, who holds a doctorate in biochemistry. He spent nearly 20 years as a professor of life sciences at Indiana State University in Terre Haute, Ind., and an adjunct professor of medical and molecular genetics at Indiana University School of Medicine in Indianapolis.

"It won't be 'we want to clone babies,' " he said. "It will be 'we want to understand the developmental process, and clones give us a better way to look at that, because we can have not one or two examples of fertilized embryos to study and watch them grow, see what problems develop. ... We can have 1,000 copies, or more, all identical.'"

Although the general public seems to recoil at the idea of reproductive cloning, Prentice argues that therapeutic cloning is the greater evil because it creates embryos solely for the purpose of destroying them.

Twenty-six years ago, "Donum Vitae," an instruction from the Vatican's Congregation of the Doctrine of the Faith, addressed cloning's moral status, stated that it is "to be considered contrary to the moral law, since they (cloning methods) are in opposition to the dignity both of human procreation and of the conjugal union."

Egg donation ethics

Human cloning remains a challenging ethical issue even for those without moral qualms regarding creating - and destroying - life in a lab, due to questions of participants' consent for the use of their genetic material and the technology's reliance on egg donations.

According to the California-based Center for Bioethics and Culture, little to no research has been done to assess the long-term health risks to women who donate eggs for in vitro fertilization or research. Ethicists also disagree as to whether women should be paid for egg "donation," as they currently are, or whether the procedure should be uncompensated, as are blood or organ donations.

Compounding cloning's ethics is the discovery that some women's eggs may have more desirable genetic attributes for cloning. This raises the question of eugenics, Prentice said, if the eggs of some women, but not others, were sought for SCNT research.

Research on animals suggests gestating clones may pose health risks to the surrogate mother and developing fetus that could extend beyond the pregnancy.

Father FitzGerald thinks these challenges may pose enough of a barrier to human cloning to discourage its pursuit.

"If I'm a researcher ... why would I do this? It's incredibly onerous and expensive and ethically fraught," he said.

He points instead to viable alternatives to embryonic stem-cell research: the success of adult stem-cell research (which includes all stem cells not taken from embryos, such as umbilical cord blood) and the promise of induced pluripotent stem-cell research, which uses "reprogrammed" adult cells that have similar qualities to embryonic stem cells, and may be better suited for therapies.

Your own clone?

Many experts insist reproduction is not the aim of cloning research.

"No serious scientist I know has any interest at all in cloning a human" for reproduction, said Debra Mathews, a faculty member at the Berman Institute of Bioethics at The Johns Hopkins University in Baltimore, in a June 27 online question-and-answer forum sponsored by Science magazine. Using cloning to produce a baby

“is a whole other kettle of fish, of course, with risks to the potential infant and to the woman who would carry that fetus,” she said.

Not everyone is convinced. Prentice sees Mitalipov’s recent advancement as a step forward for reproductive, not therapeutic, cloning. Hubris or mere curiosity could lead scientists to strive to be the first to oversee the gestation and birth of a human clone, he said.

Some people argue that science must explore all of its options for stem-cell research. Father FitzGerald disagrees.

“We don’t just go willy-nilly trying everything out on human beings,” he said. “(Human cloning) is another opportunity for us to ask these questions. What is it that we’re really pursuing when we do this research, and at what cost are we willing to pursue it, and for whom?”