

# CLONING, STEM-CELL RESEARCH, AND THE BIBLE

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THE GENETIC REVOLUTION MAY HAVE BEGUN in the twentieth century, but its impact will be felt mostly in the twenty-first century. Meanwhile, as knowledge in genetics doubles every few years, ethical and theological considerations often lag behind. The challenge for scientists and nonscientists and Christians and non-Christians is to evaluate carefully the moral and theological implications of this new technology.

For the first time in human history it is possible to redesign existing organisms completely, including humans, and to direct the genetic and reproductive constitution of every living thing. Physicians can also bypass the normal process of reproduction and therefore further direct the development of individuals. And on the horizon are powerful new genetic tools for cloning and stem-cell research that offer great promise but also threaten the sanctity of human life.

## SCIENTIFIC BREAKTHROUGHS IN CLONING

Should scientists clone a human being? This ethical debate has been going on for more than thirty years. In 1970 Paul Ramsey devoted an entire chapter to human cloning in his book *Fabricated Man*.<sup>1</sup> And in the 1970s ethicists debated the pros and cons of human cloning until scientists were able to convince nearly everyone that cloning a mammal (much less a human being) would be impossible.

All that changed when scientists in Scotland announced in 1997 that they had successfully cloned an adult sheep. Commentators were predicting that a “brave new world” was just around the

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<sup>1</sup> Paul Ramsey, *Fabricated Man: The Ethics of Genetic Control* (New Haven, CT: Yale University Press, 1970), 60–103.

corner, and ethicists began to dust off arguments that had been mothballed in the 1970s. The cloning of the sheep called Dolly implied that it might eventually be possible to clone a human being.

Dolly was significant because she was the first mammal cloned from adult cells and because this set the stage for a serious discussion about cloning human beings. However, the history of Dolly raises ethical concerns about applying this technology to humans. For example Dolly was the only success in 277 cell fusions. In other words there were 276 failures and only one success.

Some even questioned whether Dolly is a true clone since she was not cloned from a currently living adult. Dolly's older twin had been dead for several years. Some of her tissues were harvested and kept frozen in a laboratory, so there was no live animal with which to compare Dolly. However, later research published in *Nature* established that Dolly was indeed a clone.<sup>2</sup>

The debate about human cloning took on a new urgency when scientists at Advanced Cell Technology announced in 2001 that they had been successful in cloning a human embryo.<sup>3</sup> By taking a cumulus cell from an egg cell and chemically treating it, the scientists claimed to have begun the process of human cloning. Actually it is probably too soon to say if the cloning was successful, and some scientists believe this announcement was premature since the experiment seems to have been a failure.

In the summer of 2001, Congress considered a bill to ban cloning. At that time a new term began to be used: therapeutic cloning. Some members of Congress argued that there are two kinds of cloning: (a) reproductive cloning, which involves the creation of a child, and (b) therapeutic cloning, which involves cloning human embryos that are eventually destroyed rather than implanted in a mother's womb.

Representative Jim Greenwood, a Republican from Pennsylvania, sponsored a bill that would outlaw the first form of cloning but would permit the second form of human cloning so that it could be used for embryonic stem-cell research. At the time, it was described as a compromise bill, but pro-life advocates quickly understood that words were being redefined. So they began calling this legislation a "clone and kill bill." The Greenwood bill was defeated,

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<sup>2</sup> David Ashworth et al., "DNA Microsatellite Analysis of Dolly," *Nature*, July 23, 1998, 329; and Esther Signer et al., "DNA Fingerprinting Dolly," *Nature*, July 23, 1998, 329-330.

<sup>3</sup> Joannie Fischer, "The First Clone," *U.S. News and World Report*, December 3, 2001, 50-63.

and a bill banning all cloning, sponsored by Representative Dave Weldon, a Republican from Florida, passed the House and was sent to the Senate.

A similar debate took place in the United States Senate. Senator Sam Brownback, a Republican from Kansas, sponsored the Human Cloning Prohibition Act, which would ban all human cloning. Senator Dianne Feinstein, a Democrat from California, introduced a countermeasure that would permit cloning but would ban cloned embryos from being implanted in the womb.

#### STEM-CELL RESEARCH

A second genetic technology is stem-cell research. Although cloning and stem cells may seem quite different, the two are clearly related. Laboratory cloning is often used to create embryonic stem cells, and genetically specified stem cells may be placed in a cloned embryo for research purposes. The importance of stem cells can be understood by looking at basic embryology.

A single embryo cell becomes two, then four, then eight. Each of these early cells is identical to the others. There are no eye cells, no heart cells, no bone cells. But soon cells begin to differentiate. Until they do, each embryonic cell has the potential to be any kind of cell.

These stem cells in a human embryo have the capacity of developing into all 210 different kinds of tissue. They could become cells that heal broken nerve cells, thus offering the possibility of treating Parkinson's disease. They could be used in internal organs to treat diabetes or heart failure. In essence they hold the key to life itself.

A single fertilized egg is *totipotent*, meaning that its potential is total. When it first divides, it produces two identical totipotent cells. This means that either of the cells has the potential of developing into a fetus. Approximately four days after fertilization these totipotent cells begin to specialize and form a hollow sphere of cells known as a blastocyst. The outer layers begin to form the placenta, while the inner cells form every type of cell found in the human body. These inner cells are called *pluripotent*, meaning that they can give rise to many cells but not all types of cells.

The pluripotent stem cells go through a further process of specialization. For example they form blood stem cells, which can give rise to red blood cells, white blood cells, and platelets. A skin stem cell can give rise to various kinds of skin cells. These more specialized stem cells are called *multipotent*.

Embryonic stem cells represent a powerful new genetic tool for

scientists. The ability to direct these stem cells to produce particular kinds of cells is a welcome advance in medicine. Unfortunately this raises some important moral issues. Most embryonic stem cells come from spare embryos used at in-vitro fertilization clinics. This raises a significant pro-life question. When scientists puncture the human embryos to gain their stem cells, they kill the embryo.

Embryonic stem cells can also be obtained through cloning. An egg's genetic material is removed and replaced with the chromosome of an adult cell. Then stem cells are extracted from the cloned embryo. Again this raises pro-life concerns, because human embryos are being produced by cloning so that their stem cells can be taken.

Fortunately there are alternatives. First, stem cells are readily available from other sources. Placentas and umbilical cords are rich in stem cells. So are some adult tissues like bone marrow and the nervous system. Already scientists treating cancer and researching leukemia are using blood-cell-producing stem cells from bone marrow as well as stem cells from the umbilical cords in live births. These sources of tissue regeneration may become just as promising for advances in transplant therapy as embryonic stem cells.

A major advance, announced in January 2002, demonstrates the tremendous potential of adult stem cells. Researchers led by Catherine Verfallie at the University of Minnesota filed a patent application for what has become known as the "ultimate stem cell." The cells isolated from bone marrow could be used in a patient to develop heart, muscle, brain, liver, or skin cells.<sup>4</sup> If the promise of this research holds up, it could eliminate the need for embryonic stem cells.

Second, in a new procedure stem cells can be extracted from an unfertilized egg cell. This genetic technique uses a procedure known as parthenogenesis. According to a 2002 report in *Science*,<sup>5</sup> this produces a nonviable embryo that contains a double set of the mother's twenty-three chromosomes. The scientists who have developed this technique believe they have discovered a way to avoid pro-life concerns over the use of embryonic stem cells. Since the details of this procedure are still sketchy, it is difficult to determine whether this procedure will or will not avoid pro-life concerns.

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<sup>4</sup> Sylvia Pagan Westphal, "Ultimate stem-cell discovered," *NewScientist.com/news/news.jsp?id=99991826*, January 23, 2002.

<sup>5</sup> Jose Cibelli et al., "Parthenogenetic Stem Cells in Nonhuman Primates," *Science*, February 1, 2002, 819.

In August 2001 President Bush announced a compromise that limited federal funding to research on existing stem-cell lines. Federal funds are not allowed for the creation of embryonic stem cells (through fertilization, cloning, or parthenogenesis). But research on embryonic stem cells has been pursued by various laboratories using private funding. These laboratories are not affected by the current federal ban on research involving the creation of embryonic stem cells.

#### PROPOSED BENEFITS OF ANIMAL CLONING

Since the cloning of Dolly the sheep, reports have been made of successes in cloning everything from mice to cats. Why have scientists been so interested in cloning animals and humans?

The scientific potential of animal cloning was well illustrated in the December 1998 issue of *Scientific American*.<sup>6</sup> Animal cloning will be used to create large numbers of what are called transgenic animals. Transgenic animals are genetically engineered to contain genes from another species. In fact the sheep Dolly was created in an attempt to discover a more reliable method of reproducing transgenic sheep.

Creating transgenic animals is a difficult procedure, but it can yield medically important results. The institute where Dolly was created has transferred the gene for a blood-clotting protein used to treat hemophilia in humans into sheep. With the proper genetic enhancement sheep will produce this blood-clotting factor in their milk, which can then be harvested and sold.

Cloning transgenic animals can also provide organs for human transplantation. For example pig organs are just about the right size for transplanting into humans. However, a pig heart or a pig liver would quickly be rejected by the human immune system. But if human genes could be transferred into pigs, the organs they would produce would be recognized as human and not pig organs. Currently thousands of people die every year because human organs are not available. Cloning transgenic animals might provide a large and renewable source of organs for human transplants.

Transgenic animals could also be used to study human genetic diseases. Transferring defective human genes into appropriate animal hosts could produce research vehicles for discovering new treatments and cures not possible by using human subjects. Clon-

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<sup>6</sup> Ian Wilmut, "Cloning for Medicine," *Scientific American*, December 1998, 58–63.

ing of transgenic animals may also prove useful in creating cells that would be helpful in treating human diseases such as Parkinson's disease, diabetes, and muscular dystrophy.

#### PROPOSED BENEFITS OF HUMAN CLONING

Proponents of human cloning argue that this would be a worthwhile scientific endeavor for at least four reasons. First, cloning could provide an alternative way of reproduction. An article on human cloning in *Time* magazine interviewed one person who said, "I wouldn't mind being the first person cloned if it were free." He is sterile because of leukemia treatments he received when he was sixteen years old. He said that "technology saved my life when I was sixteen," so he believes, he said, that "technology should help me have a kid. That's a fair trade."<sup>7</sup>

Same-sex couples have also considered human cloning as an alternative method of reproduction. The clone of one of the partners would produce a child of the same sex. The clone would be genetically related to one of the partners (essentially his or her twin).

Second, proponents argue that cloning might be a way to replace a lost child. A dying infant or child could be cloned so that a couple would replace the child with a genetically identical child. Yet there is no guarantee that the cloned child would be like the original child. The clone would be genetically identical to the original, but would have a different personality and be influenced by different environmental factors.

Third, proponents argue that cloning could be used to produce spare human parts. The clone would be genetically identical to the original person, so that a donated organ would not be rejected by the immune system. While this would provide a source of organs for transplants, one must consider the humanity of the clone.

Fourth, cloning, it is argued, could produce biological immortality. A homosexual said he was long frustrated that he could not readily have children. As he grew older, the desire to reproduce grew stronger. He said, "I can thumb my nose at Mr. Death and say, 'You might get me, but you're not going to get all of me.'" He added, "The special formula that is me will live on into another lifetime. It's a partial triumph over death. I would leave my imprint not in sand but in cement."<sup>8</sup>

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<sup>7</sup> Nancy Gibbs, "Human Cloning Is Closer Than You Think," *Time*, February 19, 2001, 51.

<sup>8</sup> *Ibid.*, 49.

Of course this does not produce true immortality. A clone would be nothing more than a biological duplicate of the person who died. It would be like having a twin many years removed, but it would not guarantee that the person who was cloned would live on in any sense.

An article in *Newsweek* magazine proposed even more provocative scenarios. For example one woman asked some scientists to clone her deceased father, and she offered to carry the cloned baby to term herself.<sup>9</sup>

#### BIBLICAL PERSPECTIVE

Cloning and stem-cell research raise profound ethical questions, beginning with the threat they pose to the sanctity of human life. Human beings, created in the image of God (Gen. 1:26–27), deserve protection all the way from conception through natural death.

One of the key passages giving a biblical view of the sanctity of human life is Psalm 139. David began by acknowledging that God is omniscient and watched David all the time and everywhere (vv. 1–3). God was aware of David's thoughts before he even expressed them (v. 4). Wherever David might go, he could not escape from God, whether he traveled to heaven or ventured into Sheol (vv. 7–9). God is in the remotest part of the sea (v. 9) and even in the darkness (vv. 11–12). Contemplating the origin of his life, David confessed that God was there, forming him in the womb (vv. 13–16). "For you created my inmost being; you knit me together in my mother's womb. I praise you because I am fearfully and wonderfully made; your works are wonderful, I know that full well. My frame was not hidden from you when I was made in the secret place. When I was woven together in the depths of the earth, your eyes saw my unformed body. All the days ordained for me were written in your book before one of them came to be."<sup>10</sup>

The Bible does not speak of fetal life as mere biochemistry. The fetus in his mother's womb was not a piece of protoplasm that became David. This was David already being cared for by God while in the womb. God fashioned David into a living person (v. 13). Reflecting on the fact that he was a product of God's creative work within his mother's womb, David praised God for how wonderfully He had woven him together (vv. 14–15).

David drew a parallel between his development in the womb

<sup>9</sup> Sharon Begley, "Little Lamb, Who Made Thee?" *Newsweek*, March 10, 1997, 55.

<sup>10</sup> This and other Scripture quotations are from the New International Version.

and Adam's creation from the earth. Using figurative language, he referred to his life before birth when he "was made in the secret place" and "was woven together in the depths of the earth" (v. 15). This poetic allusion hearkens back to Genesis 2:7, which says that Adam was made from the dust of the earth.

David also noted that "Your eyes saw my unformed body" (v. 16). This shows that God knew David even before he was known to others. When David was forming as a fetus, God's care and compassion were already extended to him. The reference to God's eyes is an anthropomorphism connoting divine oversight in the life of an individual or a group of people.

Other verses show divine involvement in the formation of the unborn baby. God is active in the event of conception (Gen. 29:31–35; 30:17–24; Ruth 4:13; 1 Sam. 1:19–20) and also in the formation of the human baby in the mother's womb. God said to Jeremiah, "Before I formed you in the womb I knew you, before you were born I set you apart; I appointed you as a prophet to the nations" (Jer. 1:5). The word translated "formed" is used in Genesis 2:7–8 to describe God's special creation of Adam. It is also used of a potter fashioning clay into a vase or some other piece of pottery. As God fashioned Jeremiah in the womb, He was preparing him for his prophetic ministry.

Similar verses describe how God called out various servants of God while they were still in their mother's womb. God called Isaiah to serve: "Before I was born the Lord called me" (Isa. 49:1). God created Samson for his ministry and put his mother under the same dietary regimen that he would undergo. "But he said to me, 'You will conceive and give birth to a son. Now then, drink no wine or other fermented drink and do not eat anything unclean, because the boy will be a Nazirite of God from birth [lit. "from the womb"] until the day of his death.' Then Manoah prayed to the LORD: 'O Lord, I beg you, let the man of God you sent to us come again to teach us how to bring up the boy who is to be born'" (Judg. 13:7–8).

Another significant passage is Psalm 51. Written by David after his sin of adultery with Bathsheba, this psalm records his repentance. David confessed that his sinful act demonstrated the original sin that was within him. "Surely I was sinful at birth, sinful from the time my mother conceived me" (v. 5). David concluded that from his conception he had a sin nature. This would imply that he carried the image of God from the moment of conception, including the marred image scarred by sin.<sup>11</sup>

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<sup>11</sup> For more discussion of these and other verses see Roy B. Zuck, *Precious in His*

Human beings are created in the image and likeness of God (Gen. 1:26–27; 5:1; 9:6). Bearing the image of God is the essence of humanness. And though God's image in man was marred at the Fall, it was not erased (1 Cor. 11:7; James 3:9). Thus unborn babies are made in the image of God and therefore are fully human in God's sight.

Also Luke 1:41–44 points to the humanness of unborn children. "When Elizabeth heard Mary's greeting, the baby [John the Baptist] leaped in her womb, and Elizabeth was filled with the Holy Spirit. In a loud voice she exclaimed: 'Blessed are you among women, and blessed is the child you will bear! But why am I so favored, that the mother of my Lord should come to me? As soon as the sound of your greeting reached my ears, the baby in my womb leaped for joy.' " John the Baptist's prenatal ability to recognize Mary by leaping "for joy" illustrates his mental and spiritual capacity.

The term Elizabeth used to describe John in his prenatal state is *brevfo* ("baby"). This Greek word is used for a baby inside the womb and outside the womb (Luke 2:12, 16; 18:15; 2 Tim. 3:15).<sup>12</sup>

The sanctity of human life is affected by certain aspects of embryonic stem-cell research and human cloning. Pro-life concerns arise when human embryos are destroyed for their stem cells. Similar concerns surround cloning, which is an inefficient and wasteful form of reproduction. And if human cloning is used to create spare parts for the original, what is the moral status of the clone? Both individuals should be treated with respect and dignity since they are created in the image of God.

Human cloning as an alternative form of reproduction also raises questions about human parenthood. God ordained marriage as the union of a man and a woman who would give birth to children genetically related to them. While there are exceptions to this ideal (e.g., adoption), this standard should be used to judge reproductive technologies like cloning. Thus the use of this procedure by homosexual couples to provide children should not be condoned.

Motherhood may also be affected by cloning. Childbearing would no longer be a natural outcome of procreation. Human cloning bypasses God's plan for human parenthood (Gen. 1:28). A

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*Sight: Childhood and Children in the Bible* (Grand Rapids: Baker, 1996), 74–77.

<sup>12</sup> *Brevfo*, used in Luke 1:41, 44 to identify the unborn John the Baptist, is the same word used for the already-born Jesus (2:12, 16), for babies who received His blessing (18:15–17), and for newborn babies (Acts 7:19). Also the Hebrew word *dl,y<*, used in the Old Testament to refer to the unborn (Exod. 21:22–25), is the same word used to describe young children. See Zuck, *Precious in His Sight*, 149–58.

mother who clones herself would be giving birth not to a daughter but to a twin sister. A father who clones himself would have a twin brother not a son. In fact the clones would not be siblings at all, at least not in the genetic sense. Theoretically they could even marry each other since they are not genetically similar as a true brother or sister are.

Human cloning blurs the true relationship between procreation and parenthood. God intends that the family thrive (Eph. 6:1–4; Col. 3:18–21), and some of these new genetic procedures (human cloning, surrogate parenting, embryo transfer) pose a threat to the stability of the family.

The Bible teaches that God determines birth (Gen. 4:1; 17:16; Ruth 4:13) and is in control over even barren wombs (Deut. 7:14). Childless women are not displeasing to God, as the testimonies of Sarah (Gen. 18), Rachel (Gen. 29–30), Hannah (1 Sam. 1), and Anna (Luke 2:36–38) attest. God is in control, and can bring great blessing out of the heartbreak of infertility.

Human cloning raises significant questions about the sanctity of life and the meaning of parenthood. Created in the image of God, human beings differ from animals. Cloning represents a tampering with the reproductive process at the most basic level; therefore even the use of animal cloning to create transgenic animals could be questioned. Some scientists want to use genetic technology to “rewrite the fifth day of creation.”<sup>13</sup> Using cloning to create transgenic species would certainly do that.

Some wonder if a cloned human being would have a soul. Although human cloning would be an alternative form of reproduction, it is still reasonable to believe that human clones would be fully human. Thousands of children have been born through in-vitro fertilization, an alternative form of reproduction, and each of them certainly has a soul.

The origin of the human soul is often explained by one of two theories: creationism or traducianism. Creationism is the belief that God creates a soul for each individual and places it in the body while the child is in the womb. Traducianism is the belief that both the body and soul are propagated through sexual reproduction. The first view would probably not be able to provide a definitive answer as to whether a clone would have a soul. The traducian view of the origin of the soul would seem to suggest that a cloned human being would have a soul since both body and soul arise from the repro-

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<sup>13</sup> Nancy McCann, “The DNA Maelstrom: Science and Industry Rewrite the Fifth Day of Creation,” *Sojourners*, May 1977, 23–26.

ductive event.

Human cloning, like other forms of genetic engineering, could be used to usher in a “brave new world.” A leading geneticist says, “There is nothing to prevent us from taking a thousand [cells]. We could grow any desired number of genetically identical people from individuals who have desirable characteristics.”<sup>14</sup> Such a vision conjures up images of Alphas, Betas, Gammas, and Deltas from Huxley’s book *Brave New World* and provides a dismal contrast to God’s creation of each individual as unique.<sup>15</sup>

Each person contributes to both the unity and diversity of humanity. This is perhaps best expressed by the Jewish Midrash: “For a man stamps many coins in one mold and they are all alike; but the King who is king over all kings, the Holy One blessed be he, stamped every man in the mold of the first man, yet not one of them resembles his fellow.”<sup>16</sup> Christians should reject future research plans to clone a human being and should reject using cloning as an alternative means of reproduction.

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<sup>14</sup> James Bonner, quoted in *Los Angeles Times*, May 17, 1971, 1.

<sup>15</sup> Aldous Huxley, *Brave New World* (New York: Time, 1963).

<sup>16</sup> Nathan N. Glazer, *Hammer on the Rock: A Short Midrash Reader* (New York: Schocken, 1962), 15.