Lesson 7

Christian Ethics and Human Cloning

Apologetics Press Advanced Christian Evidences Correspondence Course

CHRISTIAN ETHICS AND HUMAN CLONING

INTRODUCTION

The news exploded like a bombshell. It was completely unexpected. Hardly anyone thought it could be done. Nobel laureates had suggested that it was extremely unlikely. And one specialist in the field even went so far as to say it "was impossible." Then, suddenly, without warning, it happened. The February 27, 1997 issue of *Nature* reported it in a mundanely titled article, "Viable Offspring Derived from Fetal and Adult Mammalian Cells." An adult mammal had been cloned. "Dolly," as the sheep came to be known, was introduced to a world awash with incredulity. Scientists worldwide gasped—first with complete disbelief, and then with utter awe. Scottish embryologist Ian Wilmut and his colleagues had taken a mammary gland cell from a six-year- old Scottish Finn Dorset ewe, and through a process known as "nuclear transfer" had succeeded in placing the genetic material from that cell into a hollowed-out egg cell from a Scottish blackface sheep. That zygote—which then contained the full complement of chromosomes (as if it actually had been fertilized by a sperm cell)—was placed into the uterus of a second Scottish blackface sheep that served as a surrogate mother; several months later, Dolly arrived.

The "news" part of the story was not that a mammal had been cloned; that had been done in the past. The news was that a mammal had been cloned from an **adult** cell—something that even scientists like James Watson and Francis Crick (who were awarded the 1962 Nobel Prize in Medicine or Physiology for their elucidation of the structure of DNA) had gone on record as stating was very likely impossible. But, as the old saying goes, "that was then; this is now." It turns out that the Scottish scientists' success was the tip of the proverbial iceberg. Not long after the details of the procedure used to produce Dolly were published, scientists began to report one success story after another using the same or similar techniques to clone additional mammals from adult cells, including mice (Wakayama, et al., 1998), cattle (Kato, et al., 1998), goats (Baguisi, et al., 1999), rhesus monkeys (Chan, et al., 2000), pigs (Onishi, et al., 2000; Polejaeva, et al., 2000), cats (see "Texas Researchers Clone a Cat," 2002),and rabbits (Chesné, et al., 2002)

Sheep, mice, cattle, goats, monkeys, pigs, cats, and rabbits are all mammals. Remember the definition of a mammal from high school biology? Mammals are animals that: (a) are warm blooded; (b) have an insulating body covering of hair (or fur, wool, etc.); (c) give birth to live young (with the exception of the duck-billed platypus); (d) suckle their young; and (e) possess a four- chambered heart (Hine, 1999, pp. 193-194). From an evolutionary classification viewpoint, is a human a mammal? Yes. Then surely the next question is plainly

obvious: If scientists can clone sheep, cattle, goats, monkeys, pigs, cats, and rabbits (all of which are mammals), can they then clone humans— who also are mammals? And more important, **if they can, will they?**

A BRIEF HISTORY OF CLONING

The beginnings of what we today refer to as "cloning" actually go back to the early part of the twentieth century—1901 to be exact. Hans Spemann (1869-1941) was a German embryologist who was a professor of zoology (1919-1935) at the University of Freiburg. In 1901, he successfully split a 2-cell newt embryo into two distinct parts, successfully producing two different larvae. During the early 1950s, F.C. Steward of Cornell University demonstrated how to clone plants, and produced carrots by the thousands through such a procedure (see Steward, 1970). In 1952, Robert Briggs and Thomas King of the Institute for Cancer Research in Philadelphia cloned a northern leopard frog (see Briggs and King, 1952). Since then, carrots, tomatoes, fruit flies, frogs, and a host of other plants and animals have been cloned.

In 1984, after extensive experiments with mice, Davor Solter of the Wistar Institute of Philadelphia claimed that the cloning of mammals is biologically impossible. The last phrase of the last line of Solter's paper in Science has reverberated through the halls of academia ever since. He wrote: "**The cloning of mammals by simple nuclear transfer is biologically impossible**" (McGrath and Solter, 1984, 226:1319, emp. added). Solter's conclusion was accepted as "fact," and for years to follow, funding for research on cloning was marginalized and almost impossible to obtain

In 1995, Ian Wilmut and Keith Campbell of Great Britain created the world's first cloned identical sheep, Megan and Morag, from 9-day-old embryos (Campbell, et al., 1996). One year later, Ian Wilmut and his team of Scottish scientists cloned the world's first mammal from adult cells. Dolly the sheep was created using udder cells from a six-year-old ewe (Wilmut, et al., 1997). In 1997, the Oregon Regional Primate Research Center cloned two rhesus macaques (named Neti and Ditto) that were created from DNA taken from developing monkey embryos (see Meng, et al., 1997), and University of Massachusetts researchers reported the cloning of cattle using fetal cells (see Kato, et al., 1998). A report in the April 25, 1998 issue of Science News described how Dolly—the first mammal cloned from adult cells—had been bred to David, a Welsh mountain ram, and was pregnant (see Travis, 1998, 153:263). [Actually, by the time the story got to press, Dolly already had given birth. On April 13, 1998, she produced a 6.7-pound baby ewe by the name of Bonnie. Almost a year later, on March 24, 1999, Dolly gave birth to three lambs—two males and one female.] **Dolly was not only a clone—she was a fertile clone!** This news dispelled the idea that as a clone she might be sterile and paved the way for future successes in the breeding of clones.

One of the most important milestones in the cloning controversy was reported in the May 27, 1999 issue of *Nature*, which discussed Dr. Wilmut's

examination of Dolly's chromosomes. Wilmut (who was responsible for cloning Dolly) and his colleagues studied the length of chromosome ends (telomeres) from Dolly and two other sheep produced by the same process used to clone Dolly. It generally has been accepted scientifically that telomere deterioration is a reliable indication of reduction in life span; the more rapid and serious the telomere deterioration, the shorter the expected life span. Wilmut and his coworkers reported a marked deterioration in the telomeres of Dolly's chromosomes compared to those from non-cloned animals, and even suggested that "the most likely explanation" for the deterioration observed in these animals "reflects that of the transferred nucleus. Full restoration of telomere length did not occur **because these animals were produced without germline involvement**" (see Shiels, et al., 1999, 399:317, emp. added).

In other words, since Dolly was cloned from the mammary gland cell of a six-year-old sheep, in essence her telomeres already were six years old, and therefore deteriorated more rapidly than those of non-cloned animals produced by regular procreative procedures. In simple terms, it may turn out that cloned creatures have markedly reduced life spans compared to those produced via normal, sexual reproduction. In fact, in January 2002, it was reported that Dolly was suffering from severe arthritis. One year later, in February 2003, the almost seven-year-old sheep had to be euthanized due to a progressive lung disease (an infection seen mainly in older sheep). If the findings from Dr. Wilmut and other researchers are confirmed, this obviously will have serious implications for attempts at human cloning. If a 65-year-old man had himself cloned (to choose just one example), the clone just might begin life with a 65-year head start toward the grave!

On March 9, 2001, three cattle cloned by scientists at California State University at Chico appeared to have been born healthy, but two of the calves died of abrupt immune system failure, and the third was reported to be failing rapidly (see Cooper, 2001). While not widely reported in the news media, such events are becoming quite common in regard to cloned animals, and serve to demonstrate the potential dangers of human cloning. Many of the animals that have been cloned have experienced obvious mutations, while others have died shortly after birth, even though outwardly they appeared to be quite normal (see, for example, Humphreys, 2001). In studies performed on cloned cattle by Cyagra, Inc., a Kansas company that studies the commercial aspects of cloning livestock, the "company has about a 6 percent birth rate; of those calves, about half die soon after they are born" (as quoted in Cooper, 2001).

An unsettling report in the July 6, 2001 issue of Science addressed this very point, and documented the fact that while cloned animals may **appear** normal, and may even **behave** somewhat normal, the truth is that sometimes **these animals are far from normal**. The report goes on to announce that scientists have found the first evidence that "normal-looking" clones can harbor serious genetic abnormalities. For researchers interested in pursuing cloning as an alternate method of reproduction, the news from scientists at

the Whitehead Institute for Biomedical Research and the University of Hawaii represented a veritable bomb detonated right on their very doorsteps. The first statement in a paper titled "Epigenetic Instability in ES Cells and Cloned Mice" by David Humphreys and colleagues reads as follows: "**Cloning by nuclear transfer is an inefficient process in which most clones die before birth and survivors often display growth abnormalities**" (2001, 293:95, emp. added). This is not exactly the image of cloning that federally funded researchers want the public at large to see.

Consider however, that it took over 277 embryos to make one Dolly. Scientists are reporting success rates of only 1-2%, and of those that do live, many become abnormal adolescents and adults. How many discarded and disfigured human embryos would it take before the technique becomes successful?

THE CLONING PROCEDURE

Cloning procedures currently involve the removal of an egg's nucleus (which contains the genetic "blueprints" of the cell) in order to replace it with the nucleus from either an adult cell that has been stressed, or an embryonic stem cell. Under normal conditions, cells go through a process known as "differentiation," during which all the DNA within the cell is "deactivated"—except for a small portion that instructs the cell regarding its future destiny. For example, once a cell differentiates, it may become only a muscle cell, a neuron, a blood cell, a fingernail cell, etc. Scientists, of course, have no desire to clone an entire laboratory of fingernail cells. What they want is to clone **entire organisms**. But in order to do that, they must find newly formed cells (e.g., stem cells) that have not yet differentiated, or they must "stress" older, fully formed cells that already have differentiated in order to force them to return to an undifferentiated state.

As we noted earlier, scientists already have cloned at least six mammals. Yet even the scientists directly involved in the research are critical of the methods and the current end results. In an article in the March 30, 2001 issue of *Science*, Rudolf Jaenisch (one of the authors of the Humphreys study on cloned mice) and Ian Wilmut wrote:

> 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 a cause of the frequently observed embryonic death during gestation. Newborn clones often display respiratory distress and circulatory problems, the most common causes of neonatal death. Even apparently healthy survivors may suffer from immune dysfunction, or kidney or brain malformation, which can contribute to death later (2001, 291:2552).

As frightening as the thought may be, the fact is that scientists around the world already are working on producing a human clone—a fact that was made clear when, on November 26, 2001, researchers at Advanced Cell technology of Worcester, Massachusetts announced that they had successfully cloned eight human embryos, some of which grew to the four- or six-cell stage before dying (see "Human Embryo Created Through Cloning," 2001). To complicate matters, reports are beginning to surface about other scientific groups that either are working on cloning, or that already have attempted it—with varying degrees of success.

Would a clone be an exact duplicate of the original? A clone would be an exact **genetic** duplicate—the word "genetic" providing a critical distinction. Merely possessing identical **genes** does not guarantee identical **people**. Ask anyone with identical twins. In fact, twins would be more alike than clones for the simple reason that the twins would have shared the same environment, upbringing, etc. Humans are more than just a "bag of genes." Each of us is the end product of numerous external forces that influence us from cradle to grave. Our personalities and attitudes are formed by parents, friends, teachers, societal interactions, and many other factors that affect us during our lifetimes.

SHOULD WE CLONE HUMANS?

The question is not: **Can** we clone humans? The technology to try is already available. The question is: **Should** we clone humans? That is a question science cannot answer since science is amoral (notice, not **im**moral, but amoral). That is to say, science is not equipped to make moral judgments.

In the end, cloning is not all it's cracked up to be. First, as the evidence discussed earlier plainly indicates, the cloning process itself is fraught with difficulties that can seriously affect the quality of life of the cloned offspring. Second, it is a matter of both ethics and law (in the United States at least) that no experiment or medical procedure may be performed on a human unless two specific safeguards are in place: (1) The person must provide "informed consent" beforehand; and (2) the experiment/procedure must be to the ultimate benefit of the person on whom it is being performed. In cloning, the tiny embryo being manipulated in the laboratory cannot give informed consent. And it hardly is to the benefit of the experimental embryos for 276 out of every 277 (to use Dr. Wilmut's "success" figures) to end up deformed (or dead) as the result of a failed lab experiment. **Do we really want dead and dying human embryos filling scientific laboratories around the country?**

Furthermore, anytime someone hands us a brand-new "out of the box" technology, we always should remember to ask: What are the **implications** of this technology? For example, is it beneficial to humanity for parents to be able to select the sex of their children beforehand? Do we intend to use cloning to further women's liberation? Perhaps you've heard the old Cockney saying, "It takes a man to get a girl." Not anymore. With cloning, males no longer will be needed. And what about creating large numbers of clones for

statistical studies—or spare parts? What about those people who desire immortality (at least in body, if not in soul)? And do we want homosexual "couples" producing children via cloning? The simple fact is, cloning has the potential to allow humans to circumvent God's law regarding human reproduction. In 1 Timothy 5:14, the inspired apostle Paul told the younger women to "marry, bear children, and rule the household." Notice the divinely commanded order involved. Marriage is to precede the bearing of children. With cloning, marriage becomes irrelevant. **Any** action that strikes at the heart of Jehovah's divine plan and purpose for the home must be avoided and opposed.

Another question must be asked as well: **Would a human clone have a soul?** Much of the debate occurring today (especially in religious circles) centers on this question. In addressing what seemed at the time the unlikely possibility of the cloning of a human, Duane Gish and Clifford Wilson inquired: "Would a clone be truly human? The answer is that, indeed, he would be human, for its life came from human life even though in a manner different than is usually the case" (1981, p. 174). In addition, they noted, the cloned human "is already alive, responsible to God for his actions, needing to preserve his own body against sickness, to see that he is properly fed, and all the rest. Each clone would have its own individual responsibility, its own soul" (p. 172).

We concur with such an assessment. In James 2:26, James made this observation: "The body apart from the spirit is dead." The point, of course, is that when the spirit departs the body, death results. But there is an obvious, and important, corollary to that statement. If the body is alive, it must be the case that the spirit is present. This biblical principle must not be ignored—especially in light of the present controversy. A cloned human would indeed possess a soul. The unusual manner of the clone's birth would not alter that fact. Only God, however, can instill a soul. It is He Who "giveth to all, life, and breath, and all things" (Acts 17: 25; cf. Ecclesiastes 12:7). It is only "in Him" that "we live, and move, and have our being" (Acts 17:28). Should we clone humans? No, we should not!

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Questions—Lesson 7

TRUE OR FALSE

DIRECTIONS: Write TRUE or FALSE in the blanks before the following statements.

_____ 1. Dolly was cloned after 27 unsuccessful tries.

_____ 2. Cloning would allow homosexual couples to produce offspring.

_____ 3. Scientists already have cloned mice, cattle, cats, goats, monkeys, pigs, and rabbits.

_____ 4. The technology is available to clone humans.

_____ 5. Human clones will not have a soul.

_____ 6. Cloning currently is used in producing livestock.

_____ 7. By definition, cloned animals are sterile.

_____ 8. Dolly was the first animal *ever* cloned.

MULTIPLE CHOICE

Circle the correct answer(s).

1. Which of the following is not a characteristic of a mammal?
   (a) Warm-blooded
   (b) Possesses a four-chambered heart
   (c) Born with a placenta
   (d) Has insulating body covering
2. In cloning, which of the following is replaced from an adult cell that has been stressed?
   (a) Nucleus (b) Mitochondria
   (c) Ribosomes (d) Golgi apparatus
3. The beginnings of what we today refer to as "cloning" actually go back to:
   (a) 1984 (b) 1995
   (c) 1952 (d) 1901

4. An undifferentiated cell can become which of the following:
   (a) Blood cell (b) Muscle cell
   (c) Fingernail cell (d) Hair cell
5. According to both medical ethics and United States law, experiments and medical procedures may be performed on people who can:
   (a) Afford the cost
   (b) Provide informed consent
   (c) Attend a major medical facility
   (d) Receive some benefit
6. Cloning is an inefficient process in which:
   (a) Most clones survive
   (b) Most clones die before birth
   (c) Clones can be abnormal
   (d) All clones die before birth

FILL IN THE BLANKS

1. Davor Solter stated: "The cloning of mammals by simple nuclear transfer is biologically _____."

2. Researchers Rudolf Jaenisch and Ian Wilmut wrote: "Animal cloning is _____ and is likely to remain so for the foreseeable future."

3. In 1 Timothy 5:14, Paul told younger women to "marry, bear _____, and rule the household."

4. Many of the animals that have been cloned have experienced obvious _____, while others have died shortly after birth, even though outwardly they appeared to be quite normal.

5. David Humphreys and colleagues discovered that "cloning by _____ transfer is an inefficient process in which most clones die before birth and survivors often display growth abnormalities."

MATCHING

Match the related concepts (place the correct letter in the space provided by each number).

1. ___ The first offspring born to Dolly
2. ___ Reliable indicator of reduction in life span
3. ___ Current success rate that scientists are reporting for cloning
4. ___ Indicates that if a body is living, then the soul must be present
5. ___ Initial success rate reported by Cyagra, prior to half of the company's cloned calves dying at birth

A. Telomere
B. James 2:26
C. Bonnie
D. 1-2%
E. 6%

NAME _____

ADDRESS _____

_____

CITY _____ STATE _____

ZIP CODE _____ DATE _____