Human Cloning—Is It Ethical and Necessary?

I had devoted my life to caring for extremely sick children. However, health problems robbed me of my career as a pediatric anesthesiologist and intensivist. A genetic disorder disabled my father and took the life of my brother at age 38, leaving his wife and two young children.

Not a day goes by that I don't wish for my brother to be alive or for the ability to return to my career. My family is not alone; everyone endures some degree of physical, psychological, or emotional difficulties during their lives. Some scientists suggest that human cloning or stem cell research might offer hope of a cure, not only for my family, but for those who suffer from a multitude of other debilitating disorders.

The cloning process can be illustrated by the creation of the cloned sheep Dolly. Researchers isolated a ewe's udder cell (any body cell may be used) and another ewe's unfertilized egg. The nucleus was removed from the egg cell. The udder cell and the enucleated egg were subjected to repeated electric pulses causing them to first fuse together into a one-celled embryo called a zygote and then to begin cell division. The technique of cloning is finished once the zygote is formed; simple growth and development occur subsequently. After six days, the growing embryo was implanted in a sheep's uterus, eventually resulting in the birth of Dolly, a lamb genetically identical to the original donor of the udder cell. This process was actually quite inefficient. 277 embryos were cloned, 29 of which divided after fusion and were implanted, 13 ewes became pregnant, and just one lamb was born.[1]

All human cloning is reproductive, in that it creates a new developing human, although distinctions have been made between "reproductive" and "biomedical research" (so-called "therapeutic") cloning. The former refers to implantation of a cloned embryo in a uterus with the purpose of growth through birth into adulthood. The latter denotes destruction of cloned embryos or aborted cloned fetuses for harvesting of embryonic stem cells, tissue, or organs. "Therapeutic cloning" is a misnomer. There are no human studies showing therapeutic applications. Animal studies do not show real therapeutic success using cells or tissue from cloned embryos. And it certainly is not "therapeutic" for dissected embryos.

Human cloning is unethical because it is harmful to the embryos produced and, potentially, to the patients in whom cloned products are implanted and to women.

Using embryonic or fetal products from clones destroys living organisms. Human life is a continuum, beginning with the zygote at which time the full complement of genetic material exists and processes are set into motion which produce growth and development of the individual. Whether an embryo is derived from sexual or asexual (cloning) reproduction is immaterial to the fact that an embryo has been created. Cloning a human embryo, regardless of the intended purpose, amounts to experimental research on a human without the consent of the person, a practice rejected by worldwide medical codes. Research on incompetent subjects is allowed only if there is a legal surrogate, minimal risk, and therapeutic benefit for the human subject. A convention on human rights stated "the interests and welfare of the human being shall prevail over the sole interest of society and science."[2] History illustrates the horrific consequences of scientific experimentation on those not deemed worthy of classification as humans; experiments were forced on prisoners at Dachau by Nazis, on Tuskegee Institute's black syphilis patients, and on mentally handicapped children in New York.[2]

Genetic mutations, malformations, and/or premature aging can be found in clones at every stage from embryo to adult.[3-6] Not all the genes essential for normal development are activated in cloned embryos.[7] Dolly was euthenized at age 6 (half the normal life span) due to joint and lung disorders. Transferring stem cells or tissue from such diseased clones to a patient is potentially harmful to the recipient.

Human cloning for biomedical research will subject a large population of women of childbearing age to health risks inherent in harvesting the enormous quantities of eggs required. Such risks include complications from medications to increase egg production, surgical risks, and a possible increase in the probability of ovarian cancer.[8] Human eggs may become a commodity, with exploitation of disadvantaged women around the world.[5, 6]

It is estimated that the use of cloning to treat just one patient group, the 17 million diabetics in the U.S., will require approximately 85 million women to "donate" eggs.[8, 9] This is not only unethical but impractical since there are only 55 million women of childbearing age in the U.S.

Some experts state that research requiring cloned[9, 10] or noncloned[11-13] human embryo destruction for their stem cells is not only unethical, but unnecessary for medical therapeutic purposes. It is difficult to induce cloned or noncloned embryonic stem cells to differentiate into a specific tissue type without simultaneous problems such as tumor production[9, 11, 12, 14] Ethically-derived non-embryonic stem cells ("adult stem cells") are being used to accomplish the same therapeutic goals in humans; treatments for a variety of diseases already exist[15-18] with potential benefits for other disorders.[19]

Would I be willing to pay any price to put an end to the disability and haunting questions I live with? While I heartily support non-embryonic human stem cell research, I am opposed to any research that harms another life in attempt to make my own better.

Human cloning is harmful, unethical and unnecessary. It is time to shatter its image as a panacea for human disease.

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1. Stevens D. *Mirror Image? Ethical and Political Issues in Cloning*: Christian Medical Association.
2. Stevens D. *Stem Cell Research: Executive Summary*. Bristol, TN: Christian Medical Association.
3. Vastag B. At the cloning circus sideshows abound, while scientist seek a wider audience. *JAMA*. Sept. 26 2001;286(12).
4. Vastag B. Epigenetics seen as possible key to cloning. *JAMA*. Sept. 26 2001;286(12).
5. Cohen CB. Letters to the editor: Ethical issues in embryonic stem cell research. *Journal of the American Medical Association.* March 21 2001;285.
6. National Academy of Sciences. Scientific and medical aspects of human reproductive cloning; Jan 18, 2002.
7. Stenson J. Study Sheds Light on Why Cloning So Often Fails. *Reuters Health.* April 4, 2003.
8. Do No Harm. Do the Math: Experimental Cloning Exploits Women. Available at: http://www.stemcellresearch.org/info/dothemath.htm. Accessed March 1, 2003.
9. Odorico JS, Kaufman DS, Thomson JA. Multilineage differentiation from human embryonic stem cell lines. *Stem Cells.* 2001;19:193-204.
10. Therapeutic cloning no longer necessary: expert. *AAP Newsfeed*. July 29, 2002.
11. Schuldiner M, al. e. Effects of eight growth factors on the differentiation of cells derived from human embryonic stem cells. *Proc. Natl. Acad. Sci. USA*. Oct. 10 2000;97:11307-11312.
12. Vogel G. Stem cells: New excitement, persistent questions. *Science*. Dec 1 2000;290:1672-1674.
13. Vogel G. Can Adult Stem Cells Suffice? *Science.* June 8 2001;292:1820-1822.
14. Lanza RP, Cibelli JB, West MD. Human therapeutic cloning. *Nature Medicine*. September 1999;5:975-977.
15. Prentice DA. Testimony of Dr. David A. Prentice, Ph.D. *Subcommittee on Crime, Committee on the Judiciary*; 2001.
16. Hacein-Bey-Abina S, al. e. Sustained correction of X-linked severe combined immunodeficiency by ex vivo gene therapy. *New England Journal of Medicine*. 18 April 2002;346:1185-1193.
17. Cavazzana-Calvo M, al. e. Gene therapy of human severe combined immunodeficiency (SCID)-X1 disease. *Science.* April 28 2000;288:669-672.
18. Prentice DA. Selected References Documenting the Scientific Advances in "Adult" Stem Cell Research--Current Treatments Update. Nov. 18, 2001. Available at: www.stemcellresearch.org/facts.htm. Accessed March, 2003.
19. Prentice DA. Selected References Documenting the Scientific Advances in "Adult" Stem Cell Research--Potential Treatments Update. Nov. 18, 2001. Available at: www.stemcellresearch.org/facts.htm. Accessed March, 2003.