Nationwide Human Cloning Ban Stymied as Impact Beyond Stated Goal Is Debated

By Lisa Kaeser

Looking for a quick victory at the beginning of an election-focused legislative session, the Senate Republican leadership recently tried to ram through legislation imposing a permanent, nationwide ban on the cloning of human beings. Instead, they opened a Pandora's box of scientific and ethical issues that, for the moment at least, stopped the effort in its tracks.

Chief among these issues is the impact that prohibiting cloning technology might have on other research efforts, especially on cures for devastating diseases. Abortion politics permeated the debate, but, ironically, if highly restrictive cloning legislation ultimately were to pass, its most direct impact likely would be on other areas of reproductive health, specifically the development of new contraceptive methods and infertility treatments.

Parameters of the Debate

Two competing bills quickly became rallying points over how far a federal ban on human cloning should go. The first, introduced by Sens. Kit Bond (R-MO) and Bill Frist (R-TN), would establish criminal and civil penalties for any use of "somatic cell nuclear transfer" for human cloning purposes (see box). Beyond that, however, it would ban the creation of embryos using this technology, even if the purpose of doing so were for research unrelated to the cloning of a human being.

The alternative measure, offered by Sens. Dianne Feinstein (D-CA) and Ted Kennedy (D-MA) and favored by the Clinton administration, would ban human cloning using somatic cell nuclear transfer for a period of 10 years but, meanwhile, would permit the use of this technique to create human embryos for other research purposes.

The differences between the two bills are fundamental and may be irreconcilable. Central to the debate is the perceived status of human embryos in the earliest stages of development—so-called preimplantation embryos—and, specifically, whether their creation and/or use in research are ethical.

Bioethical Underpinnings

The cloning issue, which burst onto the scene early last year with the announcement by a Scottish scientist that he had cloned a sheep, boiled over in December when the aptly named Richard Seed declared his intent to clone human beings for childless couples. Although the physicist provided no proof that he could accomplish this feat, Seed's announcement raised the specter of Frankenstein-like experiments to create "designer" babies.

Almost immediately, bills to ban human cloning began popping up in state legislatures; between January and March in 1998 alone, 40 such bills had been proposed in 22 states. Not to be outdone, President Clinton called for a nationwide ban in his State of the Union speech.

The president already had imposed a moratorium on *federal funding* of human somatic cell nuclear transfer immediately after the birth of the sheep Dolly. At the same time, he asked the National Bioethics Advisory Commission to undertake an immediate review of the legal and ethical issues associated with the use of this technology.

The commission, which includes doctors, scientists, ethicists and lawyers, narrowed its inquiry to the use of somatic cell nuclear transfer for the purpose of creating an embryo that ultimately would become a child. It recommended a continuation of the moratorium on federal funding, plus a request for voluntary compliance by the private sector. In addition, the commission endorsed the idea of federal legislation prohibiting anyone from creating a child using this technology, but also strongly urged that the measure be time-limited. Perhaps most important, however, the commission's report strongly urged that such legislation be carefully crafted so as not to interfere with other critical scientific research.

Assessing the Impact

Most observers agree that, because of its absolute ban on somatic cell nuclear transfer (which in practice would block biomedical research involving even preimplantation embryos), the Bond-Frist bill would have far-reaching implications beyond the issue of human cloning. In the area of reproductive health alone, the impact could be enormous.

By effectively siding with those who argue that even preimplantation embryos are full human beings, the bill could be seen as an indirect challenge to the legality of abortion. In Roe v. Wade, the Supreme Court specifically declined to define "when life begins," stating, "When those trained in the respective disciplines of medicine, philosophy, and theology are unable to arrive at any consensus, the judiciary, at this point in the development of man's knowledge, is not in a position to speculate as to the answer."

Antiabortion advocacy groups strongly support the Bond-Frist bill and just as strongly oppose the Feinstein-Kennedy approach. Indeed, a recent letter to senators from the National Right to Life Committee argues that "if the life of any human being is begun through the process of somatic cell nuclear transfer…then that human being must be recognized as a human being."

To accept this notion also could have far-reaching effects on contraceptive research. While some contraceptive methods, such as barrier methods, act prior to fertilization alone, others—including oral contraceptives—also may act after fertilization but before implantation.

A 1997 Pharmaceutical Research and Manufacturers Association survey found that private companies have 13 new contraceptive methods under development; others are being funded under the auspices of the National Institutes of Health (NIH) and elsewhere. Prohibiting research on any contraceptive that *might* work post-fertilization but prior to implantation would vastly reduce the ability for either the public or private sectors to continue their contraceptive development efforts. Further, some contraceptives long available in this country could be labeled abortifacients and subjected to a new set of legal and social restrictions—a serious disservice to the women and couples who are responsibly trying to protect against unintended pregnancy.

Somatic cell transfer technology is also thought to have the potential to facilitate breakthroughs in infertility research. According to NIH-funded scientists, this technique could increase the efficiency and success of in vitro fertilization, making it available to some couples currently not eligible. Moreover, a considerable amount of infertility is due to the "spontaneous loss" of preimplantation embryos. Research has shown that up to 60% of fertilized eggs do not survive long enough to result in a clinically recognized pregnancy. Somatic cell nuclear transfer could be critically important in learning more about why these embryos cannot be sustained.

Finally, improved understanding of developmental biology and genetics also could be a casualty of an overbroad cloning ban. Some birth defects are caused by abnormal cell specialization; theoretically, if the problem could be identified, the possibilities for preventing certain birth defects could be greatly expanded.

When Politics Collides with Science, The Devil's in the Details

Much of the controversy in the cloning debate involves both confusion over the biology of becoming pregnant and a fundamental—and probably unresolvable—disagreement over when life begins.

Becoming pregnant is approximately a 14-day process. According to the American College of Obstetricians and Gynecologists, ***fertilization*** *describes the procedure by which a sperm gradually penetrates the layers of an oocyte (egg) to form a new cell (zygote), after which cell division begins. This process, which can take up to 24 hours, usually occurs in the fallopian tubes; the new entity, a "preimplantation embryo," travels down the fallopian tube toward the uterus. Itself a process,* ***implantation*** *in the endometrial lining begins around day five; it can be completed as soon as day eight but usually closer to day 14. A pregnancy is considered to have begun when implantation is complete.*

Cloning techniques use fertilized eggs in the preimplantation stage. According to the National Institutes of Health, ***cloning*** *is the production of a "precise genetic copy of DNA, a cell, or an individual plant or animal." The process known as* ***somatic cell nuclear transfer****—because it is the particular cloning technology used to create Dolly and the one Richard Seed ostensibly would use—has been singled out in the legislation currently under consideration. It involves transferring the nucleus of the cell that is to be replicated into a fertilized egg from which the nucleus has been removed. Thus, as the egg cell goes on to divide, each new cell's nucleus will be a copy of that of the transferred cell.*

Giving Pause

During preliminary Senate floor debate, most opponents of the Bond-Frist measure chose not to focus on these reproductive health-related issues. Instead, they stressed research into conditions such as cancer, diabetes and cystic fibrosis that could be brought to a standstill should the legislation pass. Aided by some staunch conservatives, their efforts were successful. In the end, the Senate was unwilling to move so quickly; it defeated the motion to proceed to a full debate by a vote of 42–54. While the bill may now be taken back to committee for discussion, it is uncertain how soon it will be brought up again.

On the House side, the outlook is similarly murky. Although Majority Leader Dick Armey (R-TX) maintains that a cloning ban is a top legislative priority for the year, a hearing held by the House subcommittee on health in early March did not provide lawmakers with the blueprint they needed to move forward. Rather, what became clear from the wide range of witnesses was just how complex the science is and how difficult it will be to craft—and pass—a bill that meets the perceived political mandate to "do something" about human cloning without compromising basic scientific progress.