# Prepared Witness Testimony

**The Committee on Energy and Commerce**
**W.J. "Billy" Tauzin, Chairman**

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## H.R. 1644, Human Cloning Prohibition Act of 2001, and H.R.____, Cloning Prohibition Act of 2001

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Mr. Chairman and Members of the Subcommittee, the task that I should like to set for myself, in order to assist the Subcommittee in its consideration of legislation against human cloning, is to unmask the compelling grounds for moral approval of nonreproductive somatic cell nuclear transfer ("SCNT"). The method leading to the conclusions that I shall offer is simple to describe though somewhat difficult to execute. It consists first in probing moral views until we have passed beyond phrases and aspirations to the most fundamental commitments of each. It then requires us to construct a moral analysis faithful to each view. I shall emphasize that if we insist on this regimen, we shall find that even moral views thus far invoked against nonreproductive SCNT commend it as not only permissible but virtuous.

### Embryo Subjects

I shall be speaking about the instrumental treatment of embryos, the use of embryos as means rather than as ends in themselves. An embryo treated instrumentally is an "embryo subject." We may distinguish two sets of embryo subjects:

> (a) a set *A* each element of which is an embryo created by *in vitro* fertilization ("IVF") for the purpose of pregnancy, and
>
> (b) a set *B* each element of which is an embryo created by IVF or SCNT solely for the purpose of medical treatment or research.

We may say that elements of *A* are created by "reproductive embryo creation," and those of *B* by "nonreproductive embryo creation," the latter standing for any process of embryo creation for a purpose other than producing a baby. I do not use the term "cloning" for nonreproductive embryo creation by SCNT ("nonreproductive SCNT") because in that process, no copy of the nucleus donor ever develops. No infant is born. Only the donor's nuclear genome is copied. Nonreproductive embryo creation does not risk deformed or socially anomalous offspring or like problems that may trouble us about reproductive use of SCNT in humans ("reproductive cloning").

**Kant's Morality as Proponent, Not Opponent, of Embryo Use**

In considering elements of *A* or *B* as research subjects, we encounter a different problem. Is it moral to use an embryo as a means? Some readers of Kant have thought that this question answers itself. The second form of Kant's categorical imperative, embraced by many religious traditions, bids us to "use humanity . . . always at the same time as an end, never simply as a means." But as I have explained elsewhere ("Morals and Primordials," *Science* 292: 1659-1660 [2001], copy attached), by "humanity" Kant understands only rational beings. The early stage embryo subjects of current scientific interest are microscopic. They do not have brains, they are not rational. For Kantian guidance on how we must act with respect to any nonrational being, we must look to a more general principle. That is the command that we as rational beings act only on those maxims that, without contradicting ourselves, we can will as universal laws. One such law, Kant holds, states a duty of mutual aid. When we imagine that we stand seriatim in the shoes of our fellows who suffer from diseases that we might cure, we do not contradict ourselves in willing that we collectively support biomedical scientists in the relief of suffering by use of donated *unenabled* embryos.

**The Epidosembryo Subject, an Unenabled Unindividuated Embryo to Which No Possible Person Corresponds**

Let me explain enablement, the key concept that I have introduced here. I say that the developmental potential of an embryo becomes enabled if and only if the embryo enters a woman's reproductive system (either fallopian tubes or uterus). The boundary of the human body separates enabled embryos from unenabled embryos. I shall describe, if I may, a set of unenabled embryos that one may permissibly use as means. Suppose that Mary wants to help others by donating to research or therapy (a) an embryo produced from one of her eggs in an earlier fertility procedure or (b) an unfertilized egg for use in SCNT. In her donative instructions, given to the physician who recovered the egg from her, she prohibits reproduction. She forbids intrauterine embryo transfer and she also prohibits *ex utero* embryo nurture for more than fourteen days. The fourteen day constraint assures that neither research nor therapy will use a person as means. How is that so? Until day 14, any embryo can split, forming twins, and until day 14, twins can recombine, neither mother nor physician being the wiser. Thus until the end of the first fortnight, identity of an individual is not established, and hence it does not make sense to say that there exists a new person. "No entity," said the late philosopher W. V. Quine, "without identity."

Consider also the case of Michael, a victim of Parkinson's disease. Michael arranges with his

physician for a somatic cell to be removed from Michael's body so that via SCNT, that cell's nucleus may be used to generate embryonic stem cells of Michael's own genome, thereby enabling an autologous transplant. Michael imposes the same embryo restrictions as does Mary.

For an unenabled unindividuated embryo donated by someone like Mary or Michael, I use the term *epidosembryo.* I derive this word from the Greek *epidosis* for a beneficence to the common weal. In the relief of suffering, epidosembryos enable the bounteous possibilities of stem cell research and cellular reprogramming. (Here I describe the general concept of an epidosembryo, whether of set *A* or *B*. The discussion in "Morals and Primordials" principally concerns epidosembryos from *A*.) For the following reasons, it is morally permissible to use an epidosembryo. Enablement is an entirely discretionary act. No woman is obligated to undergo intrauterine transfer of an embryo. Instructions issued by epidosembryo donors conclusively foreclose any chance of enabling the embryos. The instructions specify research or therapy, and nothing else. Hence there exists no chance that an epidosembryo will become an infant. Therefore no possible person corresponds to such an embryo. To this we add that any early stage embryo—each so small as to be invisible to the naked eye—lacks the sensory apparatus to feel pleasure or pain. Because use of an epidosembryo cannot thwart the actualization of any possible person—no possible person corresponds to the embryo—and because the embryo cannot experience frustration or discomfort, it is permissible to use an epidosembryo in aid of others.

Because we owe profound respect to any human life form, especially embryos, we cannot use embryos for frivolous means. But the hopes of scientists for embryo research are far from frivolous. First, from work on stem cells science may be able to overcome juvenile-onset diabetes, Parkinson's, Alzheimer's, muscular dystrophy, and other diseases, and to accelerate drug development by supplying for testing normal human cells in lieu of abnormal and animal tissues. Second, in SCNT we anticipate a stem cell possibility that embryos donated from fertility clinics cannot provide. In SCNT we have an ingenious means for obtaining transplantable cells of the patient's own nuclear genome. Such an autologous, histocompatible transplant is the holy grail of cell replacement therapy. For efficiency's sake, instead of creating cells of each patient's genome whenever needed, SCNT might be used in the project of creating a bank of embryonic stem cell lines. Scientists would culture one line for each of the more common alleles of the major histocompatibility complex (the set of genes that code for antigens, the structures that signal whether a cell is self or nonself). Or into cells from an embryonic stem cell line, scientists might by transgenesis insert a given patient's own version of the complex. Each of these strategies in principle could issue in transplantable cells that surmount the vexing problem that a patient's immune system rejects anything that it does not recognize as self. Third, SCNT also constitutes our hope for knowledge of how a cell's reprogramming can occur. If we can find out how reprogramming occurs in an egg following SCNT—we know that it does occur, but do not know the details—clinicians might learn how to induce reprogramming of adult patients' cells. In such case we have the exciting prospect of inducing specialized cells in the adult to differentiate into developmentally much earlier cells that patients desperately need. Even neurons might be regenerated.

**Reply to Objections Concerning Use of Epidosembryos**

Let me address two likely objections to what I have said about unenabled embryos.

(a) It might be argued that an embryo outside the body possesses a potential to become an infant and that we just happen to observe it at a preimplantation stage, a stage through which passes every embryo that becomes a neonate. But embryos passing through that stage inside a woman's body have a nontrivial chance of implanting in the uterus. Epidosembryos have no such chance. That is to say that they have less chance of becoming babies than do the gametes of a man and woman who have never met. Most of us would approve experiments on gametes —even though each contains half the genome of a possible person. For moral purposes, some cells and cell masses are possible persons, others are not.

(b) Still it will be objected that the reason that embryos created by SCNT have a zero chance of becoming babies is that someone created them with precisely that fate in mind, and that it is wrong to create an embryo with no thought of procreation. (This is the moral objection peculiar to nonreproductive embryo creation in contrast with use of epidosembryos from fertility clinics.) Here I think that one can put one's finger on the view that may explain much of the reluctance understandably voiced concerning the challenged use of embryos. According to a previously influential teleology originating with Aristotle, some purpose obtains for every cell type, every structure. At various times in history, it has been thought that for many a cell and structure in the human, we humans know what the purpose is. It is a short step from there to the notion that the mapping of cells to purposes is not an accident but a divine design. Whereupon some would object to hijacking cells for purposes other than those ordained.

Who can know the mind of God on this? We mortals formerly thought that the sole purpose of bone marrow is to nurture bone. Now we look upon the marrow as the factory where blood cells are manufactured. We used to think that kidneys exist solely for benefit of those enclosing them, and now we recognize the virtuousness of donating one's kidney to another. We know that oocytes when fertilized develop into children, but who is to say that sexual reproduction is the sole end that oocytes may permissibly serve? Even assuming that the natural function of a cell were both singular and known, it does not follow that it would be immoral to deploy it for another purpose. Nor it is obvious that a moral wrong occurs if embryos die without implanting in a uterus. The majority of embryos do die in such manner. We do not treat their passing as the deaths of persons.

Let me take up a religious point of view. If we could have a conversation with God, is it plausible that He would tell us never to fertilize an egg except for purposes of creating a baby? If we informed Him that we had discovered stem cells, and had invented SCNT, He might first gently tease us that it took us a few thousand years to discover these things. As for what we should make of them, we may recall what Christianity teaches as the second greatest of the commandments, and the Golden Rule as embraced by virtually all religions. I suspect that God would commend epidosembryo donors. I suspect that He would not stand on metaphysics about microscopic embryos, but would wish us to use our humble abilities to relieve suffering—an effort that expresses esteem for life—when we have happened upon a way to do so in which we do not prevent the existence of any possible person who would otherwise become actual. He would know that children will not result from the use of epidosembryos as sources of stem cells or subjects of study.

From a religious perspective, SCNT may even be said to offer one advantage over the use of

embryos created with pregnancy in view. Nonreproductive embryo creation does not bring to an end any divine-human procreative collaboration.

**Breadth of Moral Support for Nonreproductive Embryo Creation**

The use of unenabled embryos as means for helping others, even as we are reminded of how carefully we must proceed, enjoys the support of a wide range of religious traditions. That support is even broader than commonly supposed. To see this, let us consider what is ostensibly the principal opposition. I refer to the view of the Congregation for the Doctrine of the Faith of the Roman Catholic Church, as joined by fundamentalist Christians, which asserts two doctrines: (a) that human life is a sacred gift of God that we must respect, and (b) zygotic personhood, the thesis that fertilization suffices to create a new person.

*We Respect Life by Relieving Suffering at No Cost in Potential Lives*

The Congregation has declared that IVF, cloning, and other technological innovations in reproduction are inconsistent with the sanctity of human life. The reason that the Congregation rejects these procedures is twofold: it categorizes the procedures as nonconjugal reproduction, and thus as a departure from God' s manner of giving life, and it expresses fear that they might lead to eugenics. But note that these two objections do not apply to procedures, such as nonreproductive embryo creation, that do not produce babies. What respect for life requires therefore remains an open question. I suggest, with ample support in religious traditions, including Catholicism, that relieving widespread human suffering when one may do so at no cost in potential lives—this in fulfillment of the wishes of generous cell donors—virtuously affirms respect for human life.

*Zygotic Personhood Untenable*

I have explained in my recent paper in *Science* that (i) zygotic personhood contradicts the Catholic church's more plausible teaching, maintained during the church's first nineteen centuries, that at fertilization a conceptus cannot, for lack of structures corresponding to the intellectual faculty that makes us human, constitute a person, and that (ii) zygotic personhood is refuted by the fact that embryos do not individuate until day 14, as Catholic theologians have recognized. The church, having recently conceded that personhood is a philosophical question, offers only one argument for zygotic personhood. That argument consists in identifying a new person with the genome formed at each conception. But the church cannot maintain this embrace of genetic reductionism. To do so contradicts the church's fundamental belief in mind and soul.

We must first plumb the depths of any moral view before we can ascertain its verdict on a question at hand. When we include in our analysis of Catholicism its bedrock—including the second greatest of the commandments and the consequence that we are obliged to come to the aid of our neighbors and to answer the call to charity—we find a compelling case for epidosembryo research and therapy.

It would be misleading to conflate the use of *unenabled* embryos with abortion. An abortion kills a conceptus developing in the womb, an *enabled* conceptus. An enabled conceptus will follow a

course of gestation requiring only that the mother stay healthy. Whereas absent a voluntary act to which no one is obliged, an unenabled embryo will never implant, will never mature even to the fetal stage. Fewer abortions mean more babies. Were society to refrain from nonreproductive embryo creation, not one more baby would likely be born.

**Wishful Thinking About Adult Cells Will Not Obviate Study of Embryonic**

Opponents of embryo use have recently urged that we forego use of embryos and instead use cells that they characterize as functionally equivalent and less morally problematic, namely, adult cells. This line of wishful thinking, embraced in H. R. 1644, §2, finding (7), begins with the notion that we might confine stem cell research to adult stem cells. Clinging to this idea, some nonscientist opponents of embryo research are wont to trumpet every report about the plasticity of adult stem cells. Meanwhile these advocates will exaggerate every qualification or condition that they hear mentioned by cautious scientists careful not to overstate present knowledge about embryonic stem cells. The refutation of this wishful thinking is immediate. Embryonic stem cells are pluripotent, which is to say that they are capable of issuing in every cell type save for the placenta. Adult stem cells are only multipotent, each capable of issuing in no more than a few cell types. When pluripotency is the goal, the earlier the better. For some cell types, among them cardiac and pancreatic islet, no adult stem cells have been found. Where adult stem cells are known to exist, often they can be found only in small quantities and obtained only by intrusive means. For instance, to obtain adult stem cells useful in the brain, as one would wish to do for Parkinson's disease, one must drill a hole in the cranium. Adult stem cells may also embody the effects of aging and contain genetic abnormalities accumulated over the course of a life. If, painlessly for both donor and recipient, one could rejuvenate one's skin with a transplant from a family member, who would prefer their grandmother's skin to that of a newborn niece? We must also recognize that stems cell vary in the extent to which clinicians will be able to direct differentiation. Embryonic stem cells may prove easier to direct. For all these reasons, it is simply implausible that adult stem cells are functional substitutes for embryonic stem cells. Nor can one assume that embryonic germ cells, derived from abortuses five or more weeks old, are functionally equivalent to embryonic stem cells.

It does not advance understanding to interject, as have opponents of embryo research, that no therapies by means of embryonic stem cells have yet been confirmed. For both adult and embryonic stem cells, the present agenda is basic research. In the U. S. there has been scant little research on embryonic stem cells and SCNT. Both lines of inquiry are stymied by law. No funds dispensed by the National Institutes of Health may be used for research in which embryos are destroyed (Pub. L. 106-554, Title V, §510). It is unrealistic to expect confirmed therapies from research not yet performed.

Frequently in the history of science when the prospect has appeared of beneficial results from several alternative avenues of inquiry, and when it has not been known which avenue would be the most productive, the practice has been to follow all paths simultaneously. Sundry mathematicians traveled down numerous paths, developing whole new fields of mathematics in the process, before Andrew Wiles combined insights from multiple fields into the proof of Fermat's Last Theorem. And then there is serendipity. Often great advances occur in one direction while scientists believe that they are working in another. Roentgen discovered x-rays without looking for them. Sometimes multiple avenues all bear fruit. Biomedical research could reveal a clinical need for all varieties of

stem cells, one type for one disease, another type for another disease. When delay and inefficiency are measured in lives lost, it would be a shame to bet everything on one horse.

The overwhelming majority of biomedical scientists prize embryonic stem cell research as one of the most promising frontiers for the relief of human suffering in our lifetime. The ability to generate specialized cells of all types renders the use of embryonic stem cells, through SCNT and otherwise, that rare strategy that can yield therapies in virtually all fields of medicine. If biomedical scientists imagined that adult cells would suffice instead, they would be the first to tell us so. Research on adult cells does offer some promise, should be pursued, and is being pursued. But the overwhelming majority of biomedical scientists urge that embryonic research possesses singular advantages and is yet more promising. On the question of which avenues of investigation are relatively more promising, the judgment of these scientists should serve as our guide, just as it does in budgetary decisions. We have learned from encounters with such ventures as "creation science," which purportedly refutes the theory of evolution, that we must be sceptical when nonscientist advocates offer purported analyses of scientific data to reinforce conclusions that they have already reached on nonscientific grounds. The current incarnation of data advocacy would have us believe that we have little to gain scientifically from the alternative that the advocates disfavor on moral grounds. To object to embryo research explicitly on moral grounds is of course quintessentially pertinent here. (Though, according to my analysis, morality bids us support, not oppose, that research.) But whatever our moral theory, if we think that the moral permissibility of an action depends on that action’s probable success in achieving a scientific result, we ought to take counsel about that probability from science’s mainstream. The voice of science’s mainstream is resounding. We could fail to apprehend the scientific consensus on the singular promise of embryonic stem cell research only by putting our heads in the sand.

The rationale for SCNT is even more compelling than that for embryonic stem cells in general, this by virtue of two advantages to which I have alluded—and perhaps others not yet glimpsed. First, SCNT affords a means of producing stem cells that are (a) ample in quantity and pluripotent and (b) of the patient’s own genome. Adult cells do not allow us to achieve (a); an unrelated embryo from a fertility clinic will not achieve (b). Second, eggs developing after SCNT furnish the optimal opportunity for observing the full scale reprogramming of gene expression and the cell’s other regulatory mechanisms, the likes of which either does not naturally occur in specialized cells of the adult, or occurs on a scale too small to allow us to learn much if we could observe it. By studying reprogramming in embryos, scientists hope to learn what steps to take in order to induce reprogramming in specialized cells of adult patients, which in turn could obviate the need to obtain embryonic stem cells for therapy. Scientists would not urge this research, would not predict the loss of useful therapies if we forgo it, if they could gain that knowledge without using embryos created by SCNT.

In short, if Congress defies the advice of science’s mainstream and excludes unenabled unindividuated embryos from research, it will handcuff research for no moral gain.

**Preserving the Legality of Nonreproductive SCNT**

As the Members well know, there obtains a scientific and, if I may say, a public consensus that because reproductive cloning in animals so often issues in deformed offspring, and because

cloning in *homo sapiens* poses further technical challenges and questions that have not been met, we ought not presently to attempt the cloning of a human. That is not the whole of the moral discussion, since we can imagine a day when present problems have been overcome to the extent that the procedure has become relatively reliable. Thereupon we would return to the morality of "replacing" a lost child with a clone and of using SCNT to conceive a child who could be available as a histocompatible donor to a sick child. Consider again a religious perspective. We, none of us, can confidently say that, if we could have a conversation with God, He would tell us to shun reproductive cloning in all instances. But insofar as reproductive cloning is not presently reliable, and I therefore cannot defend it on moral grounds, I confine myself here to the case for preserving nonreproductive embryo creation. We may further narrow the discussion to nonreproductive SCNT rather than nonreproductive embryo creation in general. For the proposed legislation would forbid SCNT but not restrain the use of IVF in research.

Thus far I have discussed morality, the only cited rationale for making nonreproductive SCNT a crime. I have argued that a close analysis of leading moral views reveals moral approval and praise for nonreproductive SCNT. This issues even from quarters that might be thought settled otherwise. I now turn to two pragmatic arguments. These have been advanced for the proposition that, even if nonreproductive SCNT is moral for the reasons that I have offered, the procedure should be prohibited anyway. The first of these arguments emanates from concern for enforceability of a ban on cloning, the second from fear of a slippery slope. I shall show that neither argument sustains the prohibition of nonreproductive SCNT.

*Difficulty of Enforcement: Inherent for Any Proscription of Reproductive Conduct, Not Grounds for an Overly Broad Proscription*

The first argument is broached in H. R. 1644, §2, finding (8), which asserts that "it will be nearly impossible to prevent attempts at ‘reproductive cloning’ once cloned human embryos are available in the laboratory." Fully stated, the argument starts with the premise that for satisfactory enforcement of a statute that prohibits *x*, law enforcement officials must be able to detect most instances of *x*. Next it is asserted that officials will not reliably be able to detect reproductive cloning if and when it is perpetrated by someone legally permitted to perform SCNT for research and therapy. It is then concluded that, by dint of such undetected violations, a statute prohibiting only reproductive cloning cannot be enforced to a satisfactory extent.

I contend that the enforcement problem envisioned here is a red herring. As the foregoing argument itself implies, the question that we must ask, when urged to forbid all SCNT so as to tighten the noose around reproductive cloning, is as follows. If SCNT in research and therapy were permitted, what would be the *probable incidence* of surreptitious reproductive cloning by persons performing SCNT in research and therapy? The probable incidence, so I shall suggest, is negligible. The foregoing argument leaps from the observation that undetected violations *can* occur to the conclusion that *significantly many* undetected violations *will* occur.

We must understand the laboratory environment. Cell biology laboratories—where studies of stem cells and cellular reprogramming would occur—do not serve patients. Such laboratories contain no examining rooms, no surgical suites, no equipment for the invasive procedures of removing an egg from an ovary or transferring an embryo to a uterus. Most of the scientists who work in such

laboratories are Ph.D.s, not physicians. Eggs and somatic cells used by such laboratories in research will have been shipped there as donations. If cell donors impose the condition by which I earlier defined an epidosembryo, the laboratories will have use of the cells on condition that any resultant embryo not be transferred to a uterus. A federal law forbidding reproductive cloning would effectively impose this condition in all cases. So if a rogue scientist seeks to clone a human, that scientist must be surreptitious indeed. The rogue must remove an embryo from a laboratory's inventory and arrange an intrauterine embryo transfer in such fashion that the rogue and the woman receiving the embryo manage to keep the whole thing secret. Where can the rogue arrange an intrauterine transfer? He cannot engage a reputable physician, hospital, or clinical laboratory. If reproductive cloning is a federal crime, reputable providers will not perform the procedure—just as, comporting with a nonpenal statute (Pub. L. 106-554), NIH-supported scientists now abstain from SCNT for any purpose. Hence the rogue must collaborate with a woman willing to undergo an assisted reproduction procedure without the usual circumstances of medical care. And she must be willing to risk punishment by a minimum fine of $1,000,000 and up to ten years' imprisonment. By proposed 18 U.S.C. §302(a)(2) of H. R. 1644, she and the rogue would both be guilty of the crime.

A step earlier in the analysis, consider also what it would take for a woman to *want* an embryo produced in a research laboratory. As a solution to infertility, SCNT is inferior to IVF: IVF produces offspring that combine the genomes of the parents, and does not, like cloning, make a deformed neonate more probable than not. Therefore a woman interested in a baby by SCNT—if we can imagine that desire amid public awareness of how likely is a deformed child—will most likely not be infertile but instead someone seeking a clone of a previously or presently living human identified by her. That is the imagined primary motivation for cloning. Only by a highly improbable accident would an embryo created in a research or clinical laboratory serve a cloning purpose of someone other than the person who chose the somatic cell donor. A woman considering cloning will not want any of a laboratory's already extant embryos. She will want only an embryo created to order, an embryo bearing a genome chosen by her. We observe what follows from this. For the vast majority of embryos produced by SCNT in research and for therapy—in a reputable laboratory, for all of the embryos—there will be no women wishing to bear them. And in the ordinary course, the embryos will be consumed in research and therapy.

So regardless how many embryos are produced by SCNT in laboratories across the country, for a rogue to produce an embryo acceptable to a given woman, the rogue must arrange yet another surreptitious procedure, namely, removal of a somatic cell from a corpse or living human chosen by her. She would also likely prefer that any embryo transferred to her be made of one of her eggs so that the clone will bear her mitochondrial DNA, not a stranger's. In order to furnish one of her eggs to the rogue scientist, she would have to undergo an oocyte recovery procedure that punctures her ovarian wall. For this she would need to seek out a fertility clinician, and, after the procedure, ask the physician to give her an egg to take home. That would immediately seem suspicious to the clinician because in the usual practice of IVF, all recovered eggs are fertilized in hopes of obtaining a few transferable embryos.

From these circumstances we can see why the risk of surreptitious cloning via research and medical care is negligible. Talk of large numbers of embryos sitting around ready to make clones makes for good rhetoric, but we must insist on analysis. Consider further that penal legislation against reproductive cloning will thwart any large scale efforts to attempt the procedure, and in

consequence its success rate on transferred embryos—i.e., the ratio of healthy infants to embryos transferred—will doubtless remain dismal. As proponents of a ban on reproductive cloning have observed, the public keenly understands the high risk of deformities through reproductive cloning and strongly opposes the practice. Opposition may harden if we learn that, in addition to the high incidence of deformities at birth, ostensibly healthy infant clones are found to develop serious health problems later in life. We do not yet know how even Dolly's life will go. All of which suggests that scant few women would be willing to tackle both the high risk of a deformed offspring and a jail sentence, fewer still if only a rogue will assist. Despite recent announcements by a handful of providers who say that they intend to produce clones, conspicuous by its absence is any sign that a significant number of women are willing to enlist. Even if, by virtue of research in other countries, the day arrives at which cloning has so greatly improved that the risk of deformities is deemed tolerable, a woman would do better to procure the procedure legally in a foreign country—assisted reproduction already serves the affluent— than to commit a crime without benefit of customary medical care.

In view of all these circumstances, the notion that SCNT in research and therapy will to any significant extent form a conduit to illegal reproductive cloning seems manifestly improbable.

Of course I do not purport to say that never will it happen that a researcher or provider attempts illegal reproductive cloning. Some illegal reproductive cloning may occur, without detection, even if federal law forbids *all* SCNT. Not only might a rare disreputable health care provider stray, but in theory women and cooperating cell donors who do not care whose eggs were used could, acting without medical assistance, buy oocytes through advertisements in campus newspapers, learn somatic cell nuclear transfer from the literature, and perform intrauterine embryo transfers entirely in private. A person who is clever and determined enough can violate any law. That does not alter my fundamental point. By virtue of the circumstances that I have described, research and clinical laboratories are not a probable back door route to illegal cloning.

Upon recognizing that airtight enforcement of any law seems unattainable, we ought not lash out and broaden a cloning prohibition to sweep nonreproductive SCNT within its maw. Instead we should understand that enforceability depends on the chosen territory. The territory chosen here should give us pause. Within the penumbra of the Bill of Rights, as interpreted in the Supreme Court's decision in *Griswold v. Connecticut* (1965), the right of privacy extends to reproduction. The Court has also made clear that each person's zone of privacy encompasses reproduction under the care of a physician. Hence if H. R. 1644 declared it a crime to perform or attempt contraception, or *in vitro* fertilization, it would be said that such prohibition unconstitutionally infringes the right of privacy. Can the conclusion be different when the proscribed act is reproductive cloning? H. R. 1644 itself states in §2, finding (8)(A), that "cloning would take place within the privacy of the doctor-patient relationship." A measure of the intrusiveness of an anticloning statute is what would be adduced as evidence of the crime. When a mother as defendant denies bearing a clone, a prosecutor may seek a " genetic audit" comparing her child's DNA to that of the person allegedly cloned. In facilitating patents on DNA sequences, as in the Biotechnology Patent Protection Act of 1995, Congress has already opened the door to legal claims predicated on DNA audits. But now we are talking about incarceration of parents on the basis of such evidence. The fate of a criminal statute about reproduction lies in the courts. We ought not worsen its chances by overbreadth. Apart from this constitutional problem, as a matter of policy overbreadth here would foreclose such

a negligible increment in illegal cloning as to make unreasonable an opportunity cost measured in relief of human suffering.

What can wisely be done to tighten enforceability of an anticloning statute includes four provisions that I shall mention in a moment. First I must discuss the second argument for making nonreproductive SCNT illegal.

*Nonreproductive SCNT Not a Slippery Slope to Reproductive Cloning*

That argument begins with the prediction that use of nonreproductive SCNT in research and therapy will add to scientific knowledge about reproductive cloning, and that this will hasten the day when reproductive cloning becomes so reliable as to tempt us. Thereupon, it is suggested. we might repeal any statute forbidding it and bring upon ourselves its detrimental effects. Hence we are urged to forbid nonreproductive SCNT now.

The slippery slope is an overworked metaphor. Not every decisionmaking surface is slippery. As the philosopher Richard M. Hare once observed, we decided to allow right turns from red traffic lights, and have not seen significantly more traffic accidents of right-turning vehicles. Now we discuss whether to allow reproductive cloning. For purposes of this discussion, we routinely abstract from the problem of defective clones, for we know that such a technical problem is solvable in principle. Even so, the public, so we are reliably informed, easily summons the collective will to prohibit cloning. That tells us that strong objections lie against even a perfectly reliable cloning procedure. Indeed it is argued that cloning may in various ways diminish respect for human life. Other objections to cloning gain expression in H. R. 1644, §2, findings [3]-[5]. If the day arrives when cloning's already anticipated reliability becomes actual, those objections will survive with undiminished force. It is not a foregone conclusion that if cloning becomes reliable, we shall approve it.

On the other hand, we must be realistic in anticipating that even if reproductive cloning is declared illegal within various jurisdictions, someone may someday clone humans so as to gain, in the eyes of others, some advantage. In that event, competitors may follow suit. (This scenario has been broached concerning germ line genetic intervention in general. See my "Norms for Patents Concerning Human and Other Life Forms," *Theoretical Medicine* 17: 279-314 [1996].) Competitors might migrate to jurisdictions where cloning is legal. Sovereign countries might themselves behave in the same way, rushing to follow the first rival who legalizes cloning, this for fear of being dominated by genetic superiors. The salient defect in the slippery slope argument against nonreproductive SCNT does not lie in the prediction that mercurial mankind will find reliable cloning irresistible, for that outcome is possible.

Rather the slippery slope argument falls by virtue of its mistaken assumption that we can somehow attenuate or delay reproductive cloning if we preclude nonreproductive SCNT in the U. S. To state the obvious, what must happen to make reproductive cloning alluring is the successful performance of reproductive cloning. For such success, there must occur experiments and cloning attempts. This is a tough row to hoe, since it doubtless begins with a spate of deformed offspring. To produce healthy clones will require surmounting many challenges, among them the shorter interval before

gene activation in humans than in sheep, the effects of aging and mutation on donated somatic cells, and cloning's failure to produce normal genetic imprinting. If progress against birth defects or later health problems of clones requires studies of development *in utero*, or even of development *ex utero* beyond fourteen days, the work of scientists using nonreproductive SCNT will not provide the solution. Scientists working on embryonic stem cells and cellular reprogramming culture embryos for only a matter of days. (In fact when an embryo reaches about day 10, if it does not implant in a uterus, it will so badly deform that it can no longer properly be called an embryo.) Suppose nonetheless that as mainstream scientists come to understand and publish accounts of how cellular reprogramming works, they inevitably issue knowledge dividends that can be cashed by those trying to perfect cloning. We are powerless to prevent such dividends. For instance, under authority of recent approval by Parliament, outstanding scientists in Oxford, Cambridge, and other British universities and research institutions will be using SCNT in research generally and in the study of cellular reprogramming in particular. So too will scientists elsewhere in the world. Their results will be reported in leading journals. New scientific knowledge disseminates rapidly. We cannot forestall improvements in cloning by any ban on SCNT in the U. S. A ban on nonreproductive SCNT can only strike a blow against those who suffer. Viewed from the perspective of years hence, the measure of damage wrought by a ban on use of SCNT in research would be the amount of suffering that could have been relieved if our extensive research enterprise had joined the worldwide effort to benefit from embryonic stem cells and cellular reprogramming.

**Tightening a Ban on Reproductive Cloning Without Overbreadth**

The prohibition of proposed 18 U.S.C. §302(a) set forth in H. R. 1644 extends to SCNT that produces an embryo "at any stage of development." This would bar all presently envisioned research use of SCNT, which produces and grows embryos to the blastocyst stage (day 5 of development). The prohibition would bar SCNT even for therapy. Thus if scientists learn how to use eggs to accomplish autologous transplants, the clinical implementation of this boon for sick patients would be a crime. No comfort can be taken from mention in H. R. 1644 (in §2, clause [9] and proposed 18 U.S.C. §302[d]) of research that the bill would not prohibit. We are told that the prohibition does not extend to "nuclear transfer or other cloning techniques" to produce, *inter alia,* "cells other than human embryos." But the sundry methods other than SCNT for producing copies of various life forms—methods that vary by life form even though some commentators (and the bill) lump them all under the name "cloning"—are not within the scope of the prohibition in the first place.

For the moral reasons that I have now recounted, if Congress were to thwart nonreproductive SCNT, that move would disserve morality. It would thwart our ability to fulfill our duty to aid those in need. If Congress chooses to legislate against reproductive cloning, I recommend the following four statutory features to preserve the availability of nonreproductive SCNT while tightening the proscription of reproductive cloning.

(1) The offense may be defined as

> "intentional transfer to a uterus of an embryo created by somatic cell nuclear transfer."

This would paint without using too broad a brush. "Intentional" assures that, as is appropriate in defining a crime, accidental conduct is not punished. Congress could consider making reckless transfer a lesser offense.

(2) It may also be provided that

> "A physician shall not effect intrauterine transfer of an embryo unless the embryo was (i) created in a laboratory under the physician's control or (ii) received from a licensed physician accompanied by a certificate that the embryo was created, without use of SCNT, in a laboratory under the latter physician's control."

This provision assures that fertility clinicians will know the means by which any embryos that they transfer to a uterus were created. It blocks the possibility of a woman inveigling an unwitting fertility clinician into a transfer into her of an SCNT-created embryo carried into the clinic by her. The transferability provision of (ii) allows a scenario such as the following. A woman engages an IVF procedure in Connecticut, then later moves to Oregon. By virtue of (ii), her frozen embryos may be sent to an Oregon fertility clinician for intrauterine transfer. She will not have to return to Connecticut for that procedure.

(3) In the preamble of H. R. 1644 appears language about what "many" think concerning morality. There exist many who believe many things. Rather than legislate morality, Congress could declare that it is prohibiting a procedure that would effectively constitute a clinical experiment with a probable success rate that is unacceptably low. This is consistent with H. R. 2172 in that the enactment becomes part of the federal scheme of regulation of drugs and medical devices.

(4) Within the several states have already been enacted a potpourri of interdictions pertinent to this technological genre. We can expect more such statutes. Only preemptive federal legislation can assure a uniform norm, at least within the U. S. It behooves us, for the sake of the public health, to foster a reliable basis of expectations for those making decisions about where to direct research efforts. This especially applies to young scientists who wisely shun fields of work whose regulatory environment is unstable. (Here it may be added that we should be grateful for the commendable caution of senior scientists who, upon discovering the techniques of nonreproductive embryo creation, have evoked an open moral discussion. This follows a pattern in the recent history of science, of which the introduction of recombinant DNA technology is another example, in which the bright light of public exposure shines early on morally sensitive innovations by virtue of their discoverers' candor and alertness to moral questions.) For preemptive legislation, precedent obtains. We look to the Food and Drug Administration, not to the several states, for a national system of regulating drugs and medical devices.

**Conclusion**

The burden of my testimony today is that it would disserve the cause of morality, disserve fulfillment of our duty to come to the aid of those who suffer, if any government action, whether a proscription of conduct or a constraint on the public purse, were to thwart nonreproductive SCNT.

When I speak of morality, I refer to the intersection of the leading moral views of our time—including especially those sometimes imagined to hold otherwise—whose common kernel holds it virtuous to relieve suffering in actual lives when we can do so at no cost in potential lives.

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