

NOTE

And “Cloning” Makes Three: A Constitutional Comparison Between Cloning and Other Assisted Reproductive Technologies

by STEPHANIE J. HONG*

Table of Contents

I. Introduction	742
II. Background	744
A. What is cloning?	744
1. History	744
2. The “Dolly” Technology and Its Significance ...	746
B. Other Assisted Reproductive Technologies (“ART”)	748
III. Analysis.....	751
A. Constitutional Issues Facing the Other ART.....	752
1. Artificial Insemination (“AI”)	752
2. In Vitro Fertilization (“IVF”).....	755
3. Surrogacy	757
B. Constitutional Implications of Cloning.....	760
1. Right to Privacy	760
2. Commerce Clause	761
3. Takings Clause.....	762
a. Personhood v. Property.....	762
b. Clone Analogy for Takings Analysis.....	764
4. Right of Scientific Inquiry	765
C. Ethical Considerations of Cloning	766
1. Harms of Cloning.....	766
a. Harms to the Child	766
b. Harms to the Family.....	768

* J.D., University of California, Hastings College of the Law, 1999. B.A., University of California, Berkeley, 1995. My heartfelt thanks to William and Margaret Hong, Ted Hong, and Jeff Shieh for their encouragement and support.

c.	Abuses of Technology	771
d.	Harms to Society	774
2.	Benefits	778
a.	Treating Infertility	778
b.	Organ and Tissue Source	780
c.	Gene Therapy	781
d.	Other Potential Scientific Advances	782
IV.	Proposed Legal Framework for Cloning	783
A.	Summary of Legislative Action	783
B.	Constitutional Precedent Lacking	784
C.	Complete Ban Unjustified	785
D.	Continue Research While Monitoring	786
E.	Engage Public Discussion	787
V.	Conclusion	788

*"[T]he clone is reduced to the level of a product made, rather than a person begotten."*¹

*"God made man in his own image. God intended man to become one with God. . . . Cloning and the reprogramming of DNA is the first serious step in becoming one with God."*²

I. Introduction

Since the first test-tube baby was born in 1978,³ society and medical technology have combined to yield numerous technologies with which a child may be born beyond traditional reproductive means. Each new method has led to litigation and judicial interpretation of issues concerning procreation.⁴ These procreative rights necessarily implicate the Constitution.⁵ However, more subtle constitutional in-

1. Kenneth D. Pimple, *Religious, Philosophical, and Ethical Perspectives on Cloning: The Ethics of Human Cloning and the Fate of Science in a Democratic Society*, 32 VAL. U. L. REV. 727, 731 (1998) (quoting Cardinal John O'Connor, *Diminished Humanity*, in REFLECTIONS (Program for Ethics, Sci., & the Env't, Oregon State University), May 1997, at 13).

2. *All Things Considered* (NPR radio broadcast, Jan. 6, 1998) (statement of physicist Richard Seed), available in 1998 WL 3643278.

3. See *Milestones of the Century*, TIME, April 13, 1998, at 87.

4. See *Davis v. Davis*, 842 S.W.2d 588 (Tenn. 1992); *In the Matter of Baby M*, 537 A.2d 1227 (N.J. 1988) (finding a surrogacy contract invalid because of conflicts with state law and public policy); *York v. Jones*, 717 F. Supp. 421, 424-25 (E.D. Va. 1989) (holding that a fertility clinic agreeing to retain frozen pre-zygotes for donor-clients has an obligation to return frozen pre-zygotes upon termination of the agreement).

5. See *Eisenstadt v. Baird*, 405 U.S. 438, 453 (1972) (finding that the decision to have a child is a fundamental right necessarily included in one's right of privacy). See also *Skinner v. Oklahoma*, 316 U.S. 535, 535-41 (1942) (upholding procreation as a fundamental right while ruling that Oklahoma's Habitual Criminal Sterilization Act violated the Equal Protection Clause).

terests may arise under the Commerce Clause and Fifth Amendment Takings Clause.⁶ The recent cloning of "Dolly" the sheep⁷ and its potential implications for the cloning of human beings have thrust these issues into the forefront of society's collective mind.

In the past, advances in constitutional law have not kept pace with the phenomenal advances in the biological sciences. In fact, the text of the Constitution "provides no guidance" on "how scientific change in particular," and "social change in general," should impact the interpretation of constitutional guarantees or prohibitions.⁸ Especially with the new methods of intervening in the reproductive process, some fear that advancements in biological knowledge may lead to the denigration of individual rights.⁹ These new reproductive technologies have also led to concerns about the potential restrictions upon a woman's privacy and liberty interests when biological reproduction is made distinct from the social elements of parenting.¹⁰

Despite these constitutional concerns, these reproductive technologies remain legally permissible. The introduction of cloning, however, has been met with resistance far greater than that of previous techniques. Because cloning offers the possibility of creating numerous, yet identical, human beings that are "made to order," this technology is "uniquely disturbing" and representative of science's "unrestrained quest for mastery over nature for the sake of knowledge, power, and profits."¹¹ Hence, a comparison of these reproductive methods provides insight into how previous methods have been legally permissible while the current tide of public sentiment urges against allowing human cloning.

This Note compares the similarities and differences, constitutionally speaking, between cloning and other assisted reproductive technologies. Part II provides the basic scientific background regarding cloning and several assisted reproductive technologies. By learning the details of the different methods, we can precisely understand the

6. See Marianne Lavelle, *Clone Bills, Clone Suits*, Apr. 7, 1997 NAT'L L.J. A14.

7. See George J. Annas, *Human Cloning: Should the United States Legislate Against It? Yes: Individual Dignity Demands Nothing Less*, 83 May A.B.A. J. 80, 80 (1997).

8. Sheila Jasanoff, *Biology And The Bill Of Rights: Can Science Reframe the Constitution?*, 13 AM. J.L. & MED. 249, 254 (1987). The only explicit mention of science in the Constitution is the authorization "[t]o promote the Progress of Science and useful Arts" by granting exclusive rights to authors and inventors in their works for a limited time. U.S. CONST. art. I, § 8, cl. 8.

9. See Jasanoff, *supra* note 8, at 253.

10. See *id.*

11. *Scientific Discoveries and Cloning: Challenges for Public Policy Before the Subcomm. on Public Health and Safety of the Senate Comm. on Labor and Human Resources*, available in 1997 WL 8221174 (1997) [hereinafter *Scientific Discoveries and Cloning*] (testimony of George J. Annas, Founder of Law, Medicine, and Ethics Program at Boston University School of Public Health).

steps of embryo creation and, thus, delineate the constitutional rights related to each method. Part III discusses the various constitutional issues raised by the four major techniques of assisted reproductive technologies: artificial insemination, in vitro fertilization, surrogacy contracts, and human cloning. Necessary to the consideration of cloning as a new reproductive method is reflection upon the potential ethical harms and benefits of cloning. By comparing the constitutional ramifications of the other assisted reproductive technologies with cloning as well as taking into account the ethical concerns cloning poses, this Note suggests that human cloning is constitutionally permissible within certain legal parameters. Finally, Part IV proposes a plausible legal framework within which cloning can be utilized in accordance with constitutional theory and societal values.

II. Background

While the term "cloning" has been used recently to describe the technological breakthrough of a sheep clone in Scotland, its scientific meaning actually encompasses several different reproductive technologies. In order to understand the current scientific ramifications of "Dolly," one must recognize the various stages and advancements of cloning after which one can knowledgeably compare cloning with the range of other reproductive techniques available.

A. What Is Cloning?

1. History

The idea of cloning emerged in 1938 with Hans Spemann, a human embryologist.¹² Then in 1952 and 1962, respectively, scientists first cloned frog embryos and adult frogs.¹³ Finally, the more difficult mammalian effort was a success with the first cloned mice in 1979.¹⁴

The introduction of cloning into the national arena came in the early 1970s when recombinant DNA ("rDNA") and gene-splicing techniques were developed.¹⁵ By using rDNA, scientists isolate a specific piece of an individual's DNA sequence and splice it into another individual's DNA sequence,¹⁶ hence the name gene-splicing. The second individual develops in accordance with the new DNA's genetic

12. See Clarke D. Forsythe, *Legal Perspectives On Cloning: Human Cloning and the Constitution*, 32 VAL. U.L. REV. 469, 480 (1998).

13. See *id.*

14. See *id.*

15. See Barry J. Swanson, *The Federal Courts and the Constitution*, 84 MICH. L. REV. 658, 659 (1986) (reviewing IRA H. CARMEN, *CLONING AND THE CONSTITUTION: AN INQUIRY INTO GOVERNMENTAL POLICYMAKING AND GENETIC EXPERIMENTATION* (1985)).

16. See John R. Harding, Jr., *Beyond Abortion: Human Genetics and the New Eugenics*, 18 PEPP. L. REV. 471, 475 (1991) (citing PRESIDENT'S COMMISSION FOR THE STUDY OF

directions. Through gene-splicing, even DNA from different species may be combined.¹⁷ Thus, the offspring combinations resulting from crossing various species are limitless. These possibilities of manipulating genes and controlling the "production" of humans could conjure up fantastic images of armies of identical automatons and could serve as the impetus for international discussion. While this technology struck fear in some, it also provided scientists with the hope of predicting "both an individual's expected performance as well as the performance of future generations."¹⁸ Concurrently, these experiments could modify the collective set of existing human genes, known as the "gene pool."¹⁹

However, any broad-based interest in the rDNA technique being used to "copy" humans was tempered by several factors. First, even in the mid-1980s, the technology was only capable of use in a single-gene context.²⁰ That is, the technique could only be used to change a genetic trait if that particular trait was controlled by just one gene.²¹ But, if a genetic trait was controlled by more than one gene (a polygenetic trait), the technology was more difficult to utilize. Second, knowledge about the more complex, polygenetic traits was scarce; scientists were unable to trace many traits to their origins located on various genes.²² Thus, there were even fewer applications of gene-splicing to polygenetic traits. Finally, the data was still in its primitive stages and scientists were not ready to use human beings as recipients of the isolated gene(s). At that time, cloning humans through this method appeared a distant possibility.

Then in 1993, researchers from the George Washington University Medical Center released findings of the first reported experiment involving the cloning of human embryos through a process called blastomere separation.²³ Blastomere separation was not a new technique.²⁴ It had been successfully used on animals for over twenty

ETHICAL PROBLEMS IN MEDICINE AND BIOMEDICAL AND BEHAVIOR RESEARCH, SPLICING LIFE 9 (1982)).

17. *See id.* (citing BIOLAW 104 (1989)).

18. *Id.* at 476 (citing Louis J. Elsas II, *A Clinical Approach to Legal and Ethical Problems in Human Genetics*, 39 EMORY L.J. 811, 815 (1990)).

19. Jan Ziegler, *Battle of the Potato Field Highlights Future of Genetic Engineering*, U.P.I., Aug. 13, 1984, available in LEXIS, Nexis Library, Wires file.

20. *See* BURKE K. ZIMMERMAN, *BIOFUTURE: CONFRONTING THE GENETIC ERA* 192 (1984).

21. *See id.*

22. *See id.*

23. *See* Gina Kolata, *Scientist Clones Human Embryos, and Creates an Ethical Challenge*, N.Y. TIMES, Oct. 24, 1993, at A1.

24. *See id.* *See also* Jerry Adler et al., *Clone Hype*, NEWSWEEK, Nov. 8, 1993, at 60; Philip Elmer-DeWitt, *Cloning: Where Do We Draw the Line?*, TIME, Nov. 8, 1993, at 64; Kathy Sawyer, *Researchers Clone Human Embryo Cells; Work is "Small Step" in Aiding*

years.²⁵ Nevertheless, the application to human embryos renewed public concern.²⁶

The process of blastomere separation begins with the creation of an embryo for cloning. To do this, the female receives hormones to stimulate the ovaries into producing more eggs.²⁷ If the hormones are successful, a doctor removes the eggs and places them in a petri dish or a test tube.²⁸ After five to twelve hours, semen is mixed with the eggs.²⁹ If fertilization occurs, an embryo is created. Then, following the procedure used at George Washington, the fertilized egg grows and divides into a two-cell embryo inside its natural membrane shell, or zona pellucida.³⁰ Each of these cells is a "blastomere."³¹ The scientist dissolves the natural zona pellucida,³² separates the two cells,³³ and then coats each cell with an artificial zona pellucida.³⁴ In theory, the new embryos are genetically identical to one another and each could be developed for implantation. The lead researcher in this project, Dr. Jerry L. Hall,³⁵ declared that he conducted the research only to increase success for couples using in vitro fertilization.³⁶ Although none of the embryos at George Washington survived longer than six days,³⁷ the actual "cloning" of the first human embryo through blastomere separation brought the fear, which had been initiated by gene-splicing, into clearer focus for the general population.

2. *The "Dolly" Technology and its Significance*

The recent cloning of an adult sheep named "Dolly" brought cloning into the international spotlight in February 1997.³⁸ The method employed by Scottish researcher Ian Wilmut involved ex-

Infertile, WASH. POST, Oct. 25, 1993, at A4; Rebecca Kolberg, *Human Embryo Cloning Reported*, 262 SCIENCE 652 (1993).

25. See J. Madeleine Nash, *They Clone Cattle, Don't They?*, TIME, Nov. 8, 1993, at 68.

26. See Adler et al., *supra* note 24, at 60.

27. See CARL WOOD, TEST-TUBE CONCEPTION 57 (1984).

28. See *id.* at 61.

29. See *id.* at 69.

30. See *The Science of Scrambling an Egg*, NEWSWEEK, Nov. 8 1993, at 62 [hereinafter *Scrambling*].

31. Karen Dawson, Introduction: An Outline of Scientific Aspects of Human Embryo Research, in EMBRYO EXPERIMENTATION: ETHICAL, LEGAL AND SOCIAL ISSUES 3, 4 (Peter Singer et al. eds., 1990).

32. See *Scrambling*, *supra* note 30, at 62.

33. See *id.*

34. See Kolberg, *supra* note 24, at 652; Adler et al., *supra* note 24, at 62.

35. See Debra Feuerberg Duffy, Note, *To Be or Not To Be: The Legal Ramifications of the Cloning of Human Embryos*, 21 RUTGERS COMPUTER & TECH. L.J. 189, 190 (1995).

36. See Mona S. Amer, Comment, *Breaking the Mold: Human Embryo Cloning and its Implications for a Right to Individuality*, 43 UCLA L. REV. 1659, 1660 (1996).

37. See Sawyer, *supra* note 24, at A4.

38. See Annas, *supra* note 7, at 80.

tracting genetic material from the body cell of an adult sheep and removing the nucleus from an unfertilized egg.³⁹ Researchers then inserted the extracted genetic material into an egg, implanted that egg into a female sheep, and allowed the egg to gestate and yield a genetically identical baby lamb.⁴⁰ The procedure is referred to as "somatic cell nuclear transfer" ("SCNT").⁴¹ This technique is unique because baby Dolly is an exact "twin" of an adult animal.⁴²

Scientists and the world immediately began discussing the possible application of SCNT to humans. Responding in March 1997 to this new development, President Clinton prohibited the use of federal funds for cloning humans⁴³ and requested the National Bioethics Advisory Commission ("NBAC" or the "Commission") review the ethical and legal issues associated with cloning technology.⁴⁴ On June 9, 1997, the Commission recommended a continuation of the ban on federal funding and encouraged the private sector to support this prohibition while cloning discussions proceeded.⁴⁵

Since then, the Dolly technology has been confirmed and utilized by scientists at the University of Wisconsin-Madison to clone five different species, including rhesus monkeys.⁴⁶ Although all the pregnancies ended in miscarriages, scientists were able to use the "Dolly" method to create viable embryos of a wide variety of animals.⁴⁷ Also, scientists at the University of Hawaii employed the Dolly technique in a more efficient way to clone several generations of mice.⁴⁸ Then, in December 1998, Japanese scientists employed a variation of the Dolly technology to successfully clone 8 calves out of 10 attempts.⁴⁹ In that same month, researchers in South Korea made

39. See Stephen A. Newman, *Human Cloning and the Family: Reflections on Cloning Existing Children*, 13 N.Y.L. SCH. J. HUM. RTS. 523, 524 (1997).

40. See *All Things Considered* (NPR radio broadcast, June 4, 1997), available in 1997 WL 12831736.

41. See NATIONAL BIOETHICS ADVISORY COMMISSION, CLONING HUMAN BEINGS: REPORT AND RECOMMENDATIONS OF THE NATIONAL BIOETHICS ADVISORY COMMISSION 1 (1997).

42. See *id.*

43. See Forsythe, *supra* note 12, at 469.

44. See *The Clone Age*, 83-Jul A.B.A. J. 68, 68 (1997).

45. See *Bioethics Commission Backs Federal Human Cloning Ban Pending More Study, Debate*, 1 NO. 15 MEALEY'S LITIG. REP.: BIOTECHNOLOGY (1997).

46. See *5 Species Cloned Using Cow's Eggs*, S.F. CHRON., Jan. 19, 1998, at A1.

47. See *id.*

48. See Ellen Ruppel Shell, *Cloning of Humans will be Inevitable; What Have We Done, Done, Done?*, CINCINNATI ENQUIRER, Jan. 5, 1999, at A6, available in 1999 WL 9417134; *Human Embryo Clone, S. Korean Team Claims*, SACRAMENTO BEE, Dec. 17, 1998, at A1, available in 1998 WL 22565589.

49. See David Derbyshire, *Made in Japan, A Herd of Cloned Calves*, DAILY MAIL, Dec. 8, 1998, at 9, available in 1998 WL 21418132. This 80% success rate is a vast improvement over the creation of Dolly after 277 attempts by the Scottish scientists. See *Japanese*

an unconfirmed claim that they used the University of Hawaii technique to clone a 30-year-old woman, yielding an embryo that developed to four cells before researchers stopped the experiment.⁵⁰

The primary significance of Dolly and her technological “offspring” is obvious: each development in cloning technology brings science one step closer to cloning human beings. Soon the question may not be “Can we?,” but “Should we?”⁵¹ Because human cloning is a potential method of reproduction and child-rearing is a goal in most societies, cloning is a development that many may encourage, or at least a technology in which many may desire more knowledge. Given this possible outcome and assuming cloning is an accepted form of reproduction,⁵² society must determine the extent to which the law should regulate human cloning.

B. Other Assisted Reproductive Technologies (“ART”)

A working knowledge of the various reproductive techniques is required before comparing the differences between cloning and other methods of reproduction. One common method of assisted conception is artificial insemination. This technique is not a new one. In fact, it has been used to reproduce animals for centuries.⁵³ Artificial insemination separates procreation from coital reproduction by inserting sperm into the uterus, cervical canal, or vagina of a woman.⁵⁴ Because this technique is relatively inexpensive and widely available,

Clone 8 Genetically Identical Calves from Cell of Single Adult Cow, TRANSPLANT NEWS, Dec. 17, 1998, available in 1998 WL 9525678.

50. See *Human Embryo Clone, S. Korean Team Claims*, supra note 48, at A1.

51. See *Humans Will Be Cloned—We Must Be Prepared*, S.F. CHRON., Mar. 23, 1997, at A8.

52. This is an assumption that not all may embrace, but this Note will argue in its support.

53. See Monica Shah, Note, *Modern Reproductive Technologies: Legal Issues Concerning Cryopreservation and Posthumous Conception*, 17 J. LEGAL MED. 547, 548 (1996).

54. See Christine A. Djalleta, Comment, *A Twinkle in a Decedent's Eye: Proposed Amendments to the Uniform Probate Code in Light of New Reproductive Technology*, 67 TEMP. L. REV. 335, 337 (1994). Artificial insemination encompasses two major categories. When the source of the semen is the woman's husband, this method is referred to as “artificial insemination by husband” (“AIH”). See Walter Wadlington, *Artificial Conception: The Challenge for Family Law*, 69 VA. L. REV. 465, 468-73 (1983). When the source of semen is from a male other than the woman's husband, the process is called “artificial insemination by donor” (“AID”), and the donor is generally paid for his contribution. See *id.* An additional subcategory, in which the semen is a combination of the husband's and other male's sperm, is called “artificial insemination, combined” (“AIC”). See Sue Teper & E. Malcolm Symonds, ARTIFICIAL INSEMINATION BY DONOR: PROBLEMS AND PERSPECTIVES, IN DEVELOPMENTS IN Human Reproduction and Their Eugenic, Ethical Implications 19 (C.O. Carter ed., 1983). This form of artificial insemination has fallen into disfavor because it causes ambiguity in the child's genetic history. See *id.*

15% of all infertile married couples employ this procedure.⁵⁵ Statistically, during a 12-month period between 1986 and 1987 in the United States, 172,000 women underwent artificial insemination, with an average cost of \$953 per patient.⁵⁶ Of those 172,000 women, 65,000 gave birth,⁵⁷ a nearly 38% success rate. Since its inception, a conservative estimate indicates that women in the United States have conceived over 500,000 children through artificial insemination.⁵⁸

A second common reproductive technique is in vitro fertilization. Literally translated as "in glass" fertilization, this technique involves retrieving an egg from a woman's ovaries, fertilizing that egg by mixing it with sperm, and implanting the fertilized egg in the mother's uterus.⁵⁹ The eggs are retrieved after drug stimulation, in which several eggs can be removed at once, or during a woman's normal menstrual cycle.⁶⁰ The eggs are removed through a procedure referred to as laparoscopy, or through a needle aspiration.⁶¹ These eggs can come from the woman who will ultimately carry the fertilized egg to term or from another donor woman.⁶² The fertilized ovum then develops into a two- to eight-cell preembryo, which is introduced to the uterus, where it will "hopefully implant and result in pregnancy."⁶³

About 50% of in vitro fertilization patients opt for cryopreservation—freezing their embryos for later use.⁶⁴ During cryopreservation, technicians cool and dehydrate the embryo in order to preserve the frozen embryo for an extended period of time.⁶⁵ A woman utilizes cryopreservation when several eggs are retrieved at once, resulting in

55. See Shah, *supra* note 53, at 549.

56. See *id.* (citing McAllister, *Defining the Parent-Child Relationship in an Age of Reproductive Technology: Implications for Inheritance*, 29 REAL PROP. PROB. & TR. 55, 59 (1994)).

57. See *id.*

58. See Katherine R. Guzman, *Property, Progeny, Body Part: Assisted Reproduction and the Transfer of Wealth*, 31 U.C. DAVIS L. REV. 193, 201 (1997) (citing ROBERT BLANK & JANNA MERRICK, HUMAN REPRODUCTION, EMERGING TECHNOLOGIES, AND CONFLICTING RIGHTS 86 (1995)).

59. See Shah, *supra* note 53, at 549-50.

60. See *id.* at 549.

61. See *id.* at 549-50.

62. See *id.* at 550.

63. *Id.* (citing McAllister, *supra* note 56, at 61).

64. See *id.* (citing McAllister, *supra* note 56, at 62).

65. See *id.* at 550. The process of cryopreservation involves placing the embryo in an aqueous medium. See *id.* (citing McAllister, *supra* note 56, at 62). Then, the embryo is treated with cryoprotectant, which replaces the water in the cells after dehydration. See *id.* (citing McAllister, *supra* note 56, at 62-63). The cryoprotectant prevents ice crystals from forming inside the cells, which may lead to tissue damage. See *id.* (citing McAllister, *supra* note 56, at 63). The embryo is cooled gradually to -80 degrees Celsius, and then transferred into liquid nitrogen, where it is quickly cooled to -196 degrees Celsius. See *id.* For thawing, the embryo is rehydrated with water and rinsed of the cryoprotectant prior to insertion into the uterus. See *id.*

numerous embryos.⁶⁶ By freezing the embryos, a woman prevents the need to implant all the embryos at the same time, which could lead to a multiple pregnancy.⁶⁷ In addition, it reduces the frequency in which a woman's eggs must be retrieved.⁶⁸ Finally, it facilitates the transfer of the embryo during a normal menstrual cycle instead of a drug-induced cycle, which renders the uterus less receptive to embryo implantation.⁶⁹ Up until 1990, it is estimated that sixty children were born from frozen embryos.⁷⁰

Still, there are additional reproductive technologies available, which are less widely used. In gamete intrafallopian transfer ("GIFT"), the unfertilized egg and sperm are placed directly into the woman's fallopian tube.⁷¹ If GIFT is successful, fertilization, cleavage, and implantation take place in the same way as with coital reproduction.⁷² In 1987 alone, at least forty-nine children were born through GIFT conception.⁷³ In 1989, GIFT yielded clinical pregnancy in 30% of its recipients, with a 23% delivery rate.⁷⁴

In zygote intrafallopian transfer ("ZIFT"), the egg is fertilized in vitro and then inserted into the woman's fallopian tubes.⁷⁵ Some physicians argue that placement of the zygote directly into the tube is a more physiologically correct approach because fertilization normally takes place in the fallopian tube.⁷⁶ In 1989, ZIFT procedures resulted in a 21% clinical pregnancy rate and a 17% delivery rate.⁷⁷

Another type of reproductive technology is uterine lavage and embryo transfer. In this procedure, the eggs are fertilized in the donor woman's body through insemination and allowed to remain there for five or six days.⁷⁸ Then, uterine lavage occurs by injecting a fluid

66. *See id.*

67. *See id.*

68. *See id.*

69. *See id.*

70. *See id.* at 551 (citing McAllister, *supra* note 56, at 63).

71. *See* LEON SPEROFF ET AL., CLINICAL GYNECOLOGIC ENDOCRINOLOGY AND INFERTILITY 931 (5th ed. 1994).

72. *See* Shah, *supra* note 53, at 551 (citing McAllister, *supra* note 56, at 64).

73. *See id.* (citing McAllister, *supra* note 56, at 64).

74. *See American Fertility Society, In Vitro Fertilization-Embryo Transfer (IVF-ET) in the United States: 1989 Results from the IVF-ET Registry*, 55 FERTILITY & STERILITY 14, 18 (1991) [hereinafter *1989 IVF-ET Registry*].

75. *See* C. Staessen et al., *An 18-Month Survey of Infertility Treatment by In Vitro Fertilization, Gamete and Zygote Intrafallopian Transfer, and Replacement of Frozen-Thawed Embryos*, 6 J. IN VITRO FERTILIZATION & EMBRYO TRANSFER 22, 24 (1989).

76. *See id.* at 28.

77. *See 1989 IVF-ET Registry*, *supra* note 74, at 19.

78. *See* Jean Macchiaroli Eggen, *The "Orwellian Nightmare" Reconsidered: A Proposed Regulatory Framework for the Advanced Reproduction Technologies*, 25 GA. L. REV. 625, 642 (1991).

via a transcervical catheter to release the embryo for transfer.⁷⁹ The final step of transfer can only occur when the recipient's ovulatory cycle is synchronized with the donor's cycle.⁸⁰ As of 1996, four children have been born using this technique.⁸¹ A possible drawback is that sometimes the embryo is not successfully flushed out of the donor's uterus, forcing the donor to proceed with the pregnancy.⁸²

Finally, one method integrates these previously mentioned reproductive techniques with private contracting to facilitate the birth of a child. This method is referred to as third-party assisted reproduction, or surrogacy. In surrogacy, a third party female agrees to act as the gestational carrier for a couple who may be able to create a healthy embryo, but is otherwise medically unable to carry that embryo to term.⁸³ The couple's embryo would be created through in vitro fertilization and then implanted in the uterus of the surrogate mother, who agrees to give the offspring back to the couple. Considering the various permutations of parental actors, surrogacy may involve donor gametes from both members of the infertile couple, from two entirely unrelated individuals, or any combination thereof.⁸⁴

III. Analysis

A careful comparison of these reproductive technologies requires a detailed delineation of the constitutional rights and issues implicated by these techniques. By comparing the constitutional concerns raised by each technology, one can begin to understand the similarities and differences between cloning and other ART, and thus reach a more informed decision about whether society at-large is prepared to accept human cloning as a form of ART. Because case law on ART is relatively new and scarce, this analysis represents both issues interpreted by the courts and issues derived from examination by the academy.

79. *See id.*

80. *See id.*

81. *See Shah, supra* note 53, at 551.

82. *See id.*

83. *See Eggen, supra* note 78, at 640. The common situations requiring a gestational carrier would be an inadequate or absent uterus or a medical condition that would render gestation an unacceptable risk of harm to the woman. *See Ethics Committee of the American Fertility Society, Ethical Considerations of the New Reproductive Technologies*, 53 FERTILITY & STERILITY 1S, 64S (Supp. 2 1990).

84. Recall, for instance, that in the widely-publicized case of Baby M, the child was conceived through a combination of the gestational carrier's genetic material and the sperm from the husband of the infertile couple. *See In the Matter of Baby M*, 537 A.2d 1227 (N.J. 1988). These various combinations, however, are critical in designating the legal parental rights of the parties involved.

A. Constitutional Issues Facing the Other ART

While this Note describes a range of several reproductive technologies, the constitutional inquiry focuses upon the more-established and broad techniques of artificial insemination, in vitro fertilization, and surrogacy vis-à-vis cloning. The three former techniques most accurately represent the general reproductive methods discussed by the courts and academics. They also create the broad categories into which the remaining reproductive techniques tend to fit because of similarities in scientific procedure and genetic source material.

1. Artificial Insemination ("AI")

The constitutional questions arising from AI serve as a starting point to a discussion of issues facing all the assisted reproductive technologies. First, debates over ART center upon the constitutional right to privacy.⁸⁵ Specifically, the question of whether the putative parents have the fundamental right to dispose of their embryos as they choose stems from the individual right to privacy.⁸⁶ Generally, this right to privacy has been implicated in the constitutional discussions relating to family, marriage, contraception, and abortion.⁸⁷ Because reproductive technologies include reference to these topics, the right to privacy is a necessary component implicated in the discourse on assisted reproductive technologies.

In *Griswold v. Connecticut*, the United States Supreme Court recognized a constitutional right to privacy.⁸⁸ Although not specifically enumerated in the Constitution, this right to privacy stems from the "penumbras" of "specific guarantees in the Bill of Rights."⁸⁹ These penumbras emanate from the following constitutional provisions: the right of association⁹⁰, the prohibition against quartering of soldiers,⁹¹ the right to be secure in your person and home,⁹² the right against self-incrimination,⁹³ and the holding that enumeration in the Constitution does not deny rights retained by the people.⁹⁴ Specifically, the Court in *Griswold* declared that the right to privacy includes the right

85. See *Eisenstadt v. Baird*, 405 U.S. 438 (1972); *Griswold v. Connecticut*, 381 U.S. 479 (1965).

86. See Kim Schaefer, Comment, *In-Vitro Fertilization, Frozen Embryos, and the Right to Privacy—Are Mandatory Donation Laws Constitutional?*, 22 PAC. L.J. 87, 98 (1990).

87. See *Roe v. Wade*, 410 U.S. 113 (1973); *Eisenstadt*, 405 U.S. 438; *Loving v. Virginia*, 388 U.S. 1 (1967); *Griswold*, 381 U.S. 479; *Skinner v. Oklahoma*, 316 U.S. 535 (1942).

88. See 381 U.S. 479.

89. *Id.* at 484.

90. See U.S. CONST. amend. I; *Griswold*, 381 U.S. at 484.

91. See U.S. CONST. amend. III; *Griswold*, 381 U.S. at 484.

92. See U.S. CONST. amend. IV; *Griswold*, 381 U.S. at 484.

93. See U.S. CONST. amend. V; *Griswold*, 381 U.S. at 484.

94. See U.S. CONST. amend. IX; *Griswold*, 381 U.S. at 484.

of married couples to use contraceptives.⁹⁵ Along with the right to prevent reproduction, the Court has also found that the right to privacy necessarily extends to the right to procreate.⁹⁶ Continuing with this line of reasoning, the Court in *Eisenstadt v. Baird* recognized a right to procreate in single individuals, not only married couples.⁹⁷ In broadening this right even further, the Court has determined in *Roe v. Wade* that a woman has a right to decide whether to terminate a pregnancy.⁹⁸ In fact, the Court found that this type of privacy right derives from the Fourteenth Amendment⁹⁹ and includes a woman's right to have an abortion.¹⁰⁰ Furthermore, the Court has found that decisions concerning procreation, contraception, marriage, child-rearing, and family relationships are personal ones, which may be made without government interference.¹⁰¹ To justify the regulation of fundamental rights,¹⁰² such as the right to privacy, the government bears the burden of demonstrating a compelling state interest.¹⁰³

The Court has found this right to be nearly inviolate in the context of the right to procreate. Furthermore, lower courts have supported the ideal that this fundamental right to privacy encompasses non-coital reproduction. In *Lifchez v. Hartigan*,¹⁰⁴ the court invalidated a law which restricted the treatment of embryos and found that concomitant with the right to contraception is the "right to submit to a medical procedure that may bring about, rather than prevent, pregnancy."¹⁰⁵ The *Lifchez* court reasoned that because there is no compelling state interest which prevents a woman from attaining an

95. See 381 U.S. at 485.

96. See *Skinner v. Oklahoma*, 316 U.S. 535, 541 (1942).

97. See 405 U.S. 438, 443 (1972). There, Justice Brennan provided in dicta that "[i]f the right of privacy means anything, it is the right of the individual, married or single, to be free from unwarranted governmental intrusion into matters so fundamentally affecting a person as the decision whether to bear or beget a child." See *id.* at 453.

98. See 410 U.S. 113, 154 (1973).

99. U.S. CONST. amend. XIV, § 1 ("No State shall . . . deprive any person of life, liberty, or property, without due process of law . . .").

100. See *Roe*, 410 U.S. at 153.

101. See *Carey v. Population Serv. Int'l*, 431 U.S. 678, 685 (1977).

102. In terms of constitutional doctrine, the finding of a fundamental constitutional right is critical to attaining strict scrutiny analysis. When a right is fundamental, a statute that limits that right can be upheld only if it passes the strict scrutiny standard proving that (1) the state's objective is "compelling" and (2) the statute is "necessary" to the accomplishment of that objective. See *Griswold*, 381 U.S. at 497 (Goldberg, J., concurring). However, if the implicated right is not fundamental, the statute may only be struck down if it is "arbitrary or without reasonable relation" to some state purpose. *Meyer v. Nebraska*, 262 U.S. 390, 400 (1923). Thus, if new assisted reproductive technologies implicate a fundamental right, statutes regulating these technologies would be subject to the higher strict scrutiny standard.

103. See *Carey*, 431 U.S. at 686.

104. 735 F. Supp. 1361 (N.D. Ill. 1990).

105. *Id.* at 1377.

abortion in the first trimester of pregnancy, there is also no compelling interest to infringe upon other protected reproductive activities in the same period.¹⁰⁶ More explicitly, in *Cameron v. Board of Education*,¹⁰⁷ the court held that the Supreme Court's right to privacy jurisprudence guarantees a woman's right of control over her reproductive functions, thereby ensuring her right to impregnate herself through artificial insemination.¹⁰⁸ Indeed, at least one scholar has argued that the Supreme Court's protection of the right to procreate via coital reproduction must extend to non-coital reproduction because both methods concern creating a child and a family to raise that child, and both support the value and intent of having children.¹⁰⁹

The Supreme Court's right to privacy cases construct a nearly impermeable right to procreate. Supported by lower court decisions which hold that procreative rights extend specifically to artificial insemination and most likely other ART,¹¹⁰ AI and human cloning are likely constitutionally protected forms of reproduction which may only be infringed upon with a showing of compelling state interest. Such compelling interest would be difficult to prove because of its probable basis upon subjective ethical and moral rationales that argue to prevent the birth of a healthy child.¹¹¹ Nearly any argument against the birth of healthy children is dubious in a society which clearly values building families through progeny.

Another consideration is that artificial insemination is not necessarily reproduction in the purest sense of the term. In the typical AI setting, a husband whose wife is impregnated by the sperm of another man, and who later participates in the birth of that child, is not that child's biological father.¹¹² The use of a syringe instead of sexual intercourse "does not alter the biological facts in any way."¹¹³ Rather than reproducing in the way that is traditionally understood, the husband is acting as the adoptive father, raising the child conceived from another man.¹¹⁴ This appears to be an exercise of the procreative right of the mother because she is now bearing a child conceived of her own genetic contribution. In terms of the husband, however, the

106. *See id.*

107. 795 F. Supp. 228 (S.D. Ohio 1991).

108. *See id.* at 237.

109. *See* Lawrence Wu, Note, *Family Planning Through Human Cloning: Is There a Fundamental Right?*, 98 COLUM. L. REV. 1461, 1491 (1998).

110. *See Cameron*, 795 F. Supp. at 237; *Lifchez*, 735 F. Supp. at 1377.

111. *See* Paul Tully, Comment, *Dollywood Is Not Just a Theme Park in Tennessee Anymore: Unwarranted Prohibitory Human Cloning Legislation and Policy Guidelines for a Regulatory Approach to Cloning*, 31 J. MARSHALL L. REV. 1385, 1412 (1998).

112. *See* Katheryn D. Katz, *Ghost Mothers: Human Egg Donation and the Legacy of the Past*, 57 ALB. L. REV. 733, 765 (1994).

113. *Id.*

114. *See id.*

constitutional issue is whether this form of reproduction actually involves him or not. If not, then perhaps the fundamental right to procreate is not implicated at all in his situation. In which case, any regulation of artificial insemination pertaining to the husband might not be subject to judicial strict scrutiny.¹¹⁵

2. *In Vitro Fertilization ("IVF")*

In vitro fertilization differs from artificial insemination by allowing not only the sperm to be acquired from a donor (who need not be the husband), but also allows the egg contribution to come from someone other than the gestational carrier. Because the scientific theory behind IVF is so similar to that of AI, the previous discussion of procreative liberty and the definition of reproduction also applies in the context of *in vitro* fertilization.

Currently, there is only one federal law, the Fertility Clinic Success Rate and Certification Act of 1992 ("the Act"), pertaining directly to assisted reproductive technologies.¹¹⁶ The Act has two basic parts. First, the Act requires all assisted reproductive technologies programs to report pregnancy success rates to the Secretary of Health and Human Services through the Centers for Disease Control ("CDC").¹¹⁷ These success rates would, in turn, be made available to the public,¹¹⁸ who were misled by these statistics when reporting was only voluntary.¹¹⁹ Second, the Act directs the CDC to develop a model program that each state could adopt regarding the certification of embryo laboratories.¹²⁰ Furthermore, the Act requires that this program provide for inspections to check for compliance with certification requirements.¹²¹ The standards of these requirements would be established so as to ensure consistent performance of ART procedures, accurate recordkeeping at certified labs, and quality assurance.¹²² These inspection results would also be available to the

115. Of course, this line of reasoning would not apply to those situations in which the wife is artificially inseminated with semen donated by her husband.

116. See 42 U.S.C. § 263a-1 to a-7 (1992).

117. See *id.* at § 263a-1(a)(1).

118. See *id.* at § 263a-5(1)(A). One of the purposes behind the Act was to standardize the reporting of success rates. See *id.* To do so, the Act has defined the "pregnancy success rate" as the ratio between the number of live births and the number of oocyte retrievals or ovarian stimulations completed in any one ART center. See *id.* at §263a-1(b)

119. See *Fertility Clinic Services: Hearing before Subcomm. on Health and the Env't of the House Comm. on Energy and Commerce*, 102d Cong. 102-120 (1992) [hereinafter *Hearing*] (indicating that often infertile couples are misled because success rates vary depending upon the measuring factors employed by individual clinics).

120. See 42 U.S.C. § 263a-2(a)(1).

121. See *id.* at § 263a-2(g).

122. See *id.* at § 263a-2(d).

public.¹²³ This process would hopefully meet the objective of increasing public confidence in these technologies and improving the overall quality of care on a national level.¹²⁴

Regrettably, the Act's reforms are not particularly novel or efficacious because "they are mostly a codification of existing practices."¹²⁵ Over ninety percent of ART facilities already voluntarily relate their success rates to the Society for Assisted Reproductive Technology.¹²⁶ Such results are published in a periodical that does not list success rates for individual clinics, but provides general statistics by summarizing data from all reporting clinics.¹²⁷ Similarly, the Act does not require publication of rates from individual clinics, but only publication of the names of individual clinics that do not report their success rates.¹²⁸ Also, the Act fails to offer guidance regarding the status of the embryo, embryo contract enforceability, and resolution of disputes over embryo disposition.¹²⁹

Thus, because the body of federal law concerning ART is scarce, this area of science is ripe for extensive regulation and legislation.¹³⁰ Legislation may be needed as the applications of ART expand beyond the traditional couple seeking to have a family. For example, people might conceive a child to act as a genetic or organ donor or to sell to infertile couples. Such legislation could originate under the auspices of the Congress' commerce power.¹³¹

The IVF technique is not a mere medical procedure, but involves the highly emotional decision of child-bearing. Couples entering a reproductive technology program may have exhausted all other types of treatment and thus may be "emotionally, physically, and financially

123. See *id.* at § 263a-5.

124. See *Hearing, supra* note 119, at 49 (statement of Leon Speroff, President of the American Fertility Society).

125. Judith F. Daar, *Regulating Reproductive Technologies: Panacea or Paper Tiger?*, 34 *HOUS. L. REV.* 609, 643 (1997).

126. See *Hearing, supra* note 119, at 17.

127. See Daar, *supra* note 125, at 643.

128. See 42 U.S.C § 263a-5.

129. See Nicole L. Cucci, Note, *Constitutional Implications of In Vitro Fertilization Procedures*, 72 *ST. JOHN'S L. REV.* 417, 434 (1998). See Part III. B for a discussion of the proposed classifications for the status of frozen embryos. See generally Cucci, *supra*, for a fuller discussion of the enforceability of embryo contracts and resolution of embryo disposition disputes, which is beyond the scope of this Note.

130. Only a handful of states have expressed a legal opinion about ART by passing laws related to the practice and scope of ART. See Daar, *supra* note 125, at 646. Those states include California, New Hampshire, Pennsylvania, and Virginia. See *id.* at 646-51.

131. See U.S. CONST. art. I, § 8, cl. 3 ("The Congress shall have Power . . . [t]o regulate Commerce with foreign Nations, and among the several States . . ."). See also Part III. B. 2 for an explanation of the Commerce Clause doctrine.

depleted.”¹³² While fertility clinics are located in individual states, couples may travel to another state to undergo these medical procedures or seek to have cryopreserved embryos transported across state boundaries.¹³³ Understanding that the use of IVF requires a substantial expenditure on the part of the hopeful parents,¹³⁴ the crossing of state boundaries to facilitate treatment renders IVF a perfect candidate for federal regulation under the interstate commerce power.¹³⁵

3. Surrogacy

Employing a surrogate mother as a reproductive technique takes the technology of IVF or AI and adds the variable of private contracting. That is, surrogacy involves a woman who, by the terms of a contract, agrees to undergo artificial insemination or in vitro fertilization, to carry a baby to term, and to release that child to the couple after birth, usually in return for a fee.¹³⁶ Hence, the prior discussion of constitutional issues facing IVF and AI, and their coterminous problems, is incorporated in the constitutional implications of surrogate mothering.¹³⁷

132. Eggen, *supra* note 78, at 648-49; A. Lopata, et al., *Use of In Vitro Fertilization in the Infertile Couple*, in *THE INFERTILE COUPLE* 266 (R.J. Pepperell, et al., eds., 1987).

133. See *York v. Jones*, 717 F. Supp. 421 (E.D. Va. 1989).

134. In 1988, the IVF procedure cost \$6,700. See Shah, *supra* note 53, at 549.

135. See *U.S. v. Lopez*, 115 S. Ct. 1624 (1995) (holding that a regulation falls within Congress' commerce power if "the regulated activity 'substantially affects' interstate commerce"); see also *Wickard v. Filburn*, 317 U.S. 111 (1942); *Hammer v. Dagenhart*, 247 U.S. 251 (1918); *Champion v. Ames*, 188 U.S. 321 (1903). Congress might also enact laws under the "necessary and proper" clause. See U.S. CONST. art. I, § 8, cl. 1, 18 (providing that, "The Congress shall have Power . . . [t]o make all Laws which shall be necessary and proper for carrying into Execution the foregoing Powers, and all other Powers vested by this Constitution in the Government of the United States . . ."). This clause permits Congress to pass laws in order to facilitate the execution of the "foregoing powers," including the same Commerce power. See *id.*

136. See generally *Johnson v. Calvert*, 851 P.2d 776 (Cal. 1993); *In the Matter of Baby M*, 537 A.2d 1227 (N.J. 1988).

137. Note that this discussion does not include the proposition that surrogacy contracts may be unenforceable because they are against the common law notion of public policy. Polls show that the majority of people in the United States believe that surrogacy contracts should be enforceable and legal motherhood should be founded upon contractual intent. See *Poll Shows Most in U.S. Back Baby M Ruling*, N.Y. TIMES, Apr. 12, 1987, at A39 (citing New York Times-CBS Poll in which 69% of the 1045 adults polled said that surrogate mothers should have to abide by agreements to relinquish custody in favor of the intended parents). Nonetheless, only four states have laws making surrogacy arrangements enforceable: Florida, Nevada, New Hampshire, and Virginia. See FLA. STAT. ANN. § 742.15 (West 1994); NEV. REV. STAT. ANN. § 126.045 (Michie 1993); N.H. REV. STAT. ANN. § 168(B)(21) (1994); VA. CODE ANN. § 20-159 to 20-165 (Michie 1995). Surrogacy contracts are unenforceable in at least seven states: Arizona, Indiana, Louisiana, Michigan, Nebraska, North Dakota, and Tennessee. See ARIZ. REV. STAT. § 25-218(A) (1995); IND. CODE ANN. § 31-8-2-1 (Michie 1987); LA. REV. STAT. ANN. § 9:2713(A) (West 1995); MICH. COMP. LAWS ANN. § 722.855 (West 1995); NEB. REV. STAT. § 25-21, 200(1) (1994);

Case law indicates that constitutional concerns raised in the surrogacy framework may take a back seat to the “best interests” of the child.¹³⁸ For instance, in *Quillion v. Walcott*,¹³⁹ the Court held that a natural father does not have a constitutional right to block the adoption of his child born out of wedlock.¹⁴⁰ In *Quillion*, the natural father, Walcott, never developed a parental relationship or bond with the child.¹⁴¹ Because the stepfather, however, had developed such a relationship with the child, the Court found that adoption by the stepfather better served the child’s interests.¹⁴² The Court held that Walcott’s genetic link to the child was insufficient to outweigh the “best interests of the child.”¹⁴³ Applied in the surrogacy context, this holding might give intended fathers, regardless of their genetic ties or constitutional objections, the right to retain custody of the child as long as a social parent-child relationship existed.

The best interests of the child have also outweighed constitutional objections raised by both the Equal Protection Clause¹⁴⁴ and the Due Process Clause.¹⁴⁵ In *Caban v. Mohammed*,¹⁴⁶ for example, the Supreme Court struck down a New York statute that required the mother’s permission, but not the father’s, before adoption could occur.¹⁴⁷ The Court held that the statute, which only applied to children born out of wedlock, violated the Fourteenth Amendment’s Equal Protection Clause because it was constitutionally impermissible to dis-

N.D. CENT. CODE § 14-18-05 (1995); TENN. CODE ANN. § 36-1-102(46)(A) (1995). New York, Utah, Washington, and the District of Columbia have gone so far as to impose civil or criminal penalties on parties to such agreements. See N.Y. DOM. REL. LAW § 123 (McKinney 1995) (civil penalty for entering into agreement and felony for third parties who recruit or procure women to act as surrogates); UTAH CODE ANN. § 76-7-204(1)(d) (1995) (violation is a class B misdemeanor); WASH. REV. CODE ANN. § 26.26.250 (West 1996) (violation constitutes gross misdemeanor); D.C. CODE ANN. § 16-402 (1995) (civil penalty not to exceed \$10,000 and/or one year imprisonment for entering into, assisting, or inducing another to enter into a surrogate parenting contract).

138. See generally *Smith v. Organization of Foster Families*, 431 U.S. 816, 862-63 (1977) (Stewart, J., concurring).

139. 434 U.S. 246 (1977).

140. See *id.* at 255-56.

141. See *id.* at 256.

142. See *id.* at 255.

143. *Id.*

144. See *Caban v. Mohammed*, 441 U.S. 380, 392 (1979); see also *infra* notes 147-151 and accompanying text. The Equal Protection Clause of the Fourteenth Amendment provides, “No State shall . . . deny to any person within its jurisdiction the equal protection of the laws.” U.S. CONST. amend. XIV, § 1.

145. See *infra* notes 152-159 and accompanying text. The Due Process Clause states, “No State shall . . . deprive any person of life, liberty, or property, without due process of law” U.S. CONST. amend XIV, § 1.

146. 441 U.S. 380 (1979).

147. See *id.* at 392-94.

tinguish between unmarried mothers and unmarried fathers.¹⁴⁸ In so holding, the Court did, however, permit states to distinguish between parents who have formed relationships with their children and those who have not.¹⁴⁹ In *Caban*, the father had a nurturing relationship with his biological children since their births.¹⁵⁰ Hence, the Court distinguished those cases where the father developed no parental ties to the children from the father in *Caban* by stating that “where the father never has come forward to participate in the rearing of his child, nothing in the Equal Protection Clause precludes the State from withholding from him the privilege of vetoing the adoption of that child.”¹⁵¹ Once again, the Court places the child’s best interest before the supremacy of the Constitution.

Similarly, the best interests of the child have outweighed objections raised by parents under a due process examination as well.¹⁵² In *Lehr v. Robertson*,¹⁵³ the Court held that the presence of a biological relationship alone does not necessarily confer upon the biological parents the full range of parental rights.¹⁵⁴ In that case, Petitioner Lehr did not have any relationship with his biological daughter since her birth, and did not support her financially.¹⁵⁵ Lehr also failed to register with a “putative father” registry established by New York’s Department of Social Services,¹⁵⁶ which would give notice to registered putative fathers of adoption proceedings for their biological children.¹⁵⁷ In upholding the adoption order, the Court found that the state had not violated the father’s rights under the Due Process Clause.¹⁵⁸ The Court noted that if the biological father fails to take some responsibility for his child’s future by establishing a parent-child relationship, the “Federal Constitution will not automatically compel a State to listen to his opinion of where the child’s best interests lie.”¹⁵⁹ Here, as in the previously mentioned cases, the Supreme Court has found that constitutional rights will be enforced only to the extent that they dovetail with the best interests of the child.

With respect to the established forms of ART, as each new technology emerges, another layer of constitutional concern falls upon the

148. *See id.*

149. *See id.* at 392.

150. *See id.* at 382.

151. *Id.* at 392.

152. *See generally* U.S. CONST. amend XIV, § 1 (“[N]or shall any State deprive any person of life, liberty, or property, without due process of law . . .”).

153. 463 U.S. 248 (1983).

154. *See id.* at 261.

155. *See id.* at 252.

156. *See* N.Y. SOC. SERV. LAW § 372-c (McKinney 1992).

157. *See* Lehr, 463 U.S. at 251-52 n.5.

158. *See id.* at 265.

159. *Id.* at 262.

stage of reproductive technology. Beginning with artificial insemination, the major issues raised were the constitutional right to privacy and, consequently, right to procreate. Then, as in vitro fertilization was added to the reproductive toolbox, constitutional interests expanded to encompass the use of the Commerce Clause as a regulatory device. Finally, as surrogacy agreements have become a reproductive technique of last resort, we find the unique situation in which the child's best interests are often prioritized over secondary constitutional questions.

B. Constitutional Implications of Cloning

In the debate over whether cloning of human beings should be permitted by law, legislators, doctors, and citizens have all weighed in.¹⁶⁰ While President Clinton has expressed his position by urging Congress to ban human cloning,¹⁶¹ experts on law and medicine have stated that there will be challenges in the courts as soon as the government attempts to control human cloning research.¹⁶² A federal ban on cloning could potentially face several constitutional challenges. By exploring such potential challenges, one can better understand the future of human cloning.

1. Right to Privacy

First, like AI, IVF, and surrogacy, cloning of humans involves the right to procreate. Couples wanting children could use SCNT cloning technology to have a child and to create a family. Hence, the right to procreate established by case law in the Supreme Court¹⁶³ could theoretically protect a couple's right to have a child via human cloning. Yet, those who oppose cloning claim that it is not reproduction, but replication, and "represents a difference in kind[,] not in degree[,] in the manner in which human beings reproduce."¹⁶⁴ Those against cloning state that IVF is an improper analogy for cloning because IVF still involves the union of an egg and a sperm.¹⁶⁵ They argue that cloning, on the other hand, does not follow the traditional union of an egg and sperm to create an embryo, but instead copies another human being, leaving the analogy to IVF entirely inappropriate.¹⁶⁶ Thus, even assuming *arguendo* a constitutional and fundamental right to procreate

160. See Edwin Chen, *Clinton Urges Law on Cloning*, S.F. EXAMINER, Jan. 11, 1998, at A1; *Scientist Says He Plans to Clone Human*, S.F. CHRON., Jan. 7, 1998, at A2. See generally GREGORY E. PENCE, WHO'S AFRAID OF HUMAN CLONING? (1998).

161. See Chen, *supra* note 160, at A1.

162. See Lavelle, *supra* note 6, at A14.

163. See *supra* notes 88-111 and accompanying text.

164. *Scientific Discoveries and Cloning*, *supra* note 11.

165. See *id.*

166. See *id.*

exists, there remains the question of whether that right extends to the right to replicate via cloning. Granted that the end desire of producing a child is the same through cloning or other ART, the constitutional right to procreate can logically extend to human cloning.

Even if a person has a right to human cloning, that right may be infringed upon if that infringement is narrowly tailored to serve a compelling state interest.¹⁶⁷ The most likely arguments offered as state interests would be the protection of human life, psychological and physical harms, and morality.¹⁶⁸

2. Commerce Clause

Second, a federal ban on cloning might be challenged under the Interstate Commerce Clause.¹⁶⁹ The most recent judicial expression of the Commerce Clause doctrine states that Congress may regulate under its commerce power in the following three areas: (1) "channels of interstate commerce"; (2) "instrumentalities of interstate commerce"; and (3) "activities having a substantial relation to interstate commerce."¹⁷⁰ It is this third category of regulation that may be invoked if federal legislators attempt to pass a law limiting human cloning.

Historically, the Court has interpreted Congressional commerce power broadly. Hence, the Court does not second-guess Congress' legislative motives as long as they are constitutionally valid.¹⁷¹ Consequently, any serious challenge to a federal law banning cloning must present a strong case showing that human cloning does not have a substantial effect on interstate commerce. Given that couples travel to other states to benefit from established ART¹⁷² and that ART can be expensive to utilize,¹⁷³ this may be difficult to prove. Thus, regulation of ART (including cloning) could proceed under the Commerce Clause; any further limitations on cloning would need to be guided by legal and ethical considerations.

167. See Debra L. Moore, Comment, *Don't Rush to Judgment on "Dolly": Human Cloning and Its Individual Procreative Liberty Implications*, 66 U. MO. KAN. CITY L. REV. 425, 436 (1997).

168. See *id.* at 436-42. As discussed in Part III. C, many of these arguments are based upon a fear of highly speculative events, which can be remedied by the appropriate legislative framework.

169. See Lavelle, *supra* note 6, at A14 (quoting R. Alto Charo, member of the National Bioethics Advisory Commission).

170. *U.S. v. Lopez*, 115 S. Ct. 1624, 1629-30 (1995).

171. See *Champion v. Ames*, 188 U.S. 321 (1903) (holding that Congress' power to regulate interstate commerce is plenary and absolute, subject only to the limitations imposed by the Constitution).

172. See *York v. Jones*, 717 F. Supp. 421 (E.D. Va. 1989).

173. See *supra* note 134.

3. Takings Clause

Third, a new direction in ART might allow for challenging federal cloning legislation as a taking under the Fifth Amendment.¹⁷⁴ The Fifth Amendment provides that “private property [shall not] be taken for public use, without just compensation.”¹⁷⁵ Thus, the Fifth Amendment’s relevance to cloning turns upon whether a person’s clone represents genetic private property or an actual person. For if a clone is not private property, then a Fifth Amendment challenge would be moot.

a. Personhood v. Property

The personhood-property dichotomy has been addressed in the context of IVF.¹⁷⁶ The perspectives on this dichotomy are divided into three classifications. In the first category, proponents of the personhood view the claim that an embryo is alive because it is composed of living cells that have the elements necessary for a potential human life.¹⁷⁷ Accordingly, because embryos are considered human life, laws applied to embryos born alive are appropriate, and embryos are thus legally deemed children.¹⁷⁸ Hence, embryos would be treated as human beings for the purposes of a custody battle, under the best interests of the child doctrine.¹⁷⁹ The perspective that an embryo has individual legal rights is, however, inconsistent with constitutional jurisprudence.¹⁸⁰ In *Roe v. Wade*,¹⁸¹ for instance, the Supreme Court held that the “unborn” are not covered by the Fourteenth Amendment protections guaranteed each “person.”¹⁸² Thus, the Court’s refusal to declare personhood prior to birth supports the position that an embryo is not a legal “person.”

The second category is composed of those who propose that an embryo is property. This position claims that an embryo is the per-

174. See Lavelle, *supra* note 6, at A14 (quoting R. Alto Charo, member of National Bioethics Advisory Commission).

175. U.S. CONST. amend. V.

176. See Kristine E. Luongo, Comment, *The Big Chill: Davis v. Davis and the Protection of “Potential Life”?*, 29 NEW ENG. L. REV. 1011, 1017-24 (1995).

177. See Schaefer, *supra* note 86, at 94.

178. See *Davis v. Davis*, 842 S.W.2d 588 (Tenn. 1992).

179. See BLACK’S LAW DICTIONARY 1114 (6th ed. 1990) (stating that in child custody determinations, the state acts as “*parens patriæ*” to protect the interests of the child).

180. See Patricia A. Martin & Martin L. Lagod, *The Human Preembryo, the Progenitors, and the State: Toward a Dynamic Theory of Status, Rights, and Research Policy*, 5 HIGH TECH. L.J. 257, 272 (1990). The cited article utilizes the term “preembryo” to refer to an embryo from the one-cell stage through the formation of the major body systems. See *id.* at 258. For the purposes of this Note’s constitutional analysis, the use of “preembryo” is interchangeable with “embryo” because both refer to the period after fertilization.

181. 410 U.S. 113 (1973).

182. See *id.* at 158.

sonal property of the intended parents because they supplied the egg and the sperm.¹⁸³ Therefore, parents are the owners of the embryo and thus retain the power, superior to any third party, to make decisions with respect to their embryo.¹⁸⁴ There is however one caveat: the embryo "may [not] be treated in all respects like other property. Rather, the term[] merely designate[s] who has authority to decide whether legally available options with early embryos will occur" ¹⁸⁵ With this qualification, defining an embryo as property is more logical than personhood because it accounts for both the physical contributions of the parents and the basic individual integrity of the embryo.

Finally, proponents of the third category propose a middle ground between the first two approaches suggesting that an embryo, although not a "person," is worthy of a special form of respect.¹⁸⁶ The American Fertility Society adopts this approach which suggests that an embryo deserves greater respect than other tissue because it has the potential of becoming a human being, but should not be recognized as a person because it has not yet developed all the features of personhood.¹⁸⁷ Thus, under this view, the degree of embryo protection should increase with each stage of development.¹⁸⁸ Nonetheless, the primary decision-making authority still remains with the persons who provided the egg and the sperm.¹⁸⁹ If there is specific legislation indicating otherwise, this primary decision-making authority would be overruled.¹⁹⁰ While this view may be appealing because it accounts for parental and state interests,¹⁹¹ it remains problematic because it never defines what "special respect" to embryos necessarily entails.¹⁹²

Nonetheless, one need not determine which definition offers a perfect fit for the purposes of the takings analysis. This Note uses the personhood-property debate to draw two conclusions: (1) that the classification of an embryo as a person is inappropriate because of constitutional case law to the contrary; and (2) both the classification of an embryo as property and interim status indicate that the gamete

183. See Clifton Perry & L. Kristen Schneider, *Cryopreserved Embryos: Who Shall Decide Their Fate?*, 13 J. LEGAL MED. 463, 480 (1992).

184. See Martin & Lagod, *supra* note 180, at 267-68.

185. John A. Robertson, *Reproductive Technology and Reproductive Rights: In the Beginning: The Legal Status of Early Embryos*, 76 VA. L. REV. 437, 454-55 (1990).

186. See Davis, 842 S.W.2d at 596; Perry & Schneider, *supra* note 183, at 486.

187. See Ethics Committee of The American Fertility Society, *Ethical Considerations of the New Reproductive Technology*, 53 FERTILITY & STERILITY 60S (Supp. 2 June 1986).

188. See Stanford P. Berenbaum, *Davis v. Davis: Frozen Embryos and the Thawing of Procreative Liberties*, 36 WAYNE L. REV. 1337, 1349 (1990).

189. See Davis, 842 S.W.2d at 597.

190. See *id.* (internal citation omitted).

191. See Schaefer, *supra* note 86, at 97.

192. See Robertson, *supra* note 185, at 449.

providers have decision-making authority concerning the embryos, which is a key characteristic of the property classification.

b. Clone Analogy for Takings Analysis

Assuming that an embryo is property, two issues still remain: whether a clone is analogous to an embryo for a takings analysis and if so, whether a federal ban on cloning would constitute a taking. Some may not consider a clone similar to an embryo because it lacks the genetic contribution of two separate individuals. On the other hand, one can argue that the presence of genetic material which, at some time prior, originated from the union of an egg and sperm, is sufficient for a clone-embryo analogy. In either case, the arguments will be hard-fought because of their possible implications. Indeed, if a clone is comparable to an embryo and an embryo is personal property, then a clone is deemed property and thus legislation preventing a clone from existing may be a taking under the Fifth Amendment.¹⁹³

The main thrust of the takings analysis is whether the applicable law is a taking, for which just compensation must be paid, or merely a regulation, for which no compensation is necessary. Most takings doctrine application has centered upon land use regulation in which the relevant doctrinal inquiry is whether the regulation “substantially advance[s] legitimate state interests” and whether it “denies an owner economically viable use of [the] land.”¹⁹⁴ If the regulation in question either does not “substantially advance” a state’s legitimate interest, or denies economically viable land use to the owner, a taking occurs.¹⁹⁵ Without any case law focused upon the nexus between the takings clause and assisted reproductive technologies, those challenging cloning legislation on takings grounds would need to utilize this two-prong test, the only available articulation of the takings doctrine. Doing so requires the analysis to move one level up in generality, from the legal technicalities of a clone-property analogy to the larger concept of public policy concerns.

Under the first prong of the test, the federal government might argue that the state’s public policy interest militates against allowing human cloning for fear of treating human beings as commodities.¹⁹⁶ Furthermore, manufacturing people “made to order undermines human dignity and individuality.”¹⁹⁷ As a counter, opponents of legislation may argue that cloning meets important reproductive needs,

193. See U.S. CONST. amend. V, cl. 4.

194. *Agins v. Tiburon*, 447 U.S. 255, 260 (1980).

195. See *id.*

196. See *Annas*, *supra* note 7, at 80.

197. *Id.*

much like other reproductive technologies do.¹⁹⁸ This being so, it is possible that the relevant inquiry with respect to cloning should focus on whether cloning differs so much from other ART so as to require “different legal or policy treatment.”¹⁹⁹ This examination, however, places the burden on the government to provide a valid reason for why banning human cloning would substantially advance a state interest. With the current state of research and knowledge at a basic level, a legitimate basis for a complete ban on cloning is lacking.

Under the second prong, trying to relate economic use of land to economic use of a clone may be attenuated and appalling. Parties on both sides of the issue may well concede that trying to quantify a human clone in financial terms is repulsive to the human conscience. The ill-fit between potential cloning legislation and current takings doctrine indicate that the proponents and opponents may need to find a middle ground in pursuing this type of constitutional analysis.

4. *Right of Scientific Inquiry*

A fourth constitutional concern would consider whether a ban on cloning would infringe upon a constitutional right of scientific inquiry.²⁰⁰ Although not explicitly enumerated, such a right would likely stem from the First Amendment’s right to free speech and the Fourteenth Amendment’s protection of personal liberty.²⁰¹ In fact, in *Griswold*, the Court found that the “penumbra” of the right to free speech includes the “freedom of inquiry, freedom of thought, and freedom to teach.”²⁰² In another instance, the Court drew an analogy between the information function provided by the press and the same function performed by academic researchers.²⁰³ Furthermore, the Court has also stated that the personal liberty rights under the Fourteenth Amendment necessarily involves the right to “acquire useful knowledge.”²⁰⁴

As the right of scientific inquiry stems from the fundamental rights delineated in the First and Fourteenth Amendments, any regulation of this right would appear to be subject to strict scrutiny analy-

198. See *Ethics of Human Cloning: Testimony on “Ethics and Theology: A Continuation of the National Discussion on Human Cloning” Before the Subcomm. on Public Health and Safety of the Senate Comm. on Labor and Human Resources*, 1997 WL 11233882, at *1 [hereinafter *Ethics and Theology*] (testimony of John A. Robertson, Vinson & Elkins Chair in Law, University of Texas School of Law).

199. *Id.*

200. See Lori B. Andrews, *Is There a Right to Clone? Constitutional Challenges to Bans on Human Cloning*, 11 HARV. J.L. & TECH. 643, 661 (1998).

201. See *id.*

202. 381 U.S. 479, 482 (1965).

203. See Andrews, *supra* note 200, at 662 (citing *Branzburg v. Hayes*, 408 U.S. 665, 705 (1972)).

204. *Meyer v. Nebraska*, 262 U.S. 390, 399 (1923).

sis. However, as mentioned before, a compelling state interest in this area would be quite difficult to prove.²⁰⁵ Moreover, under a constitutional rubric, the right to clone may be more appropriately characterized under several other constitutional rights before being deemed to fall within the First Amendment right to scientific inquiry. Thus, if this is the only basis left upon which to argue for a right to clone, it may militate against a court determining that such a right exists. Nevertheless, when combined with the more salient interests under a right to privacy, the right to scientific inquiry becomes yet another reason against a federal ban of human cloning.

C. Some Ethical Considerations of Cloning

Any analysis of cloning could not be complete without reference to the ethical concerns raised by the application of this technology. Proponents and opponents have contributed to the colloquy by depicting both the potential harms and benefits of human cloning. Careful analysis and explanation of these arguments provides a good backdrop for the issues surrounding cloning and allows for an informed decision on the permissibility of cloning.

1. Harms of Cloning

a. Harms to the Child

The cloning debate gives greatest attention to the potential effects of the technology upon children. Some have sought to ban cloning in the interest of preventing physical harm to the child, namely in an effort to prevent disease or deformities.²⁰⁶ Such physical harms may occur if cloning is attempted without adequate scientific knowledge. The premature use of this technology is a possibility when physicians place their desire to implement innovative procedures above their duty to promote health.²⁰⁷ Alternatively, the hasty application of cloning may also occur at the prodding of an over-eager patient.²⁰⁸

Proponents of cloning counter by stating that regulatory procedures are in place to assure the safety of new procedures.²⁰⁹ Even without formal procedural hurdles, the medical profession is under a covenant to "do no harm," which should render any careless or swift decision to clone less probable. Furthermore, proponents still admit that much more research is needed before human cloning is safe and

205. See *supra* note 111 and accompanying text.

206. See Note, *Human Cloning and Substantive Due Process*, 111 HARV. L. REV. 2348, 2362 (1998) [hereinafter *Human Cloning*].

207. See John A. Robertson, *Liberty, Identity, and Human Cloning*, 76 TEX. L. REV. 1371, 1410 (1998).

208. See *id.*

209. See *id.*

effective.²¹⁰ In fact, the National Bioethics Advisory Commission (“NBAC”), which convened at the request of President Bill Clinton immediately after the announcement of Dolly,²¹¹ found that the only rationale which ethically justified a public policy of restraint was one which focused upon preventing physical harm to children.²¹²

Beyond physical harm, commentators contend that a clone will suffer psychological harm as well. They claim that a clone will lack a personal identity and individuality.²¹³ This argument supposes that a unique genome is necessary to a sense of individuality.²¹⁴ (This claim stops short of asserting that identical genes will make the clone and clonee destined to live identical lives.) Other opponents add that this genetic congruence will force the clone to not be viewed as truly separate by himself or herself or others.²¹⁵ Thus, the clone may experience implicit or explicit pressure to follow in the footsteps of his or her “clonee”, the person from whom he or she is cloned. Another argument goes further to claim that creating a clone relegates that person to a realm normally reserved for subhuman things, treating the person as “wholly subject to our will.”²¹⁶

Those in support of cloning respond by stating that the psychological harms are “completely speculative.”²¹⁷ They point to the existence of identical twins as persons with the exact same genotype who have no problem leading separate and significant lives.²¹⁸ Furthermore, they refer to the “nature versus nurture” philosophy to claim that genotype is not determinative of the phenotype given differing environmental factors.²¹⁹ Practically speaking, cloning does not yield a duplicate of the adult, but an infant,²²⁰ making it even less plausible for the clone and clonee to have identical life experiences. Also, for

210. *See id.* at 1411.

211. *See The Clone Age, supra* note 44, at 68. The first molecular studies conducted on Dolly yielded preliminary evidence that clones may inherit not only the genes, but some aspects of the age of the animals from which they are cloned. *See Sheep Clone Was Born Old, Study Finds*, S.F. CHRON., May 27, 1999, at A1. Thus, clones could have shorter life spans and greater disease susceptibility at younger ages than their clonee-parents. *See id.*

212. *See* R. Alta Charo, *Cloning: Ethics and Public Policy*, in HUMAN CLONING: SCIENCE, ETHICS, AND PUBLIC POLICY (Barbara MacKinnon ed., forthcoming 1999).

213. *See Human Cloning, supra* note 206, at 2363.

214. *See* Robertson, *supra* note 207, at 1412.

215. *See id.* at 1413.

216. J.L.A. Garcia, *Human Cloning: Never and Why Not*, in HUMAN CLONING: SCIENCE, ETHICS, AND PUBLIC POLICY (Barbara MacKinnon ed., forthcoming 1999) [hereinafter Garcia, *Human Cloning*].

217. *Human Cloning, supra* note 206, at 2363.

218. *See id.*

219. *See* Robertson, *supra* note 207, at 1414.

220. *See* Bonnie Steinbock, *Cloning Human Beings: Sorting Through the Ethical Issues*, in HUMAN CLONING: SCIENCE, ETHICS, AND PUBLIC POLICY (Barbara MacKinnon ed., forthcoming 1999) [hereinafter Steinbock, *Cloning Human Beings*].

those who fear that cloning creates pressure on the clone to repeat the clonee's life and thereby violates a child's right to an open future, cloning proponents claim that one's genes do not determine who one is or will be because one becomes a self by making a multitude of choices.²²¹ Thus, it is entirely possible for two persons with the same genetic makeup to lead different and unique lives.

b. Harms to the Family

Clearly, harms to the child can transform into harms to the family, given the integration of individuals in a collective family unit. Nonetheless, scholars have broadened the debate to cover the potential impact cloning may have on the family as a whole.

Those in opposition to cloning may claim that the state has an interest in protecting existing family structures.²²² Of course, the cynical counterpoint is to ask, "what exactly is the American family structure?" It is obviously not the typical "Donna Reed" nuclear family of yesteryear. A stronger argument, however, is the concern that cloning may lead to confusion in family lineage and kinship.²²³ A basic effect of this confusion would be the identification of family members for the purposes of effectuating probate law. For example, if a parent clones himself or herself, the clone may be the social child of the clonee, but also his or her genetic twin and sibling, and the genetic child of the clonee's parents. Thus, if the clonee passes away without a valid will, then probate law must determine if the clone is a child or sibling for the purposes of intestate succession. Similarly, if the clonee's parents die intestate, the law must determine if the clone is their child as well. Also, for instance, if a couple clones an unrelated person and that clonee dies, the question then becomes whether the clone will take a share of the clonee's estate as a sibling. In any case, a specific will identifying the names of interested parties would likely help in solving the problem. Nonetheless, because probate law governs those dying intestate and also places limitations on valid wills, the legal appellations ascribed to persons in the cloning context are essential in the facilitation of probate law.²²⁴

221. *See id.*

222. *See Human Cloning, supra* note 206, at 2363.

223. *See* NATIONAL BIOETHICS ADVISORY COMMISSION, CLONING HUMAN BEINGS: REPORT AND RECOMMENDATIONS OF THE NATIONAL BIOETHICS ADVISORY COMMISSION 70 (1997).

224. An additional, but less pervasive, impact would be disruption of the current forensic DNA identification system. *See The Clone Age, supra* note 44, at 71. Given the fact that DNA matches are used as physical evidence and each person's genetic composition is unique, the appearance of clones with identical genetic stamps might cast reasonable doubt upon a defendant's guilt.

The more substantial harm to the family, though, stems from the confusion of familial titles, and consequently, familial roles that may result from cloning. In order to understand this problem, some scientific background is necessary. A portion of a person's DNA is found in the mitochondria in the egg's cytoplasm, outside the egg's nucleus.²²⁵ Thus, the woman providing the donor egg, into which DNA from the clonee will be transferred, is contributing a small portion of the total DNA for the clone-child.²²⁶ As a result, the female genetic contribution in cloning is composed of two different portions, mitochondrial DNA and nuclear DNA, as opposed to sexual reproduction in which the same woman provides both female DNA sources.²²⁷

This reveals the possibility of a third biological mother, separate from the separate genetic and gestational mothers made possible by in vitro fertilization.²²⁸ The question then becomes what, if any, legal or social rights does the donor of the enucleated egg have? Scientifically speaking, the enucleated egg donor provides some, however small, portion of DNA that contributes to the clone's genome; and as such, can be considered a "mother" in that sense. On the other hand, having established that genetics do not absolutely determine a child's life and that the child's environment does affect his or her eventual identity, one might argue that the mother who rears the child has the greatest impact of all and should be deemed the only "mother." Accordingly, the social mother could be named the legal mother, similar to an adoptive mother. In fact, there would be even less concern over who the mother was if the donor of the nucleus and enucleated egg were the same woman.²²⁹

These kinship concerns play out in differing degrees depending upon who is being cloned. If a couple decides to clone an existing child, assuming their parenting roles are sufficiently defined with respect to the clonee-child, they will be in the identical parenting position vis-à-vis the new clone-child.²³⁰ Certainly, the peculiarity is that there will be two siblings with the same genome, but different ages.²³¹

225. See Robertson, *supra* note 207, at 1423.

226. See *id.*

227. See *id.* Mitochondrial DNA contributes only one chromosome to the full complement of human chromosomes. See MICROSOFT ENCARTA ENCYCLOPEDIA (1999). However, only eggs—not sperm—contribute mitochondrial DNA to the resulting embryo. See *id.* It replicates in the same way as nucleic DNA and directs the production of proteins, which function as enzymes. See *id.* Mitochondrial DNA has been linked to the genes for diabetes and deafness. See *id.*

228. See Robertson, *supra* note 207, at 1423.

229. See *id.* at 1423-24.

230. Although human cloning may presumably be sought by a single person, for purposes of discussion I will assume a child-rearing environment consisting of a two-person relationship.

231. See Robertson, *supra* note 207, at 1424.

However, the second will be raised at a different time, in a different environment, thereby promoting the latter child's individuality and uniqueness from the clonee.²³²

If a couple clones an unrelated third party, the couple will rear and the female partner will gestate the clone.²³³ Hence, the couple will take the positions of gestational and social, but not genetic, parents. Any family lineage or kinship concerns would be similar to those of IVF, in which it is possible to gestate a child that bears no genetic relation to either person in the couple. Thus, to the extent that IVF without genetic connection is permissible, so would cloning.²³⁴ Furthermore, the gestational and rearing relationship is arguably more significant than the genetic relationship²³⁵ because of the sheer time commitment and physical presence in the life of the child.

However, in the context of cloning, there remains the issue of the genetic parents of the cloned person.²³⁶ This suggests a concern for the genetic parents because they will have a delayed twin of their existing adult child.²³⁷ Thus, this invokes the issue of consent, where if a parent does not desire to have a delayed twin, but the clonee consents, the clone will be born into an environment in which the desirability of his or her presence is in dispute. Even though the social parents may have no intention of having any sort of relationship with the genetic parents or the clonee, any knowledge the clone eventually receives of this may impact his or her psychological health, as well as the integrity of the clone's social family.

If a couple decides to clone one of the members of the couple, kinship titles begin to blur. Primarily, this stems from the clonee's position as both genetic sibling and social parent to the clone.²³⁸ As mentioned before, there would be concern if the parent creates expectations of the child to develop in a certain way based upon comparison to the parent's upbringing. This problem is symptomatic of a larger kinship issue in which the parent is unable to separate his or her role as the parent from that of the genetic clonee.²³⁹ If unchecked, this would wreak havoc upon the family structure by confusing the psychological and social status of each individual in that family. In addi-

232. *See id.*

233. *See id.*

234. Of course, the ultimate question remains regarding the permissibility of in vitro fertilization. However, as of 1998, IVF has been utilized without constitutional challenges. *See Heidi Forster & Emily Ramsey, Legal Responses to the Potential Cloning of Human Beings*, 32 VAL. U.L. REV. 433, 459 (1998).

235. *See Robertson, supra* note 207 at 1425.

236. *See id.*

237. *See id.*

238. *See id.* at 1426.

239. *See id.*

tion, the consent issue arises again because now the clonee's genetic parents have another child, whether wanted or not. Their status becomes those of genetic parents as well as social grandparents.²⁴⁰ A similar disorientation might occur if the couple cloned one of their parents, thereby rendering the clone a genetic parent of the person raising him or her.²⁴¹

Regardless of which person is being cloned, the key factor in determining the status of the relationship is social rearing. For example, if a woman takes on the social role as a mother, her child will psychologically behave like her child, whether or not that clone-child's genes came from the rearing mother or father, the genetic offspring of the rearing mother and father, or a third party. In order to ensure the parenting roles are carried out as intended, the potential parents might go through advance counseling.²⁴² Moreover, cloning service providers could also employ advance screening of potential parents to ensure familial stability and to discern whether the intent of the parties is to rear a child (or engage in some impermissible purpose).²⁴³ Whatever family lineage problems arise, they can likely be dealt with by legal change and social and behavioral adjustments such that a total prohibition of cloning would not be warranted.

c. Abuses of Technology

Another negative effect stemming from human cloning could be the abuse of that technology. One form of this abuse can be broadly categorized as fears from the science fiction realm. Several sources have provided the stories for such fears. A famous example is Aldous Huxley's *Brave New World*,²⁴⁴ in which the "Bokanovsky Process" divides a single embryo into ninety-six identical copies.²⁴⁵ These embryos are gestated under identical conditions to yield five classes of hierarchical workers, named simply, Alphas, Betas, Deltas, Gammas, and Epsilons.²⁴⁶ Some groups were conditioned to love performing specified tasks.²⁴⁷ Another unsettling example came from David Rorvik and his allegedly true account of the cloning of a wealthy bachelor.²⁴⁸ While most of the scientific response centered upon

240. See *id.* at 1427.

241. See *id.* at 1428.

242. See *id.* at 1429.

243. This determination would also encompass other, if any, purposes declared permissible uses of cloning by the legislature.

244. See ALDOUS HUXLEY, *BRAVE NEW WORLD* (1932).

245. See George J. Annas, *Human Cloning: A Choice or an Echo?*, 32 U. DAYTON L. REV. 247, 255 (1998).

246. See *id.*

247. See *id.*

248. See DAVID M. RORVIK, *IN HIS IMAGE: THE CLONING OF A MAN* (1978).

proving Rorvik's story false, scientists also argued against any laws that might affect research in this area.²⁴⁹ Leading to even greater fear is *The Boys from Brazil* by Ira Levin.²⁵⁰ In that novel, a character named Mengele creates ninety-four clones of Adolf Hitler.²⁵¹ As the story develops, however, the reader learns a valuable lesson from a Nazi-hunter, who realizes that the true issue in creating another Hitler is not genetics, but human values.²⁵²

Applied to our present situation, these fears have become articulated as, first, a fear of exploiting clones who are explicitly created for their low intelligence and ability to do boring and low-paying work.²⁵³ Or, in the same vein, a fear of a mass of easily-controlled clones, who are subject to a tyrannical leader and a mob mentality. Second, in the opposite direction, there is a fear of eugenics,²⁵⁴ producing individuals with certain genetic traits to create a superior group of people. The harm from the first group of "less intelligent" clones—oppression of human beings—is not as clear as the harm from the latter. Historically, the fear of eugenics derives from its dubious origins in those holding racist and classist beliefs which attempt to ferret out of society non-whites or the mentally or physically disabled.²⁵⁵ More recently, eugenics has shed some of these motives and become a technology driven to improve the health of those potentially subject to genetic disease.²⁵⁶ For instance, eugenics has combined genetic testing and gene therapy to prevent lethal genetic diseases such as Tay Sachs, Lesch Nyhan, and Huntington's disease.²⁵⁷ Although these motives are honorable, one may still find fault with eugenics simply because science is interfering in areas traditionally left to nature. Nonetheless, science interferes with nature each time doctors intervene in the birth of a child or a patient is prescribed antibiotics. In that sense, eugenic treatment is only a difference in the degree of interference. The true question is whether as a society, we are comfortable with, or capable of, circumscribing the limits of science.

On the balance, science fiction has provided numerous examples of technology gone wrong. It is important, however, to remember that

249. See Annas, *supra* note 245, at 252. In fact, one scientist stated, "[t]here is no need for any form of regulatory legislation, and it could only in the long run have a harmful effect." *Id.* (citing *Developments in Cell Biology and Genetics: Hearing Before the Subcomm. on Health and the Environment of the House Comm. on Interstate and Foreign Commerce*, 95th Cong. 95-105 (1978)).

250. See IRA LEVIN, *THE BOYS FROM BRAZIL* (1976).

251. See Annas, *supra* note 245, at 255.

252. See *id.*

253. See Steinbock, *Cloning Human Beings*, *supra* note 220.

254. See *id.*

255. See *id.*

256. See *id.*

257. See *id.*

such works are only fiction. They are the imaginings of a system in which all the checks and obstacles preventing abuse have failed. Nonetheless, while they are not reality, they provide useful instruction about how not to proceed, about how science can ensure that cloning technology is acceptable to society. Additionally, these works also provide hope that regardless of the ability to manipulate science or nature, the human element can always have a role in changing any prefabricated destiny.

A second category of abuse is classified as "lack of consent." Traditionally, any medical procedure requires the consent of the patient.²⁵⁸ Our notions of autonomy require the permission of the person or persons who will be directly affected by the medical procedure. Although consent is usually required because of potential physical risk, the general standard of informed consent requires disclosure of all material risks that would likely affect a reasonable patient's decision.²⁵⁹ The clonee is directly affected because he or she is being cloned, and it is likely that the risk and knowledge of having a later-born identical twin (assuming the clonee is a single-born child) is material to the "reasonable" clonee. Therefore, somatic cell nuclear transfer cloning would require the consent of the person who is the DNA source.²⁶⁰ Yet, it is possible to retrieve DNA without the source knowing, from DNA shed on doorknobs, utensils, hair, or other common objects touched by the person,²⁶¹ also known as surreptitious cloning.²⁶² In those circumstances, consent may be difficult to acquire. This difficulty leads to questions of whether consent would be required in the cases of cloning a deceased person or a child.²⁶³ Because of the desire to avoid these confusing and various permutations, cloning regulation (if cloning is permitted) should ideally limit cloning to situations in which the DNA is taken directly and with the explicit consent of the donor source.

If consent is required by the person who will be affected by the procedure, one may logically ask whether the clone source's parents must also consent.²⁶⁴ The rationale being that the cloning process would essentially create a delayed identical twin of one of their children,²⁶⁵ a product of their genes. A dichotomy occurs because the

258. See *Moore v. Regents of the Univ. of Cal.*, 793 P.2d 479, 483 (Cal. 1990) (holding that a patient, in consenting to a splenectomy, did not give his informed consent to having cell and blood samples taken for the physician's own scientific research).

259. See *Scott v. Bradford*, 606 P.2d 554, 558 (Okla. 1979).

260. See Robertson, *supra* note 207, at 1446.

261. See *id.*

262. See *Human Cloning*, *supra* note 206, at 2364.

263. See Robertson, *supra* note 207, at 1446-48.

264. See *id.* at 1448.

265. See *id.*

genetic parents are the societal grandparents. While parents of a child have the right to decide to reproduce or not, grandparents generally cannot decide whether they will become grandparents or not.²⁶⁶ If the potential parents intend to raise their clone-child in a traditional social environment with their parents behaving as social grandparents, then the clone source's parents should not have to agree. For all societal purposes, the clone-child will grow up entirely different from the clonee because of a dissimilar gestational and rearing environment. Because the genes are not determinative of a person's outcome, the clone-child would not be identical to the clonee and therefore, would effectively not be the social grandparents' child.

One scholar would go so far as to require the consent of the person who is being experimented upon, the clone.²⁶⁷ While agreed that it is impossible to receive consent to the procedure from the person who is sought to be brought into existence by the procedure, this scholar thus concludes that cloning is absolutely impermissible.²⁶⁸ In other words, because consent is required, but impossible to acquire, the inquiry into cloning should stop there. However, the fallacy in this argument is that consent has never been required of the child sought to be produced. Although it is impossible to ask a child of coital reproduction or in vitro fertilization to consent to being born, society has not deemed this a barrier to these types of reproduction. Similarly, cloning cannot and should not require the consent of the child in order to be performed.

d. Harms to Society

Human cloning technology also has the potential to impact larger societal interests as well. Such public policy issues stem from a concern that the legalization and social acceptance of human cloning could lead to society embracing certain values. It is the fear of such values that leads to this discussion.

First, a basic concern with cloning is that scientists are interfering with nature.²⁶⁹ Of course, the assumption is that such interference is inherently evil. However, at least one scholar has noted that a similar objection applies to in vitro fertilization, based upon the issue of artificiality or naturalness of such assisted reproduction.²⁷⁰ While IVF and other assisted reproductive technologies have not been explicitly condoned by the law, society as a whole has at least acquiesced in its application; thereby, expressing tacit approval. If approval of IVF

266. *See id.*

267. *See Garcia, Human Cloning, supra* note 216.

268. *See id.*

269. *See Pimple, supra* note 1, at 729.

270. *See id.*

may be viewed as accepting a certain degree of human intervention with nature, this logic would apply to cloning with the same force because the basic end result—creating a child—is identical. Indeed, our society has “allow[ed] technological interventions in just about every aspect of life”²⁷¹

Still, a second public policy concern is reflected by religious objections.²⁷² On an abstract non-denominational level, some have objected to human cloning because it challenges our transcendence, which is allegedly key to the essence of being human.²⁷³ In particular, Leon Kass has stated that “[t]o lay one’s hands on human generation is to take a major step toward making man himself simply another one of the man-made things.”²⁷⁴ Moreover, this loss of transcendence would result from cloning because cloning dehumanizes reproduction and “temper[s] our sense of wonder at creation”²⁷⁵

Furthermore, examining objections from established religions, one reaches the heart of the religious debate. As evidenced by the NBAC soliciting religious input in determining recommendations for federal cloning policy, informed public discourse on cloning necessarily involves the fundamental religious values integrated into research on the beginning of life.²⁷⁶ As one can guess, early discussion of human cloning revealed that religious groups believed human cloning to be unacceptable. For example, a Methodist theologian, Paul Ramsey, suggested that human cloning is the border demarcating the line between medicine and society.²⁷⁷ He believed that crossing such a line would jeopardize human dignity and the meaning of procreation.²⁷⁸ Also, the Roman Catholic Church has rejected human cloning. In 1987, the Vatican released an encyclical called *Donum Vitae* (Instruction on Respect for Human Life in Its Origin and on the Dignity of Procreation) which stated a moral opposition to reproductive technologies that severed procreation and sexuality.²⁷⁹ These imper-

271. *Id.*

272. Although this area is usually thought to cover only established religion, it is possible to think of such concerns under the larger category of spirituality, which even atheists and agnostics may concede is pivotal to an understanding of human dignity. See Kevin P. Quinn, *Human Cloning After Dolly: What Sort of Creatures Might We Become?*, 38 JURIMETRICS J. 91, 94 (1997).

273. *See id.* at 95.

274. *Id.* (citing Leon R. Kass, *Making Babies—The New Biology and the “Old” Morality*, 26 PUB. INTEREST 18, 49 (1972) (emphasis omitted)).

275. *Id.*

276. See Courtney S. Campbell, *Religious, Philosophical and Ethical Perspectives on Cloning: Resistance and Meaning: Religious Communities and Human Cloning*, 32 VAL. U.L. REV. 607, 607 (1998).

277. *See id.* at 609.

278. *See id.*

279. *See id.* at 612.

missible reproductive technologies included human cloning, surrogacy, in vitro fertilization, donor insemination, and experimentation on embryos created via in vitro fertilization.²⁸⁰ According to the Roman Catholic Church, any assisted reproductive technique is beyond the marriage sacrament.²⁸¹

While such objections have seemed to dominate the religious discussion, some theologians' concerns have not been so absolute. Joseph Fletcher, an Episcopal theologian, advances human autonomy to the extent that rational behavior should domesticate nature.²⁸² Therefore, in so controlling nature, Fletcher believes that human cloning is just one of the many methods of reproduction that should be permitted because of its overriding societal benefit.²⁸³ Jewish scholars have historically been more moderate as well. While there is a religious preference for coital reproduction, Jewish theologians admit that some special circumstances may warrant human cloning as a method of last resort.²⁸⁴ Such special circumstances include infertility or the goal of lineage preservation.²⁸⁵

Since the advent of Dolly, our religious pluralism has become evident as various religious representatives have reiterated past convictions and declared greater latitude for human cloning.²⁸⁶ Roman Catholics and conservative Protestants have repeated concerns about the procreation-sexuality link and human dignity.²⁸⁷ However, other Protestant commentary has allowed the idea of human technology imbued with divine creativity to justify human cloning in certain contexts.²⁸⁸ Islamic and Jewish theologians have similarly recognized specific instances for permitting human cloning.²⁸⁹

Thus, although historically organized religions have renounced human cloning altogether, some religious thinkers have considered limited circumstances in which human cloning might be allowed. At this point, it is difficult to determine how much this flexible approach has permeated the religious community; but at least, this allows some room for human cloning advocates to maneuver.

Third, ethicists have expressed concern that permitting human cloning might impact how we perceive children. This has been ex-

280. *See id.*

281. *See* Allison M. Mays, *Cloning: Now that We've Got It, What Do We Do With It?*, 22 *LAW & PSYCHOL. REV.* 287, 301 (1998).

282. *See* Campbell, *supra* note 276, at 609.

283. *See id.*

284. *See id.* at 611.

285. *See id.*

286. *See id.* at 613.

287. *See id.*

288. *See id.*

289. *See id.*

pressed as two interrelated concepts. The first of these concepts is the fear that clone-children will lead to children being treated as mere means to parental ends, instead of unique individuals worthy of being ends in themselves.²⁹⁰ This fear of objectification also manifests itself in the possibility that potential parents, seeking to have a clone with a particular genome, will regard this child as a mechanism for accomplishing the goals motivating that genome selection.²⁹¹ In this case, a child might be seen only as the instrumentality for living out certain goals, rather than a child with an open future. Taken to its furthest extent, a couple with a dead or dying child may seek to replace that child through SCNT cloning. The motive behind this use would be questionable because of the fragile state of the grieving parents. On a broader scale, this could lead to the devaluation of human life, dignity, and identity.²⁹²

The second concept that is a logical consequence of objectification is commodification. The theory is that as human cloning develops and becomes more widespread, a market may develop for human cells with particular genes. In the most strict market model, utilitarianism would allow private demand for genes to act as an incentive to collecting and cataloguing these various genetic traits. In turn, prices for these genes could be set by a simple supply-and-demand mechanism. The main criticism is that this practice would put a price on all human characteristics, thereby commodifying the children with these characteristics.²⁹³

The objectification-commodification concerns are valid considerations. However, if cloning becomes a practical and legal reality, they can be combated. The government could simply prohibit the marketing of human genes, similar to the current prohibitions on the purchase and sale of human organs or fetal tissues.²⁹⁴ Granted, enforcement might become an issue. However, those trafficking in "illicit" genes, not only would have to get the genetic traits illegally, but would also need to find a physician to perform the procedure with these illegal materials. In addition, the United States could also urge the international political community to pass similar legislation. Indeed, in January 1998, nineteen European countries signed a ban on human cloning.²⁹⁵ Furthermore, even if specific cloning practices were illegal in the U.S. but legal elsewhere, it is difficult to argue that the United States can be responsible for its citizens extraterritorially.

290. See Robertson, *supra* note 207, at 1418.

291. See *id.* at 1419.

292. See Annas, *supra* note 245, at 254.

293. See *id.* at 259.

294. See *id.* at 260.

295. See Forsythe, *supra* note 12, at 469.

2. *Benefits*

The application of cloning technology has led to different reactions depending on its intended use. There has been widespread support for continuing cloning research for use in cloning animals.²⁹⁶ Such research on animals has been encouraged in the hopes of discovering potential commercial and medical uses.²⁹⁷ This sentiment is justified given humans' historical practice of creating, manipulating, and destroying animals for our own use.²⁹⁸ Furthermore, even for those who hold animals in high regard, animal manipulation may still be permissible given an even higher regard for humans.

In contrast, the application of cloning to humans has met with great opposition.²⁹⁹ Those with science-fiction-type fears envision human cloning utilized to create clones of Adolf Hitler or produce massive armies of identical laborers.³⁰⁰ Put to its best use, however, human cloning could be used to assist infertile couples seeking to raise a child.³⁰¹ We must acknowledge that these potential benefits that cloning offers to society do exist.

a. *Treat Infertility*

The most plausible application of cloning technology would be as a possible remedy for infertility.³⁰² The most straightforward method of this treatment would involve the direct cloning of an adult using somatic cell nuclear transfer. The DNA source could come from an individual unrelated to the intended parent or parents. In which case, the social parents would raise that clone-child under an arrangement somewhat similar to adoption, with the added relationship of the woman likely acting as the gestational mother. In another scenario, the DNA source could be an individual who is genetically related to the parents, whether a biological parent (of the intended parents) or a cousin or even one of the parents who will raise the clone-child. Thus,

296. See Robertson, *supra* note 207, at 1382.

297. See *id.* In fact, shortly after Dolly was announced, Roslin Institute scientists revealed the arrival of Polly, a sheep with a human gene which yields a human protein in its milk. See *A Clone Again: Sheep Has Additional Human Gene to Produce Human Protein*, MEALEY'S LITIG. REP.: BIOTECHNOLOGY, July 25, 1997, at 14. This resulting protein may be given to persons lacking that protein, such as patients with bone disease or hemophilia. See *id.*

298. See Robertson, *supra* note 207, at 1383.

299. See *id.* at 1382. See generally Annas, *supra* note 245.

300. See Annas, *supra* note 245, at 255.

301. See GINA KOLATA, CLONE: THE ROAD TO DOLLY, AND THE PATH AHEAD 14-15 (1998).

302. See Kathleen Sullivan, *Scientists Ponder Ethics of Cloning Human Babies*, S.F. EXAMINER, Apr. 5, 1998, at C4.

in this application, an infertile couple could raise a child to which they are genetically related, which some couples would prefer.

Another method would utilize the cloning of embryos to increase the number of viable embryos for use in in vitro fertilization.³⁰³ This would increase the number of opportunities for implantation of the embryo and reduce the cost and physical burden of hyperstimulated egg production and surgical egg retrieval.³⁰⁴

Finally, cloning may be employed in which infertility is due to insufficient gametes (ova or sperm).³⁰⁵ Usually, this type of infertility is treated by seeking either donor sperm from a commercial sperm bank or fertility clinic or donor eggs from paid sources or family members.³⁰⁶ However, with the use of somatic cell nuclear transfer, couples uncomfortable with the notion of using someone else's gametes—and hence, DNA—can insert their own DNA.³⁰⁷ Thus, if there is male infertility, the woman may provide just the egg (while the man provides the DNA), the egg and DNA, or only the DNA, in addition to gestating.³⁰⁸ With female infertility, the woman may gestate and provide DNA³⁰⁹ or gestate an embryo with the man's DNA.

Regardless of why couples use cloning, they will be exercising a greater measure of control than in any other form of reproduction. With other assisted reproductive technologies, couples may be able to manipulate only one-half of the child's genome at a time. That is, with techniques such as AI or IVF, physicians separately determine the source of ovum and sperm, but are unable to predict what resultant genetic combination will form. Yet, with cloning, doctors would be able to know in advance the complete genome of the child because the adult somatic cell donor is already living.

Necessarily, whether this degree of control is desirable is a question left to public policy. In the meantime, there is at least one scientist who already has plans to clone a human being. In December 1997, Dr. G. Richard Seed announced his plans to go forth with this research before Congress has an opportunity to ban the procedure.³¹⁰ In fact, he even has four couples who have volunteered for this research.³¹¹ He has also stated that if the United States prevents him

303. See Robertson, *supra* note 207, at 1378.

304. See *id.*

305. See *id.* at 1379.

306. See *id.*

307. See *id.*

308. See *id.*

309. See *id.*

310. See *Scientist Says He Plans to Clone Human*, S.F. CHRON., Jan. 7, 1998, at A2. Professor Severino Antinori, an Italian embryologist, has also stated a desire to clone humans to let childless men have children. See Steve Connor, *Professor Plans Cloned Babies for Childless Men*, THE INDEP. (London), Oct. 26, 1998, at 6.

311. See *Scientist Says He Plans to Clone Human*, *supra* note 310, at A2.

from conducting his work, he will go to Mexico.³¹² Then in December 1998, Dr. Seed announced that he intended to take his cloning operations to Japan instead.³¹³ Furthermore, he stated that he had already raised three quarters of the \$20 million needed to establish these facilities and to begin working in August 1999.³¹⁴

While his determination is commendable, this is exactly the type of overzealous behavior that casts grave doubt on the integrity of the medical and scientific communities. In turn, it may lead to potential legislation and legal action that will overestimate the need for constraints on these communities. Doctors and scientists as a group could be hindered in doing beneficial research on cloning because of the excessive behavior of a few, or only one. Only time will reveal whether Dr. Seed will succeed in his endeavors.

b. Organ and Tissue Source

Another possible use for human cloning is to produce organs or tissue for transplantation.³¹⁵ This method would be preferred over other forms of organ and tissue donation because it offers a finite period of delay, lasting only as long as it takes to gestate the clone and retrieve the necessary tissue or organ, as opposed to the indefinite period on an organ donor waiting list. In addition, using a clone of the intended recipient would reduce the chance of rejection.³¹⁶ This reduction would occur as a result of the clone being an identical, but delayed, twin of the recipient.³¹⁷ As such, the clone would have the same antigens and immune system,³¹⁸ essentially allowing the recipient to receive his or her "own" organ or tissue.

There are, however, some commodification-objectification concerns in creating a child simply to produce an organ or tissue donor. For instance, suppose a couple's daughter suffered from leukemia and anticipated needing a bone marrow transplant. The couple could clone their own daughter so that the clone could provide a perfect tissue match.³¹⁹ This scenario could lead to situations in which a fam-

312. *See id.*

313. *See* Deborah Smith, *Maverick Will Clone His Wife*, SYDNEY MORNING HERALD, Dec. 18, 1998, at 11, available in 1998 WL 2010661.

314. *See id.* However, in January 1999, Dr. Seed's plans were hindered when a subcommittee of Japan's Council for Science and Technology recommended a human cloning ban in Japan. *See Japan Bans Seed From Setting Up Cloning Research Center*, TRANSPLANT NEWS, Jan. 15, 1999.

315. *See* Robertson, *supra* note 207, at 1380.

316. *See id.*

317. *See id.*

318. *See id.*

319. The Ayala family did something similar for one of their children. Their eighteen-year old daughter Anissa was in remission from leukemia. *See id.* at 1420. There was a possibility that the disease would recur, requiring Anissa to have a bone marrow trans-

ily would freely clone a family member “just in case” a medical need arose later for a tissue or organ donor; or a person might find a stranger who is a match and pay that person to allow him or herself to be cloned. Perhaps then, a more acceptable practice would be to allow the clone only to develop to the blastocyst stage, then retrieve stem cells prior to differentiation.³²⁰ If these stem cells could be stimulated to differentiate into the necessary organ or tissue cells, then the stem cells could provide the needed cells without having to gestate and rear an actual child.³²¹ This would avoid the potential problem of a child eventually learning that he or she was not created out of a desire to have a family, but only for harvesting cells. Indeed, this use of cloning has been implicitly supported by the NBAC report, in which they did not recommend stopping cloning research at the cellular level.³²²

c. Gene Therapy

The SCNT technique can also be used in animals and humans as a form of gene therapy. Generally, the purpose is to create animals that have had genes from other species added, called transgenic animals.³²³ Primarily, these animals have been altered through the addition of human genes, with the hope that the transgenic animals become a source of proteins and other pharmaceutical products for humans.³²⁴ Somatic cell nuclear transfer offers an improvement over transgenic animals created through other means. The previous method involved individually placing a human gene into each animal, a method that was tedious and inefficient.³²⁵ SCNT, on the other hand, lets the scientist place the human gene into an animal only once and then use the DNA from that transgenic animal to yield as many clones as needed for production.³²⁶

Originally, the Wilmut study was conducted with this purpose in mind.³²⁷ Moreover, in July 1997, the scientists at the Roslin Institute announced the creation of the first sheep clones to contain human

plant. *See id.* Because no one in their immediate family was a tissue match, Mr. and Mrs. Ayala decided to have another child so that it might be a suitable donor if needed. *See id.* The couple conceived coitally and had a child who eventually served as a suitable bone marrow donor for Anissa. *See id.*

320. *See id.* at 1380-81.

321. *See id.* at 1381.

322. *See The Clone Age, supra* note 44, at 69.

323. *See* Robertson, *supra* note 207, at 1376.

324. *See Sheep Clones Bred for Medicine*, S.F. CHRON., Dec. 19, 1997, at A2.

325. *See* Sharon Begley, *Little Lamb, Who Made Thee?*, NEWSWEEK, Mar. 10, 1997, at 52, 55.

326. *See id.*

327. The Roslin Institute scientists were attempting to genetically alter sheep and cows so that they would produce milk with human proteins. *See id.* at 55-56.

genes.³²⁸ Polly and Molly, the two new sheep, were cloned through the use of cells from sheep fetuses,³²⁹ unlike Dolly who was cloned from an adult somatic cell. Both Molly and Polly have copies of a human gene that will cause them to produce a blood-clotting protein in their milk, a protein which can save the lives of hemophiliacs.³³⁰

Animal cloning may also be beneficial as a tool for research in gene therapy. For instance, some studies call for the introduction of particular gene mutations into mice in order to study the effects of specific genes.³³¹ Traditionally, causing these gene mutations would require alteration of embryonic cells that developed into a mouse; this mouse would have to mate again to produce the necessary transmission of the gene mutation.³³² SCNT would speed up the process by eliminating the second mating and allow gene alteration in larger mammals.³³³ In another capacity, cloning can be employed to yield numerous genetically identical animals, thereby eliminating genetic variation as a frustrating variable in scientific experiments.³³⁴

In its direct application to humans, cloning may be used to avoid reproducing a genetic defect.³³⁵ For example, if there is a one-in-four chance that a couple may transmit a genetic disease to their offspring, more traditional methods would have the couple conceive and then do genetic screening.³³⁶ If the child tested positive for the disease, the couple would face the difficult decision of whether to end the pregnancy.³³⁷ Utilizing human cloning, the couple could clone a person lacking that genetic trait, thus averting a potentially tough choice and/or a challenging family life.

d. Other Potential Scientific Advances

Finally, as evidenced by the animal cloning research that led to Dolly, cloning will generate scientific advances. In addition, research can serendipitously lead to other sometimes unrelated developments.³³⁸ Allowing cloning research to go forth can provide addi-

328. See *Sheep Clones Bred for Medicine*, *supra* note 324, at A2.

329. See *id.*

330. See *id.*

331. See Robertson, *supra* note 207, at 1377.

332. See *id.*

333. See *id.*

334. See *id.*

335. See Sullivan, *supra* note 302, at C4.

336. See Robertson, *supra* note 207, at 1379.

337. See *id.*

338. For example, in 1896, Wilhelm Conrad Roentgen accidentally discovered the X-ray while experimenting with cathode rays. See MICROSOFT ENCARTA ENCYCLOPEDIA (1999). Also, in 1928, Sir Alexander Fleming accidentally discovered penicillin, a derivative of mold. See *id.* Its effectiveness against many forms of disease-producing bacteria eventually led to the development of antibiotics. See *id.* In addition, in 1945, Percy Spen-

tional knowledge. What society chooses to do with it is up for discussion, but it should nonetheless progress towards acquiring that knowledge.

IV. Proposed Legal Framework for Cloning

A. Summary of Legislative Action

Ian Wilmut announced the creation of Dolly in late February 1997.³³⁹ Immediately thereafter, on March 4, 1997, President Clinton issued an executive order banning federal funds for use in human cloning.³⁴⁰ Later, in June 1997, the NBAC published its report and urged continuance of the moratorium on federal funding for cloning of humans.³⁴¹ In addition, the NBAC report advised private researchers to voluntarily comply with the moratorium.³⁴² Finally, the Commission recommended that federal law be enacted to "prohibit anyone from attempting . . . to create a child through somatic cell nuclear transfer cloning."³⁴³ Along with this prohibition, the NBAC asked for a sunset clause so that Congress could re-examine the need for the prohibition in three to five years.³⁴⁴ The general consensus of legislative forces is against human cloning. Despite the introduction of several bills attempting to limit research funds for cloning and to prohibit human cloning,³⁴⁵ as of March 1999, Congress has yet to pass any comprehensive federal cloning legislation.

Following the announcement of Dolly, some states tried to legislate against human cloning. For instance, in Indiana, a law was proposed to revoke the license of any hospital or doctor that participates in human cloning research.³⁴⁶ The Mississippi legislature sought to ban somatic cell nuclear transfer with human cells only when there is intent to create a pregnancy.³⁴⁷

cer was working with a magnetron designed to produce short radio waves for a radar system. *See id.* While standing too close to magnetron, he noticed that the candy bar in his pocket melted, and yet he felt no heat. *See id.* His discovery led to the invention of the microwave oven. *See id.*

339. *See* Pimple, *supra* note 1, at 727.

340. *See* Forsythe, *supra* note 12, at 469.

341. *See id.* at 470.

342. *See id.*

343. Executive Summary, CLONING HUMAN BEINGS: REPORT AND RECOMMENDATIONS OF THE NATIONAL BIOETHICS ADVISORY COMMISSION iv (1997).

344. *See id.*

345. *See* H.R. 571, 106th Cong. (1999); S. 1599, 105th Cong. (1998); S. 1601, 105th Cong. (1998); S. 1602, 105th Cong. (1998); H.R. 133, 105th Cong. (1998); S. 1574, 105th Cong. (1998); S. 368, 105th Cong. (1997).

346. *See Human Cloning, supra* note 206, at 2352 (citing S. 411, 110th Leg., 2d Reg. Sess. (Ind. 1998)).

347. *See id.* (citing H.R. 996, 1998 Reg. Sess. (Miss.)).

As of March 1999, only two states have successfully passed legislation regulating human cloning. California was first when, in October 1997, it passed a five-year ban on human cloning via somatic cell nuclear transfer.³⁴⁸ In July 1998, Rhode Island enacted a similar statute barring human cloning for five years.³⁴⁹ At least nine other states have considered such bills.³⁵⁰

After Dr. Seed declared his intention to clone a human, President Clinton, in his January 1998 State of the Union address, asked Congress to enact a temporary ban on implanting cloned human embryos.³⁵¹ Congress is contemplating bills submitted by both Republicans and Democrats, which would seek to ban human cloning.³⁵² This request is representative of most cloning proposals, in which the focus is not to intrude upon scientific research, but to prevent the production of cloned children.³⁵³

B. Constitutional Precedent Lacking

Surveying constitutional legal precedent demonstrates that the Supreme Court has never addressed the issue of whether a fundamental right to procreate extends to a right to employ assisted reproductive technologies.³⁵⁴ Nevertheless, since the Court has recognized privacy rights in procreation, it would seem illogical to uphold those privacy rights only in the case of natural, but not artificial, procreation.³⁵⁵ By declaring a right to procreation, the Court does not appear to be protecting the act of sexual intercourse, but the right to conceive or not.³⁵⁶

Because there appears to be no constitutional doctrine expressly forbidding human cloning, that does not translate into a scientific "green light" to clone at will. Our "living" Constitution must always

348. See CAL. HEALTH & SAFETY CODE § 24185 (West 1998).

349. See R.I. GEN. LAWS § 23-16.4-2 (1998).

350. See S. 476, 82d Leg., Reg. Sess. (Ark. 1999); H.R. 5042, 1999 Reg. Sess. (Conn. 1999); S. 649, 91st Leg., 1999-2000 Reg. Sess. (Ill. 1999); S. 1394, 181st Leg., 1999 Reg. Sess. (Mass. 1999); H.R. 4962, 89th Leg., 1998 Reg. Sess. (Mich. 1998); H.R. 2730, 80th Leg., Reg. Sess. (Minn. 1998); S. 1954, 222d Leg. Sess. (N.Y. 1999); S. 218, 122d Leg., 1997-98 Reg. Sess. (Ohio 1998); S. 1285, 182d Leg., 1997-98 Reg. Sess. (Pa. 1998). This survey was last conducted in March 1999. See also *Human Cloning*, *supra* note 206, at 2352 (citing bills in at least twenty-two states - Alabama, Delaware, Florida, Illinois, Indiana, Maryland, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Virginia, and West Virginia - and published in June 1998).

351. See Forsythe, *supra* note 12, at 469-70.

352. See *Human Cloning*, *supra* note 206, at 2352.

353. See *id.*

354. See *Davis v. Davis*, 842 S.W.2d 588, 601 (Tenn. 1992).

355. See *Perry & Schneider*, *supra* note 183, at 470.

356. See *id.*

be tempered by the public policy determined by society. Congress may still attempt to pass a uniform ban on human cloning. With the potential challenges to such a law nearly certain,³⁵⁷ federal legislators would be wise to enact a law that represents a compromise between those that fear the mass production of humans and those that see cloning as merely another scientific advancement. In addition, those that would favor no governmental interference at all may prefer at least some modicum of regulation because of the possibility that resourceful Congresspersons can always find some rationale to legislate. It may be better to have some existing law whose course one had an active role in shaping, rather than live with the constant threat of impending stringent legislation.

C. Complete Ban Unjustified

Although there has been some legislative action to the contrary, a careful analysis reveals that a complete federal ban on cloning is not justified. In large part, the potential harms offered by opponents of cloning are highly speculative. And of those that are not speculative, namely the concerns of possible abuse of technology, they can be addressed by appropriate implementation of human cloning. Furthermore, various forms of technology have the capacity to be abused; cloning is not unique in this sense.

Granted, because human cloning has yet to be accomplished, its short- and long-term effects are unknown. However, the fact that there are unascertained results is no reason not to go forward with the research into possible implementation of human cloning. Cloning research should follow the wisdom of other scientific developments by proceeding with caution, but proceeding nonetheless. Only in this way can society establish reliable methods of this technology and determine the acceptable and unacceptable applications of cloning.

Furthermore, as a treatment for infertility, cloning is still most analogous to reproduction. In both traditional reproduction and this application of cloning ("infertility cloning"), the intent is to create and raise a child in a family setting. One's form of "conception" is only one of many strands that contribute to one's life and the broad notion of reproduction. Of greater importance is the nurturing environment of a person's upbringing consisting of gestation, family relations, education, and personal experience. In fact, relative to these factors, the method of one's conception, whether coitally or in a petri dish are nearly inconsequential. Those that call it replication are merely engaging in an exercise in semantics. Constitutional protection of reproductive rights cannot be premised upon the scientific technicalities. If this were so, the procreative liberty would narrowly protect the micro-

357. See *supra* note 162 and accompanying text.

scopic interactions between a sperm and an egg. Logically, reproductive liberty must be based upon the personal and private relationships that develop as a result of creating a child. They are these relationships that infertility cloning aims to nurture and protect.

As reproduction, cloning should be evaluated under constitutional analysis as part of a person's fundamental procreative liberty. The appropriate rubric for a procreative right is the strict scrutiny standard. Hence, any legislation on human cloning would have to serve a compelling government interest and be narrowly tailored to meet that interest.³⁵⁸

However, when considering cloning for other uses such as medical research or organ replacement, no such fundamental rights are implicated. Therefore, Congress could feasibly pass a ban on human cloning for these uses as long as there was a rational basis for such legislation. A qualifying rational basis could include concerns of commodification, psychological harm, or "family" values.

Accordingly, Congress should enact a law in which human cloning is prohibited except for use as a treatment for infertility. "Infertility" would be defined as the persistence of a couple's inability to conceive after exhausting all other infertility treatments. Also, "all other infertility treatments" should only include those methods generally accepted by reasonable medical standards. This law should have a sunset clause allowing Congress to reexamine the necessity of this law every eighteen months. Note that this period is shorter than the period recommended by the NBAC because, in light of the frequency of recent cloning developments, advances in technology may come sooner than the NBAC expects.

D. Continue Research While Monitoring

In the meanwhile, the scientific community should continue research in the cloning area, while reporting new developments as quickly as possible. Ironically, it is probably the scientific community that least needs to be told how to proceed. As a matter of practice, scientific developments are generally publicly announced promptly. Scientists understand both that the advances in all areas of science depend on the collective knowledge in the public domain and that one only receives credit for that which he or she admits.

The NBAC and Congress should monitor the progress of cloning. As new information comes forth, we must constantly re-evaluate what applications of this information are permissible. To facilitate this monitoring, a new cloning law should include a temporary moratorium on human cloning. Thus, Congress should ban public funding for

358. See *Washington v. Glucksberg*, 117 S. Ct. 2258, 2268 (1997).

research that attempts to employ human cloning. Research intended for eventual application to humans could still go forward, but would have to stop short of actual clinical trials of cloning humans. At this point, evaluations would be made and legislative action could be taken as needed. Furthermore, the federal government should ask for a voluntary moratorium on human cloning by private institutions and the international scientific community.

This broad moratorium would stay in effect until the cloning technique is perfected in animals. In order to establish a safe and reliable cloning technique in animals, scientists would need to accumulate data that reflected the long-term effects of cloning in several generations of animals as well as determine a procedure that could be reproduced consistently and safely. In the meantime, the lifting of the moratorium should also be conditioned upon the determination of the situations in which human cloning would be permitted. A consensus on this would be difficult on a national level, but national regulation is critical to the stability of the family unit, a touchstone of American society. The task of reaching national agreement could be taken up by the same National Bioethics Advisory Commission that reviewed the legal and ethical issues of cloning technology earlier in 1997.³⁵⁹ The Committee could discuss the merits of human cloning for replacing a dying child, for creating a younger identical twin of an existing child, or for creating a child that is a clone of a living adult.

E. Engage Public Discussion

Besides seeking advice from the NBAC, there should be open discussion among medical and legal academia and the general public. The NBAC should oversee these discussions and report to Congress periodically on the academic thought and public perception and opinion surrounding human cloning.

The United States should also initiate the formation of an international body to discuss worldwide developments in human cloning. The United Nations would be the most appropriate organization to implement this plan. The international body should meet annually to discuss problems and exchange possible solutions that the issue of human cloning has raised. Because reproduction is a common experience not constrained by geographical boundaries, nations would benefit from a communal body of knowledge, which would facilitate a faster learning curve.

Appropriate public policy and democratic ideals dictate that we reach a consensus. If we are to meet those duties, we must seek the most input from the widest cross-section of people. Only then can the

359. See *The Clone Age*, *supra* note 44, at 68.

resolution be a true consensus and thus, the best legislative framework for human cloning.

V. Conclusion

Although human cloning involves a new type of reproductive technology, it should be treated like the other prior ART until there is a reason to doubt its effectiveness or propriety. In truth, similar to the other ART, cloning implicates the fundamental and constitutional right to privacy and its offshoot, the right to procreate. Also, even though regulation of cloning may be permitted under Congress' commerce power, such legislation would need to take into consideration other societal concerns - such as the need for cloning for couples unable to have children otherwise - and meet the strict scrutiny standard required of laws regulating fundamental rights. Furthermore, as with the surrogacy technique, constitutional issues raised in cloning may be subordinated to the child's best interests, which are yet to be determined in the cloning context. Finally, if a clone is perceived as private property, any law banning cloning may be unconstitutional as a taking. Whatever the actual regulation is, this new law must certainly go beyond the letter of the law to account for policy concerns about human individuality and integrity.

A fear of the unknown is natural. It is precisely this fear that drives certain legislators and scientists to seek to prohibit all cloning research. This fear, however, should not paralyze society, but should provide the necessary impetus to learn more about human cloning and its possible applications. Barring the fears of a *Brave New World*,³⁶⁰ any further apprehension of human cloning is premature. Until society and science determine the questions and tentative answers, we should maintain an open mind to potential ideas that cloning may make a reality. We must admit that American society has attained success because of our independent spirit and ability to embrace the new. Indeed, "[t]he fact is that, in America, cloning may be bad but telling people how they should reproduce is worse"³⁶¹

360. HUXLEY, *supra* note 244.

361. See Gina Kolata, *On Cloning Humans, 'Never' Turns Swiftly Into 'Why Not,'* N.Y. TIMES, Dec. 2, 1997, at A1 (quoting Dr. Steen Willadsen, a cloning pioneer, from St. Barnabas Hospital in New Jersey).