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Pressing Forward: Connecticut's Approach to Embryonic Stem Cell Research

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> This is big. This is not a wedge issue . . . . This is . . . who we are as a country and how we feel about our people and about the majority . . . respecting the minority.[1]
>
> If the potential of stem cell research is realized, it would mean an end to the suffering of millions of people—a rescue, a cure . . . . Stem cells could lead to breakthroughs in developing treatments and cures for almost any terminal or catastrophic disease you can think of. This is one of the reasons that support for this work has galvanized a coalition of advocates from just about every patient community in the nation. If stem cell research succeeds, there isn't a person in the country who won't benefit, or know somebody who will.[2]
>
> – *Michael J. Fox*

Introduction

For many Americans, embryonic stem cell research ("ESCR") provides hope for the treatment of debilitating diseases and disabilities, such as leukemia, immune deficiencies, diabetes, liver disease, cardiovascular disease, neurological disorders, Alzheimer's disease, Parkinson's disease, spinal cord trauma, and cancer.[3] Although the technology is still young, many scientists share in this optimism.[4] New advancements are reported almost

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1. Interview by Katie Couric with Michael J. Fox, in New York, N.Y., Oct. 26, 2006, *available at* http://www.cbsnews.com/stories/2006/10/26/eveningnews/main2129702.shtml.

2. MICHAEL J. FOX, LUCKY MAN 152 (2002).

3. JOSEPH PANNO, STEM CELL RESEARCH: MEDICAL APPLICATIONS AND ETHICAL CONTROVERSY 35–49 (2005); JENNIFER VIEGAS, STEM CELL RESEARCH 56 (2003).

4. Thomas B. O'Karma, *Human Embryonic Stem Cells: A Primer on the Technology and Its Medical Applications*, *in* THE HUMAN EMBRYONIC STEM CELL

daily.[5]

Yet other Americans consider this surreal research immoral because it involves the destruction of embryos.[6] Embryos and other fetal tissue have been destroyed in pursuit of research since long before the provocative debate over stem cell research ("SCR") began.[7] Before *Roe v. Wade*,[8] fetal research was not met with large scale hostility. Post-*Roe*, opposition to fetal research extended to ESCR, but not to alternative reproductive technologies.[9] This selective opposition creates an irrational distinction between two methods of research that destroy embryos at similar stages of gestation.

The federal government currently agrees with research opponents who argue that the potential life harbored within embryos should be protected.[10] In 2001, the federal government implemented an embryo-friendly policy, restricting the type of SCR eligible for federal government funding.[11] Unfortunately, this approach has severely hindered the progress of American scientists, dashing the hopes of millions who await cures for their debilitating diseases and injuries.[12] Since the implementation of this policy, Congress has tried and failed on a few occasions to lessen the restrictions on federally funded research.[13]

Both the fear of losing top scientists and the potential for developing a niche economic market in human ESCR have enticed a handful of states to reconsider their anti-research policies.[14] In

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DEBATE: SCIENCE, ETHICS, AND PUBLIC POLICY 3, 5–6 (Susan Holland et al. eds., 2002).

5. *Id.*

6. Lydia Saad, *Americans Rate the Morality of 16 Social Issues*, GALLUP POLL BRIEFING, June 4, 2007.

7. 1 NAT'L BIOETHICS ADVISORY COMM'N, ETHICAL ISSUES IN HUMAN STEM CELL RESEARCH: REPORT AND RECOMMENDATIONS OF THE NATIONAL BIOETHICS ADVISORY COMMISSION 29 (1999), *available at* http://bioethics.georgetown.edu/nbac/stemcell.pdf.

8. 410 U.S. 113 (1973).

9. PANNO, *supra* note 3, at 78.

10. President George W. Bush, Speech on Stem Cell Research in Crawford, Tex. (Aug. 9, 2001), *in* LORI B. ANDREWS ET AL., GENETICS: ETHICS, LAW AND PUBLIC POLICY 141 (2002), *available at* http://www.whitehouse.gov/news/releases/2001/08/20010809-2.html (last visited Oct. 27, 2007) [hereinafter President Discusses Stem Cell Research].

11. *See id.*

12. *See* Heather L. Fowler, *Misapplied Ethical Considerations: U.S. Federal Stem Cell Mandates Lack Global Focus and Market Foresight*, 36 CORNELL INT'L L.J. 521, 523 (2004).

13. *See, e.g.*, Stem Cell Research Enhancement Act of 2005, H.R. 810, 109th Cong. (2005); *infra* text accompanying notes 128–140.

14. EVE HEROLD, STEM CELL WARS: INSIDE STORIES FROM THE FRONT LINES 152

an effort to compensate for the lack of federal funding, some states have begun to either pool together private and public research funds or construct new scientific institutes.[15] Some have also adopted regulatory requirements to ensure this research complies with generally accepted rules of bioethics.[16] While few states have successfully implemented their plans, at least one state thus far has produced and implemented a promising policy.[17]

Through examining Connecticut's approach to ESCR in comparison with the current federal policy, this Note explores the role of law in a newly emerging scientific field. Part I illustrates this rapidly advancing technology, the potential benefits it may provide, and the controversy it creates. Part II points to unfriendly political and legal precedent as a possible explanation for American hostility towards research. Part III and Part IV describe, respectively, the federal government and a majority of the states have enacted policies that further inhibit technological progress, although some states have recently enacted supportive legislation. In comparison, Part V explores Connecticut's carefully crafted scientific definitions, explicitly defined regulatory committees, broad authorization of progressive research methods, and responsible distribution of public funds. Finally, Part VI urges Americans to consider all the wonderful possibilities for ESCR. Connecticut's ESCR policy is one that should be emulated by states seeking to join in the cause of alleviating the suffering of millions of Americans.

I. Understanding the Controversial Technology

The first successfully isolated stem cells were extracted from mouse embryos in 1981;[18] however, it was not until 1998 that two teams of scientists isolated human stem cells.[19] One group of researchers, headed by Dr. John Gearhart of Johns Hopkins University, extracted embryonic germ cells[20] from a fetus aborted between approximately the second and fourth month of gestation.[21] That same year, Dr. James Thomson, along with his

(2006).

15. *Id.* at 145–49.

16. *Id.* at 152.

17. *See infra* Part V.

18. VIEGAS, *supra* note 3, at 42.

19. *Id.* at 45; PANNO, *supra* note 3, at 18.

20. Embryonic germ cells are reproductive cells derived from a fetus at five to ten weeks of gestation that later form either the sperm or the eggs of the fetus. VIEGAS, *supra* note 3, at 27.

21. PANNO, *supra* note 3, at 19–20.

team at the University of Wisconsin-Madison, extracted embryonic stem cells ("ESCs") from a discarded blastocyst obtained from an in vitro fertilization ("IVF") clinic.[22]

A blastocyst is a zygote as it appears five to six days after a sperm fuses with an egg.[23] It is comprised of approximately one hundred cells collectively and is no larger than a period on this page.[24] Scientists disagree as to whether or not a blastocyst should be identified as an "embryo" because not all of the cells in a blastocyst continue on to form a fetus.[25] Instead, some of the cells later become the placenta or umbilical cord.[26] Because not all cells in a blastocyst are slated to become potential life, some scientists prefer to label the group of cells at this stage of development as "preimplantation" embryos or "preembryos."[27]

Even the cells expected to form the fetus do not always succeed in their mission.[28] Once in utero, a blastocyst takes approximately one week to attach to the womb, or it fails trying.[29] Seventy-five percent of blastocysts never attach to later become fetuses.[30] In some instances, more than one blastocyst attach to the uterus lining concurrently.[31] This occurrence can produce multiple fetuses, but it is equally as likely that some of the attached blastocysts "dissolve" or are subsumed into the surviving embryo.[32] Successfully attached blastocysts multiply into approximately two hundred cells by the fourteenth day of formation, and then they begin to differentiate.[33] Differentiation is the process whereby an unspecialized early embryonic cell

22. *Id.* at 19; *see also* VIEGAS, *supra* note 3, at 45.

23. PANNO, *supra* note 3, at 77.

24. *Id.*

25. Fowler, *supra* note 12, at 533. The trophoblast, part of the blastocyst, later becomes the placenta and umbilical cord, while the inner cell mass of the blastocyst goes on to form the embryo. Those inner cells are the source of the stem cells extracted for research. *See id.*

26. PANNO, *supra* note 3, at 77.

27. *Id.*; *see also* Susan L. Crockin, *The "Embryo" Wars: At the Epicenter of Science, Law, Religion, and Politics*, 39 FAM. L.Q. 599, 601 (2006); Elizabeth A. Trainor, Annotation, *Right of Husband, Wife, or Other Party to Custody of Frozen Embryo, Pre-embryo, or Pre-zygote, in Event of Divorce, Death, or Other Circumstances*, 87 A.L.R.5th 253, 259 (1991). Although such distinctions are compelling, for simplicity purposes I will continue to refer to the group of cells during their first fourteen days as an embryo for the remainder of this Article.

28. HEROLD, *supra* note 14, at 123 (stating that only thirty to forty percent of embryos result in pregnancy).

29. PANNO, *supra* note 3, at 77.

30. *Id.*

31. HEROLD, *supra* note 14, at 135–36.

32. *Id.*

33. PANNO, *supra* note 3, at 77.

acquires the features of a specialized cell such as a heart, liver, or muscle cell.[34]

Likewise, if stem cells are extracted from a blastocyst before the blastocyst attaches to the uterus, the cells immediately begin multiplying into additional stem cells, forming what scientists call a cell line.[35] Unlike a typical human cell, an ESC has not yet differentiated and can thus multiply into any of a wide variety of cell types,[36] a trait that could prove useful in repairing damaged or diseased cells.[37] Many believe stem cells hold the cure to some currently incurable diseases, injuries, and illnesses,[38] which is precisely why Dr. Thomson's and Dr. Gearhart's accomplishments created excitement within the scientific community.[39]

Although the possibilities may be endless, the technology is still wrought with complications. For example, patients undergoing stem cell therapy face many of the same problems encountered by organ transplant recipients.[40] Because the stem cells typically consist of DNA different from the patient's, the patient's immune system can reject the foreign substance.[41] Experts believe therapeutic cloning may be the answer to this problem.[42] Therapeutic cloning involves extracting the nucleus from a cell and replacing it with a nucleus from one of the patient's cells.[43] Once this process is completed, the resulting embryo begins multiplying until it becomes a blastocyst.[44] At this stage, the stem cells can be extracted in the normal fashion.[45] Therapeutic cloning has three major appealing features: 1) it can create embryonic stem cells that are 100 percent compatible with the patient's cells; 2) it provides for an unlimited supply of cells;

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34. Richard A. Merrill & Bryan J. Rose, *FDA Regulation of Human Cloning: Usurpation or Statesmanship?*, 15 HARV. J.L. & TECH. 85, 93 (2001).

35. *See* VIEGAS, *supra* note 3, at 24–25.

36. PANNO, *supra* note 3, at 24.

37. *Id. See also* HEROLD, *supra* note 14, at 41 ("The principle behind stem cell research is that the formula for self-renewal, and for continuous cellular replenishment, hides within stem cells—the parent cells that generate new cells.").

38. PANNO, *supra* note 3, at 58.

39. *See id.* at 34.

40. *Id.* at 60.

41. *Id.* at 59.

42. MICHAEL BELLOMO, THE STEM CELL DIVIDE: THE FACTS, THE FICTION, AND THE FEAR DRIVING THE GREATEST SCIENTIFIC, POLITICAL, AND RELIGIOUS DEBATE OF OUR TIME 135–36 (2006). This technique was first performed in 2001. Michael J. Malinowski & Radhika Rao, *Legal Limitations on Genetic Research and the Commercialization of Its Results*, 54 AM. J. COMP. L. 45, 50 (2006).

43. BELLOMO, *supra* note 42, at 135.

44. *Id.* at 136.

45. *See id.*

and 3) if it is done properly, the cells produced are totally rejuvenated independent of the age of the donor.[46] Further research and improvement of therapeutic cloning is essential to ensure stem cell therapies can later be utilized on human subjects without fear of immune rejection.[47]

Although ESCR provides hope for many medical ailments, most research inherently involves destroying embryos.[48] Because of this, some people prefer scientists pursue adult stem cell research ("ASCR"). Adult stem cells ("ASCs") exist throughout the adult body.[49] Treatment using ASCs directly derived from the patient circumvents the problem of immune rejection.[50] The further development of ASCR offers promise for a variety of diseases and disabilities.[51] Unlike ESCR, ASCR is currently in the human clinical trial stage of development in this country,[52] and thus its benefits may be more quickly realized.

Although ASCR may lead to promising therapies, there are limits to what it can achieve. ESCR, on the other hand, is more versatile and has the potential to assist with a larger array of medical complications. In part, this is because ESCs have greater plasticity than ASCs.[53] "Plasticity" refers to a cell's ability to morph into more than one type of cell.[54] Because the plasticity of an ASC is less than its embryonic counterpart,[55] ASCs can only evolve into a limited number of cells.[56]

Not only is an ESC's plasticity greater than that of an ASC, but its multiplication rate is also much faster.[57] "It is during the periods of embryonic and fetal development that the rate of

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46. Jose Cibelli, Op-Ed., *Wake Up America*, WALL ST. J., Mar. 1, 2004, at A16.

47. BELLOMO, *supra* note 42, at 137.

48. *See* PANNO, *supra* note 3, at 23. However, scientists have begun creating methods to extract stem cells without destroying the embryo. Helen Pearson, *Early Embryos Can Yield Stem Cells . . . and Survive*, 442 NATURE, Aug. 24, 2006, at 858. Even with these techniques, the ethical controversy still remains because some believe extraction of stem cells will decrease an embryo's chance of implantation. *Id.*

49. *See* PANNO, *supra* note 3, at 10.

50. BELLOMO, *supra* note 41, at 145.

51. *Id.* at 144–45. *But see* Peter Aldhous, *Stem Cells: Miracle Postponed*, NEW SCIENTIST, Mar. 11, 2006, at 39, *available at* http://genetics-and-society.org/article.php?id=1842 (suggesting many of the promises made through ASCR were overstated and unrealistic).

52. BELLOMO, *supra* note 42, at 144.

53. PANNO, *supra* note 3, at 1; VIEGAS, *supra* note 3, at 38–39.

54. PANNO, *supra* note 3, at 1.

55. *Id.* at 9.

56. VIEGAS, *supra* note 3, at 38–39.

57. *Id.* at 39.

production of new cells is at its highest."[58] Additionally, ASCs are more difficult for scientists to extract and have a more limited life span when grown in a lab.[59] ASCs will continue to aid important research in the promise of benefits; however, their promise does not compare to that provided by ESCR. As one expert notes, ESCs contain the potential to address every disease to which our species is susceptible.[60] Even still, ESCR in the United States has been met with political resistance and skepticism, partly due to pre-existing legal precedent addressing related, yet distinguishable, procedures while ignoring more fitting comparisons.

II. Somewhere in Between: Struggling to Categorize Stem Cell Research Among Policies Regulating Alternative Reproductive Technologies and Abortion Procedures

Although ESCR may lead to groundbreaking discoveries for the treatment of many currently incurable diseases and injuries, many politicians and legal scholars are reluctant to welcome the technologies with open arms.[61] Destruction of embryos involved in research troubles some who prefer the development of ASCR to ESCR.[62] This discomfort is improperly linked to the American divide over abortion rights and should instead be analogized to other experiments involving human tissues or other procedures that destroy embryos.

A. Then There Was Roe*: The Effect of Fetal Experimentation Regulations on Research*

Although fetal experimentation has existed since the 1930s,[63] regulation of these procedures did not become popular until the mid-1970s, after the *Roe v. Wade*[64] decision legalized abortion.[65] Before *Roe*, pro-life advocates concentrated their anti-abortion arguments on the woman's disposition and the importance of safeguarding family values, focusing only passively on the

58. DANIEL R. MARSHAK ET AL., STEM CELL BIOLOGY 3 (2001).
59. VIEGAS, *supra* note 3, at 38–39.
60. BELLOMO, *supra* note 42, at 146.
61. PANNO, *supra* note 3, at 72.
62. BELLOMO, *supra* note 42, at 146.
63. NAT'L BIOETHICS ADVISORY COMM'N, *supra* note 7, at 29.
64. 410 U.S. 113 (1973).
65. Charles H. Baron, *Legislative Regulation of Fetal Experimentation: On Negotiating Compromise in Situations of Ethical Pluralism*, *in* GENETICS AND THE LAW III 431, 431 (Aubrey Milunsky & George J. Annas eds., 1984); Crockin, *supra* note 27, at 603.

preservation of fetal life.[66] Conversely, modern pro-life advocates, concentrate their abortion protests on the "sanctity of life."[67] This central focus is perhaps the reason why so many states began adopting bans on fetal experimentation in the late 1970s and early 1980s.[68] By 1984, twenty-five states had enacted some form of restriction on fetal experimentation,[69] creating a harsh environment for the research before it ever began. With the development of ESCR, many of these laws have been interpreted or amended to restrict ESCR.[70]

The effect of the pro-life movement on ESCR is tragic, especially considering the selectivity of prohibition against embryonic and/or fetal destruction. Opponents analogize ESCR to the termination of developed fetuses; however, these laws are rarely applied to alternative reproduction technologies. Interestingly enough, IVF involves the destruction of embryos at a similar stage of development as ESCR, yet it enjoys much more limited restrictions.

B. In the Name of Reproduction: Destroying Embryos During In Vitro Treatments

Developed in the late 1970s,[71] IVF involves the "union of a sperm and an egg outside the body in a laboratory setting."[72] The embryos created through fertilization are then inserted into the woman's womb for the purpose of impregnation.[73] Several are injected simultaneously because the rate of implantation using this method is very low.[74] Because of this uncertainty, more

66. Janet L. Dolgin, *Embryonic Discourse: Abortion, Stem Cells, and Cloning*, 31 FLA. ST. U. L. REV. 101, 116–19 (2003).

67. *Id.* at 128 (discussing the strategic decision to focus on "fetal life" rather then family values in order to better address opposing claims).

68. Baron, *supra* note 65, at 432, 443 nn.15–26.

69. *Id.* at 432.

70. *See infra* Part IV.

71. *See* THOMAS SCULLY & CELIA SCULLY, PLAYING GOD: THE NEW WORLD OF MEDICAL CHOICES 152 (1987) (reporting the birth of Louise Brown, the world's first test-tube baby, in 1978 in Great Britain). The first IVF baby in the United States was born in 1981. Victor Cohn, *First U.S. Test-Tube Baby Is Born*, WASH. POST, Dec. 29, 1981, at A1.

72. VIEGAS, *supra* note 3, at 58; *see also* SCULLY & SCULLY, *supra* note 71, at 160 (describing the process of implanting multiple embryos at once to assure one attaches, which can sometimes lead to multiple births).

73. HEROLD, *supra* note 14, at 32–33.

74. *Id.* at 33. The process can be very difficult for some women, who are forced to undergo many rounds of implantation of several embryos. *See* BONNIE STEINBOCK, LIFE BEFORE BIRTH: THE MORAL AND LEGAL STATUS OF EMBRYOS AND FETUSES 199 (1992).

embryos are typically created than needed.[75] These excess embryos are handled in one of the following ways: 1) destroyed outright,[76] 2) donated to other infertile couples, 3) donated to scientific research, or 4) suspended in cryopreservation for future use or until a more permanent decision can be made.[77] Cryopreservation involves freezing the embryos so that the cells do not continue to multiply.[78]

Although IVF consequently involves the destruction of embryos, energetic pro-life advocates focus little attention on IVF procedures.[79] Perhaps this is because alternative reproduction technologies destroy embryos in the pursuit of reproduction. American legal precedent has maintained a certain level of respect for individual reproductive rights.[80] "If 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."[81] This unique legal and cultural tradition facilitated America's general acceptance of and successful commercialization of IVF.[82]

Alternative reproduction methods at large, and the IVF procedure specifically,[83] enjoy minimal federal government regulation.[84] New techniques often bypass the standard animal-testing requirements or intimate human subject oversight typically required of traditional medical procedures.[85] Although

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75. HEROLD, *supra* note 14, at 33.

76. PANNO, *supra* note 3, at 78.

77. *See* George J. Annas & Sherman Elias, *Social Policy Considerations in Noncoital Reproduction, in* GENETICS AND THE LAW III, *supra* note 65, at 147, 153.

78. *See, e.g.*, HEROLD, *supra* note 14, at 35 ("[F]rozen embryos l[ie] in a state of suspended animation . . . .").

79. *See supra* note 9 and accompanying text. *But see* HEROLD, *supra* note 14, at 32 (stating some religious and political leaders spoke out against IVF at its inception).

80. *See, e.g.*, Eisenstadt v. Baird, 405 U.S. 438, 454 (1972) (holding that "providing dissimilar treatment for married and unmarried persons who are similarly situated" in terms of contraceptive distribution violates the Equal Protection Clause of the U.S. Constitution); Skinner v. Oklahoma, 316 U.S. 535, 536 (1942) (noting that "the right to have offspring" is an individual "right which is basic to the perpetuation of a race").

81. *Eisenstadt*, 405 U.S. at 453 (citing Stanley v. Georgia, 394 U.S. 557 (1969)).

82. *See* Lori P. Knowles, *Stem Cell Policy: Where Do We Draw the Lines?*, 39 NEW ENG. L. REV. 623, 628–29 (2005); Michael J. Malinowski, *A Law-Policy Proposal to Know Where Babies Come from During the Reproductive Revolution*, 9 J. GENDER RACE & JUST. 549, 561–63 (2006).

83. Malinowski, *supra* note 82, at 553–54.

84. *Id.* at 551–52.

85. *Id.* at 553–55.

the Centers for Disease Control and Prevention technically oversees clinics' practices, it conducts site visits to fewer than ten percent of IVF facilities.[86] In response, voluntary organizations have developed to assist with institutional coordination.[87] Also, many individual IVF clinics require that patients expressly indicate their intentions concerning excess embryos in signed agreements to avoid any future disputes among the co-donors and the clinics.[88] Even with agreements, legal disputes may sometimes arise.

Litigation over these contractual arrangements began during the late 1980s, shortly after the procedure emerged.[89] Generally, these cases involve spousal disputes over the disposition of excess cells created for IVF.[90] Faced with a technological phenomenon of first impression, courts often resort to traditional common law analysis and public policy considerations. Courts draw upon either traditional contract principles,[91] the doctrine of mutual consent,[92] public policy considerations,[93] or constitutional interpretations.[94] Experts analyzing these cases categorize the

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86. *Id.* at 551–52.

87. *Id.*

88. Laura S. Langley & Joseph W. Blackston, *Sperm, Egg, and a Petri Dish: Unveiling the Underlying Property Issues Surrounding Cryopreserved Embryos*, 27 J. LEGAL MED. 167, 168 (2006).

89. *See* Trainor, *supra* note 27, at 262–68; *see, e.g.*, *In re* Baby M, 109 N.J. 396 (1988) (holding a maternal surrogacy contract unenforceable as contrary to public policy).

90. *See, e.g.*, A.Z. v. B.Z., 725 N.E.2d 1051 (Mass. 2000) (finding unenforceable a written and signed agreement between a couple and a fertilization clinic to give frozen embryos to the wife upon separation of the couple); J.B. v. M.B., 751 A.2d 613 (N.J. Super. Ct. App. Div. 2000), *aff'd as modified*, 783 A.2d 707 (N.J. 2001) (modifying lower court holding to allow husband to continue to store frozen embryos if he wished to pay for the fees associated, ordering the embryos to be destroyed otherwise).

91. *See, e.g.*, Kass v. Kass, 696 N.E.2d 174 (N.Y. 1998) (limiting the analysis to interpretation of contract law); Roman v. Roman, 193 S.W.3d 40, 50 (Tex. Ct. App. 2006) ("[A]llowing the parties voluntarily to decide the disposition of frozen embryos in advance of cryopreservation, subject to mutual change of mind, jointly expressed, best serves the existing public policy of this State and the interests of the parties."); Litowitz v. Litowitz, 48 P.3d 261, 271 (Wash. 2002) (en banc) ("We base our decision in this case solely upon the contractual rights of the parties under the preembryo cryopreservation contract [which calls for the thawing out of the preembryos after five years unless decided otherwise by the parties].").

92. *See In re* Marriage of Witten III, 672 N.W.2d 768 (Iowa 2003); Carl H. Coleman, *Procreative Liberty and Contemporaneous Choice: An Inalienable Rights Approach to Frozen Embryo Disputes*, 84 MINN. L. REV. 55 (1999).

93. *A.Z.*, 725 N.E.2d at 1057 (refusing to enforce, "an agreement that would compel one donor to become a parent against his or her will" on public policy grounds); *see, e.g.*, *J.B.*, 751 A.2d at 619 ("[A] contract to procreate is contrary to New Jersey public policy and is unenforceable.").

94. *See, e.g.*, Davis v. Davis, 842 S.W.2d 588, 590, 602 (Tenn. 1992) (balancing

decisions as coming under one of three theories: the property theory, the human life theory, or the special respect theory.[95]

Jurisdictions subscribing to the property theory consider the cells to be personal property, not human life.[96] They often resort to traditional contract law principles for determining ownership over the cells.[97] Some of these courts identify the cells as "pre-zygotes"[98] or "pre-embryos,"[99] indirectly implying the tissue should not be considered embryos, let alone human life. In contrast, the human life theory declines to enforce contractual agreements regarding human cells because those cells constitute life incapable of giving consent.[100] Advocates of this theory align with the pro-life individuals who oppose ESCR.[101] Finally, proponents of the special respect theory do not focus on whether or not the cells rise to the status of living.[102] They suggest that even if the tissue is not human life, it nonetheless deserves special respect.[103] Using this approach, courts refuse to enforce contracts between donors;[104] instead, they engage in a public policy or constitutional analysis to determine the fate of the cells.[105] Regardless of the

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the rights of the parents in the absence of a contract and engaging in a constitutional analysis, holding "the state's interest in potential human life is insufficient to justify an infringement on the gamete-providers' procreational autonomy"). Although the *J.B.* court's holding rested on public policy grounds, it nonetheless stated "enforcement of the alleged contract to create a child would impair the wife's constitutional right not to procreate, whereas permitting destruction of the embryos would not effectively impair the husband's reproductive rights. Therefore . . . [rejecting] the husband's contention that his constitutional rights would be violated by destruction of the embryos." *J.B.*, 751 A.2d at 619.

95. *See* STEINBOCK, *supra* note 74, at 208.

96. *See, e.g.*, *Litowitz*, 48 P.3d at 271 ("It is not necessary . . . to engage in a . . . discussion whether the preembryos in this case are 'children' [rather this decision is based] solely upon the contractual rights of the parties . . . .").

97. *Id.*

98. *See* Kass v. Kass, 696 N.E.2d 174, 180 (N.Y. 1998) ("Agreements between progenitors . . . regarding disposition of their *pre-zygotes* should generally be presumed valid and binding . . . ." (emphasis added)).

99. *See Litowitz*, 48 P.3d at 268 ("[I]t is appropriate for the courts to determine disposition of the *preembryos* under the cryopreservation contract." (emphasis added)).

100. *See* STEINBOCK, *supra* note 74, at 208.

101. *See infra* text accompanying notes 250–52, 261–62.

102. *See* STEINBOCK, *supra* note 74, at 208.

103. *Id.*

104. In the IVF context, I loosely adopt the term "donors" to depict patients with a legal claim to the embryos whether the embryos are comprised of the "donor's" actual genetic material.

105. *See, e.g.*, A.Z. v. B.Z., 725 N.E.2d 1051, 1057–58 (Mass. 2000) ("As a matter of public policy, we conclude that forced procreation is not an area amenable to judicial enforcement."); Davis v. Davis, 842 S.W.2d 588, 591 (Tenn. 1992) ("[W]e conclude that given the relevant principles of constitutional law . . . [and] the

approach, experts argue that the analysis should focus on the rights of the donors and recipients over the embryos produced for IVF procedures.[106] Indeed, court opinions mention little concerning the rights of the individual embryos.[107]

In contrast, most laws directed at ESCR are concerned primarily with protecting individual embryos as life. Therefore, the *Roe* decision had a negative effect on one scientific technique involving the destruction of potential life (fetal experimentation) while completely ignoring another (alternative reproduction technology).[108]

III. Left in the Dust: How the U.S. Government is Failing Our Scientific Community

A. The American Position on Embryonic Stem Cell Research

Although most states increased their restrictions on fetal experimentation following *Roe v. Wade*, the federal government's Ethics Advisory Board ("EAB") of the Department of Health, Education, and Welfare, currently the Department of Health and Human Services ("DHHS"), endorsed experimentation on embryos in gestation less than fourteen days.[109] In 1983, the President's Commission on Bioethics also adopted this position.[110]

In 1996, shortly before scientists successfully extracted human ESCs, Congress attached a Dickey Amendment, banning all federal funding of research involving the destruction of embryos, to an appropriations bill.[111] In response, general counsel

existing public policy of Tennessee . . . , we must weigh the interests of each party to the dispute . . . in order to resolve that dispute in a fair and responsible manner.").

106. STEINBOCK, *supra* note 74, at 209.

107. *See A.Z.*, 725 N.E.2d 1051; J.B. v. M.B., 751 A.2d 613 (N.J. Super. Ct. App. Div. 2000), *aff'd as modified*, 783 A.2d 707 (N.J. 2001).

108. The majority of pro-life advocates have not actively advocated increased restrictions on alternative reproduction technology. In light of this inconsistency, a few pro-life advocates united against *Roe* have recently begun re-evaluating their stance on existing IVF policies. *See* HEROLD, *supra* note 14, at 75.

109. SCULLY & SCULLY, *supra* note 71, at 159.

110. *Id.*

111. The original rider amendment was attached to the Balanced Budget Down Payment Act, Pub. L. No. 104-99, § 128, 110 Stat. 26, 34 (1996). In the following years, Congress continued to attach Dickey Amendments to appropriation bills to continue the restrictions. Departments of Labor, Health and Human Services, and Education, and Related Agencies Appropriations Act of 2006, Pub. L. No. 109-149, § 509, 119 Stat. 2833, 2880; Consolidated Appropriations Act of 2005, Pub. L. No. 108-447, § 509, 118 Stat. 2809, 3163–64; Consolidated Appropriations Act of 2004,

for the DHHS interpreted the Amendments' prohibition on human embryonic experimentation to not apply to research involving stem cells,[112] pointing to the Amendments' definition of a human embryo as "any organism, not protected as a human subject . . . that is derived by fertilization, parthenogenesis, cloning, or any other means from one or more human gametes or human diploid cells."[113] The general counsel reasoned that because stem cells are not "organisms" capable of reproduction, the Amendment was inapplicable to SCR specifically.[114]

After this opinion, the DHHS established new federal guidelines in 2000 to begin disbursing federal funds for human embryonic stem cell research the next year.[115] The National Institutes of Health ("NIH") published guidelines allowing federal funding for human embryonic research as long as: 1) the cells used came from fertility clinics; 2) the cells were "in excess of the clinical need," 3) "a clear separation existed between the decision to create embryos for fertility treatment and the decision to donate them for research purposes," 4) the cells were obtained with the informed consent of the fertility patient, and 5) "no inducements were offered for the donation of the embryos."[116] President Bill

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Pub. L. No. 108-199, § 510, 118 Stat. 3, 277; Consolidated Appropriations Resolution of 2003, Pub. L. No. 108-7, § 510, 117 Stat. 11, 344; Department of Labor, Health and Human Services, and Education, and Related Agencies Appropriations Act of 2002, Pub. L. No. 107-116, § 510, 115 Stat. 2177, 2219; The Consolidated Appropriations Act of 2001, Pub. L. No. 106-554, § 510, 114 Stat. 2763, 2763A-71; Consolidated Appropriations Act of 2000, Pub. L. No. 106-113, § 510, 113 Stat. 1501, 1501A-275; Omnibus Consolidated and Emergency Supplemental Appropriations Act of 1999, Pub. L. No. 105-277, § 511, 112 Stat. 2681, 386; Departments of Labor, Health and Human Services, Education, and Related Agencies Appropriations Act of 1998, Pub. L. No. 105-78, § 513, 111 Stat. 1467, 1517; The Omnibus Consolidated Appropriations Act of 1997, Pub. L. No. 104-208, § 512, 110 Stat. 3009, 270; *see also* JUDITH A. JOHNSON & ERIN WILLIAMS, STEM CELL RESEARCH, CRS REP. FOR CONG: RECEIVED THROUGH THE CRS WEB, RL31015, 5–6, updated July 18, 2005; Crockin, *supra* note 27, at 620 ("[B]efore any funding was actually granted, Congress attached a rider to a . . . DHHS . . . appropriations bill . . . known as the Dickey Amendment . . . [and] to every subsequent DHHS appropriations bill to date."); Fowler, *supra* note 12, at 522 ("Congress did not agree with the [NIH] recommendation and enacted a federal law banning the use of appropriated federal funds for [human embryo research].").

112. JOHNSON & WILLIAMS, *supra* note 111, at 6; Fowler, *supra* note 12, at 522–23.

113. *See, e.g.*, § 509, 119 Stat. at 2880. In 1998, "or human diploid cell" was added to the definition of all subsequent Dickey Amendments. § 513, 111 Stat. at 1517.

114. JOHNSON & WILLIAMS, *supra* note 111, at 6.

115. *Id.* at 7.

116. Samuel B. Casey & Nathan A. Adams, *Specially Respecting the Living Human Embryo by Adhering to Standard Human Subject Experimentation Rules*, 2 YALE J. HEALTH POL'Y L. & ETHICS 111, 113 (2001) (citing the National Institutes of

Clinton endorsed this position and advocated for research during a speech in 2000. "[W]e cannot walk away from the potential to save lives and to improve lives, to help people literally to get up and walk, to do all kinds of things we could never have imagined, as long as we meet rigorous ethical standards."[117]

Unfortunately, the DHHS was unable to distribute funds because President George W. Bush altered the executive position on SCR upon taking office.[118] On August 9, 2001, while addressing the nation, the President announced his new restrictions on the federal funding of ESCR.[119] Although not prohibiting SCR, the new policy limits federal grants to research involving the sixty stem cell lines already in existence at the time of the speech.[120] Under President Bush's plan, no federal monies are disbursed for experiments involving the further destruction of embryos.[121] This policy also prohibits funding for constructing facilities or purchasing equipment to be used to conduct unsanctioned ESCR.[122] In addition to funding restrictions, President Bush's new policy also requires that researchers obtain informed consent of the patients who originally donated the embryos in which the stem cell lines were derived.[123]

In reaction to the federal government's moratorium on SCR funding, private endowments were established to support the experimentation.[124] Many universities including Stanford, the University of Wisconsin-Madison, the University of Minnesota, and the University of California, San Francisco contributed to the cause.[125] Harvard has gone one step further in building a privately funded research center.[126] Yet however generous, private financiers cannot provide an adequate substitute for federal grants because the cost of research is simply too great.[127]

Health Guidelines for Research Using Human Pluripotent Stem Cells, 65 Fed. Reg. 51,976, 51,980 (Aug. 25, 2000)).

117. BELLOMO, *supra* note 42, at 92.

118. JOHNSON & WILLIAMS, *supra* note 111, at 9, 12.

119. President Discuses Stem Cell Research, *supra* note 10.

120. *Id.*

121. *Id.*

122. William Hathaway, *Stem Cell Funds Draw Interest of 77 Scientists*, HARTFORD COURANT (Conn.), June 7, 2006, at A4.

123. JOHNSON & WILLIAMS, *supra* note 111, at 35.

124. *Id.* at 12.

125. Gareth Cook, *Stem Cell Center at Harvard: Researchers Seek to Bypass U.S. Restrictions*, BOSTON GLOBE, Feb. 29, 2004, at A1.

126. *Id.*

127. *See* CHRISTOPHER THOMAS SCOTT, STEM CELLS NOW: A BRIEF INTRODUCTION TO THE COMING MEDICAL REVOLUTION 171 (2006).

In 2005, the Republican-led Congress attempted to circumvent President Bush's 2001 mandate.[128] Unfortunately, the President exercised his first veto and preserved existing limits to federally funded research.[129] The President believed compelling Americans to "fund the deliberate destruction of human embryos . . . would be a grave mistake and would needlessly encourage a conflict between science and ethics that can only do damage to both and harm our Nation as a whole."[130] Again in 2007, Congress tried to offer more expansive funding to ESCR. Although the House[131] and Senate[132] once again passed legislation, Bush predictably vetoed the measures.[133] It has been over six years since President Bush implemented his ESCR policy, and scientists' problems with the remaining cell lines have continued to increase.[134]

B. The Failing Federal Plan

President Bush proudly proclaims himself to be the first president to support embryonic stem cell research.[135] As the

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128. *See* Stem Cell Research Enhancement Act of 2005, H.R. 810, 109th Cong. (as passed by House of Representatives, May 24, 2005).

129. President George W. Bush, Message to the House of Representatives (July 19, 2006), *available at* http://www.whitehouse.gov/news/releases/2006/07/20060719-5.html (last visited Oct. 28, 2007) [hereinafter Message to the House]; *see* Editorial, *Bush Readies First Veto, Dashing Hopes of Millions*, USA TODAY, July 19, 2006, at A10.

130. Message to the House, *supra* note 129.

131. The Stem Cell Research Enhancement Act of 2007 was passed by the House of Representatives on January 11, 2007. H.R. 3, 110th Cong. (2007).

132. The three Senate bills, The Stem Cell Research Enhancement Act of 2007, S. 5, 110th Cong. (as passed by Senate, Apr. 11, 2007), The Stem Cell Research Expansion Act, S. 362, 110th Cong. (2007), and The Hope Offered Through Principled Ethically-Sound Stem Cell Research (H.O.P.E.) Act, S. 363, 110th Cong. (2007), were all introduced in January of 2007. The H.O.P.E. Act promoted ASCR, encouraged the adoption of embryos, and funded research that searched for a method for obtaining ESCs without destroying embryos. S. 363, §§ 4–5. The Stem Cell Research Expansion Act mirrored President Bush's policy, but extended the federal funding deadline for stem cell lines produced before 2001 to all lines produced before January 23, 2006. S. 362, § 2. The Stem Cell Research Enhancement Act of 2007, the bill eventually passed by the Senate, provided federal support for ESCR using in vitro embryos, called for the NIH to establish research guidelines, and promoted alternative experimentation using non-embryonic stem cells. S. 5, § 2–3.

133. *See* Sheryl Gay Stolberg, *Bush Vetoes Measure on Stem Cell Research*, N.Y. TIMES, June 21, 2007, at A21.

134. *See* Fowler, *supra* note 12, at 528 (discussing the extensive difficulties of both privately and publicly funded stem cell research in the United States since President Bush implemented his policies).

135. *See, e.g.*, Message to the House, *supra* note 129 ("When I took office, there was no Federal funding for human embryonic stem cell research.").

White House Administration claims: "people are trying to politicize . . . [the issue] by accusing him of standing in the way of science, when he's the guy who's made it possible to open up the way to science."[136] Although President Bush may technically have been the first to actually distribute federal funds for SCR, it was President Clinton who laid the framework to support this new science.[137]

President Bush's piecemeal approach to "supporting" SCR is both under- and over-inclusive, welcoming hostility from supporters and defenders of the technology alike. First, the policy only restricts federal funding of research and says little about the scientific procedures themselves.[138] This policy leaves the field virtually unregulated by the government so long as experiments are conducted using private monies.[139] Secondly, the policy provides funding only for research on stem cell lines available before the 2001 policy was implemented.[140]

Anti-research[141] advocates complain that allowing experimentation on any embryos improperly validates the science.[142] Research advocates, on the other hand, consider the 2001 distinction arbitrary, especially since embryos have continued to be habitually destroyed at IVF clinics long after the President's speech.[143] "[T]here is no cogent ethical reason for stopping where his policy stops . . . . [T]hat temporal restriction is difficult to defend from an ethical standpoint."[144] Meaningless

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136. Press Release by Tony Snow, Press Sec'y for the White House, White House Communications Press Briefing (July 19, 2006), *available at* http:www.whitehouse.gov/news/releases/2006/07/20060719-2.html.

137. BELLOMO, *supra* note 42, at 93 & n.3.

138. *See* The Stem Cell Research Expansion Act, S. 362, 110th Cong. (2007), and The Hope Offered Through Principled Ethically-Sound Stem Cell Research (H.O.P.E.) Act, S. 363, 110th Cong. (2007); Stolberg, *supra* note 133 (discussing President Bush's veto of a measure lifting restrictions on stem cell research, while simultaneously encouraging scientists to pursue "unethical" stem cell research).

139. *See* SCOTT, *supra* note 127, at 169–71 (discussing privately-funded medical advances and the limitations on private research institutions).

140. The H.O.P.E. Act would have extended this deadline to January 23, 2006. *See supra* note 132 and accompanying text.

141. "Pro-life" may be a more neutral term to describe these advocates; however, many pro-life, meaning anti-abortion, advocates support ESCR; therefore the term "pro-life" is not necessarily synonymous with "anti-research."

142. *See* JOHNSON & WILLIAMS, *supra* note 111, at 34 ("The National Right to Life Committee and the United States Conference of Catholic Bishops, object [to the distinction] because the distinction validates the destruction of embryos.").

143. HEROLD, *supra* note 14, at 36–37.

144. James F. Childress, *An Ethical Defense of Federal Funding for Human Embryonic Stem Cell Research*, 2 YALE J. HEALTH POL'Y L. & ETHICS 157, 163 (2001).

destruction of cells may be prohibited by some state laws,[145] but the alternative fate of indefinite cryopreservation may be compared to a slow death sentence.[146] The longer embryos remain frozen, the harder they are to thaw, insert into a surrogate uterus, and develop to term.[147]

The problems with President Bush's ESCR policy are not limited to its under- and over-inclusive nature. Further issues arise due to the very limited quantity of research permitted using federal funds. During his 2001 speech, the President suggested sixty stem cell lines were available for research;[148] however, scientists estimate the actual number of lines available for research in the United States to be twenty-two or twenty-three.[149] Furthermore, the number of available lines appears insignificant when one considers that, as of 2003, an estimated 400,000 frozen excess embryos existed in the United States.[150]

Scientists worry that the existing twenty-some stem cell lines listed on the NIH registry may be contaminated because of the mouse "feeder" cells used on the cell lines. Mouse "feeder" cells keep cell lines from differentiating by excreting chemicals,[151] which scientists suspect leave stem cells vulnerable to potential

145. *See, e.g.*, LA. REV. STAT. ANN. § 9:129 (2006); *infra* Part IV.

146. Of course, this "death sentence" analogy only makes sense if one assumes a presence of life.

147. *See* HEROLD, *supra* note 14, at 35–36 (discussing the dilemma of what to do with the 400,000 frozen embryos, half of which may not survive the thawing process).

148. President Discusses Stem Cell Research, *supra* note 10, at 142. In fact, the Human Embryonic Stem Cell Registry, developed by the NIH after the new policy was implemented, actually estimated the number of lines available throughout the world to be closer to seventy-eight. JOHNSON & WILLIAMS, *supra* note 111, at 2, 10–11.

149. *See* HEROLD, *supra* note 14, at 64; JOHNSON & WILLIAMS, *supra* note 111, at 11–12; Editorial, *supra* note 129, at A10, Marta Brodsky, *The Viability of Our Humanity: Will the Supreme Court's Abortion Jurisprudence Survive the Challenge of Embryonic Stem Cell Research?*, 76 ST. JOHN'S L. REV. 225, 247 (2002) (discussing U.S. scientists' frustration with the limited number of stem cell lines available under President Bush's federal funding restriction). Of the seventy-eight lines world-wide reported by the NIH, thirty-one are not kept in the United States, sixteen perished while being thawed out of cryopreservation, seven were in fact duplications of lines already accounted for, one line was still in development at the time of the speech, and one was withdrawn from the original count. SCOTT, *supra* note 127, at 164–65.

150. HEROLD, *supra* note 14, at 35 (reporting that 400,000 embryos exist in a state of suspended animation, and scientists estimate that only about half that number will survive the process of thawing out of cryopreservation); Crockin, *supra* note 27, at 609.

151. HEROLD, *supra* note 14, at 64; JOHNSON & WILLIAMS, *supra* note 111, at 9 ("The mouse cells secrete a substance that prevents the human embryonic stem cells from differentiating into more mature cell types . . . .").

viral infections.[152] These viruses can remain undetected for many years.[153] Since scientists discovered this potential problem, researchers in Singapore created a technique to preserve stem cell lines without the use of mouse "feeder" cells.[154] Unfortunately, the damage has already been done to the cell lines eligible for federal funds in this country.

IV. Choosing Sides: A Shift in State Research Policies

In addition to the national restrictions prohibiting federal funding for ESCR, some states chose to impose even more stringent limitations on experiments conducted within their borders. The most sweeping of these laws belongs to Louisiana. In congruence with the human life theory, Louisiana's statute defines an embryo as a "juridical person" deserving of human rights until it is implanted in a woman's womb or until it fails to develop outside of cryopreservation within a thirty-six hour time frame.[155] In considering the embryo a legal person, Louisiana does not acknowledge property claims of ownership over the tissue[156] and expressly prohibits the sale[157] or intentional destruction[158] of the cells, thus restricting the use of cells to alternative reproduction purposes only. "The use of a human ovum fertilized in vitro is solely for the support and contribution of the complete development of human in utero implantation."[159] Unwanted frozen embryos are only available for adoption by other couples.[160]

Although the Louisiana statute is the most restrictive, other states have adopted similar provisions. Many states statutes expressly prohibit experimentation on embryos and/or fetuses[161]

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152. *See* HEROLD, *supra* note 14, at 64 (noting that the mouse feeder cells caused the stem cells to be subjected to possible rodent disease).

153. JOHNSON & WILLIAMS, *supra* note 111, at 9.

154. HEROLD, *supra* note 14, at 64.

155. LA. REV. STAT. ANN. §§ 9:123, :129 (2006).

156. LA. REV. STAT. ANN. § 9:126 ("An in vitro fertilized human ovum is a biological human being which is not the property of the physician . . . or the facility . . . ."); LA. REV. STAT. ANN. § 9:130 ("An in vitro fertilized human ovum is a juridical person which cannot be owned . . . .").

157. LA. REV. STAT. ANN. § 9:122.

158. § 9:129 (prohibiting the destruction of a viable in vitro fertilized human ovum).

159. § 9:122.

160. § 9:130.

161. *See, e.g.*, ARIZ. REV. STAT. ANN. § 36-2302 (2006); FLA. STAT. § 390.0111(6) (2006); MASS. ANN. LAWS ch. 112, § 12J(a)(I) (LexisNexis 2006); MICH. COMP. LAWS ANN. §§ 333.2685, .2688 (West 2006); MINN. STAT. § 145.422, subd. 1 (2006); N.D. CENT. CODE § 14-02.2-01 to -02 (2006); 18 PA. CONS. STAT. ANN. § 3216(a) (West

and forbid the sale or donation of embryos and/or fetal tissue.[162] As of 2002, thirty-seven states recognized some level of "life" attributed to human embryos.[163]

With the majority of states limiting research funds or restricting experimentation altogether, a minority of progressive state governments have begun contemplating safe, responsible ways to permit SCR and experimentation.[164] Those states that are considering SCR-friendly policies not only wish to provide relief to their suffering citizens, but they also hope to become leaders in an innovative scientific industry. Some states worry about a "brain drain" effect, whereby prominent scientists from leading institutions migrate to other states and counties to conduct research.[165] Massachusetts recently loosened its restrictions on ESCR,[166] and Missourians voted in 2006 to legalize ESCR and therapeutic cloning.[167] Removing state-mandated research barriers is certainly a fresh start to promoting the technology, but more proactive measures are necessary.

New Jersey recently considered allocating $200 million to the construction of three research facilities.[168] Illinois followed suit by providing ten million dollars of state funding to support SCR,[169] which will be used to establish new research facilities. Likewise,

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2006); S.D. CODIFIED LAWS § 34-14-16 to -18 (2006). Notably, some statutes limit experimentation to aborted fetuses with the consent of the mother as long as the fetus was not aborted for research purposes. *See* ARK. CODE. ANN. § 20-17-802 (2006); R.I. GEN. LAWS § 11-54-1(d) (2006).

162. *See, e.g.*, ARK. CODE. ANN. § 20-17-802(c) (2006); KY. REV. STAT. ANN. § 436.026 (LexisNexis 2006) (restricting the sale of viable aborted child); MASS. ANN. LAWS ch. 112, § 12J(a)(IV) (LexisNexis 2006); MICH. COMP. LAWS ANN. § 333.2690 (West 2006); MINN. STAT. § 145.422, subd. 3 (2006); R.I. GEN. LAWS § 11-54-1(f) (2006).

163. Casey & Adams, *supra* note 116, at 124 n.154.

164. *E.g.*, HEROLD, *supra* note 14, at 152; Editorial, *The States Confront Stem Cells*, N.Y. TIMES, Mar. 31, 2006, at A18(L) [hereinafter *The States Confront Stem Cells*].

165. *E.g.*, HEROLD, *supra* note 14, at 145–49.

166. *Massachusetts Allows Work on Embryo Stem Cells*, STAR-LEDGER (N.J.), June 1, 2005, at 8.

167. MO. CONST. art. III, § 38(d) (2006).

168. BELLOMO, *supra* note 42, at 79.

169. *See* BELLOMO, *supra* note 42, at 80; John Chase, *Governor Slips Stem-Cell Grant by Lawmakers: Illinois Joins States Opposing Bush Stand*, CHI. TRIB., July 13, 2005, at 1. Illinois once restricted stem cell research. After the state legislature attempted in vain to loosen these restrictions, the Governor issued an executive order providing state support. *See* Ill. Exec. Order No. 6 (July 12, 2005). The Order became law when it was snuck into a single line of an appropriations bill under the general guise of "scientific research" making no reference to stem cells specifically. Chase, *supra* note 169.

Wisconsin has plans to construct similar institutions.[170] Although beneficial, these states' measures are currently limited to funding the construction of facilities and do not provide monies directly for embryonic research itself.

Alternatively, some state officials propose the allocation of money directly to embryonic experimentation. In 2007, Maryland began disbursing fifteen million dollars in state funding,[171] and New York's Governor hopes to disburse two billion dollars over ten years.[172] Although these states are slowly beginning to draft research funding policies, they have not yet provided comprehensive research strategies to both disburse funds and to regulate experimentation.

Adopted in 2002, California's Proposal 71 does just that. The proposal declares SCR a state constitutional right, expressly prohibits human reproductive cloning, and allocates three billion dollars over a ten year period to SCR.[173] The funding scheme specifically gives priority to ESCR.[174] Although the law provides a copious funding gift, a detailed distribution framework, and regulatory procedures, the benefits of Proposal 71 are only now becoming realized. Proposal 71 was tied up in lawsuits challenging its legal validity until early 2007.[175] Opponents brought suit challenging its funding methodology and its validity under state voting procedure.[176] In February 2007, the California Court of Appeals upheld the law,[177] and the California Supreme Court refused to take the case on appeal in May 2007.[178] As a result of this litigation, California just began distributing the three billion dollars earlier this year.[179] Similarly, most states that provide research assistance are just beginning their

170. Chase, *supra* note 169.

171. Associated Press, *Maryland: Stem Cell Grants*, N.Y. TIMES, May 19, 2007, at A10; Robert J. Terry, *Stem Cell Commission Extends Funding Application Deadline*, BALTIMORE BUS. J. (Md.), Dec. 13, 2006, *available at* http://www.bizjournals.com/baltimore/stories/2006/12/11/daily22.html (last visited Oct. 28, 2007).

172. Nicholas Confessore, *Spitzer Wants New York to Enter the Stem Cell Race*, N.Y. TIMES, Jan. 16, 2007, at B1–2.

173. BELLOMO, *supra* note 42, at 66–69.

174. *Id.* at 66.

175. Andrew Pollack, *California Stem Cell Research is Upheld by Appeals Court*, N.Y. TIMES, Feb. 27, 2007, at A11.

176. *Id.*

177. *Id.*

178. Mary Engel, *Hurdle to Stem Cell Funds Cleared*, L.A. TIMES, May 17, 2007, at B1.

179. Pollack, *supra* note 175.

programs.[180] However, Connecticut has already implemented its comprehensive research regulations and begun distributing state funds directly to research.[181]

V. One State Steps Up: Connecticut's Expansive Approach

In June 2005, Connecticut enacted a stem cell research policy both allocating one hundred million dollars of state funds over a ten year period to SCR and creating state regulations of privately and publicly funded experimentation.[182] This statute serves as a model to other states because it is generous to all types of SCR[183] while simultaneously providing clearly defined ethical boundaries.[184] Such an approach not only strengthens a state's economy and academic prestige,[185] it also strengthens the hope held by millions of Americans today who suffer from debilitating diseases or injuries. Until this country is willing to adopt a more science-friendly approach to embryonic stem cell research, states concerned with the quality of life of their citizens will be forced to make up for the lack of national support. Connecticut's statute has gained international attention thus far,[186] and should be viewed as a model to other states hoping to facilitate the advancement of this exciting science.[187]

A. Increased Regulation of Permitted Technologies

Although some states impose blanket prohibitions on research, SCR remains largely unregulated in this country, much like the IVF industry.[188] Connecticut provides carefully

180. *See, e.g.*, *supra* text accompanying notes 171–72.

181. *Infra* Part V and accompanying text.

182. CONN. GEN. STAT. §§ 19a-32d to -32g (Supp. 2007).

183. *Infra* Part V.B.

184. *Infra* Part V.A.

185. *E.g.*, HEROLD, *supra* note 14, at 145–49.

186. *See, e.g.*, Press Release, Conn. Dep't of Pub. Health, United Kingdom Parliament Members Visit Connecticut to Learn About State's Stem Cell Research Efforts, (Sept. 19, 2006) (on file with author), *available at* http://www.ct.gov/dph/cwp/view.asp?a=3115&q=387232&dphNav_GID=1835 (follow "United Kingdom Parliament Members Visit Connecticut to Learn About State's Stem Cell Research Efforts" hyperlink) (demonstrating British interest in the Connecticut statute).

187. *See* Jennifer Medina, *Connecticut Takes a Lead in Stem-Cell Research Aid*, N.Y. TIMES, Dec. 10, 2006, at A47(L) ("Connecticut is moving faster and further than other states . . . .").

188. *See* Childress, *supra* note 144, at 162–63; Malinowski & Rao, *supra* note 42, at 56 (proposing increased government regulations of alternative reproduction procedures). Close regulation of both technologies is more commonplace in countries that allow research. *See* PANNO, *supra* note 3, at 77; Childress, *supra* note 144, at 162; Knowles, *supra* note 82, at 625–27.

constructed regulatory provisions that establish enumerated guidelines and review committees to responsibly disperse funds and actively regulate research no matter how projects are funded.[189] Along with the federal research policy, Connecticut also provides carefully mandated procedures for obtaining donors' consent to perform research on embryos obtained from IVF clinics;[190] however, unlike the federal government, Connecticut funds experimentation on properly obtained embryos created after 2001.[191] At the same time, the statute encourages diverse stem cell experimentation by distributing funds to both ESCR and ASCR,[192] creating a healthy balance of assistance and regulation of this newly emerging field.

1. A Watchful Eye: The Establishment of Review Committees

The Connecticut Statute establishes a two-committee system to ensure research within the state's borders complies with generally accepted scientific codes of conduct and also that state money is properly utilized by deserving scientists and institutions.[193] The two committees function together as a team providing a check on one another. Additionally, their diverse membership[194] guarantees the consideration of a variety of viewpoints.

a. The Diversity of Perspective

The Stem Cell Research Peer Review Committee ("Peer Review Committee") consists of five members appointed by the State Commissioner of Public Health.[195] Members cannot serve for more than two consecutive terms of four years.[196] The state law also prohibits any one member from serving consecutively on the Advisory Committee and the Peer Review Committee.[197]

The Stem Cell Research Advisory Committee ("Advisory Committee") is led by the State Commissioner of Public Health, acting as chairperson, and includes eight other members

189. CONN. GEN. STAT. §§ 19a-32e, -32f (Supp. 2007).
190. CONN. GEN. STAT. § 19a-32d(c)(3) (Supp. 2007).
191. § 19a-32e(c).
192. *See* § 19a-32e(c).
193. CONN. GEN. STAT. §§ 19a-32f to -32g (Supp. 2007).
194. §§ 19a-32f(a), -32g(a).
195. § 19a-32g(a).
196. *Id.*
197. §§ 19a-32f(a), -32g(a).

appointed by various government officials.[198] The Governor elects two members, while the Speaker of the State House of Representatives, the President of the State Senate, and the majority and minority leaders of both Houses all elect one member each.[199] Similar to the Peer Review Committee, the Advisory Committee members cannot serve more than two four-year terms.[200]

Each government official must elect an Advisory Committee member based upon statutorily expressed qualifications, ensuring a well-rounded board with diverse experience and expertise.[201] Each of the Governor's two candidates must be "nationally recognized as an active investigator in the field of stem cell research and [have] experience in the field of bioethics," while the Senate President and Speaker's selections must have "experience in private sector stem cell research and development."[202] Both congressional majority leaders' selections provide the scholarly perspective of "academic researchers specializing in stem cell research."[203] The Senate Minority Leader has broad discretion to appoint a member with research and development experience in either the public or private sector in a wide variety of scientific fields.[204] The House Minority Leader balances this voice with a member who has expertise in "business or financial investments," although there is no express requirement that his or her investment background relate to SCR or any other scientific topic.[205]

b. *Research Receiving Connecticut Monies: Who Can Do What*

These diverse committee-bodies work together to ensure the appropriate use of government monies.[206] They draft guidelines and applications for distributing funds, and they evaluate the ethical implications of each proposal.[207] This two-step process provides a check on each committee's findings, and preserves the

198. § 19a-32f(a), (b).
199. § 19a-32f(a).
200. § 19a-32f(a).
201. *Id.*
202. § 19a-32f(a)(2).
203. *Id.*
204. *Id.*
205. *Id.*
206. The Stem Cell Research Fund is essentially a collection of public and private donations set aside for ESCR. CONN. GEN. STAT. § 19a-32e(a) (Supp. 2007).
207. CONN. GEN. STAT. §§ 19a-32f, -32g (Supp. 2007).

integrity of the process against anti-research attacks.

The statute requires that the Peer Review Committee consult the National Academies Guidelines for Human Embryonic Stem Cell Research when evaluating research proposals.[208] This helps the Connecticut standards to coincide with national scientific community standards. Relying on scientific codes of ethics allows Connecticut to defer to informed professionals rather than agenda-driven politicians.[209] After consulting uniform ethical guidelines, the Peer Review Committee, made up of professionals, must draft its own guidelines in compliance with the statute and make recommendations to the Advisory Committee in accordance with these considerations.[210]

The Advisory Committee then makes the ultimate decision of how to allocate the funds.[211] In order to achieve this goal, the Advisory Committee is entrusted with the following objectives:

> (1) [to] develop . . . a donated funds program to encourage the development of funds other than state appropriations . . .
>
> (2) [to] examine and identify specific ways to improve and promote for-profit and not-for-profit embryonic and human adult stem cell and related research in the state, including, but not limited to, identifying both public and private funding sources for such research, maintaining existing embryonic and human adult stem-cell-related businesses, recruiting new embryonic and human adult stem-cell-related businesses to the state and recruiting scientists and researchers in such field to the state,
>
> (3) [to] establish and administer . . . a stem cell research grant program which shall provide grants-in-aid to eligible institutions for the advancement of embryonic or human adult stem cell research . . . and
>
> (4) [to] monitor the stem cell research conducted by eligible institutions that receive such grants-in-aid.[212]

The Advisory Committee was charged with developing an application by June 30, 2006 and was to begin accepting applications and distributing funds after that date.[213] At a minimum, the statute's application requires the following: a description of the grant-seeking organization, a proposal for use of

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208. § 19a-32g(e).

209. Massachusetts's policy takes a similar approach. *Massachusetts Allows Work on Embryo Stem Cells*, *supra* note 166, at 8 (referring to Massachusetts's new law expanding research and allowing the state health department regulatory control).

210. § 19a-32g(c) to (e).

211. § 19a-32f(e).

212. *Id.*

213. CONN. GEN. STAT. § 19a-32e(b) (Supp. 2007).

the research money, and a statement regarding the future state profit sharing plans should the discoveries become financially beneficial.[214]

Unfortunately, the disbursement of grants was delayed by the Office of State Ethics due to possible conflicts of interest.[215] Many committee members have professional connections with two of the primary institutions applying for grant money.[216] These potential conflicts concerned the Office. It worried the funds would be disproportionately distributed among all deserving applicants, and that the proposed research would not be adequately scrutinized if committee members had direct interests in approving certain grants.[217]

The ESCR scientific community is a small one, and this problem is difficult to avoid. Fortunately, some safeguards are in place to minimize potential conflicts. Not all members of the committees are from Connecticut.[218] Also, more scientists will be made available to serve on the boards as the ESC scientific community, both inside and outside of the state, continues to grow. Even if many of the scientists come from a select few institutions, geographic diversity and competing interests still exist among those scientists. The qualification requirements laid out in the statute only further assure a diverse professional perspective is available for making important ethical and funding choices. Further, committee decisions are always evaluated by the State Commissioner of Public Health, who also chairs the Advisory Committee.[219]

Shortly after this ethics delay, the Advisory Committee began accepting grant requests. In the summer of 2006, the committee received over seventy applications requesting more than sixty million dollars in state grants,[220] quite a bit more than the twenty million dollars allocated to the first year of the program. The

214. § 19a-32g(e).

215. William Hathaway, *Ethics Quandary Holds up State Stem Cell Money*, HARTFORD COURANT (Conn.), Apr. 19, 2006, at B1.

216. Most committee members have ties to Yale University or the University of Connecticut. *Id.*; William Hathaway, *Stem Cell Grants Now Available*, HARTFORD COURANT (Conn.), May 10, 2006, at B9.

217. Hathaway, *supra* note 215, at B1.

218. Office of Research and Dev., Conn. Dep't of Pub. Health, Connecticut Stem Cell Research Program Committees, http://www.ct.gov/dph/site/default.asp (follow "Programs and Services" hyperlink; then follow "Stem Cell Research" hyperlink; then follow "SCR Committees" hyperlink) (last updated Oct. 17, 2007).

219. CONN. GEN. STAT. § 19a-32g (Supp. 2007).

220. William Hathaway, *Race Is on for Stem Cell Dollars*, HARTFORD COURANT (Conn.), July 19, 2006, at B1; Hathaway, *supra* note 122, at A4.

awards were announced on November 21, 2006.[221] Over half of the twenty million dollars went to projects at the University of Connecticut, and the other half was divided among Yale and Wesleyan universities.[222] Despite the many new facility construction requests,[223] all of the money earmarked for 2006 was distributed to research projects.[224] "The grants will be used to equip labs, train researchers and to study how embryonic cells change to specialized cells . . . ."[225] Some of these exciting research projects include studies on the treatment of war wounds, epileptic seizures, Parkinson's Disease, degenerative brain disease, mental retardation, Leukemia, and cancer.[226] The hope is these studies will progress science further towards finding cures for many of the ailments SCR seeks to eradicate.

However generous Connecticut's $100 million of funding may be, it will quickly be absorbed by this expensive and under-funded field. SCR is incredibly expensive for any one state to support. In assessing Illinois's ability to "make a significant impact" on the industry, Professor Janet Rowley estimated $500 million to $1 billion in funding would be needed over ten years.[227] President Bush's policy has done little to relieve the cost burdens states are forced to absorb in order to remain globally competitive. The NIH distributed $28.6 billion in 2005 for research programs, but of that amount, only $27 million were disbursed in support of ESCR.[228] It will take more than $100 million from a single state for American scientists to realize the goal of effectively treating people with diseases and disabilities.

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221. Press Release, Conn. Dep't of Pub. Health, State of Connecticut Allocates $19.78 Million in Stem Cell Research Funds (Nov. 21, 2006) (on file with author), *available at* http://www.ct.gov/dph/cwp/view.asp?a=3115&q=387232&dphNav_GID=1835 (follow "State of Connecticut Allocates $19.78 Million in Stem Cell Research Funds" hyperlink).

222. *Id.*

223. Hathaway, *supra* note 122, at A4 (citing Yale University's and the University of Connecticut's applications requesting more than twelve and one half million dollars to support the construction of three new research institutions).

224. Conn. Dep't of Pub. Health, *supra* note 221.

225. Editorial, *Connecticut a Leader in Stem Cell Research: Despite Later Start, Connecticut's Grants Exceed California's Effort*, NEW HAVEN REGISTER (Conn.), Nov. 29, 2006.

226. Medina, *supra* note 187, at A47(L); Conn. Dep't of Pub. Health, *supra* note 221. The funds are being used to support both ESCR and ASCR alike. Hathaway, *supra* note 220, at B1.

227. Chase, *supra* note 169, at 1.

228. SCOTT, *supra* note 127, at 171.

2. Expressed Regulation of Both Privately and Federally Funded Research

Along with creating review committees to disburse funds and regulate research, Connecticut's statute also provides a few explicit guidelines and restrictions. The state permits SCR within its borders as long as the conductor complies with the following requirements:

> (1) the research is conducted with full consideration for the ethical and medical implications of such research,
>
> (2) the research is conducted before gastrulation occurs,
>
> (3) prior to conducting such research, the person provides to the Commissioner of Public Health documentation verifying that any human embryos, embryonic stem cells, unfertilized human eggs or human sperm used in such research have been donated voluntarily . . .
>
> (4) the general research program under which such research is conducted is reviewed and approved by an institutional review committee, as required under federal law, and
>
> (5) the specific protocol used to derive stem cells from an embryo is reviewed and approved by an institutional review committee.[229]

Even though Connecticut did not establish a licensing system to control privately funded research, the aforementioned regulations apply to scientists regardless of their funding source.[230]

Preserving ethical boundaries for both private and public research serves the additional purpose of promoting public confidence in experimentation. Many opponents of ESCR worry about the negative effects of research gone wild. "Such limitations are a means of addressing concerns about inappropriate uses of embryos in research."[231] Two possible negative byproducts concerning many anti-researchers are the potential for human reproductive cloning and the establishment of a black market where women are compensated for providing eggs, embryos, and/or aborted fetuses to research.[232] The statute addresses these concerns by prohibiting scientists from partaking in research involving reproductive cloning[233] and by forbidding donors from

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229. CONN. GEN. STAT. § 19a-32d(d) (Supp. 2007).

230. *Id.*

231. *See* Knowles, *supra* note 82, at 629 ("Support for oversight of embryo research is in part a desire to ensure that objectionable scientific research is not being conducted out of sight.").

232. *See* Childress, *supra* note 144, at 163 (urging closer regulation of research to assure compliance with ethical standards); *see also supra* text accompanying notes 161–62.

233. § 19a-32d(b).

receiving compensation for their tissue.[234] Violators of both of these statutory provisions are subject to possible fines and imprisonment.[235] These enumerated guidelines, along with those established by the Peer Review Committee, help establish finite boundaries well beyond the few implemented by the federal government. As the technology advances, government supervision becomes more and more necessary to assure individual scientists are not crossing the ethical line drawn by professionals.

3. The Property-Theory Approach: Donors' Consent

The Connecticut approach also regulates the extraction of stem cells from embryos provided by IVF patients. It requires donors of embryos and other fetal tissue to exercise "informed and voluntary" written consent in making their decisions.[236] To better inform the donor's choice, the state requires that the donor receive "timely, relevant and appropriate information," including notification of alternative disposal methods for unused embryos.[237]

In requiring donors' consent for scientific use of IVF clinic embryos, Connecticut adheres to the property theory. This approach finds support in some of the existing case law addressing legal control over frozen embryos from IVF clinics.[238] In reality, many embryos produced for IVF go unused. Requiring donors to make informed contractual decisions regarding their leftover tissue before beginning this highly emotional process is ideal.[239] Many IVF clinics are already well-equipped with carefully drafted consent forms.[240] Very little would need to be altered to comply with Connecticut's new regulations.[241]

Some opponents of this contractual method claim the approach ignores the complicated and often emotional process of IVF. "[R]equiring couples to make binding decisions about the future use of their frozen embryos ignores the difficulty of predicting one's future response to life-altering events such as parenthood."[242] This difficulty, however, only strengthens the

234. § 19a-32d(c)(3).
235. § 19a-32d(b), (c)(4).
236. § 19a-32d(c)(1).
237. § 19a-32d(c)(1) to (2).
238. *Supra* note 91 and accompanying text.
239. Langley & Blackston, *supra* note 88, at 201–03.
240. *See id.* at 168.
241. Clinics could likely comply by adding clauses offering the option to donate cells to science, and by implementing procedures for providing information to assist patients with the decision-making process.
242. Coleman, *supra* note 92, at 89.

need for a mutual and definitive agreement. "[I]t is illogical to argue that parties faced with a business-like transaction, though admittedly intensely personal in nature, would be more emotional than parties in the middle of a divorce or parties faced with the death of a significant other."[243] These decisions should be well informed and contemplated for the good of all involved. To conduct business, IVF clinics need to maintain a finite expectation that, once an embryo is frozen, its disposition has been predetermined.[244] "Defining embryos as property generally is the only practical route."[245]

Property disputes over frozen embryos have existed since the late 1980s[246] and will continue to arise as long as IVF persists. Donating ESCs to science should not alter this significantly. Intuitively, a donor could more easily change her mind regarding her decision to allow another person to carry her genes to term than her decision to donate the cells to research. Donor couples' relationships change over time and with that so does their intent to bear future children together. Conversely, a donor's informed position on the morality of SCR may be less likely to flail so easily. If a donor is able to make an informed decision in favor of research in the present, what are the chances he will want to retract such a decision later? In the future, if the donor wishes to bear more children, then more embryos may again be produced. Alternatively, if a donor is unsure of her stance regarding ESCR in the present, then she may cautiously elect not to donate the embryos.

Connecticut's informed consent approach allows each individual donor and future recipient of ESC therapies to determine his or her own moral position on the issue.[247]

> It matters not that most would not hesitate to accept organ donation from the victim of a carjacking and murder; while they might mourn the necessity of finding their own lives saved through the death of another, in no way would they feel that their acceptance of this gift of life made them complicit in the underlying brutality of the victim's death.[248]

In fact, Connecticut's policy requiring donors' consent is consistent

243. Langley & Blackston, *supra* note 88, at 205.

244. *Id.*

245. *Id.* at 203.

246. *Supra* notes 89–108 and accompanying text.

247. President Bush's ESCR policy also requires the consent of the donors of the available stem cell lines. JOHNSON & WILLIAMS, *supra* note 111, at 27.

248. R. Alta Charo, *The Ethics of Control*, 2 YALE J. HEALTH POL'Y L. & ETHICS 143, 146 (2002).

with many existing ethical rules governing experimentation on human subjects.[249]

Human life theory proponents contend that this consent[250] requirement does not properly take into account the embryos' best interests because the consent is derived from the "parent" and not the embryo itself.[251] "[W]e should be seriously concerned about authorizing medical research certain to kill incompetent living human subjects . . . ."[252] Potential life, however, is not synonymous with incompetent life. Equating embryos with incapacitated or incompetent persons is disingenuous. It is particularly interesting that anti-research advocates express such concern for incompetent persons while offering minimal compassion for those already born individuals who suffer from debilitating diseases or disabilities and hope to one day benefit from ESCR and its future therapies.

Anti-research advocates who cite the human life theory align well with other right-to-life supporters.[253] In fact, some believe that an anti-research victory over the ESCR issue is a crucial step towards overturning abortion rights.[254] One pro-life organization has already brought a class action law suit on behalf of a fictitious embryo in California claiming the state's research policy violates the federal and state constitutional rights of the frozen embryo.[255] Presently, courts avoid ruling on the merits of such claims, though they will have to directly address these arguments sooner or later.

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249. *See* JOHNSON & WILLIAMS, *supra* note 111, at 27. *But see* Casey & Adams, *supra* note 116, at 118 (questioning whether "even a competent person may consent to ultra-hazardous, non-therapeutic research on himself").

250. Some prefer the term "proxy consent" because they believe true consent can only be given to researchers by the embryos themselves. Casey & Adams, *supra* note 116, at 112.

251. *See id.* at 112–15.

252. *Id.* at 118.

253. *See* Dolgin, *supra* note 66, at 129.

254. HEROLD, *supra* note 14, at 72–74 ("A decision conferring legal personhood on an in-vitro embryo would compel a revising of *Roe v. Wade* and would pave the way to the nationwide outlawing of abortion."); Brodsky, *supra* note 149, at 251–52 ("This time, however, the controversy will not involve the liberty interests of individual women, as addressed in *Roe* and *Casey*, but rather, what *Roe* and *Casey* left open—namely, the liberty interests of the embryo against the health and safety interests of those who might benefit from its sacrifice.").

255. *See* Brief for Petitioner-Appellant at 2, Mary Scott Doe v. Klein, No. 06-55387, 2006 WL 2701381, *1–2 (9th Cir. July 31, 2006) (citing the district court's dismissal of plaintiffs' claim for improper venue).

B. *The Adult, Embryonic, and Therapeutic Alike: Permitting an Expansive Array of Stem Cell Research*

While regulating the entire field of SCR, Connecticut's law expressly expands the types of research eligible for public monies.[256] Unlike the federal government's system for disbursing research grants, Connecticut funds the development of new ESC lines using a variety of techniques, including the extraction of new stem cells from embryos provided by IVF clinics and the extraction of new stem cells from embryos produced using therapeutic cloning.[257]

1. Orphan Embryos: IVF Clinical Waste

To pro-research advocates, the process of extracting stem cells from abandoned IVF embryos is justifiable.[258] IVF clinics create these cells in furtherance of reproduction, not research, and the cells are likely to be destroyed regardless.[259] The potential research benefits of studying IVF embryos are only afterthoughts to their creation. Some believe research on IVF cells is more ethically appropriate than producing, and then destroying, embryos solely for experimentation.[260]

Research opponents who categorize embryos as living beings with the same human rights as viable fetuses remain unconvinced by the they-are-going-to-die-anyway approach. To them, no potential benefit can justify the destruction of embryos. "Who among us has the right to decide that another human life is a 'spare' life, especially when that human life does not have the chance to contest the decision?"[261] These opponents argue that "federal or state laws should . . . limit the number of human embryos that may be cryopreserved in the IVF treatment process, regulate the disposition of living and frozen human embryos, and encourage embryo adoption over donation."[262] In fact, the federal government, under the Bush Administration, has already contributed over one million dollars toward embryo-adoption

256. CONN. GEN. STAT. § 19a-32e(c) (Supp. 2007).

257. CONN. GEN. STAT. § 19a-32d(d) (Supp. 2007).

258. *See* Charo, *supra* note 248, at 145–46.

259. Erik Parens, *On the Ethics and Politics of Embryonic Stem Cell Research*, *in* THE HUMAN EMBRYONIC STEM CELL DEBATE: SCIENCE, ETHICS, AND PUBLIC POLICY 37, 43 (Suzanne Holland et al. eds., 2001).

260. JOHNSON & WILLIAMS, *supra* note 111, at 32.

261. Brodsky, *supra* note 149, at 239 (quoting Friar Kevin Fitzgerald, professor at Georgetown University).

262. Casey & Adams, *supra* note 116, at 126.

awareness programs.[263]

Nevertheless, it is flawed logic to equate potential life with actualized life.[264] This position assumes the potential for life will successfully develop into a sustainable fetus. "It is preposterous to define embryos as human life, because there is no way to practically apply such a definition."[265] Scientists are not the only ones adopting an amorphous definition of life. Religious leaders of all faiths call to question the living status of an embryo existing outside a woman's womb.[266]

If anti-research advocates are truly concerned with the lives or potential lives of embryos, they should also object to the destruction and freezing of embryos in furtherance of IVF treatments. "[I]t is difficult to tolerate the waste that accompanies modern infertility care, its laboratories filled with frozen surplus embryos that are no longer wanted by anyone."[267] In July 2004, eighty-four percent of clinics admitted to still routinely destroying leftover tissues.[268] Similarly, natural conception results in the destruction of some fertilized embryos,[269] and modern, legal birth control, such as the morning after pill, prevents embryos from attaching to a woman's uterus.[270] The reality is that embryos will continue to be destroyed regardless of ESCR.

Recognizing this, Connecticut's law provides specific guidelines for the process of obtaining ESCs from IVF clinics. First, the donors must provide voluntary informed consent waivers before donating their tissue.[271] Second, the statute criminalizes

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263. HEROLD, *supra* note 14, at 126. "Adoption" is the preferred term used by anti-research advocates to describe the process of implanting abandoned frozen embryos into a surrogate mother. *See generally* Nightlight Christian Adoptions, http://www.nightlight.org/snowflakeadoption.htm (last visited Nov. 9, 2007) (discussing the Snowflakes Embryo Adoption Program). *But see* HEROLD, *supra* note 14, at 126 ("[President Bush's] policy of promoting 'embryo adoption' is deceptive because there is no realistic possibility of this happening on a large enough scale to solve the 'embryo problem.'").

264. HEROLD, *supra* note 14, at 138–39 (suggesting that at best, embryos possess a conditional potential to become human life).

265. Langley & Blackston, *supra* note 88, at 203.

266. Childress, *supra* note 144, at 160; *see also* HEROLD, *supra* note 14, at 130–34 ("The view that embryonic stem cell research is universally opposed by those with strong religious beliefs is a major misconception.").

267. Charo, *supra* note 248, at 145; *see also* HEROLD, *supra* note 14, at 136 ("It's hard to get around the fact that an absolutist view of the embryo is incompatible with the IVF practices . . . .").

268. HEROLD, *supra* note 14, at 36–37 (citation omitted).

269. *Id.* at 123–24 ("[I]n a woman's body, only 30 to 40 percent of embryos ever create a successful pregnancy.").

270. Langley & Blackston, *supra* note 88, at 203.

271. CONN. GEN. STAT. § 19a-32d(c)(1) to (3) (Supp. 2007).

monetary gain for the donation of cells.[272] These restrictions should appease those concerned with the potential development of a black market where donors provide reproductive tissue to clinics not for IVF purposes but rather solely for the purpose of financial gain. As for the other concerns, no regulation would be sufficient, short of banning all IVF (which very few anti-research advocates propose).

2. The "C" Word

Connecticut's law takes a progressive, informed approach to cloning. It creates an important distinction between the reproductive and therapeutic methods.[273] The statute prohibits human cloning, which it defines as the process of "inducing or permitting a replicate of a living human being's complete set of genetic material to develop after gastrulation commences."[274] This definition limits cloning to the creation of a duplicate human while permitting therapeutic cloning, or "nuclear transfer," during the embryo's gastrulation period.[275] "Nuclear transfer" is defined as "the replacement of the nucleus of a human egg with a nucleus from another human cell."[276] While both techniques "rely upon the creation of a five-day-old human embryo," their purposes and outcomes differ significantly.[277] The statute's distinction between the two allows Connecticut to recognize this country's hesitation concerning human reproductive cloning while simultaneously acknowledging the importance of therapeutic cloning for the advancement of ESCR.

Using the "c" word to define both of these processes is perhaps the biggest terminology blunder made by ESC researchers. Unfortunately, scientists probably developed these terms with little contemplation of the political ramifications. The vast majority of Americans have not yet been properly informed of

272. § 19a-32d(c)(3) to (4).

273. § 19a-32d(a)(2), (5). Therapeutic cloning is sometimes referred to as somatic nuclear transfer.

274. § 19a-32d(a)(2) to (5).

275. § 19a-32d(a)(2). The gastrulation period is then defined as "the process immediately following the blastula state when the hollow ball of cells representing the early embryo undergoes a complex and coordinated series of movements that results in the formation of the three primary germ layers, the ectoderm, mesoderm and endoderm." § 19a-32d(a)(3).

276. § 19a-32d(a)(5).

277. Cibelli, *supra* note 46, at A16; *see also* HEROLD, *supra* note 14, at 49 ("Reproductive cloning is the creation of an exact genetic copy of an entire organism."); *supra* text accompanying notes 40–47.

the difference between reproductive and therapeutic cloning.[278] This is very problematic considering how socially unpopular the word "cloning" is with mainstream America.[279] Perhaps recognizing this problem, Connecticut wisely chose to label therapeutic cloning as "nuclear transfer."[280] This subtle definition change may assist in the broader effort to differentiate between these two techniques.

Regardless of the distinct differences between the two techniques, anti-research activists still view therapeutic cloning as a slippery slope,[281] and have begun to challenge some states' acceptance of the technology in court. Surprisingly, they have not yet filed suit in Connecticut. Litigation has occurred, however, in California, Maryland, and Missouri.[282] *Missourians Against Human Cloning v. Carnahan*[283] tackled the cloning-definition debate. The complaint challenged the definition of "cloning" found in a proposal subsequently approved by Missourians in the 2006 elections.[284] Plaintiffs claimed that the definition was misleading because it only banned reproductive and not therapeutic cloning.[285]

The real difference between these two very distinct procedures, however, cannot be ignored. Generally speaking, most scientists seeking to conduct therapeutic cloning have no interest in reproducing a human being.[286] The purpose is largely to overcome the immune rejection problems faced by stem cell therapy recipients.[287] The definitions provided in the Connecticut statute, much like the definitions found on the November 2006 ballot in Missouri, sufficiently draw this line, leaving the debate

278. *See* HEROLD, *supra* note 14, at 49 ("Unfortunately, right-to-life groups have confused the public . . . .").

279. Saad, *supra* note 6, at 7 (noting that eighty-six percent of Americans believe that cloning is morally wrong).

280. § 19a-32d(a)(5).

281. Dolgin, *supra* note 66, at 148. "Once scientists get approval for creating, experimenting [on,] and killing the smallest of cloned humans, their incessant push for no moral boundaries will extend past the embryo state to cloned fetuses (unborn babies), then onto newborns and beyond." HEROLD, *supra* note 14, at 106 (quoting a Concerned Women for America poster).

282. HEROLD, *supra* note 14, at 72–73.

283. 190 S.W.3d 451 (Mo. Ct. App. 2006).

284. *See id.*

285. *Id.* at 453–54. In this case, the court avoided addressing the main allegation of the complaint, holding plaintiffs failed to meet their burden of proving that the language was "insufficient" and "unfair." *Id.* at 457.

286. *See* BELLOMO, *supra* note 42, at 135 (noting that "at present, researching . . . cloning to create human beings is shunned in the scientific community").

287. *Supra* text accompanying notes 40–47.

surrounding the ethics of reproductive cloning for another day.

Even though such cloning distinctions have been made in Connecticut, Missouri, and elsewhere, many cautious, research-friendly states have continued to take a bright-line approach when it comes to cloning by forbidding all forms.[288] Unfortunately, these politically-conscious states are not going far enough to support meaningful research. Without permitting therapeutic cloning in their research schemes, these states are limiting scientists to experimentation that is less likely to develop into usable therapies.[289] Because of this, they risk falling behind international researchers. Even though many countries also restrict therapeutic cloning and instead rely on IVF clinic cells,[290] the countries at the forefront of research take a more expansive research approach, much like Connecticut, and permit public funding of this practice.[291]

VI. The Miracle Cell: The Potential for ESCR Technology in an Era of Inadequate Public Funding

Many studies show that the federal policy is at odds with public opinion. When President Bush's policy was enacted in 2001, fifty-eight percent of Americans polled supported federal funding of ESCR and only thirty percent opposed it.[292] In June 2005, near the time the Connecticut bill was passed, a Gallop Poll reported that sixty percent of Americans "find it morally acceptable to destroy embryos in order to prevent suffering and find cures for debilitating diseases such as diabetes, Alzheimer's and Parkinson's."[293] Because Americans are slowly beginning to

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288. *See, e.g.*, *The States Confront Stem Cells*, *supra* note 164, at A18(L) (pointing to Maryland's law allowing research on embryos obtained from IVF clinics but not those created by therapeutic cloning). Other state leaders have unsuccessfully attempted to ban cloning outright. *Id.* (citing Wisconsin Governor's veto of a bill that would have made therapeutic cloning a criminal offense); *Massachusetts Allows Work on Embryo Stem Cells*, *supra* note 166, at 8 (referring to the Massachusetts State Legislature overriding the Governor's veto of a law allowing therapeutic cloning).

289. *Supra* text accompanying notes 40–47.

290. Knowles, *supra* note 82, at 624 (citing the policies of Canada, Australia, Spain, Finland, and the Netherlands).

291. *Id.* (citing the United Kingdom, Belgium, and China); *see* HEROLD, *supra* note 14, at 203–19; Fowler, *supra* note 12, at 530–33. "[T]he United States has steadily fallen behind several other countries, such as Britain, Israel, and Singapore, that are rapidly moving ahead in the field." HEROLD, *supra* note 14, at 203.

292. Fowler, *supra* note 12, at 529 n.66 (citing an ABC poll conducted on http://www.beliefnet.com in June 2001).

293. Editorial, *Stemming Disease Top Priority*, HARTFORD COURANT (Conn.),

realize the important benefits to be gained from this research, the President's policy should be reconsidered.

> The President . . . like all Americans, [is] entitled to . . . [his] own personal faith and vision. But should the day come when that vision is shown to be too narrow to accommodate the needs of research on behalf of all Americans, one hopes that the vision may broaden to encompass the diversity of all human experience and all human faiths.[294]

The increasing public support for the technology only further legitimizes state laws like Connecticut's that seek to aid citizens in ways that the federal government currently does not. Unfortunately, over 3,000 Americans die daily from the cell-based conditions that embryonic stem cell research may one day cure.[295] Although cautious about how much work must still be done, scientists project many diseases, disabilities, and ailments could benefit from ESC therapies, including Leukemia, immune deficiencies, diabetes, liver disease, cardiovascular disease, neurological disorders, Alzheimer's disease, Parkinson's disease, spinal cord trauma, and cancer. [296]

A common argument against research is that the government should not spend money to advance the technologies because the benefits will not be realized for many years.[297] Such a statement is hardly deserving of a response. All responsible scientific endeavors take time, but this is no reason to discourage public support of research. To date, we do not have a cure for AIDS, but that is hardly a reason to stop searching for one. Even if ESC therapies are not developed in time for those currently in need of treatment, science should press on in hope of relieving the suffering of future patients. Critics should not give up too soon on such a rapidly advancing technology. After all, human stem cells were only first extracted from embryos in 1998, less than ten years ago and with little government funding.[298] In this short amount of time, many promising results have been produced in animal experiments,[299] and scientists in this country are working

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May 26, 2005, at A12.

294. Charo, *supra* note 248, at 149.

295. HEROLD, *supra* note 14, at 137.

296. PANNO, *supra* note 3, at 34–49; VIEGAS, *supra* note 3, at 56; Crockin, *supra* note 27, at 609.

297. *See, e.g.*, Response Ad to Michael J. Fox, *available at* http://www.youtube.com/watch?v=nguJQ_dRPXw (last visited Oct. 28, 2007) ("Californians . . . admit that there won't be any cures for at least fifteen years. . . . [B]eware of loopholes, Missourians will pay. Don't be tricked.").

298. HEROLD, *supra* note 14, at 47. By contrast, scientists have been working with adult stem cells for over fifty years. *Id.*

299. *See, e.g.*, VIEGAS, *supra* note 3, at 48 (citing a study in which researchers

diligently to expand their research into usable treatments for humans. For example, at Harvard University and the University of California, San Francisco, scientists are developing technologies to treat diabetes and Parkinson's.[300] The only way to find cures is to continue on with research. Hopefully, with Connecticut research institutions like Yale University, Wesleyan University, and the University of Connecticut now on board and financially equipped, further advancements will soon be realized.

Conclusion

With ESCR quickly evolving and popular opinion of the technology steadily improving, states should re-evaluate their anti-research positions. In the absence of comprehensive federal guidance, states can look to Connecticut's statute as a model when developing new research policies. Connecticut's concise definitions, research-friendly policies, generous funding, and procedural oversight of experiments all assist in the advancement of the scientific integrity of both Connecticut and the United States. As Professor Cibelli, head of the Cellular Reprogramming Laboratory at Michigan State University, exclaims: "[W]ake up America! This is not about Republican vs. Democrat, pro-life vs. pro-choice, scientists vs. intellectuals, embryonic stem cells vs. adult stem cells. It is about compassion for those suffering. It is about millions of patients around the world that deserve better quality of life."[301]

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restored movement in paralyzed rats).

300. Hathaway, *supra* note 220, at B1.

301. Cibelli, *supra* note 46, at A16.