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THE FATE OF STEM CELL RESEARCH AND A PROPOSAL FOR FUTURE LEGISLATIVE REGULATION

Lauren Thuy Nguyen*

I. INTRODUCTION

Ever since human stem cells were first isolated in 1998, the possible applications of stem cell research and the moral issues surrounding such research have created much controversy.\(^1\) This conflict has played out on both the federal and state levels. During the November 2004 elections, the presidential candidates were divided on the issue, causing voters to cross party lines on the basis of their views on stem cell research alone.\(^2\) At the state level, California introduced Proposition 71, a ballot initiative that proposed to allocate three billion dollars to stem cell research.\(^3\) Public figures including Nancy Reagan, California Governor Arnold Schwarzenegger, and Bill Gates advocated stem cell research, while conservatives and the Catholic Church opposed such research.\(^4\) Voters were caught between wanting to promote

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research that might save lives and the ethical issues of using embryos for research.\(^5\)

This comment will briefly describe the science behind stem cell research and examine why human embryonic stem cell research has been the subject of such heated debate.\(^6\) This comment will then explore current federal and state stem cell research regulations and the impact that politics has had on these regulations.\(^7\) Next, this comment will address the tension between state and federal powers, and the issue of federalism that arises upon attempts to regulate stem cell research.\(^8\) Finally, this comment will propose a federal regulatory scheme designed to address the policy and federalism issues raised by stem cell research.\(^9\)

II. BACKGROUND

A. The Science Behind Human Embryonic Stem Cell Research

Human embryonic stem cells are unique because they are unspecialized,\(^10\) divide without limitation,\(^11\) and may

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5. See Kalb & Rosenberg, supra note 2, at 43.
6. See infra Part II.A-B.
7. See infra Part II.C.
8. See infra Parts III-IV.
9. See infra Part V.
10. See Nat'l Insts. of Health, Stem Cell Information: What are the unique properties of all stem cells?, http://stemcells.nih.gov/info/basics/basics2.asp (last visited Mar. 13, 2006) [hereinafter What are the unique properties of all stem cells?]; see also NAT'L RESEARCH COUNCIL INST. OF MED. OF NAT'L ACADEMIES, GUIDELINES FOR HUMAN EMBRYONIC STEM CELL RESEARCH 15 (2005), available at http://darwin.nap.edu/books/0309096537/html. Human embryonic stem cells are not committed to a distinct cell lineage. See What are the unique properties of all stem cells?, supra. One of the fundamental properties of a stem cell is that it lacks any tissue-specific structures that allow it to perform specialized functions. Id. However, unspecialized stem cells can give rise to specialized cells, including heart, muscle, blood, or nerve cells. Id.
11. See What are the unique properties of all stem cells?, supra note 10. Stem cells are capable of dividing and renewing themselves for long periods of time. Id. Unlike muscle, blood, or nerve cells, which do not normally replicate themselves, stem cells may replicate many times and can yield millions of cells in the laboratory. Id. If the resulting cells continue to be unspecialized, then they are capable of long-term self-renewal. Id.
differentiate into specific types of cells. Given these properties, human embryonic stem cells have three potential applications. First and foremost, stem cell technologies could provide potential treatments or cures to more than 128 million Americans who suffer from Parkinson's disease, diabetes, traumatic spinal cord injury, Purkinje cell degeneration, Duchenne's muscular dystrophy, heart disease, and vision or hearing loss. The ability of stem cells to differentiate into any of the body's specific cell types provides hope that stem cells can be used to replace or repair degenerated or damaged organs, heal ailing tissues, and fight diseases. Second, stem cells may revolutionize the testing and screening of drugs. Medicinal drugs could be tested directly against stem cell lines instead of on animals. Third,

12. Id. When stem cells divide, they either remain stem cells or become terminally differentiated (i.e., become a specific type of cell). W. Christopher Matton & F. Scott Thomas, The Continuing Balance: Federal Regulation of Biotechnology, 44 JURIMETRICS J. 283, 308 (2004). The stem cell's internal signals are controlled by genes that carry coded instructions for all of the structures and functions of the cell, while its differentiation is controlled by the microenvironment. See What are the unique properties of all stem cells?, supra note 10; see also NAT'L RESEARCH COUNCIL INST. OF MED. OF NAT'L ACADEMIES, supra note 10, at 29-30. Scientists can change the microenvironment by altering the chemical composition of the culture medium, altering the surface of the culture dish, or modifying the cells by inserting specific genes. See Nat'l Insts. of Health, Stem Cell Information: What are embryonic stem cells?, http://stemcells.nih.gov/info/basics/basics3.asp (last visited Mar. 13, 2006). In the Petri dish, the cells multiply and produce millions of identical copies of specialized stem cell lines. Kalb & Rosenberg, supra note 2, at 46.


16. Nat'l Insts. of Health, Stem Cell Information: What are the potential uses of human stem cells and the obstacles that must be overcome before these potential uses will be realized?, http://stemcells.nih.gov/info/basics/basics6.asp (last visited Mar. 13, 2006). Currently, the possible side effects of medicinal drugs are initially tested on animals. Simon B. Auerbach, Comment, Taking Another Look at the Definition of an Embryo: President Bush's Criteria and the Problematic Application of Federal Regulations to Human Embryonic Stem Cells, 51 EMORY L.J. 1557, 1560-61 (2002). However, with the use of stem cells, this initial step of animal testing could be bypassed. Id. Drugs could instead be directly tested against a stem cell line that is developed to mimic the disease process in humans. Id.

17. See Auerbach, supra note 16, at 1561.
stem cells may help to improve scientists' comprehension of how and why birth defects occur.\textsuperscript{18}

There are three sources of human stem cells from which the greatest number of undifferentiated cells can be obtained.\textsuperscript{19} The first of these sources is from in vitro fertilization clinics.\textsuperscript{20} Embryos from such clinics are donated by couples who receive infertility treatment.\textsuperscript{21} Currently, there are approximately 400,000 excess embryos frozen in fertility clinics nationwide.\textsuperscript{22} Eighty-four percent of these clinics regularly discard unwanted embryos by incineration.\textsuperscript{23}

Stem cells are also derived from five- to nine-week-old embryos that are obtained through elective abortions.\textsuperscript{24} Researchers believe that cells derived from this source have very similar properties to those obtained from in vitro fertilization clinics.\textsuperscript{25}

The third source from which stem cells are obtained is cloned embryos, created by a process called somatic cell nuclear transfer ("SCNT").\textsuperscript{26} Although human cloning has largely been deemed unethical, this form of therapeutic cloning has received considerable support from the scientific community as a viable alternative source of stem cells.\textsuperscript{27}

\textsuperscript{18} See id. Through this research, scientists may be able to determine what methods will likely reduce, or even eliminate, certain birth defects. See id.

\textsuperscript{19} See 1 NAT'L BIOETHICS ADVISORY COMM'N, ETHICAL ISSUES IN HUMAN STEM CELL RESEARCH 9 (1999), available at http://www.georgetown.edu/research/nrcbl/nbac/stemcell.pdf. Sources of stem cells, aside from embryonic stem cells, include adult tissue and umbilical cord blood. JUDITH A. JOHNSON & ERIN WILLIAMS, CONGRESSIONAL RESEARCH SERVICE REPORT FOR CONGRESS, STEM CELL RESEARCH, at CRS-2 (2004), available at http://www.fas.org/spp/civil/crs/RL31015.pdf. However, these stem cells may not be as long-lived or capable of as many cell divisions as embryonic stem cells. Id.

\textsuperscript{20} See 1 NAT'L BIOETHICS ADVISORY COMM'N, supra note 19, at 9.

\textsuperscript{21} Id. When couples choose in vitro fertilization, doctors typically fertilize several eggs with sperm in a Petri dish and then implant the fertilized eggs into the womb after they have matured for about five days. Id. at 17. If there are extra fertilized eggs, doctors store the extra embryos and couples may either choose to discard the embryos, donate them to other couples, or donate them for research. See id. at 53.

\textsuperscript{22} Dan Vergano, Embryonic Imbroglio, USA TODAY, Oct. 27, 2004, at 6D [hereinafter Vergano, Embryonic Imbroglio].

\textsuperscript{23} Id.

\textsuperscript{24} JOHNSON & WILLIAMS, supra note 19, at CRS-1.

\textsuperscript{25} See id.

\textsuperscript{26} Id.

\textsuperscript{27} Ella De Trizio & Christopher S. Brennan, The Business of Human Embryonic Stem-Cell Research and an International Analysis of Relevant Laws,
Grown from a patient’s own DNA, the cells could potentially regenerate damaged tissue without the risk of rejection by the patient’s immune system. Moreover, SCNT would allow scientists to determine which genes trigger diseases, rather than working backwards to figure out how a patient contracted a disease.

When an embryo is allowed to grow for five to six days, it develops into a blastocyst. At the blastocyst stage, the outer layer is partially differentiated and the inner layer is composed of thirty to thirty-four undifferentiated stem cells. The focus of stem cell research is to remove and study the inner mass of undifferentiated cells. The ethical controversy usually arises from this removal of undifferentiated cells from the blastocyst because it terminates the life functions of the embryo.

B. Central Ethical Issues Surrounding Stem Cell Research

The two primary ethical dilemmas of stem cell research revolve around the assessment of when human life begins and the use of human embryos as research subjects. To resolve these dilemmas, numerous lawmakers, scientists, commissions, and presidents have attempted to balance the potential life of a human embryo with the possibility of alleviating the suffering of millions of Americans.
To address these concerns, President Bill Clinton issued Executive Order 12,975 in 1995, which created the National Bioethics Advisory Commission ("NBAC"). According to NBAC's executive summary, the commission recognized that human embryos deserved respect as a form of human life. However, the commission disagreed over what form such respect should take and what level of protection was required at different stages of embryonic development. NBAC recognized that those who believe an embryo is a person from the moment of conception would view research that destroyed the embryo as wrong and impermissible. On the other hand, NBAC acknowledged that arriving at an ethically acceptable policy would require balancing a number of important ethical concerns, such as the potential to cure human disease, protecting human life, determining when human life begins, and according human embryos the respect they deserve. After assessing these ethical issues, NBAC recommended that the federal government fund research if the embryos were derived from fertility clinics, but not if they were created through in vitro fertilization solely for research purposes or derived from SCNT.

Subsequently, NBAC's recommendation fell into disfavor after the change in administration in 2001. In August 2001, President George W. Bush made a radio address to the American public announcing his administration's position on stem cell research. President Bush stated that stem cell research was at the "leading edge of a series of moral hazards." He framed the ethical issues surrounding stem cell research as "forcing us to confront fundamental questions about the beginnings of life and the ends of science. [Stem cell research] lies at a difficult moral intersection,

37. 1 NAT'L BIOETHICS ADVISORY COMM'N, supra note 19, at 66.
38. See id.
39. See id.
40. See id.
41. See id. at 68-69. The Commission concluded that somatic nuclear transfer technology should not be granted federal funds because issues would arise over the question of life. Id.
43. Id.
juxtaposing the need to protect life in all its phases with the prospect of saving and improving life in all its stages." Moreover, President Bush declared that, "[w]e do not end some lives for the medical benefit of others. For me, this is a matter of conviction: a belief that life, including early life, is biologically human, genetically distinct and valuable." With these ethical considerations in mind, President Bush decided to limit federal funding of stem cell research only to those stem cell lines already in existence. He articulated his commitment to the pursuit of stem cell research without crossing a fundamental moral line by providing taxpayer funding that sanctions or encourages further destruction of human embryos.

C. Stem Cell Research Regulations

1. Federal Executive Regulation

In 1999, the National Institutes of Health ("NIH") issued guidelines that supported the use of federal funds for the creation and research of stem cells from existing spare human embryos, beyond the existing and recognized lines of embryonic stem cells. The guidelines were not regulations that were mandated by federal law. However, compliance was required for researchers to receive federal grants.

In 2001, President Bush rejected the NIH guidelines in

44. Id.
46. Id. at 41.
51. Id.
his radio address to the nation.\textsuperscript{52} He instead decided that federal funds could be used for research on existing human embryonic stem cell lines if, prior to his announcement: (1) the derivation process, involving the removal of the inner cell mass from the blastocyst, had already begun, and (2) the embryo could no longer develop into a human being.\textsuperscript{53} Furthermore, consistent with the President's statements, the Bush Administration limited federal funding to research on certain existing stem cell lines. These stem cell lines were obtained with the informed consent of the donors, derived from excess embryos created solely for reproductive purposes, and obtained without any financial inducements to the donors.\textsuperscript{54}

President Bush has kept his promise to allocate federal funding for stem cell research.\textsuperscript{55} In 2003, the federal government provided $24.8 million for human embryonic stem cell research.\textsuperscript{56} The Bush Administration also provided $190.7 million for research on human non-embryonic stem cells, which included research on adult stem cells derived from cord blood, placenta, and bone marrow.\textsuperscript{57}

\section*{2. Congressional Regulation}

\subsection*{a. Congress's Authority to Regulate Stem Cell Research}

As the head of the Executive Branch of the federal government, the President of the United States has the final responsibility and authority to set federal governmental policy for the funding of human embryonic stem cell research.\textsuperscript{58} Nevertheless, according to the U.S. Constitution,
the duty of federal lawmaking rests squarely on the shoulders of Congress.\textsuperscript{59} Therefore, Congress arguably has authority to override the President’s policies.\textsuperscript{60} However, Congress may only act if the Constitution expressly grants such authority.\textsuperscript{61} In the context of stem cell research, Congress may be able to exercise legislative power through the Commerce Clause and the Spending Clause. The policies enacted pursuant to these powers may also preempt state regulations because of the Supremacy Clause.

\textit{i. Authority Under the Commerce Clause}

Congress has the enumerated power to pass legislation under the Commerce Clause. Article I, Section 8 of the U.S. Constitution states: “Congress shall have the power to . . . regulate commerce with foreign nations, and among the several states, and with the Indian Tribes.”\textsuperscript{62} The U.S. Supreme Court has determined that congressional regulations may fall within the purview of the Commerce Clause if the subject of regulation is (1) an instrumentality of interstate commerce, (2) a channel of interstate commerce, or (3) an activity that has a substantial effect on interstate commerce.\textsuperscript{63} In order to have a substantial effect, the activity should be commercial and should have an economic impact on interstate commerce.\textsuperscript{64}

In \textit{Gonzales v. Raich}, the U.S. Supreme Court found that

\begin{footnotesize}
\textsuperscript{59} See Schiller, \textit{supra} note 34, at 1048.
\textsuperscript{60} Stem Cell Information, FAQ, \textit{supra} note 58 (follow “Who is responsible for setting the policy to allow federal money to be used for human embryonic stem cell research?” hyperlink) (last visited Mar. 13, 2006). The National Institutes of Health is a part of the executive branch. \textit{Id}. The day-to-day enforcement and administration of federal laws rests with various executive departments, such as the Department of Health & Human Services, which administers the NIH. These departments were created by Congress to govern specific areas of national affairs. See U.S. DEPT. OF STATE, OUTLINE OF U.S. GOVERNMENT, http://usinfo.state.gov/products/pubs/outusgov/ch3.htm (last visited Mar. 13, 2006).
\textsuperscript{61} See United States v. Morrison, 529 U.S. 598, 607 (2000) (“Every law enacted by Congress must be based on one or more of its powers enumerated in the Constitution.”); ERWIN CHEMERINSKY, CONSTITUTIONAL LAW PRINCIPLES AND POLICIES 230 (2d ed. 2002).
\textsuperscript{62} U.S. CONST. art. I, § 8.
\textsuperscript{64} \textit{Morrison}, 529 U.S. at 610; see CHEMERINSKY, \textit{supra} note 61, at 263.
\end{footnotesize}
even if an activity is local, and though it may not be regarded as commercial, it may still be regulated by Congress "if it exerts a substantial economic effect on interstate commerce." Thus, when Congress decides that the collective effects of a certain activity pose a threat to the national market, it may regulate the entire class of that activity.

Although the U.S. Supreme Court has narrowed the scope of Congress's commerce power by reviving the Tenth Amendment as a limitation on federal authority, the Commerce Clause remains the constitutional basis for a broad array of federal legislation. The Tenth Amendment to the U.S. Constitution protects state sovereignty from improper federal intrusion. The Tenth Amendment states, "[t]he powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people." Traditionally, states retain the police power to regulate matters that concern their general welfare. Thus, while Congress may possess the powers necessary to enact legislation involving stem cell research, the Tenth Amendment may limit the scope of congressional authority to do so.

ii. Authority Under the Spending Clause

Congress may also have the ability to regulate federally funded stem cell research through its spending power. Article I, Section 8 of the U.S. Constitution gives Congress the power "to lay and collect taxes, duties, imposts and excises, to pay the debts and provide for the common defense and general welfare of the United States; but all duties, imposts and excises shall be uniform throughout the United States."
States." Congress is given great discretion in exercising its spending powers. Accordingly, Congress should have the authority to fund stem cell research because it may be considered a matter of "general welfare." Congress may also condition a state's receipt of federal funds by withholding such receipt if a state does not conform to a congressionally advocated policy or rule. Congress has used its spending power to set forth conditions for the receipt of federal funds, even in areas where Congress might not be able to otherwise regulate. The Supreme Court has recognized that "the financial inducement offered by Congress might be so coercive as to pass the point at which 'pressure turns into compulsion.'"

iii. Preemption of State Law Through the Supremacy Clause

Policies enacted pursuant to the Commerce and Spending Clauses may also preempt state regulations through the Supremacy Clause, found in Article VI of the Constitution. The Supremacy Clause provides that laws made by Congress are the "supreme law of the land." As the Supreme Court declared, "[u]nder the Supremacy Clause, from which our pre-emption doctrine is derived, 'any state law, however clearly within a State's acknowledged power, which interferes with or is contrary to federal law, must yield.'" Accordingly, if there is a conflict between federal and state law, the federal

73. CHEMERINSKY, supra note 61, at 273 (quoting United States v. Butler, 297 U.S. 1 (1936)).
74. See Snead, supra note 70, at 498.
75. See Schiller, supra note 34, at 1045 (stating that "Congress has found stem cell research to be a topic ripe with ethical, moral and social concerns," and thus "the general welfare requirement would almost certainly be met").
76. See id. at 1048 (evaluating Congress's powers to use conditioned federal funding to regulate stem cell research and concluding that Congress would have sufficient constitutional power to legislate stem cell research and its potentially beneficial applications).
77. See CHEMERINSKY, supra note 61, at 273.
79. U.S. CONST. art. VI.
80. See CHEMERINSKY, supra note 61, at 376.
law controls and the state law is invalid. There are two common situations where preemption occurs: when a federal law expressly preempts a state law, and when preemption is implied by a clear congressional intent to preempt state law.

Even though no stem cell bill proposed in Congress has expressly sought to preempt state law, without a clear directive stating that federal law will not preempt state law, implied preemption may still occur. Implied preemption may be present in the stem cell context in two situations: (1) when concurrent compliance with both a federal and a state regulation is a physical impossibility, and (2) when the state law "stands as an obstacle to the accomplishment and execution of the full purposes or objectives of Congress."

Even if Congress has authority to regulate stem cell research, the President may use his veto power to hinder Congress's efforts to circumvent his Executive Order. The tension between these two branches of government, along with the tension between federal and state powers, has made stem cell research an issue of ripe constitutional concern.

b. Legislative Activity

i. The Dickey Amendment

In 1996, Congress attached a rider to the Department of Health and Human Services ("DHHS") appropriations bill, called the Dickey Amendment. This Amendment prohibits

82. CHEMERINSKY, supra note 61, at 376.
83. Id. The Supreme Court has identified three scenarios where implied preemption occurs: (1) where the federal government extensively regulates an area of law, (2) where there is conflict between federal and state law, and (3) where the state law interferes with a federal objective. In practice, these types of preemption often overlap. Id. at 378.
84. Fla. Lime & Avocado Growers, Inc. v. Paul, 373 U.S. 132, 142-43 (1963) (stating that preemption will occur where compliance with both federal and state regulations is physically impossible).
87. "The rider, an amendment originally introduced by Representative Jay Dickey," was attached to legislation that affected NIH funding in 1996. JOHNSON & WILLIAMS, supra note 19, at CRS-3.
the use of federal funds for research towards the creation of human embryos and research in which human embryos are destroyed, discarded, or knowingly subjected to risk of injury or death.\textsuperscript{89}

The Dickey Amendment would seem to settle the question of federal funding for human embryonic stem cell research because obtaining stem cells for such research requires the destruction of human embryos.\textsuperscript{90} However, the DHHS announced, in what is now referred to as the Rabb Memorandum,\textsuperscript{91} that funding of embryonic stem cell research is, in fact, legal because these cells do not meet the statutory, medical, or biological definition of a human embryo.\textsuperscript{92} Although the DHHS has stated that embryonic stem cell research does not fall within the purview of the Dickey Amendment,\textsuperscript{93} President Bush has affirmed his desire to maintain "the spirit" of the Dickey Amendment.\textsuperscript{94}

Accordingly, the President relied on the Dickey Amendment to frame his current policy of allocating funding to embryonic stem cell research for existing stem cell lines, as it does not encourage or contribute to any future destruction of human embryos.\textsuperscript{95}

\section*{ii. Current Legislative Activity}

Although it is evident that Congress has been active in

\begin{footnotesize}
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\item 89. H.R. 3061, 107th Cong. 510 (2001) (enacted).
\item 90. THE PRESIDENT'S COUNCIL ON BIOETHICS, supra note 45, at 21.
\item 92. See JOHNSON & WILLIAMS, supra note 19, at CRS-4. Human stem cells are not and cannot develop into an organism; they lack the capacity to become organisms even if they are transferred into a uterus. See 1 NAT'L BIOETHICS ADVISORY COMM'N, supra note 19, at 1. The finding was based in part on the determination by the DHHS that the statutory ban on human embryo research defines an embryo as an organism that, when implanted in the uterus, is capable of becoming a human. JOHNSON & WILLIAMS, supra note 19, at CRS-4.
\item 93. See Am. Ass'n for the Advancement of Science, supra note 88.
\item 94. THE PRESIDENT'S COUNCIL ON BIOETHICS, supra note 45, at 28. President Bush has made a number of statements articulating his position that nascent human life is deserving of protection and should not be violated. See, e.g., George W. Bush, Stem Cell Science and the Preservation of Life, N.Y. TIMES, Aug. 12, 2001, at D13.
\item 95. See THE PRESIDENT'S COUNCIL ON BIOETHICS, supra note 45, at 196.
\end{itemize}
\end{footnotesize}
debating issues concerning stem cell research and cloning, it is equally clear that the House of Representatives and the Senate are in a virtual deadlock over the acceptability of funding this research.\textsuperscript{96} Of the seven bills involving stem cell research introduced in the House of Representatives during the 107th Congress, none gained approval.\textsuperscript{97}

In April 2004, 206 bipartisan members of the House of Representatives signed a letter urging President Bush to allow the federal government to finance studies on embryos left over from in vitro fertilization clinics.\textsuperscript{98} A month later, fifty-eight senators sent a similar letter to the President requesting that he relax federal restrictions on stem cell research.\textsuperscript{99}

As of this comment, the 109th Congress is considering a total of twelve pieces of legislation.\textsuperscript{100} The issues being considered include: the federal government's infringement of state or private programs that fund embryonic stem cell research,\textsuperscript{101} the creation of a national cord blood stem cell

\textsuperscript{96} See Schiller, supra note 34, at 1035-36.


\textsuperscript{99} See Kemper, supra note 98, at A10.


\textsuperscript{101} H.R. Con. Res. 166.
bank network and registry, the allowance of a tax credit to holders of stem cell research bonds, the expansion of activities under the NIH to include adult stem cell research, the authorization of federal funds for research on embryonic stem cells, irrespective of the date on which such stem cells were derived, and prohibition of human cloning and protection of SCNT stem cell research.

The House of Representatives recently passed a bill termed the “Stem Cell Research Enhancement Act of 2005.” This bill would essentially override President Bush’s Executive Order by allowing federal funds to be used for stem cell research regardless of the date on which the “derivation process for such stem cells [was] initiated or completed.” Nevertheless, President Bush has threatened to veto the bill if it passes both houses of Congress.

3. State Regulation

The federal government lacks exclusive jurisdiction to regulate stem cell research. In fact, states have the authority to enact laws that permit or limit human embryonic stem cell research using state funds. Unless Congress passes a law that bans it, states may fund research that uses human embryonic stem cell lines that would be ineligible for federal funding. Some states have already banned, or are

102. H.R. 596; S. 681.
103. H.R. 1650.
105. H.R. 162.
108. H.R. 810.
111. Id.
112. Id.
considering banning, the destruction of human embryonic stem cells for research, while other states have expressly endorsed such research. Several states also have human cloning laws that may impact stem cell research.

a. Stem Cell Research in California

California was the first state to enact legislation encouraging stem cell research. On September 22, 2002, Governor Gray Davis signed into law a bill that sought to protect stem cell research. This bill allows research on stem cells that were derived from human embryonic stem cells, human embryonic germ-cells, SCNT, and human adult stem cells, regardless of whether the stem cell line existed at the time of President Bush's Executive Order. The bill also prohibits the purchase or sale of embryonic or cadaveric fetal tissue. Governor Davis subsequently signed several other pieces of legislation related to stem cell research. These bills establish ethical and legal standards that govern stem cell research and the disposition of human embryos for individuals undergoing fertility treatment.

On November 2, 2004, fifty-nine percent of Californians voted to approve the California Stem Cell Research and Cures

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113. Aaron Zitner, States Challenge Bush on Embryonic Stem Cell Research, L.A. TIMES, Nov. 29, 2002, at A32. In recent years, Iowa, Michigan, and Virginia have banned cloning for any purpose, while Louisiana, Rhode Island, and California banned cloning to initiate a pregnancy. Id. A handful of other states have laws protecting embryos, which might be interpreted as barring embryonic stem cell experiments. Id.

114. Dan Vergano, States Dive Into Stem Cell Debates, USA TODAY, Apr. 24, 2004, at 1D. Thirty-three state legislatures have considered 100 bills that condemn, condone, or fund embryonic stem cell research. Id.


118. See CAL. HEALTH AND SAFETY CODE § 125300.

119. Id.

120. Id. § 125305.

121. Id. § 125315.
Bond Act of 2004 (hereinafter referred to as the "Act"). The Act closes the funding gap created by the federal government moratorium by establishing an institute that will issue bonds to support stem cell research. It also authorizes an allocation of three billion dollars in bonds, distributed over a ten-year period, to fund stem cell research and advanced medical research facilities at California’s universities and throughout the state. The Act also expressly permits research on adult stem cells, cord blood stem cells, progenitor cells, and pluripotent stem cells derived from SCNT and in vitro fertilization treatments.

The Act establishes the California Institute for Regenerative Medicine (CIRM), headquartered in San Francisco. The Act also creates an Independent Citizen’s Oversight Committee (ICOC), which will grant awards, establish policies regarding intellectual property rights, and develop annual and long-term strategic research and financial plans for the institute. The ICOC has taken the position that the CIRM will focus its attention on financing research opportunities that federal grants cannot assist. Specifically, the biggest emphasis would be on SCNT research. By far, the Act would create the largest state-run scientific research effort in the country and make California the global center of stem cell research, on par with Singapore, Israel, South Korea, and the United Kingdom, all of which

125. Id. § 125290.10.
126. CAL. CONST. art. XXXV §5.
128. CAL. HEALTH & SAFETY CODE §§ 125290.10-.45.
130. Id.
have moved aggressively in the field since the late 1990s. Several state legislators, however, have concerns about the Act. Senator Deborah Ortiz has advocated an amendment to the California Constitution that would change the ground rules for the Act by increasing public oversight and ensuring that state-financed stem cell treatments are affordable and accessible. In response, the ICOC issued a press release stating its opposition to the amendment and that the amendment would make it extremely difficult, if not impossible, for scientists to accomplish their work by delaying the production of critically needed medical therapies. Meanwhile, another obstacle for issuing the stem cell bonds has arisen from lawsuits filed by pro-life advocates who challenge the destruction of human embryos for stem cell research.

b. Stem Cell Research in New Jersey

New Jersey was the second state to endorse embryonic stem cell research. In response to the California initiative, former New Jersey Governor Richard Codey committed $150 million in state funds to build a stem cell research center. Codey's successor, Governor James McGreevey, signed a bill

133. Resolution to propose an amendment to the Constitution by amending section 6, relating to biomedical research, S. 13, 2005 Leg., Reg. Sess. (Cal. 2005).
in May 2004 to establish the nation's first state-sponsored stem cell research institute,\textsuperscript{138} a $25 million endeavor.\textsuperscript{139} New Jersey currently permits research involving the derivation and use of human embryonic stem cells, human embryonic germ cells, human adult stem cells, and SCNT.\textsuperscript{140} New Jersey law requires the physician or other health care provider treating a patient for infertility to provide the patient with information sufficient to allow that person to make an informed and voluntary choice about the disposition of any embryos created during the patient's treatment.\textsuperscript{141} A person who elects to donate embryos for research purposes remaining after infertility treatments is required to provide written consent to that donation.\textsuperscript{142}

As states such as California and New Jersey race forward in the stem cell industry, many other states are considering similar legislation in order to remain competitive.\textsuperscript{143} States recognize that stem cell research is an important emerging field of biology and, thus, believe that this new industry could generate well-paying jobs as well as cures for disease.\textsuperscript{144} However, state legislatures recognize that although national polls show that seven out of ten voters support the idea of stem cell research, the moral debate over using human embryos makes the subject politically controversial.\textsuperscript{145}

Given the recent spur of activity over stem cell research at both the federal and state level, the question of which level of government is better suited to regulate stem cell research is certain to arise. The next section will introduce this legal problem.

III. IDENTIFICATION OF THE LEGAL PROBLEM

Stem cell research is a topic full of ethical and political
controversies. The state and federal governments have attempted to regulate this area of research since its discovery. Thus far, Congress has remained silent on the issue, while President Bush has limited the funding of stem cell research by Executive Order. Meanwhile, a number of states have restricted such research, while others have funded and expanded the science. Because the state and federal governments have enacted an inconsistent regulatory scheme for stem cell research, problems of federalism will arise if and when Congress chooses to speak on this issue. In particular, there is a question of whether Congress has the constitutional authority to regulate stem cell research. Further, if it does have such authority, a larger problem of preemption and the content of such federal regulation arises.

IV. Analysis

A. Congress's Ability to Enact Stem Cell Research Legislation

1. Congressional Power Under the Commerce Clause

Although President Bush used an Executive Order to institute a national policy on stem cell research, under the U.S. Constitution, the duty of federal lawmaking rests squarely on the shoulders of Congress. Pursuant to the Commerce Clause, Congress may have the power to regulate public and private stem cell research. Congressional regulations may be considered to fall within the purview of the Commerce Clause if the subject of the regulation is an instrumentality or channel of interstate commerce, or is an activity that has a substantial effect on interstate commerce.

Arguably, stem cell research has a substantial effect on interstate commerce. It is firmly established that Congress may regulate purely local activities that contribute to an economic "class of activities" that have a substantial effect on

146. Tara L. Branum, President or King? The Use and Abuse of Executive Orders in Modern-Day America, 28 J. LEGIS. 1, 45-47 (2002).
147. See Schiller, supra note 34, at 1049; see also Youngstown Sheet & Tube Co. v. Sawyer, 343 U.S. 579, 587 (1952) ("In the framework of our Constitution, the President's power to see that the laws are faithfully executed refutes the idea that he is to be a lawmaker.").
interstate commerce.\textsuperscript{149} This "substantial effect" test is likely satisfied in the case of stem cell research because such research efforts will likely have a significant commercial and economic impact throughout the country. Potentially lucrative drug therapies based on stem cell research provide one example of this economic effect. Moreover, the biotechnology industry involved in the research and production of stem cells is an increasingly considerable segment of the U.S. economy.\textsuperscript{150} The potential for such research to lead to cures for pandemic diseases will have a financial impact of millions, if not billions, of dollars for private industries and educational institutions.\textsuperscript{151}

In \textit{Gonzales v. Raich}, the U.S. Supreme Court held that Congress's authority under the Commerce Clause includes the power to prohibit local cultivation and use of marijuana, irrespective of such activities' legality under California law.\textsuperscript{152} The issue before the U.S. Supreme Court surrounded the growth of medical marijuana that was purported to be a purely intrastate, noncommercial activity.\textsuperscript{153} Respondents also contended that the possession and use of medical marijuana for personal medical purposes were in accordance with state law.\textsuperscript{154} Nevertheless, the Court found there existed a "rational basis" for Congress's conclusion that private growth and use of marijuana has a "substantial effect" on the interstate commerce of drugs.\textsuperscript{155} Like the growth and use of marijuana in \textit{Raich}, the aggregate growth and use of stem cells by biotechnology companies may have a "substantial effect" on the interstate commerce of this industry. Thus, under the Court's Commerce Clause jurisprudence in \textit{Raich}, Congress likely has authority to regulate stem cell research through its Commerce Clause power.

Given Congress's power to enact legislation regulating

\textsuperscript{149} See, e.g., \textit{Gonzales v. Raich}, 125 S. Ct. 2195, 2205 (2005).
\textsuperscript{151} See \textit{id.} at 646.
\textsuperscript{152} \textit{Raich}, 125 S. Ct. at 2209, 2212-13.
\textsuperscript{153} See \textit{id.} at 2204-05.
\textsuperscript{154} \textit{Id.}
\textsuperscript{155} \textit{Id.}
the commerce of stem cells,\textsuperscript{156} Congress should be able to regulate both private sector and state activity over how stem cells are derived, whether informed consent is necessary, and how the stem cells are banked and distributed.

2. \textit{Preemption of State Regulation by Congress}

Thus far, states have been unrestricted in regulating their own research. However, if Congress effectively exercises its power to regulate stem cell research, then the Supremacy Clause would trigger the issue of preemption for state-created stem cell research programs.\textsuperscript{157} Such preemption could nullify states' efforts to regulate and fund stem cell research and could hinder progress that states have made in this area.

There are two situations applicable to stem cell research where preemption could occur. First, a federal law could expressly preempt a state law.\textsuperscript{158} Second, preemption could be implied by clear congressional intent to preempt a state law.\textsuperscript{159}

With respect to the first type of preemption, the House of Representatives has already proposed a concurrent resolution,\textsuperscript{160} which provides that the federal government

\begin{itemize}
\item \textsuperscript{156} \textit{See}, \textit{e.g.}, Human Cloning Prohibition Act of 2005, S. 658, 109th Cong. (2005); Human Cloning Prohibition Act of 2005, H.R. 1357, 109th Cong. (2005). Congress declared in this bill that it has the authority to regulate cloning because it affects stem cell research. \textit{See id.} The bill provides:
  \begin{itemize}
  \item It shall be unlawful for any person or entity, public or private, in or affecting interstate commerce, knowingly –
  \item (1) to perform or attempt to perform human cloning;
  \item (2) to participate in an attempt to perform human cloning; or
  \item (3) to ship or receive for any purpose an embryo produced by human cloning or any product derived from such embryo.
  \end{itemize}
  \textit{Id.} § 302(a)(1)-(3).
\item \textsuperscript{157} \textit{See} \textit{U.S. CONST.} art. VI, cl. 2. The Supremacy Clause provides that if there is a conflict between a federal and a state law, then the federal law controls and the state law is invalidated because the federal law is supreme. CHEMERINSKY, \textit{supra} note 61, at 376.
\item \textsuperscript{158} CHEMERINSKY, \textit{supra} note 61, at 376.
\item \textsuperscript{159} \textit{Id.} at 378.
\item \textsuperscript{160} Concurrent resolutions must be passed in the same form by both houses, but they do not require the President's signature and are not legally binding. U.S. Senate Legislation, Laws and Acts, http://senate.gov/legislative/common/briefing/leg_lawsActs.htm#3 (last visited Dec. 22, 2005). Concurrent resolutions are generally used to make or amend rules that apply to both houses of Congress. \textit{Id.} They are also used to express the sentiments of both of the houses. \textit{Id.}
\end{itemize}
should not infringe on state or private programs that fund embryonic stem cell research. However, this resolution by itself will not resolve issues that remain due to a lack of federal legislation in this field. First, concurrent resolutions are not legally binding. Second, the type of research permitted varies by states. Some states have expressly endorsed stem cell research, while other states have restricted such research. Thus, variations between states regarding the breadth of research allowed will ultimately lead researchers to migrate toward more favorable states.

Second, with regard to implied preemption, in the context of stem cell research this could occur if a state allowing research on SCNT stem cells were confronted with federal legislation that bars experimentation on embryos derived from cloning, including SCNT stem cells. In that scenario, states permitting SCNT would no longer be able to make advancements using these means, as they would be illegal.

This problem is very real in the State of California, as the ICOC has expressly stated that it endorses SCNT research. Considering the great lengths that California has taken to develop and fund legislation supporting stem cell research, specifically SCNT research, federal legislation preempting such investment may thwart any advancements made thus far.

Preemption would thus have the effect of leveling the playing field between the states. The generosity of funding and the level of ethical and scientific regulation would vary according to each state’s constituencies and oversight committees. Inevitably, from a business and economic standpoint, states willing to give the most latitude will attract the best researchers in the field because they will be able to work with the most advanced technologies. This is problematic because states would be disinclined to implement strict moral guidelines and would instead mold their policies

162. U.S. Senate Legislation, supra note 160.
163. See Stevens, supra note 150, at 652.
164. See id.
to meet researchers' demands.

As states like California create their own oversight committees, ethical issues will be assessed within the confines of an untested institution.\textsuperscript{168} This development demonstrates the degree to which the federal government will remain excluded from important developments in the stem cell debate.\textsuperscript{169} A redundancy in government bureaucracy will be created since the NIH's purpose is to oversee such research.\textsuperscript{170} Implementation of a federal regulation that empowers the NIH would ultimately streamline this entire process.

B. Lack of Federal Legislation Regarding Stem Cell Research

Currently, there are no existing federal statutes or related regulations that specifically address human stem cell research.\textsuperscript{171} However, the federal government has created guidelines for fetal research.\textsuperscript{172} The guidelines set forth that:

The Secretary may not conduct or support any research or experimentation, in the United States or in any other country, on a nonviable living human fetus ex utero or a living human fetus ex utero for whom viability has not been ascertained unless the research or experimentation—
(1) may enhance the well-being or meet the health needs of the fetus or enhance the probability of its survival to viability; or
(2) will pose no added risk of suffering, injury, or death to the fetus and the purpose of the research or experimentation is the development of important biomedical knowledge which cannot be obtained by other means.\textsuperscript{173}

The ethical debate as to when life actually begins arises from the concept that a stem cell is considered a fetus under this Act.\textsuperscript{174} If stem cells are considered fetuses, research may

\textsuperscript{169} \textit{Id.} at 1119.
\textsuperscript{170} \textit{Id.}
\textsuperscript{171} See Matton & Thomas, \textit{supra} note 49, at 309-10.
\textsuperscript{172} 42 U.S.C. § 289g (2000).
\textsuperscript{173} \textit{Id.} (emphasis added).
\textsuperscript{174} See, e.g., Roe v. Wade, 410 U.S. 113, 158 (1973) (determining that the word "person," as used in the Fourteenth Amendment, does not include the unborn).
be conducted under this federal regulation only if an exception applies. Accordingly, human embryonic stem cell research may fall within the exception requiring that such research offers biomedical knowledge that cannot be obtained by other means. Given the forecasted medical advancements in stem cell research, conducting research on stem cells should not violate this federal regulation.

With this tension between state and federal regulation of stem cell research, the bounds of federalism will surely be tested. The federal government, using its aforementioned powers, will be able to set standards for stem cell research. Given this trend, Congress should set a national policy that will clearly guide both states and private industries as they research using this technology. The next section of this comment will propose such federal legislation.

V. PROPOSAL

Many academics and policymakers recognize the pressing need for a uniform national policy governing stem cell research that extends beyond the efforts made by individual states. Such a scheme would encourage stem cell research because it would allow for greater certainty in the industry. A federal regulation would normalize state approaches to such research and would allow businesses to operate more efficiently and without the threat of their investments being abrogated by changes in state law. The federal government has heavily regulated the biotechnology industry since the mid-1970s, and stem cell research should not be treated any differently. Inconsistent legislation among the states and the virtual lack of regulation in the private

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175. See supra Part II.C.1.

176. As John Gearhart, a professor at Johns Hopkins, stated: "I believe strongly we should have a national policy [for stem cell research] that permits this work to go forward with appropriate oversight. But the fact is we don't have it." Hall, Proposition 71, supra note 122, at B1.

177. NAT'L RESEARCH COUNCIL INST. OF MED. OF NAT'L ACADEMIES, supra note 10, at 1. The National Academies panel said that uniform national guidelines are needed to reassure the public that the research is being conducted ethically, whatever the funding source, and to assure scientists of reliable standards for conducting and sharing their work. Id.

178. Matton & Thomas, supra note 49, at 288. The Bush policy was written against the backdrop of the nearly thirty-year history of give and take between the executive and legislative branches over the question of federal funding for embryo research. Snead, supra note 70, at 497.
sector make it now more important than ever that the federal
government implement stem cell research policies that will
normalize the state and private industries in accordance with
the ethical, scientific, and social concerns of the country.\textsuperscript{179}

Congress should set guidelines in five important areas of
concern regarding stem cell research: (1) procurement of stem
cells for research; (2) informed consent from individuals who
donate embryos and human tissue for research; (3)
registration of stem cells used for research; (4) regulation
standards for both private and public research, regardless of
whether the research is funded by the federal government;
and (5) guidelines expressly indicating that state regulations
are not entirely preempted by federal legislation.\textsuperscript{180}

Under the first area of regulation, the legislature must
create standards for the procurement of stem cells used for
research.\textsuperscript{181} Congress has tried numerous times to exclude
SCNT from this list because of the ethical implications of
using such research.\textsuperscript{182} However, the use of SCNT technology
is necessary to advance stem cell technology.\textsuperscript{183} This
technology reduces the risk of rejection by the body of a
patient who receives stem cell treatment and allows scientists
to understand how diseases begin.\textsuperscript{184} Harvard University is
considering using such technology in its research.\textsuperscript{185}

\begin{itemize}
\item \textsuperscript{179} See Stevens, supra note 150, at 652.
\item \textsuperscript{180} See National Institutes of Health Guidelines for Research Using Human
Pluripotent Stem cells, 65 Fed. Reg. 51,976 (Aug. 25, 2000). Guidelines were
changed after President Bush initiated his Executive Order on stem cell
research. See id. The proposed regulation is loosely based upon the NIH
guidelines published in 2000 and the guidelines set forth by the National
Academies. See id. The NIH's guidelines are considered to be “a source for a
wealth of insight into how federal regulations can, and perhaps in the future
will, be applied to human [embryonic stem] cell research.” Auerbach, supra
note 16, at 1580.
\item \textsuperscript{181} See 65 Fed. Reg. at 51,976.
\item \textsuperscript{182} Human Cloning Research Prohibition Act, H.R. 222, 109th Cong. (2005);
Research Prohibition Act, H.R. 916, 108th Cong. (2003); Human Cloning Ban
and Stem Cell Research Protection Act of 2003, S. 303, 108th Cong. (2003);
Representatives, Feb. 27, 2003).
\item \textsuperscript{183} See McLean, supra note 30, at 1022-23.
\item \textsuperscript{184} Id.
\item \textsuperscript{185} See Joyce Howard Pierce, Stem Cell Ambivalence, WASH. TIMES, Jan. 9,
\end{itemize}
Without the use of SCNT and human embryonic stem cells, it would be impossible for researchers to compare the advantages and effectiveness of such stem cells with adult stem cells. Accordingly, the federal guidelines should allow for research from the following sources: adult stem cells, cord blood stem cells, progenitor cells, stem cells derived from SCNT, and stem cells donated by individuals with excess embryos from in vitro fertilization treatments. This new standard would essentially render President Bush's limitation of research to existing stem cell lines void, which is well within Congress's lawmakers' authority.

The second part of the proposed guideline would require consent from stem cell donors. Stem cells may be derived from embryos, umbilical cords, and from embryos discarded at infertility clinics. Thus, it is necessary to obtain consent from individuals who intend to donate their embryo or tissue for research. It is important that the guidelines for informed consent follow the national guidelines for researchers set by the Institutional Review Board. Both male and female donors should be required to sign a statement agreeing to allow their excess embryos to be used

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187. See id. In response to criticism of using human pluripotent stem cells for research, the NIH reasoned:
   Given the enormous potential of stem cells to the development of new therapies for the most devastating diseases, it is important to simultaneously pursue all lines of promising research. It is possible that no single source of stem cells is best or even suitable or . . . usable for all therapies. Different types or sources of stem cells may be optimal for treatment of specific conditions. In order to determine the very best source of many of the specialized cells and tissues of the body for new treatments and even cures, it is vitally important to study the potential of adult stem cells for comparison to that of [human pluripotent stem cells] derived from embryos and fetuses. Unless all stem cell types are studied, the differences between adult stem cells and embryo and fetal-derived [human pluripotent stem cells] will not be known.

Id. This line of reasoning could also be applied to somatic cell nuclear transfer.
188. See Branum, supra note 146, at 47.
189. See supra Part II.A.
for the derivation of human pluripotent stem cells for research. In addition, donors should also agree that their donations are made without any restrictions regarding the transplantation's recipient. It should also be disclosed that there may be commercial potential in the results of the research and that the donors will not be entitled to any compensation.\textsuperscript{192} Moreover, the regulation should provide that no inducement, monetary or otherwise, has or will be made for the donation of human tissue or embryos for research.\textsuperscript{193}

However, unlike the NIH guidelines, the proposed federal regulations should require that the donor's identity be disclosed to the researchers.\textsuperscript{194} First, this will allow for an accurate federal database of the sources of stem cells. Second, it will allow scientists to learn more about the sources of the embryos that they are to research. Although this may deter individuals from donating embryos, with the 400,000 excess embryos in fertility clinics nationwide,\textsuperscript{195} there will likely be an ample number of willing donors available to assist the progress of science.\textsuperscript{196}

Third, in order to ensure that the derivation of stem cells is ethically proper, the proposed federal regulations should require that all agencies register the stem cells on which they are conducting research.\textsuperscript{197} This is imperative because if stem cells are derived from illegal sources, such as the sale of human parts or embryos for research, the government should be able to monitor and regulate the source of such cells. Information in the registry should include specifics of how

\begin{itemize}
\item \textsuperscript{192} National Institutes of Health Guidelines for Research Using Human Pluripotent Stem Cells, 65 Fed. Reg. 51,976, 51,980 (Aug. 25, 2000).
\item \textsuperscript{193} See id. at 51,977.
\item \textsuperscript{194} See id. at 51,980. The NIH provides that "a statement as to whether or not information that could identify the donors of the embryos, directly or through identifiers linked to the donors, will be removed prior to the derivation or the use of human pluripotent stem cells." \textit{Id}.
\item \textsuperscript{195} Vergano, \textit{Embryonic Imbroglio}, \textit{supra} note 22, at 6D.
\item \textsuperscript{196} Kerstin Bjuresten & Outi Hovatta, \textit{Donation of Embryos for Stem Cell Research—How Many Couples Consent?}, 18 \textit{Hum. Reprod.} 1353, 1353 (2003), available at http://humrep.oxfordjournals.org/cgi/content/full/18/6/1353 (reporting that ninety-two percent of couples who underwent infertility treatment in Sweden preferred donating their supernumerary embryos for stem cell research rather than letting them be discarded).
\item \textsuperscript{197} See Ayer, \textit{supra} note 190, at 419.
\end{itemize}
research is conducted, identification of the individuals involved in the research protocols, and a detailed log of the identities of the donors of the stem cells. The government should also try to institute a national bank of stem cells, similar to the one created in the United Kingdom, that would offer a readily available resource of stem cells for both public and private entities. Implementing a stem cell bank will ensure that stem cells are derived from proper sources and will also provide scientists with convenient access to stem cells for research.

Fourth, the guidelines should be applicable to both public and private industries. The purpose of the proposed federal regulations is to set ethical and scientific guidelines for research throughout the nation. Currently, the federal government does not directly regulate stem cell research in the private sector. This lack of standards or regulation could lead to unethical practices by researchers. Thus, because Congress can regulate stem cell research pursuant to the Commerce Clause, it should be able to regulate the private stem cell industry regardless of whether it receives federal funding.

The last section of the guidelines should address the issue of preemption. Several states have implemented stem cell policies that may create a patchwork of policies to which a national agency would find difficult to conform.

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198. Id.
200. See, e.g., Suzanne Kaderet & Pamela J. Hines, An Overview of Stem Cell Research, 39 NEW ENG. L. REV. 607, 621 (2005) ("[C]linical application of embryonic stem cells will require large banks of cell lines in order to provide an immunological match for as many patients as possible.").
203. See THE PRESIDENT'S COUNCIL ON BIOETHICS, supra note 45, at 21-51.
204. See Kim, supra note 202, at 102 ("Because no federal regulations exist outside of the federal funding context, privately funded researchers are currently virtually unregulated.").
205. See Stevens, supra note 150, at 649-50.
Thus, it would be more pragmatic to have a national policy that normalizes the regulations among the states.207

Given this ideal of a national policy, the standards set forth in the guidelines should preempt any conflicting regulations set forth by individual states. However, where the federal guidelines are silent, states should be free to maintain their current policies. Since states like California have tried to implement policies in accordance with the proposed national standard,208 the issue of preemption should not be problematic. However, California, New Jersey, and Massachusetts have expressly stated that they would allow research to be conducted on stem cells produced by SCNT technology.209 Therefore, it is important that the federal guidelines allow this resource to be utilized in the event that researchers in these states have already begun implementing this means of research.

VI. CONCLUSION

The Executive Order has created a tension between the federal government's authority to restrict funding of stem cell research and the states' deliberate attempts to enact laws that circumvent such limitations.210 Nevertheless, it will be an exciting decade for stem cell research, especially for researchers in California. Since states are often viewed as laboratories of experimentation, it will be interesting to see the effects of California's Proposition 71 on stem cell research in the United States. With several states already attempting to pass legislation to follow California's lead, it is likely that many other states concerned with their biotechnology industry will press for legislative support in favor of stem cell research.211 Accordingly, it is imperative to implement a national policy that avoids the problems associated with a patchwork of federal and state regulations. Such a national

207. See Stevens, supra note 150, at 649.
208. California has modeled its policies in accordance with the Institutional Review Board and National Health Institute. See CAL. HEALTH & SAFETY CODE §§ 125291.10-.85.
209. Id. §§ 125291.10-.85; N.J. STAT. ANN. § 26:2Z-2; MASS. GEN. LAWS ch. 111L § 1 (2005).
210. See supra Part II.C.
211. See Chase & Gorner, supra note 143, at M1; Garvey, supra note 122, at A1; Mansnerus, supra note 143, at B1.
policy should detail the regulatory scheme for stem cell research and set forth standards that afford scientists the leniency required to advance this technology, while taking into consideration the ethical and moral concerns over such research.
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