PLURIPOTENT STEM CELLS: THE PROBLEM WITH BINARY POTENTIAL AND THE BENEFIT OF THE SLIPPERY SLOPE

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Stem cell researchers have been busy. Late in 2007, stem cell researchers in Wisconsin, USA,[1] and Kyoto, Japan,[2] announced that they had a new and improved pluripotent stem cell called the induced pluripotent stem cell (iPSC).[3] Unlike previous embryonic stem cells or cloned stem cells, the iPSC was not harvested from an embryo and did not use a human oocyte. Unlike previous pluripotent stem cells, researchers did not have to destroy any embryos or oocytes to get iPSCs. But like embryonic stem cells, many commentators touted the iPSC for its wonderful potential for new therapies and groundbreaking research. Charles Krauthammer welcomed the iPSCs as the "holy grail"[4] and others welcomed iPSCs as ethically clean or

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1. Junying Yu et al., *Induced Pluripotent Stem Cell Lines Derived from Human Somatic Cells*, 318 SCI. 1917, 1917 (2007).

2. Kazutoshi Takahashi et al., *Induction of Pluripotent Stem Cells from Adult Human Fibroblasts by Defined Factors*, 131 CELL 861, 861 (2007).

3. Pluripotent stem cells have the ability to differentiate into any cell in the body, but probably not the placenta, which is needed for implantation. A pluripotent stem cell can become a brain cell, or a kidney cell or a bone cell. The stem cells that are the subject in this essay are pluripotent stem cells, in contrast to adult stem cells, like hematopoietic stem cells, which also have the potential for differentiating into more than one type of mature or differentiated cell, but not as many different types as the pluripotential stem cell. *See id.*

4. Charles Krauthammer, Editorial, *Stem Cell Vindication*, WASH. POST, Nov. 30, 2007, at A23. Mr. Krauthammer also credits President George W. Bush's policy with helping cause scientists to produce iPSCs, writing, "Because the moral disquiet that James Thomson always felt—and that George Bush forced the country to confront—helped lead him and others to find some ethically neutral way to produce stem cells." *Id.*

"uncomplicated" and a solution to the "raw material problem."[5] Stem cell research, which had been a politically hot topic, is proving to be a mostly absent issue during this presidential election year of 2008, at least as of July 2008.

The second news event about stem cell research was in January 2008, when researchers at Stemagen Corporation in California published in a peer reviewed journal that they were the first to clone an early human embryo, known as a blastocyst.[6] They used a process called somatic cell nuclear transfer (SCNT), in which they combined enucleated human eggs (donated by three women from a fertility program) with the nuclear material of differentiated adult skin cells.[7] Importantly, these researchers did not isolate stem cells from the early embryos.[8] Experts say that this next step is difficult and time consuming;[9] however, several months earlier researchers at Oregon Health and Sciences University (OHSU) successfully extracted stem cells from cloned monkey embryos.[10] These researchers also used SCNT, and this was the first time researchers had cloned an animal other than a mouse, and it was not easy.[11] The investigators had started with 304 monkey eggs and ended up with two stem cell lines, one with an abnormal Y chromosome and the other apparently normal.[12]

These two recent events take us to the present state of stem cell research. There are two proven ways of acquiring human stem cells. The "traditional" method is to extract embryonic stem cells from a human blastocyst, which is a five or six day old hollow ball of cells consisting of the outer layer cells that will make up the placenta and the inner cell mass of pluripotent stem cells that will differentiate into

5. Andrew Pollack, *After Stem-Cell Breakthrough, the Work Begins*, N.Y. TIMES, Nov. 27, 2007, *available at* http://www.nytimes.com/2007/11/27/science/27stem.html.

6. Andrew J. French et al., *Development of Human Cloned Blastocysts Following Somatic Cell Nuclear Transfer with Adult Fibroblasts*, 26 STEM CELLS 485, 485 (2008).

7. *Id.*

8. *Id.*

9. ABC/Reuters, *First 'Proven' Human Cloned Embryo*, ABC SCI., January 18, 2008, http://www.abc.net.au/science/articles/2008/01/18/2141478.htm.

10. Gina Kolata, *Scientists Use Monkey Clones to Extract Stem Cells*, N.Y. TIMES, Nov. 15, 2007, at A1 (reporting that OHSU researcher Shoukhrat Mitalipov cloned monkey embryos and extracted stem cells from these embryos).

11. *Id.*

12. *Id.*

all the different cells in our body.[13] Despite great promise, embryonic stem cell research has progressed relatively slowly, in part because of limited federal funding and the shortages in supplies of stem cells. Stem cells and unfertilized eggs can be obtained from fertility clinics or from volunteer donors, but this latter approach is expensive and few women want to donate their oocytes (eggs), because payment for anything more than expenses is not allowed and the procedure is risky and carries potential side effects, including death.[14] Unlike the United States, the United Kingdom allows women to be paid for eggs, despite the deaths of five women from ovarian hyperstimulation syndrome (OHSS) that resulted from the drugs used to stimulate the ovary to release eggs.[15]

The second proven method is the new and possibly ethically improved way to induce differentiated cells to become stem cells. This is accomplished by incorporating transcription factors into a differentiated cell's DNA with retroviruses. These induced pluripotent stem cells or iPSCs have their own shortcomings.[16] Although politically and ethically less controversial, iPSCs carry an increased risk of cancer and other mutations since they have virally incorporated transcription factors. It is unlikely that the Food and Drug Administration (FDA) would allow placing virally modified cells into patients.[17] Some stem cell researchers believe that iPSCs as they now exist hold less therapeutic promise than embryonic stem

13. *See generally* S. Matthew Liao, *Rescuing Human Embryonic Stem Cell Research: The Blastocyst Transfer Method* 5 AM. J. BIOETHICS, Nov.–Dec. 2005, at 8.

14. *Safety of Egg Donation 'Unclear,'* BBC NEWS, June 30, 2005, http://news.bbc.co.uk /1/hi/health/4634625.stm.

15. The chairwoman of the British Fertility Society, Alison Murdoch, has emphasized that: "We stimulate something like 40,000 women per year for IVF treatment and there have been five reported deaths in the UK. The risks of someone dying during a pregnancy are very much higher than with the risks with IVF treatment." *Id.*

16. Many of the shortcomings relate to the fact that iPSCs currently depend upon retroviruses permanently modifying the chromosomes of the differentiated ("adult") cells so that they act like stem cells. Researchers are now working on methods to effect this change without permanently inserting genes into the differentiated cells. *See* Monya Baker, *Easing out the Viruses in Induced Pluripotency*, NATURE REP. STEM CELLS, July 3, 2008, http://www.nature.com/stemcells/2008/0807/080703/full/stemcells.2008.101.html#a1.

17. Pollack, *supra* note 5 (quoting the chief scientific officer of Advanced Cell Technology, Dr. Robert Lanza, who said the FDA "would never allow us to use those virally modified cells in patients").

cells, and plan to continue their research using embryonic rather than induced stem cells.[18]

A third method of acquiring human stem cells remains theoretical, but the above reported news events bring it closer to reality. This method uses somatic cell nuclear transfer (SCNT) to make a cloned human blastocyst and then isolates stem cells from the cloned blastocyst.[19] The technique of SCNT begins with an enucleated oocyte and then places within it the nuclear material of a differentiated cell, like a skin fibroblast.[20] In a process that scientists do not fully understand, the oocyte causes the differentiated DNA, originally from the skin, to act like a pluripotent stem cell.[21] The process is similar to iPSCs, but without the addition of virally incorporated transcription factors. Like embryonic stem cell research, the SCNT technique is held back by a shortage in supply of oocytes, which are essential for SCNT.

One important advantage of iPSC and SCNT stem cells is that they may have better therapeutic application because they reduce the risk of immune rejection. Recall that iPSC and SCNT stem cells derive from adult differentiated cells, so a potential patient's DNA and any stem cell derived tissue going back into the patient would have very similar, perhaps identical, DNA to the patient. This reduces the risk of rejection by the patient's immune system. The three kinds of human stem cells are described and compared in the chart below.

18. *See* Colin Nickerson, *Caution Urged in New Method for Stem Cells*, BOSTON GLOBE, Dec. 17, 2007, *available at* http://www.boston.com/news/science/articles/2007/12/17/caution_urged_in_new_method_for_stem_cells/?page=2 (reporting that researchers at Harvard and other universities plan to continue to pursue embryonic stem cell research rather than iPSC research because they remain skeptical whether iPSCs will ever be allowed for use in human therapies).

19. *See generally* CHRISTOPHER THOMAS SCOTT, A BRIEF INTRODUCTION TO THE COMING MEDICAL REVOLUTION 39–58 (2006).

20. *Id.*

21. *Id.*

	Destroy an embryo or Oocyte	Cloning	Use of oocyte	Result of fertilization	Retro-virus	Placenta[22]	Potential for born baby
Embryonic stem cell (ESC)	Yes usually	No	Yes	Yes	No	No	Yes, embryo does
Somatic cell nuclear transfer (SCNT)	Yes	Yes	Yes	No	No	No	Yes, potential for potential
Induced pluripotent stem cell (iPSC)	No	Yes	No	No	Yes	No	No/maybe potential for chimera

Are iPSCs the ethical "holy grail"? Certainly not all stem cells are alike, but how different are they? Note, that there is theoretic potential for iPSCs to become implanted into a blastocyst and grow to become a born baby.[23] Note, too, that although an embryonic stem cell is taken from a blastocyst, which has the ability of making a placenta and implanting into the uterine wall, none of the stem cells have this capability. Will looking carefully at the different categories of stem cells allow us to better understand arguments for and against stem cell research and to understand whether different kinds of stem cells should be differently funded and regulated?

22. A blastocyst's outer cell layer gives rise to the placenta, but none of the stem cells used for research have a capacity yet to give rise to a placenta. Nicholas Agar argues that it unimplanted embryos can ethically be used for research because they lack a "functional relationship with a womb" and the important question is whether IVF and SCNT embryos have the "morally relevant potential for sentience." Nicholas Agar, *Embryonic Potential and Stem Cells*, 21 BIOETHICS 198, 198–207 (2007) (discussing unimplanted embryos used for research).

23. Kazutoshi Takahashiand & Shinya Yamanaka, *Introduction of Pluripotent Stem Cells from Mouse Embryonic and Adult Fibroblast Cultures by Defined Factors*, 126 CELL 663, 673 (2006) (inducing pluripotent stem cells injected into mouse blastocyts and contributing to mouse embryonic development).

No federal laws prohibit stem cell research on any kind of stem cells, including embryonic stem cells.[24] Most states do not prohibit stem cell research, but some, like South Dakota, make it a misdemeanor[25] and others limit funding. This uneven landscape is important to keep in mind, as are the polling results that consistently show that a majority of Americans support stem cell research.[26] To this extent, there is yet no "winner" in the stem cell debate. President George W. Bush limited federal funding to research using only stem cell lines created before August 2001, which, although frustrating to supporters of stem cell research, allows states and private capital to fund any kind of stem cell research. California, for example, initiated a new stem cell program called the California Institute for Regenerative Medicine for a variety of reasons, including the hope of boosting its economy.[27] Moreover, although President Bush has limited federal funding, the U.S. federal government still gives substantial support to stem cell research, almost $240 million in 2005, which was more than any other country.[28]

The new iPSCs may polarize the stem cell research debate, because opponents to other kinds of stem cell research now have a workable alternative and a way to appease the powerful and tragic stories of patients whose faith for a cure lies wholly in the promise of stem cell therapies. Many scientists believe that the most promising route is to continue research using all types of stem cells; it is too early to put all one's eggs into the iPSC basket.[29] The risk for

24. There is federal policy limiting federal funding to stem cell lines created before August 2001, but no federal law prohibits stem cell research or cloning. The FDA has claimed authority over regulating human cloning technology and stated that they would not now approve any cloning projects because of safety reasons. There are several pending bills that aim to ban cloning. *See* Nat'l Conf. of St. Leg., Stem Cell Research, http://www.ncsl.org/programs/health/Genetics/embfet.htm (last visited Oct.11, 2008).

25. S.D. CODIFIED LAWS § 34-14-18 (2008).

26. Poll results show that 68% of respondents support embryonic stem cell research on April 15, 2007, and 63% supported embryonic stem cell research on April 24, 2005. A three point error margin was reported. Washington Post-ABC News Poll, April 16, 2007, http://www.washingtonpost.com/wp-srv/politics/polls/postpoll_041607.html.

27. *See* CAL. CONST. art. XXXV (allowing up to three billion dollars in bonds to be issued and sold to provide funding, and expressly prohibiting any Institute funds for human reproductive cloning).

28. RUSSELL KOROBKIN WITH STEPHEN MUNZER, STEM CELL CENTURY: LAW AND POLICY FOR A BREAKTHROUGH TECHNOLOGY 51 (2007).

29. *Stem Cell Science: The Foundation of Future Cures: Hearing Before the H. Comm. on Energy and Commerce Subcomm. on Health*, 110th Cong. (2008) (statement of Elias A. Zerhouni, Director, Nat'l Inst. of Health), *available at* http://www.hhs.gov/asl/testify/2008/05/

supporters of all kinds of stem cell research is that iPSCs will allow the debate to become more polarized and politicized, and will lead legislatures, and perhaps courts, to declare iPSCs the winner. Another risk is that iPSCs will further conflate the debate about stem cell research and abortion, whereby iPSCs are the winner because they are different from the embryos destroyed in embryonic stem cell research and abortion.[30]

This article will examine the reasons why iPSCs are not and should not be declared the winner. It will argue that the current use of the idea of potential has degenerated into a binary construct, and that a better approach to evaluate whether we should do research on pluripotent stem cells, whether iPSCs or other kinds, is to look at slippery slope arguments. Part I will examine the basis of the ethical objections to embryonic stem cells. It will focus on issues surrounding stem cells and leave alone issues about cloning. The article will particularly focus on the idea of potential that is relied upon by many who object to research using embryonic stem cells because such research necessarily destroys a potential human life. Part II will compare this idea of potential to the notion of potential used in the context of abortion cases. Both the 'potentialists' opposed to stem cell research and the abortion 'potentialists' rely on a binary, either/or, conception of potential. Part III will build on the problem of this unnuanced binary approach to potential. It will explore the advantages of a slippery slope approach, including that a slippery slope argument recognizes a continuum and forces a discussion about risks and benefits in keeping with how most citizens view the problem. It will suggest that the present binary view of potential becomes a discussion about overarching and controversial first principles that are not ideal for the political arena. The binary approach to potential is too close to the blatantly denominational

t20080508b.html ("However these human iPS cells are not yet suitable for use in transplantation medicine. The current techniques use viruses that could generate tumors or other undesirable mutations in cells derived from iPS cells."). *See also* Nickerson, *supra* note 18 (reporting that researchers at Harvard and other universities plan to continue to pursue embryonic stem cell research rather than iPSC research because they remain skeptical whether iPSCs will ever be allowed for use in human therapies).

30. *See*, Janet Dolgin, *Embryonic Discourse: Abortion, Stem Cells and Cloning*, 31 FLA. ST. U. L. REV. 101, 102–103 (2003). Professor Dolgin argues that although there are similarities between the debate about abortion and the debate about embryonic stem cell research, there are also big differences. The debate around abortion is fundamentally about preserving a world view that values "hierarchy, fixed roles, and communal solidarity." The debate around stem cell research is about the meaning of personhood. *See id.*

position that the fertilized human egg is the same as a born baby,[31] and these constitutional issues are beyond the scope of this article. Part IV concludes that iPSCs are not distinctly different from other types of stem cells when focusing on the idea of potential as a continuum, and that the lessons of *Roe v. Wade*[32] instruct us to hold back on picking a stem cell winner.

I. THE IDEA OF POTENTIAL AS THE BASIS FOR OPPOSITION TO STEM CELL RESEARCH

A. The Conceptionalists and the Potentialists

The basis of most arguments opposed to embryonic stem cell research is that obtaining the stem cells requires destroying an embryo. In other words, the objection is not to the stem cell research but to the destruction of an embryo. Father Kevin Wildes explains: "[I]f there were a way to conduct stem cell research without destroying human life, either embryonic or fetal, I do not think Roman Catholic tradition would have a principled opposition to such research."[33] Viewing embryonic stem cell research as unavoidably paradoxical led President George W. Bush to his compromised restriction of federal stem cell funding, which only allows federal funding for stem cell lines existing before August 2001. President Bush explained: "Embryonic stem cell research offers both great promise and great peril, so I have decided we must proceed with great care."[34] His policy has enjoyed broad criticism for many reasons.[35]

31. *See* Pope John Paul II, *Evangelium Vitae*, ¶ 58–63 (1995), *available at* http://www.vatican.va/holy_father/john_paul_ii/encyclicals/documents/hf_jp-ii_enc_25031995_evangelium-vitae_en.html. Pope John Paul II believed that human life begins at fertilization, stating: "[T]he use of human embryos or fetuses as an object of experimentation constitutes a crime against their dignity as human beings who have a right to the same respect owed to a child once born, just as to every person." *Id.* at ¶ 63.

32 410 U.S. 113 (1973).

33. *See* 3 NAT'L BIOETHICS ADVISORY COMM'N, ETHICAL ISSUES IN HUMAN STEM CELL RESEARCH: RELIGIOUS PERSPECTIVES I-1, I-3 (2000) [hereinafter NAT'L BIOETHICS ADVISORY COMM'N] (testimony of Kevin Wildes).

34. EVE HEROLD, STEM CELL WARS 63 (2006).

35. *See* Ronald Miller, *Ethical Issues in Stem Cell Research, Therapy and Public Policy*, *in* FUNDAMENTALS OF THE STEM CELL DEBATE: THE SCIENTIFIC, RELIGIOUS, ETHICAL & POLITICAL ISSUES 146–196 (Kristen R. Monroe et. al. eds., 2008) (criticisms include that (1) it exchanges moral reasoning with a pragmatic date line, (2) it is impractical because there are too few stem cell lines and they gain mutations with time, and (3) it is impractical because it forces stem cell researchers to divide their labs into areas doing federally funded research and areas using other funding).

Simply stated, perhaps over-simplified, there are two basic arguments against destroying a five or six day old fetus (blastocyst) to obtain stem cells. Although some commentators combine elements of the two, it is worthwhile to conceptually distinguish between them. I will refer to these two arguments and their supporters as "conceptionalists" and "potentialists." Both arguments focus on the value of the blastocyst. The conceptionalists hold that the embryo at the moment of conception is human and worthy of full protection. In other words, there is no reason to give different levels of protection to a newly fertilized egg, a blastocyst, a thirteen week old pre-viability fetus, a twenty-nine week old post-viability fetus, or a new born. Reflecting this position, the President's Council on Bioethics wrote:

> This view holds that only the very beginning of a new (embryonic) life can serve as a reasonable boundary line in according moral worth to a human organism, because it is the moment marked out by nature for the first visible appearance in the world of a new individual. Before fertilization, no new individual exists. After it, sperm and egg cells are gone—subsumed and transformed into a new, third entity capable of its own internally self-directed development. [36]

Note that, while the idea of potential is implied in the phrase "self-directed development," as well as the idea that the "new third entity" is capable of development, the quote gives moral worth not because of potential but because of nature. Reliance on potential is minimized by the idea of "self-directed development," which implies that only external happenstance can interfere with inevitable birth. The moral worth of the new life is at "the moment marked out by nature." The National Right to Life Committee stated it simply: "Each human begins as a human embryo, male or female. The government should not fund research that requires the killing of living members of the species of Homo sapiens."[37] The fertilized egg is the moral equivalent of a born living person.

Although there may be a developmental continuum, the moral (or legal) worth of an early embryo for potentialists is not dependent upon the level of development. Moreover, for them, focusing on various stages of development is perilous because it will make it too

36. PRESIDENT'S COUNCIL ON BIOETHICS, MONITORING STEM CELL RESEARCH 76 (2004), *available at* http://bioethics.gov/reports/stemcell/pcbe_final_version_ monitoring_stem _cell_research.pdf [hereinafter MONITORING STEM CELL RESEARCH].

37. ALAN MARZILLI, STEM CELL RESEARCH AND CLONING 51 (2007) (citing Letter from the Nat'l Right to Life Comm. to U.S. Senators (2005)).

easy to devalue a human life. Although the argument presumes its conclusion that valuable life begins at conception (it is circular), it has rhetorical appeal. Researchers might arbitrarily designate some of us as "pre-embryos" with devastating results. Ex-chair of the President's Council on Bioethics, Edmund Pellegrino explains:

> Terms such as "pre-embryo" or "pre-implantation embryo" seem to be contrivances rather than biological or ontological realities. Also rejected are socially constructed models that leave moral status to definition by social convention. In this view, moral status may be conferred at different times, or taken away, depending on social norms. This is a particularly perilous model for the most vulnerable among us: fetuses, embryos, the mentally retarded, or those in permanent vegetative states. The horrors of genocide in current events force us to recognize how distorted social convention can become, even in presumably civilized societies.[38]

For Pellegrino, destroying "pre-implantation embryos" is immoral because we all are humans deserving of full moral respect, whether we are embryos, in a permanent vegetative state, or at work writing essays. Social norms typically value these different places differently, but social norms for Pellegrino are arbitrary, ever changing, inherently misleading, and dangerous. Indeed, as Jeb Rubenfeld reminds us, "the concept of 'person' is ineluctably normative; it is not given by facts or by definition alone, but by a normative judgment operating definitively on certain sets of facts."[39]

Similarly, although Father Demopulos of the Orthodox Catholic Church recognizes that there may be a continuum in how close to "authentic human personhood" we may get, he emphasizes that every human, whether born or a blastocyst, should be given the same chance to reach authentic human personhood.[40] "Unborn human life is entitled to the same protection and the same opportunity to grow in the image and likeness of God as are those already born."[41]

This first argument maintains that a newly fertilized embryo is the moral equivalent to a born baby because, in part, there is no particular point to draw the line. In other words, conceptionalists

38. *See* NAT'L BIOETHICS ADVISORY COMM'N, *supra* note 33, at F-1, F-3 (testimony of Edmund D. Pellegrino).

39. Jed Rubenfeld, *On the Legal Status of the Proposition that "Life Begins at Conception,"* 43 Stan. L. Rev. 599, 619 (1991).

40. *See* NAT'L BIOETHICS ADVISORY COMM'N, *supra* note 33, at B-1, B-3 (testimony of Demetrios Demopulos explaining that the Eastern Orthodox view does not see the continuum as ending at birth, but as a life-long struggle toward theosis).

41. *Id.*

believe that either nature, God, or our moral code gives value to the newly fertilized egg, and there is no subsequent point that allows one to distinguish between the newly fertilized egg and a born baby. As the 2004 report by the President's Council on Bioethics put it, there is "no discrete point in time or development [that] would seem to give any justification for assuming that the embryo in question was one thing at one point and then suddenly became something different (turning, for example, from non-human to human or from non-person to person)."[42]

The second argument is based on potential and is a central topic of this article. Potentialists, like the conceptionalists, give equal protection to the implanted embryo and a blastocyst in a Petri dish; both are worthy, but for different reasons. Whereas conceptionalists draw no distinctions between the newly fertilized egg and a born baby, potentialists do discriminate between the blastocyst's microscopic ball of cells and the born human. The President's Council on Bioethics, which has advanced arguments from both conceptionalist and potentialist viewpoints, wrote: "An embryo is, by definition and by its nature, potentially a fully developed human person; its potential for maturation is a characteristic it *actually* has, and from the start."[43] Similar to the conceptionalist approach, the quote reflects the belief that the embryo's value does not change during gestation; the "potential for maturation" to a "fully developed human person" is from conception. It does not progress incrementally. Similar, too, is the appeal to nature. The embryo is "by its nature" a potential "fully developed human person." Different, however, is that the embryo's value is based on potential of becoming that which has full moral and legal worth and protection, the fully developed human.

Responding to critics who claim that a pre-implanted blastocyst is different from an implanted embryo because the later is further on its way to becoming a viable human, the President's Council on Bioethics analogized the pre-implanted, Petri dish bound blastocyst with a caged bird:

42. MONITORING STEM CELL RESEARCH, *supra* note 36, at 77.

43. PRESIDENT'S COUNCIL ON BIOETHICS, HUMAN CLONING AND HUMAN DIGNITY: AN ETHICAL INQUIRY 156 (2002) (emphasis in original), *available at* http://www.bioethics.gov/reports/cloningreport/pcbe_cloning_report.pdf [hereinafter HUMAN CLONING AND HUMAN DIGNITY].

> The fact that embryos have been created outside their natural environment—which is to say, outside the woman's body—and are therefore limited in their ability to realize their natural capacities, does not affect either the potential or the moral status of the beings themselves. A bird forced to live in a cage its entire life may never learn to fly. But this does not mean it is less of a bird, or that it lacks the immanent potentiality to fly on feathered wings. It means only that a caged bird—like an in vitro human embryo—has been deprived of its proper environment.[44]

Note again, the reliance on the idea of nature. First, the paragraph equates the "natural environment" (the woman's body) with the "proper environment." The free bird is like the in utero fetus, and both are in the "proper" environment. Secondly, the authors write of the "natural capacities" of the in vitro embryo that affects neither its potential nor moral status. The argument equates moral status and potential; the in vitro embryo deserves the same moral regard as the in vivo implanted embryo because both have potential, and the potential is the same for an in vivo or an in vitro embryo.

The potentialist argument ignores the greatly different odds of realizing or actualizing potential. Many intervening events have to occur for the in vitro embryo to actualize its potential: a woman must consent to its implantation, a clinician must consent to performing the procedure, whoever has present control over the in vitro embryo must consent, and a significant number of in vitro embryos are defective and may never develop. The bird analogy similarly ignores the differences in potential. A bird in a cage has wings and might learn to fly; it is much closer to actualizing its potential than is a blastocyst, perhaps frozen, sitting in a Petri dish.

Lastly, the President's Council on Bioethics characterizes the potential as "actual," stating, as above: "[P]otential for maturation is a characteristic it actually has, and from the start." The potential is not actualized until viewed retrospectively. Is adding the modifier "actually" meant to distinguish "actual" potential from "imaginary" potential? Is this an attempt to distinguish the potential of a sperm or egg from that of the fertilized egg? Is it the inward self-directed drive? But then any stem cell, embryonic or iPSC, with the potential for self-directed development should not be destroyed. Furthermore, it is not the attribute for self-directed development that is so valuable,

44. *Id.*

since living creatures generally have this whether or not they have a self or a soul. Instead, it is the notion of a single cell having the potential for becoming a human.

Of note, both the potentialist and the conceptionalist arguments opposing stem cell research reject the idea of any cut-off points between conception and birth, albeit for different reasons. Both reject picking some point in time other than conception, such as implantation, beginnings of neural crest formation, viability, or "quickening," to name a few. And, both reject viewing a continuum of increasing value between conception and birth. In this important way potentialists and conceptionalists are similar; both are binary in their approach.[45] Whether viewed as identical to a born baby (the conceptionalists) or the moral equivalent to a born baby (the potentialists), both give similar moral value to the blastocyst and the born baby. The potentialists do not make distinctions based on the likelihood of potential, or more precisely, the likelihood of actualization. In other words, all potential is the same, and there is no difference between a lot of potential and a long-shot.

Recently, some members of the President's Council on Bioethics have tried to adjust the potentiality argument to emphasis the "continuity" between the fertilized egg and the born baby. This change in emphasis is evident in President Bush's 2006 remarks when he vetoed a bill seeking to expand federal funding for stem cell research.[46] Instead of placing the focus on the embryo and its forward potential, President Bush's rhetoric was focused on children and looked backwards. This has a powerful effect. It changes one's impression of the odds. Whereas looking forward from the frozen Petri dish, a blastocyst has a long-shot at becoming an adult; but, looking at an adorable six year old child backwards to his life as an embryo can give the impression that all embryos have an equal chance of reaching adulthood. It reminds us that we were all at one time an embryo. President Bush told his audience,

45. Angela K. Upchurch notes the limits of the adversarial model's binary approach in the frozen embryo disputes that forces courts to first define the legal status of an embryo before defining anything else, and causes the missed opportunity for a more nuanced decision. *See* Angela K. Upchurch, *A Postmodern Deconstruction of Frozen Embryo Disputes*, 39 CONN. L. REV. 2107 (2007). In other words, it makes sense to understand that an embryo means different things in a Harvard biology lab compared with a Catholic convent.

46. Press Release, Office of the Press Secretary, President Discusses Stem Cell Research Policy (July 19, 2006), *available at* http://www.whitehouse.gov/news/releases/2006/07/20060719-3.html.

> Each of these human embryos is a unique human life with inherent dignity and matchless value. We see that value in the children who are with us today. Each of these children began his or her life as a frozen embryo that was created for in vitro fertilization but remained unused after the fertility treatments were complete.[47]

He continued: "They remind us that we all begin our lives as a small collection of cells."[48] Despite this powerful rhetoric, it is unclear how the argument based on continuity is different from either the argument anchored in potential or the argument of the conceptionalists. Robert George, a professor of jurisprudence at Princeton, explains that the value of the early embryo is from its "internal resources to actively develop themselves to the next more mature stage of the life of a human being."[49] Professors George and Tollefsen further explain in a recent book that it is simply a matter of biology: "[T]o be a complete human organism an entity must possess a developmental program (including both its DNA and epigenetic factors) oriented toward developing a brain and central nervous system."[50] This sounds strikingly similar to inward self-determination giving potential its value, only now it is in terms of DNA and epigenetic factors. The continuity argument remains unconvincing as to why the six day old blastocyst should be given protection and value equivalent to a six year old child, despite the reason that the blastocyst has the potential (albeit still small) of becoming a six year old child.

II. BINARY POTENTIAL

A. Evolution of the Idea of Potential Toward a Binary Construct

1. Risk Benefit in the Research Setting and the Evolution of Potential in the Abortion Cases

Poll results confirm that there is a correlation between people who think abortion should be illegal and those who oppose embryonic stem cell research. One ABCNews/Beliefnet poll found 58% of

47. *Id.*

48. *Id.*

49. HUMAN CLONING AND HUMAN DIGNITY, *supra* note 43, at 259.

50. William Saletan, Book Review, *Little Children*, N.Y. TIMES, February 10, 2008, (reviewing ROBERT GEORGE & CHRISTOPHER TOLLEFSEN, EMBRYO: A DEFENSE OF HUMAN LIFE (2008)), *available at* http://www.nytimes.com/2008/02/10/books/review/Saletan-t.html.

people who believed that abortion should always be illegal also opposed stem cell research.[51] The percent of people opposed to stem cell research dropped to about 50% among those who wanted abortion to be illegal but who made exceptions for certain situations.[52] Of course, results are influenced by how the questions are phrased. For example, two different polls reported seemingly-significant different results. One found 70% opposed to destroying "live embryos" for undefined "experiments," whereas another found 77% in favor of using "excess fertilized eggs" to treat "deadly diseases."[53] Perhaps these differences are partly explained by what people place on the risk/benefit scale: research vs. treatment and, embryos vs. excess fertilized eggs. The results also likely reflect public thinking that stem cell research or treatment should be undertaken with respect and seriousness, but that people view the issue in terms of balancing risks and benefits.[54]

Interestingly, President George W. Bush, known for his pro-life stance in the abortion debate, employed a risk/benefit analysis when he explained his compromise on federal funding for stem cell research.[55] Like many citizens, his religious views powerfully influenced his policy toward stem cell research, [56] but it was not the only consideration. He has stated, "I'm a strong supporter of science

51. Gary Langer, *Public Backs Stem Cell Research: Most Say Government Should Fund Use of Embryos*, ABCNEWS.COM, June 26, 2001, http://www.abcnews.go.com/sections/politics/DailyNews/poll010626.html (polling a national random sample of 1,022 people). An August 2007 Pew Research Center Poll for the People and Press and a Pew Forum on Religion and Public Life survey by Schulman, Ronca and Bucuvalas found that 51% of people chose stem cell research when asked: "All in all, which is more important: conducting stem cell research that might result in new medical cures, or not destroying the potential life of human embryos involved in this research?" David Masci, *Declining Majority of Americans Favor Embryonic Stem Cell Research*, PEW F. ON RELIGION AND PUB. LIFE, July 17, 2008, http://pewforum.org/ docs/index.php?DocID=317 (Polling results appear relatively stable over the past few years).

52. Langer, *supra* note 51.

53. *Id.*; Masci, *supra* note 51.

54. Masci, *supra* note 51.

55. Press Release, Office of the Press Secretary, President Discusses Stem Cell Research (August 9, 2001), *available at* http://www.whitehouse.gov/news/releases/2001/08/20010809-2.html (President George W. Bush announced the federal funding policy to limit federal money to existing cell lines and discussing his decision making process).

56. The ABCNEWS.COM poll also found that religious belief was the most important single factor influencing people's views on whether they supported or opposed stem cell research. The poll found 42% of opponents to stem cell research said that religious beliefs had the most influence on their opinion. In contrast, only 3% of supporters of stem cell research said religious beliefs had the most influence on their opinion. Langer, *supra* note 51.

and technology, and believe they have the potential for incredible good—to improve lives, to save life, to conquer disease."[57]

He further stated:

> I also believe human life is a sacred gift from our Creator. I worry about a culture that devalues life, and believe as your President I have an important obligation to foster and encourage respect for life in America and throughout the world. And while we're all hopeful about the potential of this research, no one can be certain that the science will live up to the hope it has generated.[58]

Note that the idea of potential is a nuanced one when applied to research, but that the comments reflect no value continuum for the embryo. But note, too, the suggestion that if the research benefits were actualized that the scale may tip differently. This point is made by Janet Dolgin, who writes that President Bush's comment "undermines the notion of embryo-as-person," and shows "a new diversity of viewpoints among pro-life adherents with regard to the status of the embryo."[59] In other words, some pro-life supporters who advocate an absolutist's approach in the abortion debate, nonetheless recognize a balancing approach in the stem cell research debate. The debates about abortion and stem cell research may be about fundamentally different things, but they share a reliance on ideas about potential and a struggle about the appropriateness of a risk/benefit approach.

The Supreme Court in *Roe v. Wade* took a practical approach to the "difficult question of when life begins;" it said that it chose not to answer it.[60] Justice Blackmun, writing for the majority, sought to avoid doing as Texas had done. He did not want to "adopt[ ] one theory of life."[61] He noted the disparate views on this issue: "When those trained in the respective disciplines of medicine, philosophy, and theology are unable to arrive at any consensus, the judiciary, at this point in the development of man's knowledge, is not in a position to speculate as to the answer."[62] Moreover, states such as Texas were not in a position to define when life began, if that would violate the privacy rights of a pregnant woman.[63] The Court acknowledged that

57. Press Release, *supra* note 55.
58. *Id.*
59. Dolgin, *supra* note 30, at 145 (emphasis omitted).
60. Roe v. Wade, 410 U.S. 113, 159 (1973).
61. *Id.* at 162.
62. *Id.* at 159.
63. *Id.* at 162.

the state would have a compelling interest and the ability to prohibit abortion were it to grant the fetus personhood.[64] However, the decision in *Roe* refused to grant fetuses status as persons under the Fourteenth Amendment, but it did recognize that a state had an "important and legitimate interest in protecting the potentiality of human life."[65] The state's interest became compelling at the point of viability, but the compelling state interest is still in a fetus with, according to the Court's own rubric, only potential life.[66] In other words, the Court recognized that the state's compelling interest could be in a viable fetus, which has greater potential than a first trimester fetus, or a six day old blastocyst.

In *Roe*, the Court's view of potential as a compelling interest is of potential very near actuality. Blackmun wrote: "With respect to the state's important and legitimate interest in potential life, the 'compelling' point is at viability. This is so because the fetus then presumably has the capability of meaningful life outside the mother's womb."[67] There is no "compelling" state interest, according to *Roe*, in a pre-viability fetus.[68] *Roe*'s notion of potential is on a sliding scale. The Court did not hold that a viable fetus was the equivalent of a born baby; recall that abortion is still allowed after fetal viability if it is necessary to preserve the health or life of the mother.[69] Instead, the court held that the compelling interest is in the potential life of the fetus once the fetus is considered "viable."

2. Binary Potential

The shift away from the sliding scale potential seen in *Roe* is clear in the plurality opinion in *Webster v. Reproductive Health Services*, which shifted the compelling interest in potential life to conception instead of *Roe*'s viability.[70] The result was that potential

64. *Id.* at 156–57, 162–63.

65. *Id.* at 162–163.

66. *Id.* at 163.

67. *Id.*

68. *Id.*

69. *Id.* at 163–64.

70. Webster v. Reprod. Health Serv., 492 U.S. 490, 518–20 (1989). The Court upheld a Missouri state law requirement that doctors perform certain viability tests on fetuses greater than twenty weeks to ensure no abortion would be done on a viable fetus. Chief Justice Rehnquist's plurality opinion, joined by Justices White and Kennedy, criticized *Roe* for its trimester structure and emphasis on viability. Also of note, the Missouri law had a preamble that declared the view that life begins at conception.

life no longer had gradations of value. Instead, the potential at conception had the same value as potential at viability. Chief Justice Rehnquist, writing for the plurality, stated: "[W]e do not see why the State's interest in protecting potential human life should come into existence only at the point of viability, and that there should therefore be a rigid line allowing state regulation after viability but prohibiting it before viability."[71] Endorsing the dissenting opinions of Justices White and O'Connor in *Thornburgh v. American College of Obstetricians and Gynecologists*,[72] the *Webster* plurality shifted the state's compelling interest in protecting human life to "throughout pregnancy."[73]

Planned Parenthood v. Casey[74] confirmed the view adopted in *Webster* that potential fetal life begins "from the outset" of pregnancy.[75] *Casey* made no attempt to recognize a continuum or gradation of either value or status between different age pre-viability fetuses. If the fertilized egg is potential life, not quite the same as the newborn baby or post-viable fetus, but indistinguishable from a twelve week old fetus, then it should be protected in the same way as any other pre-viability fetus. The determining difference between the five day old fertilized egg and the twelve week old fetus became the level of the burden to the mother, rather than where on a continuum of potentiality the fetus may lie. The *Casey* joint opinion stated, "the State has legitimate interests from the outset of the pregnancy in . . . the life of the fetus that may become a child."[76] In this structure, stem cell research cannot be allowed if it means destroying any fetus, or perhaps any cell with human DNA with the potential to become a human person (e.g. iPSCs), because there is no countervailing constitutionally recognized interest as there is in the setting of abortion.

The blame for this shift, according to Professor Jed Rubenfeld, is at least partially on *Roe*. He writes, "It was *Roe* that recognized a compelling state interest in protecting *potential* human life, and if there can ever be such an interest, then the *Webster* plurality is quite right to question why it should be marked at viability rather than at

71. *Id.* at 519.
72. 476 U.S. 747, 795, 828 (1986) (White, J., dissenting; O'Connor, J., dissenting).
73. *Webster*, 492 U.S. at 519.
74. 505 U.S. 833 (1992).
75. *Id.* at 846.
76. *Id.* at 846.

conception."[77] *Roe* and Rubenfeld's comments illustrate the vagueness of potential and the problems with relying on it. One might argue that *Roe* distinguished between potential at viability and potential at conception, or potential with a high likelihood of actuality and potential with a low degree of actuality, respectively. But *Roe* failed to explicitly state this. Justice Blackmun viewed the trimester framework[78] as an artificial construct placed on a biological continuum, but a continuum means that the points on it are not identical. *Roe* is a pragmatic approach that uses a risk/benefit framework, with tipping points translating into a trimester framework, but it relies on an idea of potential as a continuum.

Having examined the idea of potential in the abortion cases and the idea of potential in the stem cell debate, one may ask whether the abortion cases are relevant to stem cell research.[79] The *Casey* fetus is in utero, and specifically described as one "that may become a child," implying that there are others, perhaps not in utero, that are not en route to becoming a child. At issue in the abortion cases is an implanted fetus, which has a much better chance of becoming a born baby than a yet to be implanted five or six day old blastocyst. In the abortion debate, the underlying state interest might be best characterized as promoting family values and healthy children.[80] It has not been framed to discuss the balancing of state interest in protecting a woman's privacy or reproductive right against the state interest in protecting the fetus. Rather, the woman's interests are private interests, albeit constitutionally protected.

One advantage to the *Casey* approach, which focuses upon the undue burden on the mother, is that it returns to a continuum, instead of the binary notion of potential at work in *Webster* and *Thornburgh.* Some burdens to the mother are reasonable, whereas others are

77. Rubenfeld, *supra* note 39, at 607.

78. Justice Blackmun adopted the trimester framework from the medical profession. The following passage from *Roe v. Wade* illustrates this:

> With respect to the State's important and legitimate interest in the health of the mother, the 'compelling' point, in the light of present medical knowledge, is at approximately the end of the first trimester. This is so because of the now-established medical fact [ ] that until the end of the first trimester mortality in abortion may be less than mortality in normal childbirth.

Roe v. Wade, 410 U.S. 113, 161 (1973).

79. *See generally* Dolgin, *supra* note 30 (The abortion debate and stem cell debate are fundamentally different because the first is about preservation of nineteenth century ideas regarding family and strict gender roles, while the later is about personhood.).

80. *Id.*

unconstitutional. There is an implicit continuum. In the stem cell research setting, in contrast, there may or may not be a state interest in promoting stem cell research. States lack uniformity in what they view as their state interest in stem cell research. Some states, like South Dakota, prohibit using stem cells, and others, like California, promote it. The same dichotomy does not exist in the abortion setting. Certainly, some states make it more difficult for women to get abortions than other states, but all share the basic equation, in part, because it has become a federal issue. On one side is the woman's privacy right. Stem cell research, on the other hand, does not have the constitutional aspects of a woman's right with which it must contend. Instead, the state interest, which either favors research (and its "potential" benefits) or favors the potential life of a five day old blastocyst, will set the state's policy.

The binary theory of potential, whether in the context of the abortion or stem cell debate, forces the discussion into one about a controversial and overarching view. Opinion poll results repeatedly confirm that people have a complex view about both issues.[81] The polling shows that people have what may be summarized as a reluctant or cautious support of embryonic stem cell research; most people support it as long as it is undertaken with respect and awareness. To reduce the debate to only the single issue of whether a blastocyst is the moral equivalent of a person, based on a binary idea of potential, is to reduce the debate to a single overarching and controversial issue. It is an issue that extends into the abortion debate, and it is not the kind of public reason that many theorists think should drive political debate in a liberal democracy.[82]

III. THE SLIPPERY SLOPE IS A BETTER APPROACH TO THE STEM CELL DEBATE

My contention is that the political debate about pluripotent stem cells is improved if we focus on slippery slope arguments, rather than fixating on arguments based on potential. Potential has served its purpose. It is no longer helpful because it has devolved into a binary construct where there is no difference between the potential of a five day old blastocyst and a second trimester fetus. A binary notion of

81. *See supra* notes 51–53 and accompanying text.

82. *See, e.g.*, Kent Greenawalt, *Natural Law and Public Reasons*, 47 VILL. L. REV. 531 (2002) (discussing whether Robert George's reasons against embryonic stem cell research qualify as public reasons, and when natural law may qualify as a public reason).

potential cannot incorporate the risk/benefit, pragmatic approach supported by the American public, and it hinders open and fruitful political debate because it fosters a controversial and overarching view. Focus on the slippery slope, in contrast, helps define the arguments and give them greater substance. Admittedly, I am rejecting the idea that there is in fact, or that an overwhelming majority of people draw a bright line at, the instant of conception. Recall, too, that many opposed to embryonic stem cell research do not draw a bright line at conception, as did Pope John Paul II, who wrote that the fertilized egg is the same as a newborn.[83] Pope John Paul II's approach does not rely on potential.

Instead, I maintain that the slippery slope approach is particularly applicable to the debate about whether research using iPSCs is better than research using embryonic stem cells or SNCT stem cells. The binary idea of potential frames the debate as asking whether embryonic stem cell research justifies the destruction of blastocysts that have potential to be born persons, and compares such research to research using iPSCs, which do not have this potential. Whether this framing of the issue is accurate depends in large part on a question of fact. It is likely that there is the potential that iPSCs can become born chimera, but from a slippery slope approach the question is what walls can be built between iPSC research and allowing iPSCs to develop into a born chimera. The binary theory of potential belies the understanding of potential as a continuum, where there is "much potential" contrasted with "little potential" and countless points in between. Whether described in terms of potential, possibility, or probability,[84] a slippery slope approach is less dependent on a particular philosophical approach. Unlike the binary idea of potential, a slippery slope approach addresses a continuum and expands the political debate rather than limiting it to a single and overarching question of "is the blastocyst the moral equivalent of a born person."

Arguments based on potential and slippery slope arguments, being both based on a continuum, see a link between points A (i.e. a

83. *See* Pope John Paul II, *supra* note 31, and accompanying text.

84. Some supporters of arguments from potential maintain that objections to potential confuse ideas of possibility or probability with potential. S*ee, e.g.*, Massimo Reichlin, *The Argument from Potential: A Reappraisal*, 11 BIOETHICS 1 (1997). Interestingly, however, most of these arguments rely on particular philosophical perspectives that are too restrictive for guiding a legal approach. For example, Reichlin draws heavily upon an Aristotelian view to support his nuanced argument from potential. *Id.* at 13–17.

blastocyst) and B (i.e. a second trimester fetus) and C (a born baby). They must evaluate A based on B. Potential, for example, values A because of its potential to become B and C. The slippery slope approach evaluates doing something to or for A on the basis of doing the same thing to or for B or C. For example, the wisdom of allowing the destruction of A to do stem cell research should be evaluated on the basis of how this may lead to allowing the destruction of B to do research, which all agree should not be done. One advantage of a slippery slope approach is that it focuses on the benefits and risks of A, and how strong we can build a wall between A and undesirable B. Arguments based on potential tend to get lost in the grey areas between A and B when attempting to precisely draw the line. Slippery slope arguments focus on drawing the line someplace and evaluating the strength of the line. Slippery slope arguments recognize that A and B are linked, but are also distinct.

Consider how the issue is framed depending on whether the focus is on the idea of potential or the more concrete slippery slope approach. "The blastocyst must be protected because it has the potential to become a human person." Or, "The blastocyst should be protected because if it is not then we may begin research on second trimester fetuses."[85] The potentialist's perspective in using a binary idea of potential focuses on destroying the moral equivalent of a born human in order to do stem cell research. Similarly, a continuum-based notion of potential blurs the difference between a blastocyst and a newborn, and leads to debate about where to draw the line. On the other hand, the slippery slope argument focuses on the issue of embryonic stem cell research using cells from a blastocyst, and on slipping down the slope to undesirable point B. It places the focus on the risk of progressing to the undesirable second event, in this case research on second trimester fetuses. The slippery slope approach allows one to think of the wall between A and undesirable B, and thus, to more clearly evaluate A on its own. One need not necessarily worry about where to draw the line, as long as it is somewhere in between points A and B. Importantly, it approaches the issue as a question of the risks and the benefits of embryonic stem cell research, instead of the single question of whether a blastocyst has potential to become a born human. As the poll results discussed above indicate, Americans view the stem cell debate in terms of balancing risks and

85. One might also frame the issue as "Not protecting the blastocyst will undermine respect for all fetal life, which will lead to more second trimester abortions."

benefits. The slippery slope approach allows a consideration of risks and benefits in a way that discussing potential does not. This is an important difference, because a risk/benefit discussion allows for a debate about what to put on the scale and opens a way for political compromise.[86]

Many slippery slope arguments apply to the pluripotent stem cell debate, and each brings with it other political issues. Applied to the stem cell debate, slippery slope arguments include the following:[87]

1. Allowing stem cell research will result in people becoming accustomed to its benefits and tolerant of fetal research when scientists inevitably argue that even greater progress can be made using fetal tissue. People will change how they value the benefits. This is the "beware of the creeping line or shifting social norms argument," which may or may not be problematic.

2. The "better safe than sorry argument." Allowing stem cell research on a blastocyst might not be objectionable, but it is close to the line and we cannot be certain where to draw the line. The safest approach, therefore, is to draw the line brightly and earlier in the continuum rather than too late.

3. Allowing stem cell research will build up the academic and industrial infrastructure, which will make slipping down the slope

86. Slippery slope arguments are more ubiquitous than one may initially appreciate. For example, an earlier quote from Edmund Pellegrino was likely intended as support for a bright line drawn at conception, but it hints at a slippery slope approach. *See* NAT'L BIOETHICS ADVISORY COMM'N, *supra* note 38. Pellegrino seeks to classify embryos as part of the disadvantaged and dehumanized members of the human race. *Id.* The "pre-implantation embryo" has the same moral standing as the mentally disabled six year old, and to suggest otherwise, Pellegrino states, is to succumb to the shakiness and inevitable distortions of social convention. *Id.* at F-2–F-3. This argument does not prove the moral worth of the newly conceived, because treating the pre-implantation embryo as less than a born human is only a problem if it has the same value as a born human baby. Rather, Pellegrino suggests that only by drawing the line at conception can one escape the horrors of social convention that have made the conceptionalist's bright line grey and blurred. *Id.*

Perhaps Pellegrino's conclusions acknowledge the applicability of slippery slope arguments. If none of us are wholly free from the inherent vagaries of social convention, then implicit in any position is the idea that we cannot know for sure where the line actually exists. In other words, it may be that acquisition of personhood is a continuum, but we do not know where the bright line is or if there even is a bright line somewhere. Therefore, disallowing stem cell research is the best course, because it will not lead to crossing a line that we cannot know where to place due to the vagaries of social convention. This is the "better safe than sorry argument," and it is a form of the slippery slope argument.

87. *See* Eugene Volokh, *The Mechanisms of the Slippery Slope*, 116 HARV. L. REV. 1026 (2006) (articulating and explaining may attributes of slippery slope arguments).

economically and politically advantageous. This is the "cost and bureaucracy argument."

4. Allowing stem cell research will give political momentum to anti-abortionists. It has similarities with some of the other slippery slope arguments listed, but emphasizes the political aspects. Perhaps we would see Supreme Court nominees having to address a stem cell research support litmus test. This is the "political momentum argument."

5. Allowing stem cell research will undermine respect for God and humanity. Even if the just fertilized egg is not the same as a viable fetus, there is value in respecting the argument that it is and respecting views of the people that believe it. One would weigh the advantages of this against the advantages of doing stem cell research. This is similar, but not identical, to the first two slippery slope arguments. It is the "broad umbrella of God and humanity argument" and introduces an aspect of tolerance and diversity.

6. Allowing stem cell research will reinforce our misguided emphasis on concierge medicine that focuses on ridiculously expensive therapies for the select few, instead of simpler, cost effective therapies for many. In other words, there is nothing wrong with stem cell research, except that it makes it more likely that we will continue to have problems with under-funding more routine health care for the economically disadvantaged. This is the "distributive justice argument" and introduces many issues to the debate.

There are undoubtedly many more slippery slope arguments, and my descriptions of those above could be more comprehensive. Nonetheless, the advantage of these arguments is that they expand the discussion to one that is more complete and nuanced.

IV. CONCLUSION

Are iPSCs the "holy grail"? Those who think they are, argue that iPSCs allow scientists to do stem cell research without destroying embryos, and destroying embryos is a problem for a number of reasons. One argument that is prominent and reflected in the President's Council on Bioethics is that destroying an embryo is destroying a potential human life, and therefore, is the moral equivalent to destroying a second trimester fetus or a born baby. It is equivalent because of a binary idea of potential that does not distinguish between degrees of potential. This devolution of the idea

of potential is also reflected in the Supreme Court cases, like *Webster* and *Casey*. However, even iPSCs have the potential to become born human babies, although admittedly, the potential is very small right now. Scientists have placed iPSC derived stem cells into mouse blastocytes and these iPSCs have contributed to embryonic development. The potential of iPSCs and embryonic stem cells to become a born baby is different, but potential as a binary idea (it either is or is not) cannot distinguish between the two types. One can distinguish between ESCs and iPSCs if one views potential as a continuum, but this is not the view of potential held by many who support iPSCs as the "holy grail" and see potential as a binary notion.

An alternative approach is needed because the binary idea of potential has lead to a debate about stem cell research that fails to incorporate a risk/benefit approach, which is the approach supported by most Americans. The binary potential approach leads to a debate that focuses on only a single overarching view that maintains the blastocyst is like a born human because it has a particular kind of potential. In contrast, an approach based on the slippery slope allows a broad consideration of risks and benefits and a more substantive discussion.

Are iPSCs the new and ethically improved stem cell? The answer, I think, depends on whether the issue focuses on the abstract idea of potential, or on the more concrete slippery slope. Consider: "iPSCs can potentially result in a born chimeric baby that has many of its cells from the initial iPSC," compared with, "research using iPSCs should be disallowed because it may result in a born chimeric baby." If one relies on a binary notion of potential, iPSCs would be as problematic as embryonic stem cells because of the small probability of iPSCs becoming live chimeric births. Just like potential blurs the distinction between a frozen unclaimed blastocyst and a newborn in the debate about embryonic stem cell research, the binary potential also obfuscates the difference between an iPSC and a born human chimera. On the other hand, the slippery slope argument focuses on the risk of progressing to the undesirable second event and allows a more robust discussion of risks and benefits.

The argument is not that following a slippery slope approach necessarily means that stem cell research, on embryonic stem cells or iPSCs, should be allowed. It may be that the slope is so slippery that the better approach is to not allow any kind of stem cell research, or to give preference to iPSCs because the risks of slipping to undesirable point B are less with iPSCs. The point is that a slippery

slope approach allows for a better discussion than the current debate based on binary potential. Recall that iPSCs have the theoretical potential of becoming born human babies, but the potential is very small. Nonetheless, there is a House of Representatives bill pending that declares "the life of each human being begins with fertilization, cloning, or its functional equivalent, irrespective of . . . stage of biological development . . . at which time every human being shall have all the legal and constitutional attributes and privileges of personhood."[88] Although unlikely to get anywhere, the bill captures the logic of a binary notion of potential and may treat iPSCs as functional equivalents of cloning.

It may be that the debate between iPSCs and embryonic stem cells returns us to debating about varying degrees of potential, and that this idea of potential as a continuum will cross over into other debates about stem cells, the value of blastocysts, and even abortion. Certainly, potential as a binary concept is too rigid, and, I think, misleading. On the other hand, the notion of potential as a continuum risks being too great of an abstraction and still lends itself to basing political discussions on overarching and controversial topics that do not meet the criteria for ideal public reasons.

Reliance on the slippery slope approach is in keeping with our post-modern distrust of metaphysical or epistemic approaches. It is pragmatic. It will allow debate about risks and benefits on different kinds of stem cell research, which is what states like California, New Jersey, South Dakota and others are doing.[89] And we ought to discuss these important issues in the public arena.

88. Sanction of Human Life Act, H.R. 4157, 110th Cong. (1st Sess. 2007), *available at* http://www.govtrack.us/congress/billtext.xpd?bill=h110-4157.

89. *See* Nat'l Conf. of St. Leg., *supra* note 24; *see also*, Nickerson, *supra* note 18.