An updated version of a study published in Douglas Kellner, *The Postmodern Adventure. Science Technology, and Cultural Studies at the Third Millennium*. New York and London: Guilford and Routledge, 2001.

The Dangers of Human Cloning

Steven Best and Douglas Kellner

> "O, wonder!
> How many goodly creatures are there here!
> How beauteous mankind is!
> O brave new world
> That has such people in't."
> William Shakespeare, The Tempest

> "We're ready to go because we think that the genie's out of her bottle." Dr. Panos Zavos

> "Anyone who thinks that things will move slowly is being very naive." Lee Silver, Molecular Biologist

As we move into a new millennium fraught with terror and danger, a global postmodern condition is unfolding in the midst of rapid evolutionary and social changes co-constructed by science, technology, and the restructuring of global capital. We are quickly morphing into a new biological and social existence that is ever-more mediated and shaped by computers, mass media, and biotechnology, all driven by the logic of capital and a powerful emergent technoscience. In this global context, science is no longer merely an interpretation of the natural and social worlds, rather it has become an active force in changing them and the very nature of life. In an era where life can be created and redesigned in a petri dish, and genetic codes can be edited like a digital text, the distinction between "natural" and "artificial" has become greatly complexified. The new techniques of manipulation call into question existing definitions of life and death, demand a rethinking of fundamental notions of ethics and moral value, and pose unique challenges for democracy.

As technoscience develops by leaps and bounds, and as genetics rapidly advances, the science-industrial complex has come to a point where it is creating new transgenic species

and is rushing toward a posthuman culture that unfolds in the increasingly intimate merging of technology and biology. The posthuman involves both new conceptions of the ”human” in an age of information and communication, and new modes of existence as flesh merges with steel, circuitry, and genes from other species. Exploiting more animals than ever before, technoscience intensifies research and experimentation into human cloning. This process is accelerated because genetic engineering and cloning are developed for commercial purposes, anticipating enormous profits on the horizon for the biotech industry. Consequently, all natural reality -- from microorganisms and plants to animals and human beings -- is subject to genetic reconstruction in a commodified "Second Genesis."

At present, the issues of cloning and biotechnology are being heatedly debated in the halls of science, in political circles, among religious communities, throughout academia, and more broadly in the media and public spheres. Not surprisingly, the discourses on biotechnology are polarized. Defenders of biotechnology extol its potential to increase food production and quality, and to cure diseases, endow us with “improved” human traits, and prolong human life. Its critics claim that genetic engineering of food will produce Frankenfoods which pollute the food supply with potentially harmful products; that could devastate the environment, biodiversity, and human life itself; that animal and human cloning will breed monstrosities; that a dangerous new eugenics is on the horizon; and that the manipulation of embryonic stem cells violates the principle of respect for life and destroys a bona fide “human being.”

Interestingly, the same dichotomies that have polarized information-technology discourses into one-sided technophobic and technophilic positions are reproduced in debates over biotechnology. Just as we have argued that critical theories of technology are needed to produce more dialectical perspectives that distinguish between positive and negative aspects and effects of information technology (Best and Kellner, 2001), so too would we claim that similar approaches are required to articulate the potentially beneficial and perhaps destructive aspects of biotechnology. Indeed, current debates over cloning and stem cell research suggest powerful contradictions and ambiguities in these phenomena that render one-sided positions superficial and dangerous. Parallels and similar complexities in communication and biotechnology are not surprising given that information technology provides the

infrastructure to biotechnology that has been constituted by computer-mediated technologies involved in the Human Genome Project, and, conversely, genetic science is being used to push the power and speed of computers through phenomena such as "gene chips."

As the debates over cloning and stem cell research indicate, issues raised by biotechnology combine research into the genetic sciences, perspectives and contexts articulated by the social sciences, and the ethical and anthropological concerns of philosophy. Consequently, we argue that intervening in the debates over biotechnology require supradisciplinary critical philosophy and social theory to illuminate the problems and their stakes. In addition, debates over cloning and stem cell research raise exceptionally important challenges to bioethics and a democratic politics of communication. Biotechnology is thus a critical flashpoint for ethics and democratic theory and practice. For contemporary biotechnology underscores the need for more widespread knowledge of important scientific issues; participatory debate over science, technology, values, and our very concept of human life; and regulation concerning new developments in the biosciences, which have such high economic, political, and social consequences.

In our book The Postmodern Adventure, we argued that problems with the cloning of animals for now render the cloning of humans unacceptable.[1] In our view, human cloning constitutes a momentous route to the posthuman, a leap into a new stage of history, with significant and potentially disturbing consequences. Consequently, in this study we will delineate some of the problems with human cloning and the reasons we are against it.

We have serious worries about biotechnology because of the colonialist history of science and capitalism, the commodification of the life sciences, and the ways that genetic technologies have already been abused for profit and power by corporations like Monsanto and Du Pont, as well as concerns about the reductionistic paradigm informing

[1] Steven Best and Douglas Kellner, The Postmodern Adventure. Science Technology, and Cultural Studies at the Third Millennium. New York and London: Guilford and Routledge, 2001.

molecular engineering.[2] Ironically, while biology helped to shape what theorists conceive as a postmodern physics through evolutionary and holistic emphases, the most advanced modes of biological science -- genetic engineering and cloning research -- have not advanced to the path of holism and complexity (see Best and Kellner, 2001). Rather, biotechnology seems to have regressed to the antiquated errors of atomism, mechanism, determinism, and reductionism. The new technosciences and the outmoded paradigms (Cartesian) and domineering mentalities (Baconian) that informs them generates a volatile mix, and the situation is gravely exacerbated by the commercial imperatives driving research and development, the frenzied "gene rush" toward DNA patenting.

Yet if human cloning technologies follow the path of IVF technologies, they eventually will become widely accepted, even though currently large percentages of U.S. citizens oppose it (90% according to some polls in summer 2001). Alarmingly, scientists and infertility clinics have taken up human cloning technologies all-too-quickly. After the announcement of the birth of Dolly, many were tripping over themselves to announce emphatically that they would never pursue human cloning. Nonetheless, only months later, these same voices began to embrace the project.[3] The demand from people desperate to have babies, or "resurrect" their loved ones in conjunction with the massive profits waiting to be made, is too great an allure for corporations to resist -- a demand begging for supply. The opportunistic attitude of cloning advocate Panayiotis Zavos is all-too-typical: "Ethics is a wonderful word, but we need to look beyond the ethical issues here. It's not an ethical issue [!]. It's a medical issue. We have a duty here. Some people need this to complete the life cycle, to reproduce."[4]

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[2] For a discussion of how modern science and capitalism co-evolved in the context of colonialism, whereby they underpinned each other in the bid to control other peoples and exploit their knowledges, see Harding (1998).

[3] See Gina Kolata, "Human Cloning: Yesterday's Never is Today's Why Not?" The New York Times, December 2, 1997).

[4] Cited in Nancy Gibbs, "Baby, "It's You! And You, and You …" Time, February, February 19, 2001: 50. In March 2001, to great media fanfare, Zavos, Israeli biotechnologist Avi Bin Abraham, and Italian fertility specialist Severino Antinori announced that the group had signed up more than 600 infertile couples and were undertaking human cloning

In his attempt to dispel the ineliminable moral quandaries surrounding cloning, Zavos has confused "need" with desire, and reduced humans to crude reproduction machines. Yet, as his statement shows, defenders of cloning and biotechnology argue for the primacy of individual reproductive rights over potential risks to society as a whole. They believe that science is valuable to the extent that it increases freedom, individuality, and choice, as if embryos were a soft drink and what an "individual" chooses in this case is not of enormous consequence for future humanity, to say nothing of the deformed children who surely will be the guinea pigs of science. Of them, Zavos can only say, "We're ready to face those mishaps … It's part of any price that we pay when we develop new technology."[5]

There are indeed legitimate grounds for fear and loathing about reproductive cloning, but opposing views often are illogical. Standard psychological objections, for example, are poorly grounded. We need not fear Hitler armies assembling because the presumption of this dystopia -- genetic determinism -- is false and no one can clone the singular experiences and social contexts that in addition to genetics are key constituent features of an individual's make-up. Nor need we fear individuals unable to cope with lack of their own identity since identical twins are able to

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experiments to provide them with children; see "Forum on Human Cloning Turns Raucous," Los Angeles Times (March 10, 2001). When Zavos and his partner went to Israel to seek permission to do human cloning there, ABC News (March 25, 2001) reported that they received the blessing of an old rabbi, but the Israeli justice minister said that he was against cloning "on moral and ideological grounds." A University of Pennsylvania ethicist said that Zavos had no medical training, had published no articles in the field, had no qualifications, and that one of the dangers of cloning was that frauds were operating in the treacherous minefield of human cloning and exploiting people with false promises. There were also numerous discussions of the failures of animal cloning that were suggesting that human cloning would be highly hazardous and disturbing; see Aaron Zitner, "Perpetual Pets, Via Cloning," Los Angeles Times (March 16, 2001), Gina Kolata, "Researchers Find Big Risk of Defect in Cloning Animals," New York Times (March 25, 2001), and the examples that we provide below.

[5]"Brave New World?" http://msnbc.com/news/525661.asp

differentiate themselves from one another relatively well and they are even more genetically similar than clones would be. Nor would society always see cloned humans as freaks, as people no longer consider test-tube babies alien oddities, and there are anywhere from 20,000 to 200,000 such humans existing today (figures vary widely). The physiological and psychological dangers are real, but in time cloning techniques could be perfected so that cloning might be as safe, if not safer than babies born through a genetic throw-of-the-dice, or IVF.

Most fears of human cloning are irrationally rooted in what Leon Kass claims is an intuitive human repulsion -- the "yuk" factor -- toward something that is seemingly "unnatural" (see Kass 1998 and the critique by Pence 1998b). Intuitions are hardly a sound basis for rooting a critique of technology, especially because perceptions can quickly change from shock to acceptance. Similarly, Francis Fukuyama (2001) argues that reproductive cloning is an assault on human dignity. Fukuyama qualifies his earlier thesis (1992) that society has reached "the end of history" in the sense that liberal capitalism has defeated its main ideological competitors, communism and fascism, and brought moral evolution to its magnificent close. While he does not change the problematic political argument that liberalism is the culmination of human political culture, he describes his profound anxiety that we are entering a "posthuman" stage of history. This era will take off when biotechnology overrides natural limits set on human modification and set us on a dizzying and dangerous path of rapid and radical change.

Fukuyama advances an Aristotelian argument that roots ethics and politics in a substantive notion of human nature. Rejecting the "naturalistic fallacy" which claims that "is" cannot be derived from "ought," Fukuyama argues that human nature provides a normative foundation to develop notions of the good life and to address core issues in the debate over biotechnology. His concept of human nature is relatively complex in that it acknowledges a dialectic of nature and culture in shaping human beings and emphasizes that the human species is malleable. But he rejects the idea that human nature is infinitely plastic, arguing that despite dynamic changes in human evolution there are important biological constants that abide transhistorically and cross-culturally. If human beings do not adapt to or flourish under repressive governments, for instance, it is due to elements in their

nature that resist being molded in negative ways.[6]

Fukuyama worries, however, that biotechnology has the potential to reshape our nature in negative ways. Biotechnology has distinct political implications in that it could alter liberal democracy and the nature of politics itself by manipulating human personalities, behaviors, and traits. Invoking the dystopia of Huxley's Brave New World throughout the book, he fears that human rights and liberal equality is threatened by the spectre of eugenics. Even if germ line engineering never materializes, he observes that genomics, neuropharmacology, and the prolongation of life will transform notions of human equality and give societies new possibilities for manipulating biology and society. His most general fear is that biotechnology will cause us to lose our humanity, "some essential quality that has always underpinned our sense of who we are" (101).[7] With this dehumanization comes a loss of human dignity, some "factor X" that involves the universal human demand for recognition that one person is basically equal to one another. Biotechnology threatens to disrupt complex, long-standing evolutionary processes that we manipulate at our peril. It will undermine

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[6] Once again, Fukuyama's neo-liberal politics are smuggled into his concept of human nature as he sees no other social system but capitalism to be compatible with "human nature." His claim that only capitalism can create a political system that does not interfere with "natural patterns of behavior" (14) takes no account of either past cooperative social systems that fostered healthy bonds among people or the destructive aspects of competitive individualism and class structures under capitalism.

[7] Fukuyama is not so generous when it comes to deciding the moral status of nonhuman animals. Unlike Darwin, he defines human animals in sharp opposition to all nonhuman animals and posits "a very important qualitative, if not ontological, leap that occurred at some point" (170) in the evolutionary process that led to human beings. Our "factor X" amounts to everything that distinguishes us in "essence" from all other animals. Consequently, Fukuyama defines human dignity as "the idea that there is something unique about the human race that entitles every member of the species to a higher moral status than the rest of the natural world" (160). The nature and moment of the evolutionary "leap" and the concept of dignity that rests on it are left unexplained, as therefore remain crypto-religious notions often embellished with references to God.

key human qualities such as genius or ambition, and eradicate the depth of human experience that is enhanced through struggle and suffering. Biotechnology also threatens to create a new class system based on genetics, and will lead to notions that some individuals inherently are better than others, thereby dissolving liberal democracy.

The state and market could ensure there is full democratization of eugenic technologies, he recognizes, but this would only universalize the other problem of distorting human nature. Not regarding a ban on biotechnology as a plausible goal, he calls for national and international regulation of it. For those who proclaim the genie is out of the bottle, Fukuyama points to past precedents in human history such as with nuclear weapons and energy technologies where humanity has been able to control the spread of powerful technologies.

Essentialist arguments assume the existence of a human species essence that somehow is violated by technological manipulations of the body. From a fluid evolutionary perspective, the concept of species -- as something static, changeless, and ontologically sealed from other life forms -- has always been suspect as ultimately each "species" is related to every other and all share the same DNA material that enable life to exist on this planet. This not mean, as Fukuyama rightly argues, that there are not species specific characteristics, but it does dispel pre-Darwinian concepts that species are self-enclosed essences.

While other species such as birds and chimpanzees make and use tools, technology has been a major force in the evolution of human intelligence and social life. The human being is a natural being that changes, develops, and evolves through interaction with specific technologies and social conditions. As Marx and Engels observed in their theory of praxis, as we change and shape our world, we change and shape ourselves. Far from something alien to human nature, technology has been part and parcel of the human condition. Although the line between biology and technology has become increasingly blurred, it was never an absolute distinction in the emergence of the hominid line that some 5-8 million years ago evolved into Homo sapiens. While there is nothing about human cloning or genetic alteration to make biotechnology more or less "unnatural" than other technologies, such transformations nonetheless would constitute major new developments that bring about a postbiological mode of human

reproduction and a posthuman culture that implodes distinctions among human beings, animals, and machines, as humanity undertakes the project of its own genetic redesign.

Rather than demonizing cloning technologies from a priori essentialist premises that they violate the commands of God or the laws of nature, and are therefore inherently objectionable, we argue that they are better assessed in light of empirical realities of what already has happened with animal cloning, the current commodification of biotechnology, and the consequences that might result from cloning human beings. There is nothing intrinsically wrong with altering "human nature" and, as we have argued, human beings by definition are dynamic self-altering beings. But some changes or mutations are more dramatic and risky than others, and collectively human beings may decide some are safe, ethical, and rational to choose and others are not.

A strong objection against human cloning and genetic engineering technologies is that they could be used to design and mass reproduce desirable traits, bringing about a society organized around rigid social hierarchies and genetic discrimination -- as vividly portrayed in the film *Gattaca* (1997). Fukuyama emphasizes this problem and it was, of course, the nightmare of Aldous Huxley, who continued H.G. Wells' speculations on a genetically engineered society and creation of new species. Indeed, with only trivial qualifications, Huxley's Brave New World ([1932] (1958a)) of genetic engineering, cloning, laboratory conception, addictive pleasure drugs (soma), entertainment and media spectacles, and intense social engineering has arrived. Huxley thought cloning and genetic engineering were centuries away from realization, but in fact they began to unfold a mere two decades since his writing of Brave New World in the early 1930s. Technocapitalism cannot yet, for instance, biologically clone human beings, but it can clone them in a far more effective way -- socially. Whereas biological clones would have a mind of their own, since the social world and experiences that conditioned the "original" could not be reproduced, social cloning according to a given ideological and functional model is far more controlling. That is why Huxley's sequel work, Brave New World Revisited ([1958] 1989b) focused on various modes of social conditioning and mind control.

Of course, as Baudrillard argues (2000), cloning is connected as well to the fantasy of immortality, to defeating

the life-death cycle. Techno-utopians fantasize about the possibility of cloning one's body, or downloading one's memories into another body or a machine, thereby achieving immortality and alleged continuity of selfhood. The Raelians promote cloning as a chance for "eternal life." In the current social setting, it's no surprise that cryogenics -- the freezing of dead human beings in the hope they might be regenerated in the future through medical advances -- is a booming global industry.

Defenders of cloning and biotechnology argue that they will increase individuality, freedom, and choice, enabling people to design their own children and to alter their own bodies. Already with preimplantation genetic diagnosis, parents can screen out embryos at risk of disease and select those most likely to be healthy, as they also can know in advance the sex of the their child. Soon, parents and doctors might be able to isolate and remove genes that cause obesity, addictions, and a host of fatal illness, as well as to engineer genes that would enhance intelligence, strength, athleticism, physical attractiveness, and other desirable traits.

Along with Lee Silver, Gregory Stock is perhaps the most utopian advocate of germ line engineering (GLE), which, unlike gene therapy, makes potentially permanent changes in the human genome. Cloning is a conservative technology as it simply copies existing genetic information to create a human simulacrum, while GLE is revolutionary in that it alters human genes and makes them susceptible to design. Stock aggressively asserts the positive potential of GLE and believes it is the next stage in the realization of parent desires to create the best life for their children. Against cyborg champions like Ray Kurzweil (2000), Stock believes that the most important engines of change in the human future will not be computers and implants, but rather genetic manipulation. We will remain largely fleshy beings, but biology will radically change the coding of that flesh. Stock also claims that the dramatic changes GLE will bring are inevitable; history is not a tale of self-restraint, he finds, and change is accelerating all the time. The great promise of GLE, then, is that it will "improve" our genetic assets as it provides us with more choice and freedom: "Human conception is shifting from chance to conscious design" (75).

Stock acknowledges the complexity involved in genetic manipulation, but thinks that through technologies such as artificial chromosomes science can precisely define and control modifications in the human genome. He denies that the charges GLE makes need be permanent modifications in the genome, and therefore ought to be rejected as too dangerous, because he believes the artificial chromosomes can be turned on and off at will. This also allows him to override the objection that parents are wrongly determining physical traits for their children insofar as he believes children could simply switch them off if they so choose and reclaim their natural heritage. Stock's reliance on a technofix for problems that might arise with complex biological systems is most unconvincing. Quite likely, Stock's intentional evolution will be plagued by unintended consequences. Stock effectively rebuts the argument that GLE will result in the *homogenization* of the human genome, as even if millions of people employ the technology billions will not. But given that advertising models will inevitably influence the kinds of traits future humans will attempt to design, he fails to see that GLE will bring the *trivialization* of humanity as advertising ideologies would become absorbed into the genes themselves.

Currently, the human race stands at a crossroads and must make crucial choices concerning the future of the human, including the issue of GLE. Whatever one's philosophical and ethical conceptions of cloning, it is clear that at present human cloning is unacceptable. Cloning proponents argue that it took hundreds of attempts to develop a test-tube baby and that trial-and-error is simply the scientific method. We need to ask, however, if such costs are legitimate when the benefits are not yet clear. While one might sympathize with couples that fervently desire a child and utilize IVF, legions of unwanted children await adoption, and it is difficult to justify the great leap forward to cloning through these kinds of rationale.

Therapeutic vs. Reproductive Cloning: The Debate Over Stem-Cell Research

> "It is not unrealistic to say that stem cell research has the potential to revolutionize the practice of medicine." Dr. Harold Varmus, former NIH director
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> "The 20th century was the drug therapy era. The 21st century will be the cell therapy era." George Daleuy,

biologist with the Whitehead Institute for Biomedical Research, Cambridge, Massachusetts

Full-blown human reproductive cloning is problematic for numerous reasons, and we reject it on the grounds that it lacks justification and portends a world of eugenics and genetic discrimination rooted in the creation and replication of desired human types. Yet scientists are also developing a more benign and promising technology of stem cell research, or "therapeutic cloning." The controversy around *embryonic* stem cell research -- because it involves using and destroying cells from frozen human embryos -- remains one of the key debates of our time, important enough to provoke a major policy crisis for the Bush Administration and to warrant an address to the nation on prime-time TV in August 2001. Rarely do scientific debates erupt into the public forum, and although the technical aspects are difficult and complex, the ethical and medical stakes are clear enough to command a national debate.

In 1998, Dr. James A. Thomson, a developmental biologist at the University of Wisconsin, announced to the scientific world that he had isolated embryonic stem cells, thus portending a new era of "regenerative medicine" based on the renewal and recreation of the body's cells. Stem cells are the primitive master cells of the body that differentiate into functions like skin, bone, nerve, and brain cells (the body produces over 200 cell types). The goal of stem cell research is to program the development of stem cells toward specific functions in order to replace lost or damaged cells, tissues, and organs. Using similar technological breakthroughs such as led to Dolly, stem cell research involves cloning cells from a wide range of human tissue, or very young human embryos (around 5 days of age) and aborted fetal tissues.

In the debates over stem cell research, an important distinction emerged between <u>adult stem cells</u>, that are derived from blood, bone marrow, fat and other tissues, and <u>embryonic stem cells</u> from discarded IVF cultures, aborted fetuses, or embryos created in a lab. While scientists are experimenting with adult stem cells, the current consensus is that embryonic cells are the most pliable and hence have the most regenerative potential. In July 2001, the National Institute of Health issued a report that "Stem cells from adults and embryos both show enormous promise for treating an array of diseases but at this early stage, cells from

days-old embryos appear to offer certain key advantages." As Ceci Connolly summarized it: "Embryonic stem cells are more plentiful and therefore easier to extract, can be grown and made to multiply in the laboratory more easily and appear to have the uncanny ability to develop into a much wider array of tissues."[8] In fact, embryonic and adult stem cell research may each contribute to significant medical and health advancement. According to Senator Bill Frist (R-Tenn), the only medical doctor in Congress, an opponent of abortion, and key science advisor to the Bush administration: "because both embryonic and adult stem cell research may contribute to significant medical and health advancement, research on both should be federally funded within a carefully regulated, fully transparent framework that ensures respect for the moral significance of the human embryo."[9]

Scientists argue that therapeutic cloning has tremendous medical potential. Early in life, for example, each individual could have their stem cells frozen to create their own "body repair kit" if they developed a disease or even lost a limb. There would be no organ shortages, no rejection problem, and no need for animal exploitation as the cells would be their own. Although there has of yet been no significant advances in human research, and the results so far confined to animals are not necessarily applicable to human beings, stem cell research nonetheless shows remarkable potential for revolutionary breakthroughs in medicine. Among their achievements with mice, rats, pigs, and fetal monkeys, scientists have directed stem cells to produce insulin, to induce growth of brain cells, and to form new blood vessels in hearts, thereby suggesting immense contributions to curing diabetes, Alzheimer's or Parkinson's, and heart disease.[10]

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[8] Ceci Connolly, "Embryo Cells' Promise Cited in NIH Study" (Washington Post, July 18, 2001: A01. The NIH notes the preliminary status of the report, the many uncertainties around stem cells, and the need for more research.

[9] See www.time.com , July 19, 2001.

[10] See "Stem Cells Coaxed To Produce Insulin," http://www.msnbc.com/news/607294.asp, "Fetal Stem Cells Boost Brainpower," http://www.msnbc.com/news/566735.asp, and "Rebuilding Hearts," http://abcnews.go.com/sections/GMA/DrJohnson/GMA010402Stemcells dr.Tim.html, and "Early Success Seen with 2nd Type of Stem Cell," www.nytimes.com/2001/07/26/health/genetics/26MOUS.html. The experiment with brain cells involved injecting human stem

Still, while industries and media often hype the research as producing immanent medical revolutions, many scientists believe breakthroughs in gene therapy and therapeutic cloning are likely decades away and that expectations have been unduly raised.[11]

Another crucial distinction involves using embryonic stem cells from IVF discards and cloning embryos for the explicit sake of research. Whereas Britain allows both kinds of stem cell research, and thus condones embryo cloning for therapeutic purposes, the Bush administration highly restricts the use of IVF stem cell lines and condemns embryonic cloning. Yet many scientists argue that the ideal source of stem cells for regenerative medicine would not only be those derived from IVF embryos, but from embryos cloned from a patient's own cells, as the derived stem cells would be one's own and in theory far less susceptible to rejection. Thus, there is a medical justification for cloning human embryos and embryo cloning will be crucial to regenerative medicine.

On January 22, 2001, Britain became the first country to legalize human embryo cloning, with the proviso, perhaps impossible to enforce, that all clones would have to be destroyed after 14 days of development, and never implanted in a human womb. Britain thus endorsed therapeutic cloning, while banning reproductive cloning.[12] On the whole, Britain

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cells from the brains of aborted fetuses into mice, rats, and pigs, thereby imploding species boundaries and demonstrating the versatility of human stem cells. And in February 2003, scientists at the University of Wisconsin announced that they had genetically manipulated human stem cells to provide replacements for specific cells and organs; see "Scientists replace stem cell genes," Reuters (February 10, 2003).

[11] One key problem is that scientists as of yet have been unable to get stem cells to grow into the specialized types they seek, rather than clumps of different cells. For an important article that punctures much of the hype surrounding stem cell research, see "A Thick Line Between Theory and Therapy, as Shown With Mice," Gina Kolata, www.nytimes.com/2001/12/18/science/life/18MICE.html.

[12] See "Britain Oks Human Embryo Cloning," www.msnbc.com/news520058.asp and Kristen Philipkoski, "U.S. to Clone Brit Policy?," Wired News, Jan. 24, 2001. In April, 2001, however, Britain prepared to pass laws criminalizing human cloning, and to make sure that genetic treatment was

seems to have more scientifically advanced and democratic political guidelines and policies on cloning than the U.S. While a ban on human reproductive cloning is pending, therapeutic cloning is allowed under rigorous guidelines. Britain was ahead in the process of IVF since the birth of Louise Brown in England in 1978. Moral philosophers have been debating bioethical issues and there has been much public discussion. Parliament set up an agency on Human Fertilization and Embryology Authority that license fertility clinics and research institutions that study human embryos. The agency has kept detailed statistics of the number of human embryos created, planted and destroyed in fertility clinics.[13] The U.K. is establishing a stem cell bank that would be run as a public resource, in a way similar to the Human Genome Project. Hence, existing stem cell lines and techniques are available to any qualified researcher, and Britain has passed progressive laws banning genetic discrimination and mandating that therapies and medical advances that come out of genetic research will be available to and benefit everyone through its National Health Service.

In the U.S. and elsewhere, many religious groups and hard-core technology critics vituperate against stem cell research as "violating" the "inherent sanctity of life." To be sure, there is an ethical issue at stake in creating embryos for research purposes, or even using IVF cells, as living matter is being used as a means to some end other than its own existence. Clearly, using IVF cells that are going to be destroyed regardless is less objectionable than cloning an embryo for the sake of "harvesting" its cells then

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available to everyone through their national health service. See Marjorie Miller, "Britain Proposes Law Against Cloning of Humans," Los Angeles Times (April 20, 2001: A10). After the November 2001 ACT announcement that they had cloned human embryos, however, a loophole was discovered in the law that would allow reproductive cloning despite the fact that the Human Fertilization and Embryology Act sought to ban human cloning. After a High Court judge ruled it was in fact legal to clone embryos, the British House of Lords proposed emergency legislation in late November 2001 to explicitly ban human cloning and have now explicitly banned human reproductive cloning.

[13]See Nicholas Wade, "Clearer Guidelines Help Britain to Advance Stem Cell Work," New York Times, August 14, 2001, and Judith Klotzho, "Embryonic victory," The Guardian, August 20, 2001.

terminating it, but many religious groups and conservatives nonetheless vehemently oppose all forms of stem cell research and any manipulation of life, no matter what profound medical consequences may result. "Anyone truly serious about preventing reproductive human cloning must seek to stop the process from the beginning," Leon Kass, later to be Bush's cloning czar, proclaimed before a House judiciary subcommittee in June 2001.[14]

To challenge stem cell research, many conservatives (and some liberals) are recycling philosophical arguments from earlier debates over abortion.[15] The Pope and critics of stem cell research argue that once a sperm and egg are mixed into an embryo, no matter what the medium, there is a human life with all of its rights and sacredness. Others claim that a human life exists only when the embryo is implanted in a mother and has undergone the beginnings of the maturation process. Some medical experts assert that 14 days is the crucial dividing line when a backbone and organs begin to develop, while many pro-choice proponents argue that a fetus itself is not yet fully a human being. These earlier philosophical arguments have been revived in the stem-cell debate to legitimize conflicting scientific and political positions. In the context of stem cell research, religious conservatives repeat the same question-begging argument: (1) a human embryo is a human being; (2) it is wrong to take a human life; (3) therefore, it is wrong to "destroy" an embryo. The most controversial claim of the argument, in premise (1), is either just assumed, or defended through dogmatic claims that "life begins at conception," when, arguably, there is no real conception in a petri dish holding

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[14] "Cloning Capsized?" The Scientist 15[16]:1, August 20, 2001.

[15] The philosophical debate over when human life starts is a long-standing one. The Greek philosopher Aristotle choose 40 days into pregnancy, and the 40 day rule was long followed by Jewish and Muslim traditions. The Catholic Church followed this line until 1588 when Pope Sixtus V declared that contraception and abortion were mortal sins; the ruling was reversed, however, 3 years later until 1859 when Pope Gregory XIV brought the church back to the view that the human embryo has a soul and renewed the call for excommunication for abortion at any stage. See Rick Weiss, "Changing Conceptions," Washington Post, July 15, 2001: B01.

a 5-day-old cell mass.[16]

Ultimately, the debate comes down to the philosophical issue of what constitutes a human being. Opponents of therapeutic human cloning and embryonic stem cell research claim that "conception" takes place when an embryo is produced, even in a petri dish. Critics of this notion of human life argue that an embryo is a merger of sperm and egg that takes place in five or six days and is called a blastocyst, which scientists distinguish from a fetus. Scientists further claim that an embryo only attains fetus-status at around 14 days when it develops a "primitive streak," the beginnings of a backbone. Up until that point, a single embryo can divide into identical twins, and two embryos can merge into one, leading Ronald Green, a Dartmouth bioethicist to conclude: "It is very clear that you cannot speak of a human individual in the first 14 days of development. How can one speak of the presence of an individual soul if the embryo can be split into two or three?"[17]

Clearly, it is difficult to say when human life begins, and claims that it emerges "at conception" are simplistic. So far human life has only been produced from fetuses that mature in the womb of a woman's body, and thus we have trouble conceiving that 5 day-old embryos in a petri dish are human. It also might be pointed out that only about one in eight embryos implanted through IVF achieves fetal status, and few conservative critics worry over the doomed embryos or question the ethics of IVF as a whole, a technology that produces surplus cells for medical research. The fact that embryos typically used for stem cell research are leftover from couples using in vitro fertilization, and are marked for destruction regardless, strongly undercuts the force of the argument against embryonic stem cells.[18]

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[16] For a thorough critique of attempts to define the "beginning point" of life, see Silver (1998).

[17] Cited in Aaron Zitner, "Uncertainty is Thwarting Stem Cell Researchers," Los Angeles Times, July 21, 2001: A01.

[18] In Britain, "the Human Fertilization and Embryology Authority has reported that some 50,000 babies have been born through in vitro fertilization since 1991, and 294,584 surplus human embryos have been destroyed." While no official records have been kept in the United States, "According to the American Society for Reproductive Medicine, about 100,000 children have been born in the

United States by in vitro fertilization, or twice the number in Britain, implying that some 600,000 embryos would have been destroyed if American clinics followed the same five-year storage limit used in Britain. Only a small fraction of the discarded embryos would provide as many stem cells as researchers could use." See Nicholas Wade, "Stem Cell Issue Causes Debate Over the Exact Moment Life Begins," New York Times, August 15, 2001.