THE STEM CELL PRESS: A HISTORY OF STEM CELLS IN NEWS MEDIA AND THE CREATION OF THE AMERICAN STEM CELL DEBATE

A Senior Honors Thesis

by

LOGAN HAMPTON BOATMAN

Submitted to the Office of Honors Programs
& Academic Scholarships
Texas A & M University
in partial fulfillment of the requirements of the

UNIVERSITY UNDERGRADUATE
RESEARCH FELLOWS

April 2004

Major: History

THE STEM CELL PRESS: A HISTORY OF STEM CELLS IN NEWS MEDIA AND THE CREATION OF THE AMERICAN STEM CELL DEBATE

A Senior Honors Thesis

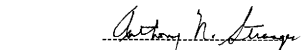
by

LOGAN HAMPTON BOATMAN

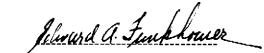
Submitted to the Office of Honors Programs
& Academic Scholarships
Texas A & M University
in partial fulfillment for the designation of

UNIVERSITY UNDERGRADUATE
RESEARCH FELLOW

Approved as to style and content by:



Anthony N. Stranges
(Fellows Advisor)



Edward A. Funkhouser
(Executive Director)

April 2004

Major: History

ABSTRACT

The Stem Cell Press: A History of Stem Cells

In News Media and the Creation of the

American Stem Cell Debate. (April 2004)

Logan Hampton Boatman
Department of History
Texas A&M University

Fellows Advisor: Dr. Anthony N. Stranges
Department of History

In February 2004, Korean scientists made the startling announcement that they had cloned an embryo and collected embryonic stem (ES) cells. Consequently, American scientists have clamored for increased funding from the federal government, and claim that the United States no longer leads the world in biotechnology. Unfortunately for these scientists, Americans have had an uneasy past with the idea of ES cells. Since their isolation in 1998, ES cells have become one of the most hotly debated ethical issues in this country, and as stem cells become a more politicized issue the public's knowledge of the subject will prove increasingly important. As such, this paper will look at how major media sources such as *The New York Times*, *The Washington Post*, *Time Magazine*, and *Newsweek* among others have presented information on stem cells since they first mentioned stem cells in the early 1980s. By evaluating how the media has portrayed medical, ethical, and political aspects of the debate, this paper will reveal what information has impacted the American public's

understanding of the issues. Within the stem cell debate, two things have become readily clear. The first is that both sides of the debate have strongly held beliefs, hopes, and expectations for the course of progress. The second is that the popular perception will play an extensive role in determining this course. As such, researching how the press and other poplar sources of information have presented the issues of both embryonic and adult stem cell research will prove important to understanding where both the debate and its advances in biotechnology will take us in the next decades.

TABLE OF CONTENTS

Page

ABSTRACT iii

TABLE OF CONTENTS v

INTRODUCTION: SHEEP AND STEM CELLS 1

STEM CELLS AND EMBRYOS 5

What is a Stem Cell? 5
Cell Growth: Embryos, DNA, and Clones 9
Defining the Debate 18

STEM CELLS IN THE PRESS 22

Stem Cell Isolation: 1980-1989 23
Stem Cell Growth: 1990-1997 28
Stem Cell Divide: 1998-2000 36
Stem Cell Decision: 2001 to the Present 45

CONCLUSION: A STEM CELL FUTURE 54

REFERENCES 60

VITA 65

INTRODUCTION: SHEEP AND STEM CELLS

When Dolly the sheep bounded into the public light in 1997, she became, besides an instant celebrity, the reification of a long and increasingly complex and public discussion involving science, technology, religion, ethics, and politics. During her lifetime, from 1996 to early 2003, Dolly and the rest of the world saw the culmination of decades of research, debate, and work on three of the most important areas of modern science: genetics, cloning, and stem cells. During the 1990s, scientists in the United States and United Kingdom led the drive to produce increased research funding from both the public and private sectors. Many of these scientists and lay persons alike believed that looming breakthroughs in these areas would soon revolutionize the way that doctors treated everything from simple illnesses to complex genetic disorders. While most researchers recognized that treatments remained at least a decade or two in the future, their exuberance at the possibilities quickly and thoroughly seeped into the public realm.

Shortly after Dolly's appearance in 1997, a team at the University of Wisconsin-Madison led by James Thomson announced in their November 1998 *Science* article the successful derivation of stem cell lines from a human embryo.[1] While reporters and politicians struggled to figure out both the details and implications of this event, scientists rejoiced at one of the crowning moments of embryological research. Almost a theoretical entity until the mid 1990s, embryonic stem cells and their ability to become

This thesis follows the style and format of *Isis*.

[1] Thomson, James A. "Embryonic Stem Cell Lines Derived from Human Blastocysts," *Science*, Nov. 1998, **282**, *5391*: 1145-47.

any type of body tissue promised new treatments for a number of degenerative diseases. To date, early 2004, neither the United States nor the world has witnessed any extraordinary leaps or mainstream treatment options using stem cells. While researchers have made significant progress with laboratory accomplishments such as the creation of pancreatic cells in Petri dishes capable of producing insulin, they have had difficulty translating these successes into publicly concrete and evident progress. Today, research and testing proceed with increased efforts but with notably fewer hurrahs from the public than in the last decade.

As with cloning, embryonic stem cell research has prompted both ethical and political debate since its initial stages of research. Because embryonic stem cell research requires the destruction of a human embryo to culture the cells, proponents and opponents typically arise based on the pro-life/pro-choice debate. A large percentage of scientists and the supporters of choice argue that stem cell research should proceed for the sake of the aforementioned progress in medical treatment. Those against abortion argue that human life begins at conception and therefore deserves protection under the law. As in most debates, the popular press has provided a basis for a lay understanding of the present status and potential of embryonic stem cells. Articles in major newspapers and magazines, as well as other popular news sources such as television and the internet, have covered the issue from political, ethical, and clinical points of view. These sources have editorialized stem cells' expected and realized medical impact, debated their ethical aspects, and observed their ramifications within United States politics.

Consequently, these popular news outlets have indubitably made a significant impact on how people view the important issues within the stem cell debate. The authors of these popular articles have had a difficult burden in explaining and arguing about a topic of which most of the population has a relatively cloudy understanding. Widely read scientific journals such as the United States' *Science* and the United Kingdom's *Nature* publish some new stem cell development almost monthly, but most of it remains beyond the understanding and concern of the public. The stem cell debate, however, has clearly become one that the United States' public will at the least heavily influence. The failed attempts by the United States Congress to create legislature in 2001 and 2003 that would ban cloning and related research highlights the political and public nature the debate has already taken. Educating the public on the current and future aspects of stem cell research and its medical applications has thus become an extremely important role for popular news sources.

As such, this paper will discuss stem cells and the debate surrounding them in three ways. First, in order to make this paper readable by a member of any discipline, it explains the current science and debate surrounding stem cells. Second, it discusses the advances in embryology and genetics since the nineteenth century that have led to current science. Third, and most importantly, it observes and comments on how the major news resources such as *The New York Times*, *The Washington Post*, *Time Magazine*, and *Newsweek*, among others, have presented information on stem cells in the three areas most important to popular culture: ethics, politics, and medical research. While some may claim that these news sources have a pre-existing bias, examining how

they have reported these topics is important because they lead the news in both amount of coverage and readership numbers. Regardless of their bias, these newspapers and magazines have had an indelible effect on other news sources' reporting and the American public's view of stem cells. Using these print news publications from the past several years, this paper evaluates the current popular understanding of stem cell research and how that understanding has evolved.

In February 2004, South Korean scientists announced that they had used DNA from an adult female to create stem cells genetically identical to the donor. Among other reactions, this announcement sparked various editorials announcing the need for the United States to increase its stem cell research and resume its place as the preeminent research location in the world. Only a week later, New Jersey announced its intentions to become the second state, behind California, to fund research on stem cells. Despite its current stalls, stem cell research's second rise in the United States appears fast approaching, and in order to comprehend its ramifications in the near future the United States' public needs to look back to understand its past. Given the increasing importance of the stem cell debate within this country, this paper argues that beneficial progress in stem cell research and treatment will require increased flexibility and patience from scientists, politicians, and the public.

STEM CELLS AND EMBRYOS

What is a Stem Cell?

As biologists Daniel Marshak, David Gottlieb, and Richard Gardner note in the introduction to their collection of essays, "Stem Cell Biology," "there is still no universally acceptable definition of the term stem cell, despite a growing common understanding of the circumstance in which it should be used."[2] Although the authors then continue to belabor the inexactness of the term, an explanation of the "common understanding of the circumstance in which it should be used" should suffice for purposes here. Human physiology contains two major types of stem cells: adult stem cells (AS cells) and embryonic stem cells (ES cells). Adult stem cells, the more developed of the two, exist in any person or fetus after the earliest stages of development and remain functioning until death. AS cells give rise to cells that the body uses up or sheds. For instance, the dead skin cells that a person sloughs regularly originate from skin cell producing stem cells beneath the lower skin layers. Likewise, red blood cells, the blood cells used to carry oxygen throughout the body, originate from blood cell producing stem cells found in the marrow of bones.

Biologists have understood the value of these AS cells for nearly forty years. Until embryonic stem cells gained attention in 1998, AS cells held the most promise for scientists hoping to manipulate and use them to cure various sicknesses. So far, treatments using AS cells have consisted only of restoring blood and assisting in immune repair. The most useful and best understood AS cell is the hematopoietic stem cell (HS

[2] Marshak, Daniel R., et al., *Stem Cell Biology* (Cold Spring Harbor, NY: Cold Spring Harbor Laboratory Press, 2001), p. 1.

cell). However, research on HS cells, typically taken from bone marrow, suggests they may eventually help treat leukemia and lymphoma.[3] As *Science* magazine writer Gretchen Vogel reported in her June 2001 article "Can Adult Stem Cells Suffice?" scientists have made gains in utilizing fat cells from human fat, neuron cells from cadavers, and bone marrow cells from mice to reproduce tissue types. While the fat and neuron cell tests have met with some dispute from within the scientific community, the work with bone marrow cells holds a good deal of potential, to the point that developmental biologist Douglas Melton of Harvard University claims that "bone marrow stem cells can probably form any cell type."[4]

While laboratories continue to evaluate the possibility of producing advanced cell types from marrow stem cells, many scientists have remained ready to note the problems with using AS cells in both research and treatment. First, while AS cells can form several types of tissue, what scientists call being multipotent, they cannot form all types of tissue, or be pluripotent. This aspect could affect finding a cure to major problems such as diabetes or Parkinson's, two diseases suspected to be difficult to treat with AS cells. Second, AS cells purportedly lack the ability to divide and create lines as ES cells can. This fact strictly limits the availability of AS cells, because it requires scientists to gather each one directly from a research subject. Third, AS cells have undergone standard aging and may have complications resulting from their deteriorated genetic information. One way to get around the aging and availability problems has

---

[3] "NIH Backgrounder on Stem Cells," (Bethesda, MD: National Institutes of Health, 25 Mar. 2003). <www.nih.gov/news/backgrounders/stemcellbackgrounder.htm>

[4] Vogel, Gretchen, "Can Adult Stem Cells Suffice?" *Science*, June 2001, **292**, *5523*: 1820-1822, on p. 1822.

been to collect AS cells from the umbilical cord blood of newborn babies. This process, used since 1988, typically treats people suffering from anemia or other blood disorders in which the patient lacks the blood stem cells to produce adequate red blood cells. Although scientists have known about AS cells longer than ES cells, they have not yet discovered how to use them to treat any diseases other than blood related diseases. A common misconception exists that AS cells have already treated more complicated diseases in human trials.[5] In regard to treatments for diseases such as Parkinson's or diabetes, AS and ES cells remain in the same stages of laboratory testing.

Embryonic stem cells occur in the early stages of embryonic development, only two to three days, and are typically collected from what embryologists call the blastocyst stage of an early fertilized embryo. The egg, fertilized at conception, splits into two and then each of the two divide to produce four and so on in an exponential growth pattern for several divisions. After splitting cells have divided a few times they reach the blastocyst stage which has specialized protective cells on the outside and pluripotent cells on the inside. Scientists pierce the external layer of cells and collect the internal stem cells, destroying the embryo. Once they have been removed from the embryo, the cells are typically placed on a bed of mouse cells referred to as "feeder cells." These feeder cells send as yet unknown signals to the ES cells that prevent them from dividing into more advanced tissue such as neurons, muscle, and bone.[6] Once the proper environment exists, ES cells can either remain in stasis or multiply based on the stimulus

[5] "NIH Report Backs Embryonic, Adult Stem Cell Research," (CNN.com, 17 July 2001). <www.cnn.com/2001/HEALTH/07/17/NIH.stem.cells>

[6] "Scientists Find New Way to Grow Human Embryonic Stem Cells." (Baltimore, MD: Johns Hopkins University, 18 Mar. 2003). <www.hopkinsmedicine.org/press/2003/March/030318.htm>

they receive. This appeals to researchers because in theory it will provide them with stem cell lines that can produce a virtually unlimited amount of ES cells with which to work. Furthermore, scientists suspect that ES cells have a greater range of possible tissues including the heavily sought after pancreatic cells that produce insulin and could drastically help treat diabetes. While AS cells can produce many types of tissues, ES cells may have the ability to produce an extremely valuable tissue type that AS cells cannot.

Despite their great potential, ES cells have two major difficulties. First, the cellular mechanisms that cause ES cells to form tissue cells have eluded the understanding of researchers. Until scientists have grasped the minute processes that cause the stem cells to become a certain tissue they will have a difficult time proving a procedure's reliability. Scientists formerly believed that stem cells could be injected into any deficient area and the surrounding cells would indicate to the ES cell what kind of tissue it needed to become. For instance, an ES cell injected near other neurons would form neuronal cells and an ES cell injected into bone marrow would form bone marrow cells. Unfortunately, growth factors have proven more complicated than this. For instance, doctors in China injected ES cells into a Parkinson's patient's brain hoping that the stem cells would grow into replacement nerve tissue. When the patient died thereafter, an autopsy revealed an unexpected growth of hair, skin, and bone, referred to as a teratoma.[7] In the United States, researchers have conducted similar experiments on

[7] Krauthammer, Charles, "The Great Stem Cell Hoax," *The Weekly Standard*, August 2001, **006**, *46*: 12-13.

mice with varied results. Sometimes the mice managed to regenerate lost tissues as complicated as nerve cord cells and sometimes the tests have had no success whatsoever.

Second, the aspect around which most of the stem cell debate revolves, the creation of ES cells requires the death of the embryo during the cellular harvest. Typically the ES cells have been taken from the unused embryos created by fertility clinics after in vitro fertilization, but can also be found in embryos aborted between five and nine weeks. And now, thanks to the advances in Korea, they can also be recovered from embryos of adult clones. As of President Bush's decision in August 2001, American scientists working with federal money only have access to sixty-four already existing ES cell lines.[8] For now, public funds cannot be used to produce new stem cell lines or be used for research on lines developed after August 2001. Some researchers have complained that this mandate has considerably limited the availability of stem cells and made useful research difficult to accomplish. As a result, they contend, the United States has fallen from its preeminence in the field of ES cell research. Most scientists have agreed, and the National Institutes of Health supports, that ideally research in stem cells should consist of both AS and ES cells.

Cell Growth: Embryos, DNA, and Clones

During the late 1990s the world witnessed advances in multiple areas of science and technology. As satellites beamed information through the air and microchips and the internet turned information into 1s and 0s, biotechnology bloomed. Since its beginning in the 1970s biotechnology had remained a relatively silent science, but then

[8] "Information on Eligibility Criteria for Federal Funding of Research on Human Embryonic Stem Cells," (National Institutes of Health, 8 Mar. 2004). <stemcells.nih.gov/registry/eligibilityCriteria.asp>

in the late 1990s two enormous biotech undertakings drew the public's attention. The 1996 birth of Dolly and the race to map the human genome, all the genetic information in a human, brought forth the quiet labors of biotech scientists. These two results along with James Thomson's isolation of human ES cells started what many people saw as the next medical revolution. Over the past century, biologists had amassed an impressive understanding of how the fundamental aspects of life function and felt confident that they would soon manage to put their developments into practical use. Therapeutic cloning and ES cells, with their ability to morph into any tissue, seemed especially exciting. Some scientists claimed that in only ten to fifteen years they would have the capability to transform embryonic stem cells into one of the most profoundly useful medical tools since Scotsman Alexander Fleming's (1881-1955) discovery of penicillin to fight bacterial infections in 1928.

Like Fleming's notion in its time of using a substance to fight infectious bacteria, the use of stem cells or genetic treatment to cure diseases could have hardly been understood sixty years earlier. "As a separate discipline," British anatomist T.J. Horder notes in his introduction to *A History of Embryology*, "embryology did not exist until some time in this century (twentieth)."[9] Even as late as the 1940s *Gray's Anatomy* had only proposed drawings of what the human embryo should look like at its earliest stages. Despite this relative lack of knowledge, scientists had been looking at organisms' older embryos since the late nineteenth century. Until then scientists suspected the earliest stages of the human form to resemble a miniaturized human seen at birth. One of the

[9] Horder, T.J, *A History of Embryology* (New York: Cambridge University Press, 1986), p. 3.

prevalent notions suggested that conception produced an even more miniaturized human form commonly referred to as a homunculus. Another version called epigenesis, Aristotelian in nature, claimed that the swelling at pregnancy came from the realization of potential created at conception and subsequently guided by a mysterious and transcendent vital force[10]. As with physics in the seventeenth and eighteenth centuries, people still sought to understand the life sciences in philosophical rather than experimental terms. Even when in 1827 German biologist Karl Ernst von Baer (1792-1876) discovered that mammals form eggs, researchers struggled to understand the processes taking place within the egg or to provide some conclusive evidence to prove any of the prevalent theories.

Not until the technological progress in microscopic staining in the mid-nineteenth century could biologists study the later stages of the developing human embryo. With better observation tools and German biologist Wilhelm His' (1831-1904) 1880 studies of cross-sectioned fetuses from various stages of development, understanding in embryology gradually improved.[11] However, despite their advances, scientists still lacked knowledge of the physiological processes taking place within the womb. In 1891, hoping to corroborate the notion that a vital force provided the drive, German embryologist and philosopher Hans Driesch (1867-1941) separated sea urchin cells after their first cellular division. To his excitement, the separated cells grew into adults and led Driesch to conclude correctly that after the first and second cellular

[10] Maienshein, Jane, "What's in a Name: Embryos, Clones, and Stem Cells," *The American Journal of Bioethics*, Winter 2002, **2**, *1*: 12-19, on p. 12.
[11] Maienshein, "What's in a Name," p. 13.

divisions the individual embryonic cells' fates had not been fixed.[12] Although other studies showed both that various organisms' cells had different types of division and debunked had Driesch's belief in the vital force, this discovery has since had significant impact on the study of human embryology during the twentieth century.

Although no one could grasp the idea until nearly a century later, Driesch produced totipotent cells, those capable of becoming entire living organisms, and the rudiments of modern ES cells. Unlike Driesch's totipotent cells, today's pluripotent ES cells come from a more developed form of the embryo and cannot become living organisms. Nonetheless, Driesch's experiment proved valuable for the understanding of what information exists in early embryonic cells. However, before researchers could theorize on using the plasticity of developing cells, they would spend nearly a century investigating the science that causes the cells to grow into the adult form. The rediscovery in 1900 of Gregor Mendel's (1822-1884) nineteenth century work on characteristic heritability in pea plants quickly created an emphasis on determining the complex formative features of biology. Along with this, developments in chromosomes, the structures that support the cell's genetic material and cell cycles, gave scientists an idea of processes occurring within cells. Then, in 1907, Ross Harrison (1870-1959) cultured the first tissues outside of the body by growing frog nerve tissue on a medium of lymph clotting fluid.[13] While not an earth shattering gain, the experiments allowed him and other researchers to further understand the processes of growing specific tissues

---

[12] Bowring, Finn, "Therapeutic and Reproductive Cloning: a Critique," *Social Sciences and Medicine*, Jan. 2004, **58**, 2: 401-409.
[13] "Harrison, Ross Granville," *Columbia Encyclopedia*, 6th ed., 2004.

from basic cells. After around 1910, however, studies in embryology decreased as a result of the lack of scientists' understanding in embryological physiology. Then, in 1953, the combined efforts of James Watson (1928-), Francis Crick (1916-), Maurice Wilkins (1916-), and Rosalind Franklin (1920-1958) revealed the shape of DNA, and presented the possibility of understanding the chemical constructs of life. With these developments, scientists began to wonder at the possibility of manipulating human genetic information to treat disease and conditions that standard medicines could not cure.

During the 1970s James Watson appeared before Congress to testify on the importance and inevitability of researching adult cloning, a thought that some scientists at the time dismissed as impossible. His appearance belied a new social and political concern regarding embryos and the early stages of human growth and how new technology might impact the future. Technology, it seemed, had begun to dangerously approach some of the issues that had previously stayed within the realm of science fiction writing. In the 1950s, Robert Briggs and Thomas King had successfully injected tadpole embryonic cells into evacuated frog eggs and created genetic copies of the tadpole donors.[14] With a more accurate understanding of genetics and an improvement of techniques, scientists such as Watson argued that transferring complete genetic information from an adult into an evacuated egg would become inevitable. Social and political uneasiness increased in 1978 "when Patrick Steptoe's team demonstrated the

[14] Bowring, "Therapeutic," p. 401.

astonishing efficacy of in vitro fertilization."[15] With this advance, scientists could create embryos outside of the body. For the most part, the public viewed this advance as beneficial because it allowed otherwise sterile parents the opportunity to have babies.

With the addition of work in genetics, embryology returned as one of the leading biological sciences during the 1980s. Using the nuclear transplantation methods devised by Briggs and King for tadpoles and frog eggs, scientists began to attempt cloning mammals from embryos. During the past several decades, scientists have developed the following different techniques to create genetically identical organisms. The first type, embryological cloning, occurs after fertilization when the egg receives half of its genetic material from each parent. Once the early cells reach the two-cell stage, scientists split the cells apart. After splitting they grow into separate genetically identical embryos as in the case of Driesch's sea urchins. Nature has done this process for millennia in the form of identical twins. The second type, as in the case of Briggs and King's tadpoles, uses embryonic cells that have not undergone as much differentiation as adult cells. During the 1980s, scientists made significant advances by cloning animals such as cows and sheep from embryos sometimes as old as eight weeks.[16] This science turned to humans when in October 1993 researchers Jerry Hall and Robert Stillman from George Washington University divided eight-cell human embryos into single embryonic cells and created identical human twins.[17]

---

[15] Maienshein, "What's in a Name," p. 14.
[16] Bowring, "Therapeutic," p. 401.
[17] Harris, John, *Clones, Genes, and Immortality: Ethics and the Genetic Revolution* (New York: Oxford University Press, 1998), p. 27.

The first cloning from an adult cell was of course Dolly's 1996 creation by Ian Wilmut and Keith Campbell of the Roslin Institute in Scotland. This third and most important type of adult cloning extracted Dolly's aged DNA from a mammary cell and inserted it into one of her eggs, from which the nucleus had been removed. This egg then underwent cellular division and formed an embryo and fetus like any other fertilized egg. Since Dolly, researchers have come to refer to either therapeutic cloning, in which a clone is created for the purpose of replacement parts or stem cells, or reproductive cloning, in which the clone develops into a normal adult. Both of these types of cloning have encountered huge amounts of ethical debate within both scientific and political circles. Foremost, opponents of adult human cloning fear that the line between the two types, therapeutic and reproductive, will prove difficult to define if and when human adult cloning becomes more easily facilitated. Opponents, who consist of mainstream biotech scientists, ethicists, and religious groups, argue that the creation of clones, whether used for their genetic material as embryos or allowed to grow into adults, undermines the value of clones' lives and in turn the value of human life. Their projections of biotech controlled societies reminiscent of the fears of science fiction may have some relevancy as some ethicists and scientists have already taken to referring to clones as cyborgs.[18] As bioethicist Greg Pence of the University of Alabama at Birmingham notes, "science fiction movies have taught us that this technology must create mutants, but in fact, any problems we're facing are merely technical. And fear of

[18] Fox, M, "Pre-Persons, Commodities or Cyborgs: the Legal Construction and Representation of the Embryo," *Health Care Analysis*, 2000, **8**, 2: 171-188.

technical problems is just masking other problems people have with the idea of cloning."[19]

While these arguments over cloning are not currently at the heart of the debate over stem cells, they will soon have greater significance. One of the goals that scientists have sought since stem cell treatment began has been to create a clone of an adult and then extract genetically identical ES cells. In February, Korean scientists used an adult woman's DNA and egg to create a cloned embryo from which they extracted ES cells.[20] Many in the field believe that a genetically identical stem cell may prove more capable of interacting with the already existing tissues during treatment. Although this type of adult cloning is currently possible only with women able to produce eggs, the ethical arguments regarding the sanctity of her clone still apply. Internationally, several countries have outlawed cloning and the United Nations' Ad Hoc Committee on an International Convention Against the Reproductive Cloning of Human Beings will likely meet for a third time in as many years late in 2004 to discuss the possibility of creating an international prohibition on at least reproductive cloning, and perhaps also therapeutic cloning as well.[21]

Although Dolly's cloned status made the greatest impact on the public, her creators' main focus had been to insert a human gene within her that would produce a complex protein. Until then, scientists had to rely on genetically altered bacteria to grow

---

[19] Reaves, Jessica. "Human Cloning: Cause for Rejoicing or Despair?" (Time.com, 9 March 2001). <www.time.com/time/world/article/0,8599,101998,00.html>

[20] Pollack, Andrew, "Scientific and Ethical Questions Cloud Plans to Clone for Therapy," *The New York Times*, 13 Feb. 2004: A1.

[21] "Ad Hoc Committee on an International Convention Against the Reproductive Cloning of Human Beings," (United Nations, 15 Dec. 2003). <www.un.org/law/cloning>

replacement proteins needed to treat various diseases. By infusing the human gene into Dolly, Wilmut and Campbell hoped that Dolly would produce a protein in her mammary glands too complex for bacterial cultures. While Wilmut and Campbell's attempt to create a hybrid has remained relatively unknown, they did manage to bring together genetic manipulation and cloning in mammals. As such, Dolly not only demonstrated the possibility of adult cloning, but she also showed geneticists' ability to genetically engineer a complex animal. Since then, the notion of gene therapy has taken its own course and incurred its own separate debate. Gene therapy applies to the stem cell debate in regard to whether and the degree to which mankind should interfere with natural processes and random determination. By learning to control the fundamental elements of life, scientists in this field now have a responsibility to educate the public on the new potential within their grasp. As cloning and genetics reached their heyday in the late 1990s with the aid of computers and other technology, the debates over ethics and the impact on the value of human life heated up within the scientific field, then boiled over into the public realm.

Amidst the notoriety of these other two sciences, embryological stem cell research arose during the 1990s as a relatively quiet step child of cloning. At first, popular attention overlooked stem cell research for the more glamorous exploits in cloning. For instance, Thomson's isolation of human stem cells a year after Dolly's creation has received notably less public acclaim despite its arguably greater significance to future medical treatment. Then in 1999 the scientific world's and public's attention shifted to further understanding the new stem cell technology and its future possibilities.

This focus continued for only a few years, however, until President Bush's restrictions of ES cell research created what many scientists have referred to as "a brain drain of experts." With more restrictions on United States funding, countries such as Great Britain have risen to the top of this area of research. Furthermore, researchers fearing further restrictions on stem cells and cloning have increased their cries for more funding and access to necessary resources. As in the case in Korea, cloning and ES cells have now become closely related. Furthermore, Dolly's euthanasia in 2003 for premature aging and arthritis has cast considerable doubt on the viability of reproductive adult cloning from aged DNA. As a result of the melee of ethical questions on both cloning and stem cell research, American researchers have had to pare back their earlier predictions of medical revolutions looming around the corner.

Defining the Debate

The stem cell debate has evolved since ES cells came on the scene in 1998. Before November 1998, the public had heard little of stem cells in their morning papers and news magazines. As mentioned before, doctors had used AS cells to treat blood deficiencies for some time, but none of this had garnered much attention from the public interest. Then the publicity explosion over Dolly made a big impact on the attention given to biotechnology and genetics. As bio-ethicist Finn Bowring notes in his article "Therapeutic and Reproductive Cloning: a Critique," "the arrival of Dolly dispelled two decades of complacency" among ethicists regarding the possibilities of a biotech revolution.[22] While the papers printed headlines such as "Ewe Two," professional

[22] Bowring, "Therapeutic," p. 402.

attention turned to the possibilities of therapeutic cloning and the development and application of human ES cells.[23] Then Thomson isolated human ES cells, and for the general public learned of a new element in the biotech revolution.

While both of these events stand out, Thomson's isolation posed considerably more important ethical questions. Primarily, ES cell isolation had required and would require the destruction and manipulation of human embryos rather than sheep or one of the other mammals since cloned by scientists at various institutions. Rather than simply working on an animal, scientists had used human embryos for research that most Americans at the time did not understand. This new and strange process immediately infused the debate over cloning and its new technologies with a new category of ethical concerns. Scientists had knowingly stepped into the fierce debate over the rights of fetuses and embryos. The issue initially seems similar to the pro-life/pro-choice debate; however, the issue proves more complicated since the stem cells being used typically come from excesses embryos created at in vitro reproductive clinics. Thus the embryo, despite its viability, will otherwise spend its days frozen in stasis at the clinic. This aspect adds a different angle to the older debate. Proponents of ES cell research claim that, since the embryo has no possibility of coming to term, it would better serve the world in scientific study. Opponents remain firm that something with the potential of human life should enjoy protection under the law afforded to both people and fetuses terminated without the consent of the mother.

---

[23] Turner, John R.G, "Ewe Two," *The New York Times*, 28 Dec. 1997: Z1.

The science and debate regarding stem cells have evolved simultaneously since their origins in the late 1990s. Those typically in favor of ES cell research have been mainstream scientists and celebrities afflicted by diseases that could ideally be cured by advances in stem cells, such as Christopher Reeve and Michael J. Fox. Politically, moderate Republicans and the majority of Democrats side in favor of ES cell research. Opponents include the Catholic Church, pro-life organizations, a few, typically ostracized, scientists, conservative Republicans, and a small number of Democrats. Democrats such as Bart Stupak (MI) and Mary Landrieu (LA) have cosponsored bills that would strictly limit cloning and stem cell research. Almost all parties against the research claim that AS cells should have the ability to do exactly what an ES cell can do.[24] The notion that AS cells will someday suffice for ES cells has recently become the most hotly argued aspect of the debate. Many supporters of AS cells, such as the pro-life lobby and scientists working with AS cells, claim that mainstream science and leading scientific magazines have squelched reports that reveal the benefit and utility of AS cells for fear of losing ES cell research funding. As the debate over publicity continues among scientists and politicians, ES cell research proponents and the National Institutes of Health maintain that the inability of AS cells to reproduce in culture and their limited multipotency make ES cell research necessary.

Currently, both types of stem cell and cloning advances within the United States have failed to live up to scientists' original hopes and expectations. While this certainly comes as a disappointment to many stem cell research supporters, it also provides an

[24] Prentice, David A. "Adult Stem Cells: Draft." (The Ritz Carlton, Washington D.C.: Meeting of The President's Council on Bioethics, 23 July 2003). <www.bioethics.gov/background/prentice_paper.html>

excellent moment for both sides of the stem cell debate to reflect on the advances to date and the prospects for future technology. Within the stem cell debate, two things have become readily clear. First, both sides have large numbers of supporters. Since the debate has its foundations in the pro-life and pro-choice political arguments, it has received an influx of energy and emotion from both sides. Furthermore, it brings in the ethical arguments that have flooded scientific and technological communities during the second half of the twentieth century. How far should science and technology go? What are the risks of plodding on in science without oversight and input from ethics-minded and non-scientific bodies? Second, as seen in the case of the 2001 and 2003 bills before Congress, popular perception of the issues will have a significant impact on the direction of the major aspects of stem cell research. While scientists might prefer to work in the relative anonymity they had during the early 1990s, they have crossed definitively into the public and political realms. Because cures and treatment options remain distant, biotechnologists have had difficulty generating private sector funding for stem cell research. Until February, no state had set grant money aside for ES cell research, and New Jersey's proposed six million dollars remains small in an industry as vast as biotechnology. If measurable progress occurs, it will almost certainly require funding provided by the federal government. For an increasingly important topic such as stem cells, public opinion will play a significant role in how this funding is allotted. As such, researching how the press and other poplar sources of information have presented the issues of both embryonic and adult stem cell research will prove important to understanding where the debate and science will take us in the next decades.

STEM CELLS IN THE PRESS

In November 1998 news sources across the country ecstatically heralded the isolation of an extremely important part of modern biological science. These news articles assured readers that scientists were extremely excited that these new embryonic stem cells would eventually allow doctors to produce new types of tissues "including bone marrow for cancer patients, neurons for people with Alzheimer's disease, and pancreatic cells for people with diabetes."[25] Clearly, scientists had been expecting this development and pondering its potential ramifications for quite a while. Furthermore, reporters added, the new discovery came complete with already existing debate about whether this new technology would alter the value of the embryo. The language of the reports made the isolation of embryonic stem cells seem like the inevitable and expected next step in biotechnology. But what had these same news sources printed about the inevitability of human embryonic stem cell isolation before November 1998? In the fifteen years prior, *The New York Times* used the phrase "embryonic stem cell" only twice in science and technology reports in August 1996 and November 1989 and once in an editorial in February 1998. *The Washington Post* had slightly more to say on the topic with six reports between April 1990 and October 1997. The only 1998 mention of embryonic stem cells before November had occurred in a single *The New York Times* article in February about the senate's attempt to create a cloning ban.[26] Despite reporters' claims of apparent inevitability, Thomson's discovery had taken major news sources by surprise. This may explain why newspapers since then have taken embryonic

[25] Weiss, Rick, "A Crucial Human Cell Is Isolated, Multiplied," *The Washington Post*, 6 Nov. 1998: A1.
[26] Wade, Nicholas, "Senate Plans to Weigh Ban on Cloning," *The New York Times*, 19 Feb. 1998: A1.

stem cells more seriously. Between November 1998 and March 2004, *Washington Post* writers used the phrase "embryonic stem cells" two hundred and forty three times. *The New York Times*, not to be outdone again, used the phrase four hundred and fifteen times.[27]

Stem Cell Isolation: 1980-1989

While embryonic stem cells may have taken these newspapers by surprise, adult stem cells, formerly just "stem cells," received a generous amount of attention. *The New York Times* first referred to stem cells in story on David the 'bubble boy." The October 1983 article states that after David received a bone marrow transplant from his sister, doctors hoped the remaining "embryonic bodies known as stem cells" would hopefully "adapt themselves into cells compatible with David's body as they grow to maturity."[28] At the time, scientists used the designation "embryonic" to refer to any type of stem cell because they gave rise to other cells. As such, the article refers not to embryonic stem cells but the AS cells within the sister's bone marrow. The term stem cell first appeared in *The Washington Post* in October 1985 in the article "Righting Nature's Wrongs; Gene Therapy On the Threshold of Medicine's Next Revolution."[29] The article mentions only that stem cells have something to do with bone marrow, and that geneticists hoped to use them as transports of genetic therapy. In reality, scientists sought to genetically alter

---

[27] These numbers were obtained by searching the Lexis Nexis Academic database for the words in parentheses. Aside from the embryological term, "stem cell" can be used with botany. However, the numbers of articles with botanical references were approximately two or three out of one hundred and would make no significant difference in the final numerical results. In results with numbers below fifty, the botanical references were excluded.

[28] "3-Month Wait Seen For Boy in Bubble," *The New York Times*, 25 October 1983: A4.

[29] Squires, Sally, "Righting Nature's Wrongs; Gene Therapy On the Threshold of Medicine's Next Revolution," *The Washington Post*, 30 Oct. 1985: A10.

bone marrow stem cells and then use the altered cells to repopulate the system. Although AS cells proved difficult to isolate and alter, scientists continued to mix AS cells and gene therapy for the next decade. Both of these articles provided little or no scientific explanation or further information on stem cells. One possible explanation for this lack of information is that the scientific community did not fully comprehend adult stem cells and could only theorize on embryonic stem cells. These two articles also show that, despite their incomplete understanding, scientists understood the potential of modifying AS cells to produce deficient or altered cells. None of the stories from the early 1980s discussed ethical or political issues directly related to stem cells. However, several stories did mention ethical concerns regarding genetic engineering and asked the question that will dominate the biotech industry for the next two decades, "just because science can do something, does it mean that it should?"

Newsweek's early stories included better explanation of the scientific facts. Its first article in February 1983 entitled "Beefing Up the Bone Marrow," noted specifically that marrow stem cells give rise to both white and red blood cells.[30] The article stated that scientists at New York's Memorial Sloan-Kettering Cancer Center had discovered a means to disarm the white blood cells that interfere with tissue-immune acceptance. At the time, scientists hoped that this important achievement would allow for bone marrow transfusions from donors with inexact marrow matches. While this science never fully blossomed, a result of scientific complications in removing the white blood cells, it brought stem cells into the popular vernacular and encouraged scientists to pursue the

[30] Clark, Matt with John Taylor, "Beefing Up the Bone Marrow," *Newsweek*, 14 Feb. 1983, **102**, 7: 75.

idea of using stem cells to replace defective tissues or chemicals. Four more stories in *Newsweek* followed this initial use until 1986 when no articles mentioned stem cells until 1993. These four stories all concentrated on developments within the transplant sciences and discussed how bone marrow transfers could treat leukemia and childhood immunodeficiency diseases. As in newspaper articles of the time, none of these magazine stories mention political issues or ethical considerations surrounding stem cells. However, while it may have remained almost a decade away, some reporters did begin hint at the possibility of cloning sciences and complicated genetic therapy.

For the next decade and a half, ideas on using extracted or modified AS cells to treat disease grew and spread among the medical field. While neither scientists nor lay people knew precisely the final destination of the combined effects of all of this new technology, they both understood that bigger developments rested on the horizon. Before these new developments arrived, however, AS cells would become suspect for the cause of cancers that come about as the result of certain AS cells' improper divisions. Fortunately for stem cells, this negative attention spanned a brief time between 1985 and 1986. Hope for treatments of diseases with stem cells began in the late 1980s when reports of results on lab mice and other animals became increasingly prominent. In July 1988, *The Washington Post* reported that Stanford University Medical School researcher Irving Weissmanbone had isolated and grown mouse bone marrow stem cells in his lab.[31] The story went on to note that having succeeded in isolating mouse stem cells, scientists planned to begin attempts to isolate human AS

[31] Hilts, Philip J, "Stem Cells Grown in Lab," *The Washington Post*, 11 July 1988: A3.

cells. A month later *The New York Times* covered this exciting new topic with an examination of the potential of isolating these bone marrow stem cells. Harold M. Schmeck's article, exuberantly titled "'Holy Grail' of Blood Research Is in Sight," was one of the most important stem cell articles of the late 1980s.[32] The article not only notes the suspected success of attempts to isolate human bone marrow stem cells, but also examines the medical benefits of their pure isolation. While Schmeck focused mostly on advances with bone marrow treatments, he also noted that scientists still lacked a complete understanding of AS cells. Although mainstream science had not yet realized AS cells' full potential, this moment presents the first major attempts to specifically isolate human stem cells for treatment.

Throughout the 1980s, AS cells evolved from un-isolatable cells within the bone marrow to internationally pursued subjects of medical anticipation. The isolation and assay methods developed during this time would establish the foundations for future work with AS cells. Although neither scientists nor lay people realized the value beyond red blood cell regeneration, they began to formulate ideas about how these basic cells could replenish depleted or malignant cell populations. As scientists made advances in cell biology and gene therapy, bioethical considerations played an increasingly significant role with research and development of new procedures. Many research institutions created in-house bioethics panels, and the position of the bioethicist began. During much of the 1980s, bone marrow stem cells did not receive much attention from early bioethical or political discussions because they came from adult bone marrow

[32] Schmeck, Harold M. "'Holy Grail' of Blood Research Is in Sight," *The New York Times*, 23 Aug. 1988: C1.

donations, a donation process slightly more invasive than giving blood. As a result, scientists and doctors working with stem cells had relative freedom in how they conducted their research.

This freedom ended in 1989 when some scientists introduced bone marrow stem cells into the ongoing debate over transplanting aborted fetal tissue. In his February 1989 *Washington Post* article, "ETHICS: How Abortion Politics Stifles Science," John C. Fletcher claimed that current National Institutes of Health restrictions preventing the use of fetal tissue in research had encumbered drastic gains in both research and treatment options.[33] He supported using both the bone marrow stem cells from aborted fetuses and the extra embryos created by in vitro fertilization. Again, the stem cells he spoke of were not embryonic stem cells in the modern sense, but AS cells taken from the bones of late stage fetuses. In this case, the tissues came from fetuses or embryos that people had already aborted, but opponents argued that scientists should not violate the sanctity of the fetus by scrapping it for spare parts. Despite Fletcher's title "ETHICS," his only ethical contention is based on the simple but compelling argument: "why not utilize what already exists." In his statement, "obviously, scientists should not be permitted to do anything to a pre-embryo or fetus at any stage," Fletcher revealed the current ethical taboo against intentionally destroying a fetus or embryo for the pursuit of science."[34] From this point onward, proponents of fetal tissue transplant and later embryonic stem cell research echoed his complaint that anti-abortion arguments

[33] Fletcher, John. C, "ETHICS: How Abortion Politics Stifles Science," *The Washington Post*, 5 Feb. 1989: D3.
[34] Fletcher, "ETHICS," D3.

illogically and caustically immobilize beneficial research. Although the current stem cell debate does not typically focus on AS cells, this early association with fetal transplant tissue would accompany AS cells as scientists further explored their potential during the early and mid-1990s.

Stem Cell Growth: 1990-1997

In February 1990, stem cells took on a personal side when parents of seventeen year old Anissa Ayala decided to have a second child to save Anissa. Despite the four to one odds against producing a matching donor, her parents decided to do this so that Anissa's doctors could use the stem cell rich umbilical cord blood from their newborn to treat Anissa's leukemia. According to an Associated Press article, the event raised the ire of many bioethicists including law and medicine professor Alexander Morgan Capron of the University of Southern California who stated, "one of the fundamental precepts of ethics is that each person is an end in himself or herself, and is never to be used solely as a means to another person's ends without the agreement of the person being used."[35] For a second time, AS cells became associated with the ethical debate regarding the rights of the newborn and unborn. This article was the first to mention umbilical cord blood as a resource for AS cells, a fact that would become extremely important throughout the rest of the 1990s. In August of that year *The Washington Post* printed a similar personal interest story about a four year old boy with incurable leukemia who doctors successfully treated with his infant sister's umbilical cord blood.[36]

---

[35] "Baby Is Conceived To Save Daughter," *The New York Times*, 17 Feb. 1990: A10.
[36] Spolar, Chris, "Umbilical Cord Blood Used To Treat Boy's Leukemia," *The Washington Post*, 28 Aug. 1990: Z5.

Using infants' stem cell-filled cord blood to treat their ailing siblings remains in use as one of the major successes of stem cell treatments. These personal stories served to increase public familiarity and interest with stem cell and their treatment potential, and raised ethical questions of whether people should create embryos for the purpose of helping others. Some articles however remained free of ethical discussions. A July 1990 article in *The New York Times* entitled "Source of Hair Regeneration Found at an Unexpected Site" lauded new research in hair growth that demonstrated that small clusters of stem cells beneath the scalp were responsible for hair growth.[37] This discovery prompted scientists to rethink some of their earlier notions of tissue development because they had previously believed that hair grew strictly from the bulb at the base of the hair follicle. Within the non-scientific understanding, this required people to expand their conception of the term "stem cells." Now, people learned, stem cells existed not only within the bone marrow but also in the scalp and perhaps other places.

Perhaps one of the most important events in the history of AS cells occurred in September 1990 when an unidentified four year old underwent the first attempt at treating an immunological disease with gene therapy. This moment was noteworthy for stem cells not because they provided the source of the genetically modified cells but because it marked their failure to live up to expectations. Despite years of hope that stem cells could one day transport new genetic material, scientists had not yet adequately figured out how to isolate and manipulate them. Thus when *The Washington Post*

[37] Angier, Natalie, "Source of Hair Regeneration Found at an Unexpected Site," *The New York Times*, 3 July 1990: C3.

declared in their headline "First Gene-Therapy Patient Opens Door to Treating 4,000 Inherited Diseases" they noted that stem cells had failed to provide the answers which doctors had hoped for during the 1980s.[38] This failure marked a low point in the history of AS cell research. During the next two years, articles spoke only of bone marrow treatments and the use of placental and cord blood. Although articles in both magazines and newspapers mentioned stem cells, they did not report on them with the expectancy, personal interest, or detail that had been prevalent in previous reports.

Then in 1994, stem cells and other biotechnology received an enormous influx of attention from the media. To begin this important year for biotechnology, *Time*'s January 17th cover article, entitled "The Genetic Revolution," discussed the wide range of issues that could arise from new genetic treatments and research.[39] Within the broad topic of genetics, the article discussed genetic screening, gene therapy, and the ethical issues of what to do with the wealth of genetic technology sure to come. Stem cells come into the article when the authors discuss the first gene therapy treatment from 1990. Since the recipients received only white blood cells that eventually die, they would have to receive regular new infusions. In order to solve this issue, Dr. Michael Blaese of the National Institutes of Health isolated stem cells from his patient and grafted in the genetic alteration. He then injected the modified stem cells into one of the original gene therapy pioneers and watched the candidate thrive.[40] Although his team had not published the findings at the time, Blaese accomplished something that scientists

[38] Thompson, Larry, "Medicine's 4-year Old Pioneer: First Gene-Therapy Patient Opens Door to Treating 4,000 Inherited Diseases," *The Washington Post*, 25 Sep. 1990: Z8.
[39] Elmer-DeWitt, Philip and David Bjerklie, "The Genetic Revolution," *Time*, 17 Jan. 1994, **143**, *3*: 46-54.
[40] Elmer-DeWitt, "The Genetic," p. 50.

had pursued for years. His use of stem cells began a year of important gains in medicine and science as well as significant political involvement with the reinvigorated stem cell topic.

In February 1994, the NIH took one of the first steps in governmental intervention of biotechnology by creating the Human Embryo Research Panel. This panel, consisting of a varied field of researchers, ethicists, and medical doctors, assembled in response to the end of the federal funding ban on embryonic research established in the early 1980s, and to provide government supervision for the ongoing research within the biotech field. Although this panel's formation made for a momentous event, only *The Washington Post* mentioned it. In Boyce Rensberger's article "NIH Panel Looks at Ethics, Standards for Human Embryo Research," he noted testimony from scientists complaining that "in the absence of NIH's traditional peer review process, which scientists must pass to get government funding -- human embryo research has become dominated by a decidedly inferior brand of science."[41] Along with federal funding, they presumed, came federal oversight of the science. The panel faced ethical questions about in vitro fertilization, gene therapy, and the use of discarded human embryos for research. Although they had not yet isolated human embryonic stem cells, the article shows scientists pleading for national funding and oversight that would raise American science to the preeminence it held in other areas of research. This foray of federal interest in human embryonic research ended later that year when President Bill Clinton stopped the NIH from providing funds. Interestingly, the four major news

[41] Resenberger, Boyce, "NIH Panel Looks at Ethics, Standards for Human Embryo Research," *The Washington Post*, 7 Feb. 1994: A3.

sources missed this story completely. Why only one source noticed the formation of the panel and all four sources missed this significant series of events cannot be fully understood, especially since the events provided an interesting prelude to a debate that rages at the front of the current stem cell debate.

Most of the other important stem cell news reported between 1994 and 1996 consisted of stories similar to those earlier that decade. One medical issue that became increasingly important during this time dealt with saving placental and umbilical cord blood. In August 1994, *The Washington Post* published "The Littlest Donor; Umbilical Cord Blood Is a New Source of Marrow," and discussed how the more immature stem cells found in umbilical cord blood could treat bone marrow diseases.[42] Although the science itself was not new, the article discusses the new notion of storing cord blood for the purpose of creating a national cord blood bank system. In 1996, *Newsweek* wrote an article on the option of saving and storing a newborn's cord blood in case the child developed some immunological disorder later in life.[43] From this interest arose several companies that specialized in the refrigeration of cord blood, and although the process never reached the popularity they hoped, several companies still specialize in preserving cord blood. The only other medically significant news during this time period came in January 1995 when researcher Tao Cheng and David Scadden of the New England Deaconess Hospital in Boston announced in *Science* a new and simpler method for the isolation of bone marrow stem cells.[44] This progress increased stem cell yield to one in

[42] Colborn, Don, "The Littlest Donor; Umbilical Cord Blood Is a New Source of Marrow," *The Washington Post*, 2 Aug. 1994: Z10.
[43] Kalb, Claudia and Melinda Beck, "Seizing Nature's Lifeline," *Newsweek*, 29 Apr. 1996, **127**, *18*: 75.
[44] Kolata, Gina, "Crucial Advance Made in Blood Cell Research," *The New York Times*, 6 Jan. 1995: A16.

five of the blood cells separated rather than one in fifty or one hundred. Clearly this discovery would provide significant assistance to those studying bone marrow stem cells in the future.

Once again, major news sources missed the significant political advances regarding stem cells during the mid 1990s. In 1995, President Clinton issued an Executive Order to create the National Bioethics Advisory Commission. Although the commission would eventually become defunct, it was intended to evaluate the issue of federal funding for embryonic research as well as private sector research. When the creation of Dolly the sheep became public in 1997, President Clinton encouraged the NBAC "to undertake a thorough review of the legal and ethical issues associated with the use of this technology."[45] In 1996, the newly seated Republican majority began annual bans on public funding for any research using human embryos not just research requiring the destruction of an embryo. From this point, the political parties began to take sides within the embryonic and stem cell research debates. Again, why the newspapers ignored these significant political events remains unexplained. Perhaps they ignored the topics because embryonic research had not yet produced any significant scientific or medical achievements that the reading public would consider interesting. Regardless, they would correct their missteps regarding the early stages of the political debate when science provided a momentous achievement with the creation of Dolly.

Ian Wilmut and Keith Campbell of the Roslind Institute in Scotland created the first clone from an adult sheep mammary cell in July of 1996. Between July and late

---

[45] Clinton, Bill in "*Cloning Human Beings: Report and Recommendations of the National Bioethics Advisory Commission*," (Rockville, MD: National Bioethics Advisory Commission, June 1997).

February 1997, when the team made the results public, they cloned nine lambs from adult cells and forever changed biotechnology's prominence within the news and attention of popular culture. Understandably major news sources across the globe quickly seized on the topic with a deluge of articles covering all aspects of the story. Not only did every story report the scientific details of the process, but they also discussed the ethical and political impact that such a discovery would surely have. "The real question, of course," as *Newsweek* reporter Sharon Begley put it, "was, wherever the lamb went, was Mary sure to follow?"[46] The ability to clone humans, once thought impossible by mainstream science, became, in the matter of a few days, a distinct possibility if not probability in the minds of everyone. This spark from the scientific community ignited a large public discussion on how society should employ this new technology and its forthcoming progeny. This conversation took place within the pages of newspapers and magazines, the halls of government, the hearings of ethics boards, and the normal work place. Although the debate over embryonic stem cells had not yet come in force, the publicity and discussion of cloning set in place many of the issues that would constitute the heart of the stem cell debate.

While most news attention focused on the cloning story, a few articles followed the course of stem cells during 1997 albeit they mostly occurred in connection with cloning. In July 1997 stem cells made news in their own right when scientists announced they had managed to influence bone marrow stem cells to reproduce within the lab. However, as *The New York Times* reported, as the cells divided they became

---

[46] Begley, Sharon et al., "Little Lamb, Who Made Thee," *Newsweek*, 10 Mar. 1997, **129**, *10*: 52-58, on p. 52.

more developed and lost their plasticity.[47] The inability to reproduce in the lab has remained the main problem with using AS cells, and stands as one of the major arguments against pursuing treatments from AS cells. Political and ethical discussion dominated the rest of the significant stem cell news. In June, *The Washington Post* reported that ethics boards in both the United States the European Union had come to a decision on the future of human cloning.[48] Both boards determined that cloning with the purpose of producing an adult clone should be prohibited. Interestingly they also both agreed to allow cloning for the purpose of research as long as researchers never implanted the embryo in a uterus. With this approval, scientists could continue to create and destroy embryos for the purpose of science as long as they used no federal money for the destruction of embryos. The article mentions stem cells as one of the promising new sciences that would come from future work with these non-implanted embryos. With this ethical clearance, James Thomson and the other teams attempting to isolate embryonic stem cells could bring their research efforts to fruition.

The 1990s saw an explosion of growth first in bone marrow and umbilical cord stem cells and second in cloning and embryonic research. Although reporters did not give much attention to the possibility of ES cells, they did mention them as possibilities of where biotechnology might go next. Most likely, reporters did not fully understand exactly what an embryonic stem cell was. During 1996 and 1997, scientific teams had begun to theorize about and search for ES cells but they had no promise of actually

---

[47] Riordan, Teresa, "Patents; A Doctor Finds a Way to Induce Rare Bone Marrow Cells to Reproduce Themselves in the Laboratory," *The New York Times*, 7 July 1997: D2.
[48] Herman, Robin, "European Bioethics Panel Denounces Human Cloning," *The Washington Post*, 10 June 1997: Z19.

isolating them. Instead, most ethicists, politicians, and laypersons focused on the multiple issues of cloning and embryonic research. Significantly, the discussion of these arguments set foundations for the multifaceted debate over embryonic stem cells that would soon ensue.

Stem Cell Divide: 1998-2000

The four years between 1998 and 2001 would prove to become the crucial years for the stem cell debate. Within this period the *New York Times* referred to the term "stem cell" in an astonishing 664 articles. *Newsweek*, who had used the term only eight times between 1980 and 1997, used "stem cell" in sixty-seven articles. Clearly the age of stem cells had arrived. During these four years political parties would become polarized on the issues, states would create bans on research, debate over ethics would spread from institutional boards and journals to the United States Congress, and scientists would race to keep up with the rapidly expanding firestorm they had ignited.

Until November 1998, no one could have predicted the unfurling of events over the next four years. Throughout 1998, stem cells remained buried within articles about cloning. In most cases, reporters continued to mention stem cells as a useful and possible byproduct of increased embryonic research. In February, *The New York Times* printed an editorial by bioethicist John A. Robertson of the University of Texas in which he noted that to ignore embryonic research could prevent new treatments such as ES cell and fetal tissue transplants.[49] Although some stories noted the possibility of ES cells, few gave any explanation. All this cloudiness ended quickly in November. From

[49] Robertson, John A., "Debate on Human Cloning Ignores Some Benefits," *The New York Times*, 3 Feb. 1998: A22.

November 6th to the end of the year, *The New York Times* and *The Washington Post* produced nearly thirty articles dealing with the newly discovered ES cells. Interestingly though, most of the articles did not focus on the science that had led to such a creation. Both papers exhausted explanations of the new science and even the potential medical benefits within the first two or three days after *Science* printed Thomson's article.

Reporters filled the gap with articles discussing a combination of politics and ethics. As early as November 7th, *The New York Times* printed an article entitled "A Ban on Cells That Could Heal."[50] This small article from the editorial desk argued that Congress should abolish the ban on federal funding of embryonic research because the "gains are potentially enormous and the ethical problems appear minimal."[51] This understatement highlights the initial surprise that scientists and ES cell research proponents experienced in the early debate. Many of the proponents could not understand why the pro-life lobby would find using frozen embryos ethically problematic. They quickly discovered that opponents such as the National Right to Life Committee and the American Family Association not only decried the destruction of implanted embryos, but also resented the destruction of an embryo for any purpose. Aware of their new albatross, ES cell proponents quickly began to argue for federal funding for research on stem cells already derived from embryos. Soon the NIH requested to hear from lawyers on whether the Congressional ban included ES cells because they were technically not embryos. On November 10th, *The New York Times*

[50] "A Ban on Cells That Could Heal," *The New York Times*, 7 Nov. 1998: A14.
[51] "A Ban," p. A14.

printed an article explaining the complexities of the Congressional ban.[52] The last significant article during this initial rush came from *The Washington Post* on December 3rd. Rick Weiss' article stated that scientists had once again appeared before the Senate to testify as to the necessity of lifting the federal funding ban.[53] As long as the bans existed, they claimed, the United States could not become the world leader in ES cell research. Furthermore, Weiss claimed that scientists and ethicists believed Congress had enacted the ban to prohibit the creation of an adult clone. As previously noted, Congress had actually created the ban to prevent federal funding of research that destroyed an embryo not created one. Regardless, the senate hearings would have no effect, and the ban remained in place.

While scientists failed to have the ban lifted, they won the other point of contention. In January 1999 the Department of Health and Human Services handed down its decision that the NIH could provide funding for research performed on stem cells. Although the NIH would not create guidelines for getting grants until later that year, researchers rejoiced that they could now get federal funding as long as they did not create or destroy embryos. With the possibility of this new source of funding, ES cell proponents hoped for significant advances for treatment of spinal cord injuries, Parkinson's disease, Alzheimer's disease, and more, but 1999 would witness almost no medical or scientific advances.

---

[52] Wade, Nicholas, "Primordial Cells Fuel Debate on Ethics." *The New York Times*, 10 Nov. 1998: F1.
[53] Weiss, Rick, "Ban on 'Stem Cell' Testing Reviewed; At Senate Hearing, Advocates Offer Evidence of Research's Medical Promise," *The Washington Post*, 3 Dec. 1998: F1.

Instead, following the January announcement, politicians began a year of defining the debate. Even before Health and Human Services had come to a decision, *The Washington Post* published an editorial by researcher Daniel Perry entitled "Promise (and Pitfalls) of Research."[54] Perry argued that the possible benefits of ES cell research outweighed the ethical concerns some people held. He claimed that the thirty years of abortion debate had so debilitated the United States Congress that it could not reach a reasonable and fair decision. Furthermore, he suggested, "elected officials with little or no scientific training are neither well prepared nor generally comfortable with parsing issues of cell biology."[55] Unreasonable as it may be, Perry preferred that ignorant legislators not waste their time trying to figure out minute ethical details and instead trust that scientists would make good moral decisions. Neither the legislative nor executive branches would prove so obliging. Instead they both spent much of 1999 listening to testimony from researchers and convening ethics panels. One such panel did provide some hope for researchers in April when it announced that researchers could use federal funds to purchase ES cells already destroyed by privately funded labs. Despite opposition from the House Pro-Life Caucus and the National Conference of Catholic Bishops, the panel agreed with Secretary of Health and Human Services Donna Shalala that such funding did not violate the Congressional ban.[56] In 1999 the United States government took control of the ES cell topic, and consequently slowed the advance that many proponents had expected.

---

[54] Perry, Daniel, "Promise (and Pitfalls) of Research," *The Washington Post*, 7 Jan. 1999: A25.
[55] Perry, "Promise," p. A25.
[56] Wade, Nicholas, "Panel Drafts Rules For Human Embryo Study," *The New York Times*, 9 Apr. 1999: A20.

One of the few scientific advances made during 1999 came from the unexpected source of AS cells. According to a May article from *The Washington Post*, scientists discovered a technique using rats to turn bone marrow into liver cells.[57] This significant event suggested the possibility that some AS cells could form cell types and tissue other than those they normally form. For the first time, this raised the question: "if AS cells could be coaxed into becoming other types of tissue then could AS cells supplant the ethically contested ES cells?" In April 2000, Rick Weiss of *The Washington Post* wrote an in depth article on the further potential of such "cell alchemy."[58] In his article, Weiss commented that scientists had already discovered how to manipulate neuronal cells to morph into other types of valuable cells, and that in April 1999 a team from Baltimore reported being able to turn bone marrow stem cells into bone, muscle, cartilage, ligament, tendon, and fat tissue. A similar article from *The New York Times* in August of 2000 reported that scientists had managed to take human bone marrow stem cells and turn them into neuron cells.[59] Clearly this incredible discovery held great promise for treatment of diseases such as Alzheimer's and Parkinson's which are both caused by the depletion of neuron cells. Despite these significant gains in the laboratory, AS cells remained a secondary aspect within the ongoing stem cell debate.

One argument currently put forth by several opponents of ES cell research, such as conservative bioethicists, reporters, and scientists, holds that major news media have

---

[57] "Bone Marrow Cells Can Become Liver Tissue, Animal Studies Show," *The Washington Post*, 14 May 1999: A19.
[58] Weiss, Rick, "In Cell 'Alchemy,' an Alternative to Embryo Studies," *The Washington Post*, 24 Apr. 2000: A11.
[59] Kolata, Gina, "Scientists Find New Method Of Producing Nerve Cells." *The New York Times*, 15 Aug. 2000: A10.

ignored the advances made in AS cells, and indisputably news media have reported more thoroughly on the ES cell debate. In hundreds of articles printed between 1999 and 2000, only a few dealt with the possibilities posed by advances in AS cells. However, the news media cannot be held completely responsible for ES cells overshadowing AS cells. The attention given to ES cells has been fueled by intense political and ethical interest, and so the news media often find stories on ES cells more appealing to their readership. Most of the stories in both newspapers and magazines that provided examples of successful treatment options involved AS cells. For ES cell opponents to suggest that popular media excludes developments on AS cells is not entirely correct because, as demonstrated here, they have reported their successes. Still, news sources could improve their coverage of the overall topic and more clearly present the weaknesses and strengths of both. By equalizing coverage, news media could give the public a more extensive familiarity with the debate and its multiple medical, ethical, and political complexities.

Perhaps the most compelling reason to increase reporting on AS cells should be that since 1998, ES cell research has been crippled by debate and managed to yield few notable advances. The remainder of 1999 and most of 2000 progressed much like the early part of 1999. Despite a large pool of articles on ES cells, few of them brought significant new information. As the government trudged on in its attempt to regulate federal funding and research progressed without any marked discoveries, newspapers and magazines focused on the continuing moral issues of ES cells. During 2000, similar pleads for Congress to lift the federal funding ban continued, and opinion pieces

readdressed the necessity of working through the slue of ethical issues. All the while, articles continued to report on the successes of AS cells. One Reuters' article in February demonstrated the continued confusion among the press as to the difference between ES and AS cells. In the article, the author began by reporting of scientists at the University of Florida using stem cells to treat diabetes in mice. The article then proceeded to state that "stem cells have been the subject of much interest since their potential was discovered just over a year ago."[60] The problem was that for the rest of the article the author discussed the scientists' use of AS not ES cells as his or her other commentary led the reader to believe. During the article the author claimed that such advances should fuel future stem cell research but without actually saying which stem cell research. Although most articles on AS cells provide more information, this type of confusion over stem cell types is one of the problems that opponents of ES cell research decry.

In the area of biotechnology business, reporters wrote with better clarity. Private biotechnology companies arose during the late-1980s but did not reach their height until after the economic and scientific growth of the mid-1990s. With the advent of ES cells and their expected revolution of medicine, investors immediately became interested in biotech of all types. Geron, the company that had funded James Thomson and other embryonic research pioneers, quickly found stout competition from numerous startup biotech companies during 1999 and 2000. Because the United States could not provide funding for the creation or destruction of embryos, research relied heavily on the money

[60] "Scientists Say Cell Treatment Can Reverse Diabetes in Mice," *The New York Times*, 29 Feb. 2000: A19.

provided by biotechnology companies planning to purchase the patent once the researchers had made the discovery. Evidence of the fast growth of these companies appeared in the business pages of both newspapers and magazines during 1999 and 2000. Needless to say, the subsequent delays and absence of patentable scientific results from embryonic research deflated the biotech bubble. After 2001 investor excitement over biotechnology has waned but by no means disappeared. One of the inherent aspects of biotechnology, as scientists regularly remind, is that significant and profitable progress often moves slowly. Since 2000, the market has eliminated several biotech companies and adjusted to the slower pace of the industry.

As 2000 progressed, the media's attention turned to the upcoming election. While stem cells had become a hotly debated topic, they had not reached the point that newspapers brought them into campaign articles. Despite the press' apparent lack of interest, the candidates did have separate opinions on where they believed stem cell research should progress. The campaign helped to define where the parties stood regarding bioethical issues, because the candidates offered their, and subsequently those of many in their parties, views on the direction of stem cell research. Vice-President Al Gore supported research in all areas of technology, especially stem cells, and said he would allow federally funded laboratories to create embryos with the intent to create new stem cell lines. Many in the Democratic Party, with the backing of many scientists, largely supported this method and claimed embryological stem cells held greater promise for treatment, but would require the creation of new lines to maintain an adequate supply of stem cells. Meanwhile, Texas Governor George Bush claimed, to the

delight of the pro-life lobby, he would not support technology "that involves the destruction of live human embryos."[61] Most, but not all, Republicans rallied behind Bush and claimed that, as with abortion, the destruction of a human embryo represented the destruction of human life.

The years between 1998 and 2000 witnessed the government's and the public's reaction to ES cells. Many proponents of ES cell research, such as the American Medical Association, claim that the government's slow reaction to the events has cost science and patients the many promises that researchers initially promised. While this may be the case, the delays were not without warrant. To dive headlong into an area surrounded with such enormous moral questions could have mired research beyond where it is today. The events of this time period had two important outcomes, one good, one bad. First, the combination of the government's engulfing and the press' reporting assured that the public and the political process would provide guidance on the future of stem cell research. While not all people may see this as a good thing, in a democratic society, the citizens rather than a small group of individuals should decide issues of such magnitude. Second, the issue fell along the pro-life/pro-choice divide. While this fact served in the stemming of the research tide, it has since fallen short of fully comprehending the aspects of the debate. The issues of embryonic stem cells deserve an accounting of the ethical issues in its own right. From 2001 to the present, ethicists, politicians, and the public have attempted to do this, and have had mixed results.

---

[61] "Candidate Bush opposed embryo stem cell research," (CNN.com, 9 Aug. 2001). <www.cnn.com/2001/ALLPOLITICS/08/09/bush.history.stem.cell/index.html>

Stem Cell Decision: 2001 to the Present

In August 2001, stem cells received more attention from the press than in any month before or after. The month stood as the zenith in a year that had been filled with news on stem cells. On January 26th, only a few days after President Bush took office, Rick Weiss of *The Washington Post* reported that "Fetal Cell Research Funds Are at Risk; Scientists Fear Curbs Over Abortion."[62] As his title indicated, ES cell proponents now feared that the new conservative president would attempt to cut the federal funding for ES cell research that had been established under President Clinton's administration. Although such a possibility existed, the President would first have to overcome differing opinions within his own administration. In June, Ceci Connolly and Rick Weiss coauthored a *Washington Post* article that noted the division over stem cells that existed within his cabinet. According to the article, Secretary of Health and Human Services Tommy Thompson preferred to allow federal research on stem cells, and stated, "hopefully we'll come up with a decision that's going to allow for the continuation of research, which is very important, and at the same time take into consideration the legal and the ethical questions that have to be considered."[63] Congress likewise found the issues complex. In July, *The New York Times* released a series of stories that covered how various factions within Congress favored different approaches to the issue. Among headlines such as "61 Senators Call for Stem Cell Research" and "Conservatives

---

[62] Weiss, Rick, "Fetal Cell Research Funds Are at Risk; Scientists Fear Curbs Over Abortion," *The Washington Post*, 26 Jan. 2001: A3.
[63] Connolly, Ceci and Rick Weiss, "Stem Cell Research Divides Administration; Thompson Expresses Optimism That a Compromise Will Be Reached Soon," *The Washington Post*, 12 June 2001: A8.

Pressure Bush In Cell Debate," the articles addressed how finding a compromise could prove precarious for President Bush.

To add to this precariousness, ES cells had finally shown signs of scientific progress. In July 2001, *The New York Times*' article, "Researcher Sees Early Success Using a 2nd Type of Stem Cell," claimed that researcher John Gearhart of Johns Hopkins University had managed to make damaged nerves in mice move again by injecting ES cells.[64] While this treatment did not use ES cells to regenerate cells, it showed that ES cells could reinvigorate damaged cells. Then on April 27th, both newspapers published articles on three studies using ES cells that showed hope for diabetes and Alzheimer's treatments. In one study, scientists had shown that old rats injected with human fetal brain cells gained improved memories. This would be useful to patients with Alzheimer's who experience gradually decreasing brain function. In the second study, scientists used chemicals to stimulate ES cells to grow into pancreatic cells that could produce insulin that diabetics lack. In the third, scientists cloned rat embryos and proved that the ES cells created from the clones matched the donor's DNA exactly.[65] Scientists and ES cell proponents finally managed to produce useful and eye-catching results not a moment too soon. While these findings showed no sign of producing a treatment, they did provide kindling for the debate raging in American politics.

---

[64] Wade, Nicholas, "Researcher Sees Early Success Using a 2nd Type of Stem Cell," *The New York Times*, 26 July 2001: A14.
[65] Weiss, Rick, "New Potential for Stem Cells Suggested; Findings of Three Studies May Affect Treatment of Diabetes, Alzheimer's Disease," *The Washington Post*, 27 Apr. 2001: A2.

On August 10, 2001, President Bush announced that after much deliberation he had decided to disallow the creation of new stem cell lines and allow use of only the sixty four already existing and in compliance with certain specifications. Bush explained he could not cross a "fundamental moral line by providing taxpayer funding that would sanction or encourage further destruction of human embryos that have at least the potential for life."[66]

Bush's decision satisfied almost no one, as *Washington Post* reporter Michael Ruane quickly pointed out in his August 11th article, "Stem Cell Decision Only Adds To Debate; Many Oppose Bush Plan; Others Say It's Too Limited."[67] In article after article, newspapers and magazines addressed what the announcement meant, and noted the wide disagreement. Most of the articles discussed the fact that researchers believed the limitation would make stem cell lines difficult to obtain and consequently slow research. Other articles, noted that the President's attempt at compromise had created a renewed interest in ethical questions and a new zeal among supporters and opponents. Some August articles did suggest that good could come from Bush's decision. On August 18th, *The New York Times* printed an article entitled "Officials Say Bush's New Stem Cell Policy May Streamline the Research Process."[68] The article suggested that since Bush's decision had scrapped the strict guidelines imposed by the NIH under the Clinton administration, scientists might have an easier time getting funding. The renewed

---

[66] "Bush to Allow Limited Stem Cell Funding," (CNN.com. 10 Aug. 2001). <www.cnn.com/2001/ALLPOLITICS/08/09/stem.cell.bush/index.html>

[67] Ruane, Michael, "Stem Cell Decision Only Adds To Debate; Many Oppose Bush Plan; Others Say It's Too Limited," *The Washington Post*, 11 Aug. 2001: B1.

[68] Wade, Nicholas, "Officials Say Bush's New Stem Cell Policy May Streamline the Research Process," *The New York Times*. 18 Aug. 2001: A10.

attention encouraged *Time* to publish a cover story simply titled "Stem Cells." The August 20th article named the top stem cell scientists and for the first time provided an in depth history of ES cell research since Thomson's 1998 isolation.[69] An editorial from *The New York Times* printed on the same day entitled, "The Genius of George W. Bush," claimed that while Bush's decision had not satisfied either pro-life or ES cell research supporters, it had been a political success for him.[70] By reaching a compromise, Bush managed to set himself apart from the intense political battles that had ensued and would continue over stem cells.

Discussion of Bush's decision continued with high volume through the end of the year. While the events of September 11th moved political attention from the topic, the press continued to cover the repercussions into 2002. However, as the country became increasingly embroiled in its War on Terrorism, stem cells experienced a trough in the news. On November 28th, President Bush issued and Executive Order to create The President's Council on Bioethics. This board, headed by Leon Kass of the University of Chicago, would look into many issues regarding the wide range of topics within bioethics. While reporters continued to report on researchers' calls for more access to stem cells and the ethical issues received renewed coverage, news sources published few scientific or political events during 2002. One of these few significant events occurred in March when two preliminary studies conducted in Florida and Scotland suggested that AS cells may not prove as flexible as previous studies had shown. According to *The Washington Post*'s Justin Gillis, the new studies stated that the earlier demonstrations of

[69] Lemonick, Michael D, "Stem Cells: America's Best." *Time*, 20 Aug. 2001, **158**, 7: 54-55.
[70] Rich, Frank, "The Genius of George W. Bush," *The New York Times*, 18 Aug. 2001: A15.

AS cell plasticity may have resulted from unpredictable reactions with other types of cells.[71] Although Gillis does admit that the results required more scrutiny, those who complain that the media gives preference to ES cell research could note the title, "Questions Raised on Stem Cells; Adult Cells Found Less Useful Than Embryonic Ones," as an example of media bias. In fact, if such a bias does exist, 2002 could have been the beginning. During this lull, few articles fully addressed the AS cell topic. Instead, news focused on smaller details such as who supported ES cells and who did not.

Throughout the later history of stem cells, ethics became a topic to fall back on during droughts of medical or political news. Many of the articles combed over the ethical issues without actually adding any new perspectives. As stem cell interest waned, articles began relating stem cells to cloning as they had before 1998. By December 2002, the debate had been reduced to contests over words. As *The New York Times*' Nicholas Wade noted in his article, Leon Kass of The President's Council on Bioethics had determined that the new term "therapeutic cloning" invented by Stanford researchers to describe the creation of an embryo for the purpose of using its stem cells was too euphemistic.[72] Although the term would become adopted, Kass objected that the name did not fully express the fact that the process still required the creation of a clone. Because scientists could derive stem cells without implanting an embryo, they argued that therapeutic cloning was not cloning because scientists would never implant

---

[71] Gillis, Justin, "Questions Raised on Stem Cells; Adult Cells Found Less Useful Than Embryonic Ones," *The Washington Post*, 14 Mar. 2002: A3.
[72] Wade, Nicholas, "Word War Breaks Out In Research On Stem Cells," *The New York Times*, 21 Dec. 2002: A16.

the resulting embryo. As arguments became increasingly nebulous and complicated, both stem cell news and the debate needed something less abstract to rejuvenate it.

In 2003 it received just that from both politics and medicine. In Bush's January State of the Union Address, he mentioned the importance of stem cells and cloning. Although the media paid little attention to his statement, Congress did. In early 2003, members in both Houses produced multiple cloning bills. David Weldon (R-FL) and Bart Stupak (D-MI) offered the first and the most prominent bill (HR 534) in January 2003. This bill sought to prevent cloning of embryonic cells for any purpose including stem cell research derived from embryonic destruction. The other prominent House bill (HR 801), sponsored by Jim Greenwood (R-PA), would have outlawed the creation of embryonic clones only for the purpose of reproduction, but would have allowed development of stem cells for the purpose of experimentation.[73] The Senate produced several similar bills. Sam Brownback (R-KS) and Mary Landrieu's (D-LA) bill (S-1989) made similar allowances to those in the Weldon-Stupak bill. These bills sought to disallow the creation of clone embryos with the intent to destroy them for their contents. The Brownback-Landrieu bill did support the use of other nondestructive cloning for stem cells and tissue. Senate bills that coincided with the Greenwood bill, Specter-Harkin (S. 1893) and Feinstein-Kennedy (S. 1758) likewise supported cloning of embryos to provide research material.[74]

---

[73] Carey, Mary Agnes. "House Considers Cloning Ban," (C-span.org, 24 Feb. 2003). <www.c-span.org/capitolspotlight/cq022403/preview.asp>

[74] "Human Cloning Legislation in Congress," (www.cloninginformation.org, Feb. 2003). < http://www.cloninginformation.org/info/talking_points.htm>

News media covered this legislative activity from a distance. On January 30th, *The Washington Post*'s Rick Weiss wrote an article that explained the basic issues within the debate as well as the supporters of various bills.[75] Weiss, whom opponents of ES cell research claim reports with a distinct pro-ES cell bias, made no mention of Democratic support from Landrieu or Stupak, but did note the Republican support of the bills in favor of increased ES cell and cloning research. *The New York Times* took a different approach to the ongoing political debate, and on January 24th published an editorial from Leon Kass insisting that Congress needed to separate the stem cell issue from cloning in their pursuit of legislation for both.[76] Both sides of the stem cell debate favored such an action. Since few people support cloning, ES cell opponents believed that by splitting the debate they could illegalize cloning in general and put an end to the possibility of therapeutic cloning. Proponents realized that as long as ES cells remained attached to cloning that they would not get evaluated on their own merit. Despite the support for splitting them no new legislation arrived. The Weldon-Stupak bill passed the House on February 28, 2003, but Democratic leadership managed to pigeonhole the Brownback-Landrieu bill and it never came to vote. The bills closely resembled many of Bush's 2001 statutes, but dealt more specifically with the production of cloned embryos for the purpose of research. Had the bill passed, not only would the government refuse funds to embryo destroying research but also would have forbidden the private sector from cloning embryos for any purpose.

---

[75] Weiss, Rick, "Debate About Cloning Returns to Congress: Senate Considers Ban Affecting Human Embryos," *The Washington Post*, 30 Jan. 2003: A9.
[76] Kass, Leon, "How One Clone Leads to Another," *The New York Times*, 24 Jan. 2003: A23.

As the war in Iraq became more politically important, ES cell and cloning news dropped from politics and returned to ethical discussions similar to those that had occurred during 2002. Unlike 2002, the newspapers printed a few stories about the progress of AS cells in treating various diseases. In a March article titled, "Bone Marrow Harbors Cells That Can Fix the Pancreas," *The New York Times* reported recent discoveries by doctors that suggested bone marrow cells could "repair the liver, the heart and now the pancreas".[77] The article also pointed out the difference between AS and ES cells, but noted that scientists believed they needed to continue research on ES cells. Another article in April reported that doctors could now perform stem cell transplants from donor's corneas that would allow recipients to grow valuable epithelium tissue and defeat blindness from burns or rare diseases.[78] During this time, no articles reported treatment successes using ES cells. While some ES cell opponents would suggest that this was indicative of ES cells failure to produce any treatments, the fact that the government had slowed ES cell treatments needs to be taken into account.

Despite their impediments of lack of federal funding and a limited number of ES cell lines, researchers continued to plod on and produce treatments as quickly as possible. A September article from *The New York Times* reported that "Researchers on Stem Cells Are Making Do, and Hoping."[79] Since Bush's decision in 2001, most researchers had continued in both their research and their efforts to encourage the Bush

---

[77] Wade, Nicholas, "Bone Marrow Harbors Cells That Can Fix the Pancreas," *The New York Times*, 15 Mar. 2003: A12.
[78] Kinkead, Gwen, "Stem Cell Transplants Offer New Hope in Some Cases of Blindness," *The New York Times*, 15 Apr. 2003: F7.
[79] Santora, Marc, "Researchers on Stem Cells Are Making Do, and Hoping," *The New York Times*, 17 Sep. 2003: B5.

administration and Congress that their work would need more time and funding before it could produce its anticipated results. Currently, the NIH supports increased scientific efforts in both AS and ES research, and it claims that neither one should not be considered more important than the other. Extremely bright and talented researchers currently work on both veins, and as research continues, it becomes more apparent that each kind may prove more suited to its own set of cures. Even so, as long as political and ethical contention exists over ES cell research, scientists will have the burden of simultaneously researching and validating their research to the public. The thing researchers probably need more now than anything is a renewed interest in ES cell science and treatments from the public. Researchers in the United States got a surge of help from their South Korean colleagues when they announced the first successful isolation of stem cells from a cloned embryo in February 2004. Although this reignited the editorial pages and increased article output, it has not yet managed to take root in the American conscious. The year 2004, however, is still relatively young and rumors have already begun about new Congressional legislation on cloning and stem cells. ES cell research has spent most of its grownup life under a conservative administration. With the possibility of a new administration in early 2005, the remainder of 2004 will hopefully provide an opportunity to work out some of the complex moral issues at play.

CONCLUSION: A STEM CELL FUTURE

As a result of the vast interest and significance of stem cells, an almost inexhaustible supply of newspaper and magazine articles exists on the topic. Electronic and televised news, sources from which most people now get their news, hold an even greater supply of information on stem cells. The type of news available on the internet, as in all things, varies greatly based on the specific agendas of the page. Most of the major news sources on the internet such as cnn.com, foxnews.com, etc. contain information similar to what has been presented in this paper. Other news and information on the subject varies greatly in accuracy and truth. Since ES cell research and cloning have become such debated topics, an almost endless amount of information, both true and untrue, exist on the internet. As such, searching through even a small portion of the total resources of news and discussion would be extremely difficult and far beyond the capacity of this paper and most likely any paper. Instead, this paper discusses the major moments in the history of stem cells as reported in major news sources. It is by no means a comprehensive review of stem cells in the media as it pays little attention to the location of the stories within the pages of the newspapers and magazines. Since the early 1990s, stem cell have been on front pages and cover stories as well as buried within the later pages. As such, this paper serves as only a general indicator of how the popular press has covered the major medical, ethical, and political issues within the stem cell debate. News sources typically cover these three sides because they realize that the general public's attention focuses on the aspects of the debate that affect or have the potential to affect them the most. Based on observations of

news coverage from the past decade and a half, the media foremost discuss possible medical applications, followed by the political issues and then ethical considerations involved.

Stem cell coverage began in the early 1980s with articles solely mentioning the potential medical advances of a new and relatively unknown aspect within anatomy and physiology. Scientists focused intensely on adult stem cells found within the bone marrow, and although these cells proved difficult to isolate, scientists continued research efforts with the hope that stem cells could one day transport regenerative gene therapy. Despite the fact that AS cells never fulfilled their initial expectations, scientists spent the latter parts of the 1980s expanding their understanding and developing techniques for isolation that would prove extremely valuable to the important advances made during the 1990s. In the early part of the 1990s, news sources added a personal side to the medical treatments with several stories on the umbilical cord blood from infants being used to treat the otherwise incurable leukemia of their older siblings.

As the 1990s progressed, scientists continued their research on bone marrow transplants and the isolation of adult stem cells. Then in 1998 with the advent of embryonic stem cells and their pluripotency, scientists sought to discover the ability of both ES and AS cells to form completely new tissues. Work on these theories has proceeded to today within laboratory and animal testing, but despite successes with some lab and animal trials, no revolutionary medical treatments have come from these studies. Most articles since 1998 proclaim the creation of radical new treatments for diseases such as Parkinson's, Diabetes, and spinal cord injury as a result of continued and

research on ES cells. These treatments are typically listed as compelling reasons to expand and fund ES cell research. However, an equally common statement in news stories from doctors and researchers pursuing these treatments has been that possible treatments are ten to fifteen years away. Some people feel, as expressed in cartoonist Mike Luckovich's cartoon "Stem Cell Research" (Figure 1), that the promises of revolutionary new treatments have fallen short. Regardless, news sources have been rife with ES cell content during 2004 as a result of South Korean scientists' creation of cloned ES cells and the consequent renewed interest in the future of American stem cell and cloning sciences.

Figure 1: "Stem Cell Research"
By permission of Mike Luckovich and Creators Syndicate, Inc.
Copyright, 2003.

While medical advances have been at the heart of stem cells since newspapers first reported on them, politics remained almost completely absent from early discussion of stem cells. Although stem cells had been in the news since the early 1980s, reporters presented few connections between stem cell research and politics until John Fletcher's article "ETHICS: How Abortion Politics Stifles Science." While Fletcher had no idea about embryonic stem cells, he made the argument that reporters, bioethicists, and eventually politicians continue to make today. They claim that politics surrounding the abortion debate have wrongly carried over and interfered with the progress of science and medicine. The modern political debate over stem cells however did not have its basis until Thomson isolated ES cells. Since the 2000 election, stem cells and cloning have become a major but not decisive point of political contention and promises to remain one in the near future. The political realm has attempted to guide and evaluate stem cell research with the National Institutes of Health guidelines on allowable research, President Bush's declaration of limitations on federal funding, and creation of The President's Council on Bioethics, have yet to create a federal standard on research. Currently, all sides would agree that the most important political issue involves the creation of federal legislation to deal with the many issues generated by stem cell research. Surprisingly, the United States has become one of the last developed nations to come to a decision on the future of stem cells. While several states have already decided to ban or fund research, the future path of stem cell research in the United States will remain in limbo until the federal government creates definitive and encompassing legislation.

Necessary to the creation of such legislation will be the consideration of the ethical ramifications within the stem cell debate. News sources have related stem cells with ethical issues since scientists first planned to use them in genetic therapy, and, although the exact ethical questions have changed, the fundamental question about the limits of science remain. The creation of ES cells significantly elevated the intensity and complicated the moral debate surrounding stem cell use. One important result has been the ethical debate's shift out of the realm of institutional bioethicists and into a more open forum. While people involved in the sciences or President's Council continue to author the majority of editorials on stem cell and cloning topics, many of the transactions now take place on the editorial pages of popular media rather than within the walls of research institutions or bioethics meetings. This venue shift combined with the increasing popularity of stem cells among the public has sharply influenced the topic within politics

Throughout the history of stem cells in American news media, the three issues of medical advances, politics, and ethics have become inextricably linked. Nowadays, only a few articles fail to mention all three of these topics, and how they affect the current status and future of stem cells. Clearly, each of the three has a significant effect on the other. As researchers appeal to the government for increased availability of ES cells and funding, politicians must make decisions that will represent the desires of their constituents. As the ethical debate becomes increasingly important to the public, their opinions will exert influence on their political representatives. In the end, the future of stem cell research within the United States will be determined by the decisions of

political figures. This has both positive and negative aspects. Hopefully, a legislative and political determination of stem cells' future means that the final decision will represent the will of the majority. As such, an informed public will prove critical in order to reach an educated and reasoned decision. So far, the press has clearly failed to present the multiple gains in the area of AS cell research, including the re-growth of muscle and heart tissue in some animals. For this, American news sources have a responsibility to provide complete coverage of advances on both adult and embryonic cells.

Unfortunately, a political decision also means that the battle will be fought along the old pro-life/pro-choice lines. Not only do these arguments fail to comprehend the entire ethical argument about stem cells, but they also invigorate old feuds when more conciliatory methods should prevail. As in all things political, the final decisions will come as a result of wrangling over words, facts, and ideas. As a major factor of education and fact reporting in modern society, popular newspapers and magazines have a responsibility to provide clear explanations of all aspects of this wide and complex issue. As the understanding and manipulation of stem cells and cloning expand, the public must have the facts needed to make judgments that will not only provide society with otherwise impossible cures, but also avoid frightening *Brave New World* visions of society. Both the cures and the realization of these visions may not be so far off as we suppose.

REFERENCES

"3-Month Wait Seen For Boy in Bubble," *The New York Times*, 25 October 1983: A4.

"A Ban on Cells That Could Heal," *The New York Times*, 7 Nov. 1998: A14.

"Ad Hoc Committee on an International Convention Against the Reproductive Cloning of Human Beings," (United Nations, 15 Dec. 2003). <www.un.org/law/cloning>

Angier, Natalie, "Source of Hair Regeneration Found at an Unexpected Site," *The New York Times*, 3 July 1990: C3.

"Baby Is Conceived To Save Daughter," *The New York Times*, 17 Feb. 1990: A10.

Begley, Sharon et al., "Little Lamb, Who Made Thee," *Newsweek*, 10 Mar. 1997, **129**, *10*: 52-58, on p. 52.

"Bone Marrow Cells Can Become Liver Tissue, Animal Studies Show," *The Washington Post*, 14 May 1999: A19.

Bowring, Finn, "Therapeutic and Reproductive Cloning: a Critique," *Social Sciences and Medicine*, Jan. 2004, **58**, *2*: 401-409.

"Bush to Allow Limited Stem Cell Funding," (CNN.com, 10 Aug. 2001). <www.cnn.com/2001/ALLPOLITICS/08/09/stem.cell.bush/index.html>

"Candidate Bush opposed embryo stem cell research," (CNN.com, 9 Aug. 2001). <www.cnn.com/2001/ALLPOLITICS/08/09/bush.history.stem.cell/index.html>

Carey, Mary Agnes, "House Considers Cloning Ban," (C-span.org, 24 Feb. 2003). <www.c-span.org/capitolspotlight/cq022403/preview.asp>

Clark, Matt with John Taylor, "Beefing Up the Bone Marrow," *Newsweek*, 14 Feb. 1983, **102**, 7: 75.

Clinton, Bill in "*Cloning Human Beings: Report and Recommendations of the National Bioethics Advisory Commission*," (Rockville, MD: National Bioethics Advisory Commission, June 1997).

Colborn, Don, "The Littlest Donor; Umbilical Cord Blood Is a New Source of Marrow," *The Washington Post*, 2 Aug. 1994: Z10.

Connolly, Ceci and Rick Weiss, "Stem Cell Research Divides Administration; Thompson Expresses Optimism That a Compromise Will Be Reached Soon," *The Washington Post*, 12 June 2001: A8.

Elmer-DeWitt, Philip and David Bjerklie, "The Genetic Revolution," *Time*, 17 Jan. 1994, **143**, *3*: 46-54.

Fletcher, John. C, "ETHICS: How Abortion Politics Stifles Science," *The Washington Post*, 5 Feb. 1989: D3.

Fox, M, "Pre-Persons, Commodities or Cyborgs: the Legal Construction and Representation of the Embryo," *Health Care Analysis*, 2000, **8**, *2*: 171-188.

Gillis, Justin, "Questions Raised on Stem Cells; Adult Cells Found Less Useful Than Embryonic Ones," *The Washington Post*, 14 Mar. 2002: A3.

Harris, John, *Clones, Genes, and Immortality: Ethics and the Genetic Revolution* (New York: Oxford University Press, 1998), p. 27.

"Harrison, Ross Granville," Columbia Encyclopedia, 6th ed., 2004.

Herman, Robin, "European Bioethics Panel Denounces Human Cloning," *The Washington Post*, 10 June 1997: Z19.

Hilts, Philip J, "Stem Cells Grown in Lab," *The Washington Post*, 11 July 1988: A3.

Horder, T.J, *A History of Embryology* (New York: Cambridge University Press, 1986), p. 3.

"Human Cloning Legislation in Congress," (www.cloninginformation.org, Feb. 2003). < http://www.cloninginformation.org/info/talking_points.htm>

"Information on Eligibility Criteria for Federal Funding of Research on Human Embryonic Stem Cells," (National Institutes of Health, 8 Mar. 2004). <stemcells.nih.gov/registry/eligibilityCriteria.asp>

Kalb, Claudia and Melinda Beck, "Seizing Nature's Lifeline," *Newsweek*, 29 Apr. 1996, **127**, *18*: 75.

Kass, Leon, "How One Clone Leads to Another," *The New York Times*, 24 Jan. 2003: A23.

Kinkead, Gwen, "Stem Cell Transplants Offer New Hope in Some Cases of Blindness," *The New York Times*, 15 Apr. 2003: F7.

Kolata, Gina, "Crucial Advance Made in Blood Cell Research," *The New York Times*, 6 Jan. 1995: A16.

Kolata, Gina, "Scientists Find New Method Of Producing Nerve Cells," *The New York Times*, 15 Aug. 2000: A10.

Krauthammer, Charles, "The Great Stem Cell Hoax," *The Weekly Standard*, August 2001, **006**, *46*: 12-13.

Lemonick, Michael D, "Stem Cells: America's Best." *Time*, 20 Aug. 2001, **158**, *7*: 54-55.

Maienshein, Jane, "What's in a Name: Embryos, Clones, and Stem Cells," *The American Journal of Bioethics*, Winter 2002, **2**, *1*: 12-19, on p. 12.

Marshak, Daniel R., et al., *Stem Cell Biology* (Cold Spring Harbor, NY: Cold Spring Harbor Laboratory Press, 2001), p. 1.

"NIH Backgrounder on Stem Cells," (Bethesda, MD: National Institutes of Health, 25 Mar. 2003). <www.nih.gov/news/backgrounders/stemcellbackgrounder.htm>

"NIH Report Backs Embryonic, Adult Stem Cell Research," (CNN.com, 17 July 2001). <www.cnn.com/2001/HEALTH/07/17/NIH.stem.cells>

Perry, Daniel, "Promise (and Pitfalls) of Research," *The Washington Post*, 7 Jan. 1999: A25.

Pollack, Andrew, "Scientific and Ethical Questions Cloud Plans to Clone for Therapy," *The New York Times*, 13 Feb. 2004: A1.

Prentice, David A, "Adult Stem Cells: Draft," (The Ritz Carlton, Washington D.C.: Meeting of The President's Council on Bioethics, 23 July 2003). <www.bioethics.gov/background/prentice_paper.html>

Reaves, Jessica, "Human Cloning: Cause for Rejoicing or Despair?" (Time.com, 9 Mar. 2001). <www.time.com/time/world/article/0,8599,101998,00.html>

Resenberger, Boyce, "NIH Panel Looks at Ethics, Standards for Human Embryo Research," *The Washington Post*, 7 Feb. 1994: A3.

Rich, Frank, "The Genius of George W. Bush," *The New York Times*, 18 Aug. 2001: A15.

Riordan, Teresa, "Patents; A Doctor Finds a Way to Induce Rare Bone Marrow Cells to Reproduce Themselves in the Laboratory," *The New York Times*, 7 July 1997: D2.

Robertson, John A., "Debate on Human Cloning Ignores Some Benefits," *The New York Times*, 3 Feb. 1998: A22.

Ruane, Michael, "Stem Cell Decision Only Adds To Debate; Many Oppose Bush Plan; Others Say It's Too Limited," *The Washington Post*, 11 Aug. 2001: B1.

Santora, Marc, "Researchers on Stem Cells Are Making Do, and Hoping," *The New York Times*, 17 Sep. 2003: B5.

Schmeck, Harold M, "'Holy Grail' of Blood Research Is in Sight," *The New York Times*, 23 Aug. 1988: C1.

"Scientists Find New Way to Grow Human Embryonic Stem Cells," (Baltimore, MD: Johns Hopkins University, 18 Mar. 2003). <www.hopkinsmedicine.org/press/2003/March/030318.htm>

"Scientists Say Cell Treatment Can Reverse Diabetes in Mice," *The New York Times*, 29 Feb. 2000: A19.

Spolar, Chris, "Umbilical Cord Blood Used To Treat Boy's Leukemia," *The Washington Post*, 28 Aug. 1990: Z5.

Squires, Sally, "Righting Nature's Wrongs; Gene Therapy On the Threshold of Medicine's Next Revolution," *The Washington Post*, 30 Oct. 1985: A10.

Thompson, Larry, "Medicine's 4-year Old Pioneer; First Gene-Therapy Patient Opens Door to Treating 4,000 Inherited Diseases," *The Washington Post*, 25 Sep. 1990: Z8.

Thomson, James A, "Embryonic Stem Cell Lines Derived from Human Blastocysts," *Science*, Nov. 1998, **282**, *5391*: 1145-47.

Turner, John R.G, "Ewe Two," *The New York Times*, 28 Dec. 1997: Z1.

Vogel, Gretchen, "Can Adult Stem Cells Suffice?" *Science*, June 2001, **292**, *5523*: 1820-1822, on p. 1822.

Wade, Nicholas, "Bone Marrow Harbors Cells That Can Fix the Pancreas," *The New York Times*, 15 Mar. 2003: A12.

Wade, Nicholas, "Officials Say Bush's New Stem Cell Policy May Streamline the Research Process," *The New York Times*, 18 Aug. 2001: A10.

Wade, Nicholas, "Panel Drafts Rules For Human Embryo Study," *The New York Times*, 9 Apr. 1999: A20.

Wade, Nicholas, "Primordial Cells Fuel Debate on Ethics," *The New York Times*, 10 Nov. 1998: F1.

Wade, Nicholas, "Researcher Sees Early Success Using a 2nd Type of Stem Cell," *The New York Times*, 26 July 2001: A14.

Wade, Nicholas, "Senate Plans to Weigh Ban on Cloning," *The New York Times*, 19 Feb. 1998: A1.

Wade, Nicholas, "Word War Breaks Out In Research On Stem Cells," *The New York Times*, 21 Dec. 2002: A16.

Weiss, Rick, "A Crucial Human Cell Is Isolated, Multiplied," *The Washington Post*, 6 Nov. 1998: A1.

Weiss, Rick, "Ban on 'Stem Cell' Testing Reviewed; At Senate Hearing, Advocates Offer Evidence of Research's Medical Promise," *The Washington Post*, 3 Dec. 1998: F1.

Weiss, Rick, "Debate About Cloning Returns to Congress; Senate Considers Ban Affecting Human Embryos," *The Washington Post*, 30 Jan. 2003: A9.

Weiss, Rick, "Fetal Cell Research Funds Are at Risk; Scientists Fear Curbs Over Abortion," *The Washington Post*, 26 Jan. 2001: A3.

Weiss, Rick, "In Cell 'Alchemy,' an Alternative to Embryo Studies," *The Washington Post*, 24 Apr. 2000: A11.

Weiss, Rick, "New Potential for Stem Cells Suggested; Findings of Three Studies May Affect Treatment of Diabetes, Alzheimer's Disease," *The Washington Post*, 27 Apr. 2001: A2.

VITA

Logan Hampton Boatman

2032 Hillcrest, McKinney TX 75070

Education

Texas A&M University
College Station, Texas
Graduation: May 2004, *magna cum laude*
History, Bachelor of Arts
Minors in Biology and English

Honors

Phi Beta Kappa National Honor Society
Phi Kappa Phi National Honor Society
Texas A&M Dean's Honor Roll
Research Fellows Honors Distinction
Phi Alpha Theta History Honor Society

Involvement

Texas A&M Class Council: Class of 2004
Phi Alpha Theta History Honor Society – Vice President

Future Plans

University of Texas – Houston Medical School: Fall 2004