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Stem Cell Research: What the Cell is the Controversy?

Humpty-Dumpty sat on a wall; Humpty-Dumpty had a great fall. All the king's horses and all the king's men couldn't put Humpty together again...but stem cells sure could. However, American eagerness to formulate generally uneducated opinions regarding sophisticated and complex issues such as stem cell research often scribes disaster for the minds behind the technology. This, when coupled with government willingness to pass legislation representing "the people" (however uninformed), leads to unnecessary restrictions on a powerful medical tool like stem cell advancement. Because American society as a whole including the government is ignorant on scientific matters such as stem cell research, only experts at the helms of privately funded corporations should make decisions regarding this issue. The federal government should lift its restrictions, thereby permitting the pursuit of both embryonic and adult stem cell research, and support current endeavors toward the collection of umbilical cord blood for research purposes, or the United States will fall further behind other nations.

By definition, "a stem cell is a non-differentiated cell that can divide and multiply in its undifferentiated state, but which can also give rise to more specialized differentiated cells" (Holm 494). Incredible controversy has arisen in the U.S. specifically over embryonic stem cell research. Human embryos contain "the most powerful stem cells," as these totipotent cells "have the potential of transforming to any type of cell" and therefore contain by far the most potential of the three types of stem cells—embryonic, adult, and umbilical cord blood cells

(Toh Keng Kiat 89). Robert Klein, head of the 2004 Proposition 71 campaign to fund stem cell research in California, stated that even as we wait for stem cells to be "perfected, they'll dispense potent medicine—hope" (McManus 159). Unfortunately, we can never be certain of a "correct" answer when discussing ethical questions and morals; we can only do what is best for the majority. A majority of our population does stand to profit from stem cell research, and "helping many, many individuals is justification for taking a single cell [...] and using it to benefit more individuals" (McManus 170). However, stem cell research progress has been stalled in our nation since critics of the research—President Bush included—wield more power over science than the scientists themselves because of political, legal, and ethical debates freezing the progress of researchers.

Conservatives opposed to embryonic stem cell research favor a ban on the use of human embryos for research, arguing that "human beings in their earliest stages have the same right not to be killed that children and adults do" ("Stem" 12). These individuals base their beliefs on a literal interpretation of the Bible ("whatever you did [to] one of the least of these [...], you did [to] me"), with fears of organ farms and indestructible cloned armies fueling their crusade (Concordia, Matt. 25.40b). A prominent theory among naysayers is that of the classic slippery slope. Opponents to stem cell research fear "that allowing this would put us on a slippery slope towards reproductive cloning" (Holm 500). In the UK and "a number of other European countries," the "political reaction to the perceived slippery slope [...] is seen as a possible threat to the positive development of stem cell research," while being perceived by the U.S. government as a "possible tool to justify the prohibition of stem cell research [...] as part of a more comprehensive ban on all kinds of human cloning" (Holm 501). What challengers to stem cell research fail to recognize, however, is that "the potential to become something (or someone) is hardly the same as being something (or someone)" (qtd. in McManus 169). Jonathan D. Moreno, Kornfeld Professor and Director of the Center for Biomedical Ethics at the University of Virginia, summarizes the "standard argument" for the employment of "the hundreds of thousands" of unused embryos still in

fertility clinics: The embryos “could be freely donated, and they will never be implanted so will never be in a position to continue to develop” (Moreno 3). He also explains critics’ assertions that “there is in this argument a suppressed appeal to a notorious premise that these leftover embryos ‘will die anyway,’” somehow thereby associating “the feared massacre of human embryos in fertility clinics with a previous holocaust,” but an embryo becomes a human being and is given life in a mother’s womb, not in a test tube or Petri dish (Moreno 3).

On November 7 of last year (2006), Missouri voters passed Amendment 2, the Missouri Stem Cell Research and Cures Initiative, with support from 51.1 percent of the electorate (about 45,000 votes) despite the pronounced efforts of those opposed. One Lutheran church’s newsletter told the members of its congregation to vote against the amendment in the election, describing the wording of the initiative as “deceitful” and citing Proverbs 15:4 as a supporting verse: “The tongue that brings healing is a tree of life, but a deceitful tongue crushes the spirit” (St. Paul). In fact, the main arguments against Amendment 2 came from churches and specifically targeted the vocabulary of the initiative with regard to cloning and “ambiguous language about unborn human life (e.g. ‘the product of fertilization’),” stating it would “[open] the door for unlimited taxpayer funds to be used for the cloning and destruction of human embryos” (St. Paul). The Missouri Roundtable for Life called the cloning initiative “the boldest attempt ever to highjack the legitimate processes, procedures, and functions of representative government in Missouri,” further asserting that “its basic mechanism is a language structure [...] designed to defeat the casual reader by reversing reasonable inferences about the text in subsequent subsections” (St. Paul). The main point of interest in this particular pamphlet and countless other pieces of religious propaganda against the amendment is the lack of definition of the origin of life (when it begins, what is considered a “human being,” etc.) or a substantial argument against stem cell research itself, topics which many individuals debate. The difficulty lies not in stating one’s position but in defending that position with solid facts, which the church failed to do.

Along with substantial campaigns against the Missouri

Stem Cell Research and Cures Initiative came many proponents of this amendment, using scientific data and the experiences of others as support for their standing. Over 100 non-profit patient and medical groups supported a “yes” vote on Amendment 2, including the American Association for Cancer Research, American Diabetes Association, Christopher Reeve Foundation, Muscular Dystrophy Association, and Society for Women’s Health Research (Why). The medical conditions for which stem cells could provide cures “affect hundreds of thousands of Missourians including a child, parent, or grandparent in over half of all Missouri families” (Why). It is those hundreds of thousands of people in one state alone (not to mention the rest of the nation, the world, and the afflicted yet to come) that justify using tiny, non-human bunches of cells grown in tubes and dishes to assist in the discovery of cures for diseases inflicting pain and death on living, breathing, feeling human beings.

Jeff McCaffrey is a business major at the University of Missouri-Kansas City. He played football as a college freshman at the U.S. Air Force Academy when he was paralyzed in a car accident. Now in a wheelchair, he is “rallying students” and has helped found the Student Society for Stem Cell Research, UMKC chapter, the “first student-organized stem cell advocacy group in Missouri,” for the “cause that may have him walking again” (“UMKC”). The mission of the SSSCR is “to educate, advocate, and act on public policy affecting medical stem cell research” (“UMKC”). Similarly, retired Missouri U.S. Army veteran Colonel Stanley D. Brown remarked during the campaign for the Missouri Stem Cell Research and Cures Initiative, “When I talk with injured soldiers back from Iraq and Afghanistan, sometimes the only smile I receive is when I speak of the medical research being done to repair or replace damaged spinal cord nerves,” the same kind of treatment that could in the future help Jeff McCaffrey walk once again (Why). Matt LaVanchy, a fire fighter, also reasons in favor of stem cell research with the following: “Stem cells could provide cures for diseases like muscular dystrophy and new treatments for severe burn injuries that affect thousands of fire victims and fire fighters” (Why). They those suffering with muscular dystrophy, Alzheimer’s, sickle cell disease, ALS, lung diseases,

or diabetes; those who are paralyzed; burn victims; and so many more — are the ones we think about when we think of stem cell research and all it has to offer (Why). The bundles of cells in a laboratory are not people; they are not even comparable.

The potential to develop into a life is hardly the same as a life itself, evidenced in the process of somatic cell nuclear transfer (SCNT), part of the “human research cloning protocols” of several acclaimed scientific teams from around the world (Hyun and Jung 34). In this procedure, the nucleus of an unfertilized human egg is replaced with the nucleus of an ordinary patient-specific human cell and used to “develop a blastocyst-stage embryo that is genetically identical to the patient cell donor” (McManus 158, Hyun and Jung 34). These altered human stem cells are then cloned (McManus 158). However, “like the stem cell [‘soup’] more generally, the idea of using the products [human blastocysts] of SCNT to generate lines of human embryonic stem cells has thrust a remarkably esoteric matter into the political scene” (Moreno 3). When broken down into its basic parts, however, the issue becomes uncomplicated and more black-and-white.

Fundamentally, this newest breakthrough clearly poses an unembellished challenge to the conservatives’ position that embryonic stem cell research ends human lives. With the explanation that “every human cell contains the genetic information to create a new human being, the old arguments for preserving ‘unique’ human embryos fade away” (Singer 40). Obviously, “if mere potentiality to develop into a human being is enough to make something morally human, [...] then every human cell has a special or inviolable moral status, a view that is patently absurd” (McManus 170). The opposition, however, argues that “the use of a neutral expression [somatic cell nuclear transfer] deliberately obfuscate[s] what [is] ‘really going on’” and accused the California Stem Cell Research Initiative sponsors of “deception,” though the name of the process does actually describe exactly what is “really going on” (Moreno 3). Debates on the power and philosophy of language should be left out of science. We have the abilities to think, learn, and create in order to use them, not sit idly on them.

Another goal of embryonic stem cell research has been to discover a method to make these stem cells created

through SCNT reproduce without differentiating and then direct their cellular development, thereby eliminating some of the hullabaloo surrounding the use of actual human embryos (Cohen 240). This could be achieved through therapeutic cloning, or stem cell expansion. SCNT is, after all, part of a broader area of study known as “human research cloning.” Lest we turn ghostly pale at the word “clone,” interim president and neuroscientist Zach W. Hall of the University of California, San Francisco School of Medicine assures us that “no, we’re [not cloning human beings]; we’re taking the cells out at a very, very early level of development and cloning cells” (Lehrman 40). When stem cells divide, they “create one copy of themselves (daughter cells), and start differentiating into specialized cells” (Toh Keng Kiat 92). Stem cell expansion would “create daughter cell after daughter cell without also differentiating” (Toh Keng Kiat 92). Nonetheless, additional ethical queries arise from the possible abuse of cloning’s extensive replication capabilities.

Here we make the distinction between “reproductive cloning (to make a baby that’s genetically identical to the donor), which almost no one favors, or therapeutic cloning (to isolate and harvest its stem cells) to advance the field of regenerative medicine” (McManus 158). We cannot prohibit all cloning “just because its therapeutic applications could be misused. Even Michael Jackson’s face doesn’t get plastic surgeons arrested” (McManus 169). In 1998 “researchers at the University of Wisconsin published a method for deriving and culturing human embryonic stem cells indefinitely,” making possible the creation of “stable human stem cell lines” and “[generating] (in principle) unlimited quantities of any particular embryonic stem cell” (Holm 494). The results of therapeutic cloning would be these stem cell lines, “something that is self-renewing, that you can perpetuate indefinitely,” though “researchers will need hundreds possibly thousands of lines to provide genetic matches for the entire population” (Bruck 13; McManus 161). Stem cell lines would allow for both the standardization of “research into human stem cells” and the creation of “reproducible stem cell therapies” (Holm 494). Today, however, only a few are in existence in the United States.

An inevitable consequence of the attempted development

of viable stem cell lines is the need for ova. Even for the process of somatic cell nuclear transfer, many unfertilized eggs are required, just as in more common and accepted fertility treatment procedures. The result of this need for ova is the “harvesting of multiple eggs,” achieved through ovarian stimulation, “an invasive and uncomfortable two-stage process requiring many clinic visits, multiple injections of hormones, and minor surgery,” at the end of which the “mature eggs are then collected [...] for use in in vitro fertilization or in research” (Beeson 574). This can be harmful to the women who undergo the process, which has led to an occasionally unenthusiastic conclusion.

A number of individuals fear that “egg harvesting” is becoming a serious problem and is “threatening [to] women’s health” (Beeson 573). Young women are “being asked to donate or sell their ova, not only for use in fertility clinics, but increasingly for non-clinical use in experimental cloning research” (Beeson 573). Egg collection for stem cell research is “being conducted in the context of an international race for dominance in and commercialization of the production of embryonic stem cells and related products,” which some do not judge to be a defensible rationale for the process considering the alleged threats to women’s health in egg harvesting practices (Beeson 573).

These individuals believe the “risks of egg harvesting [...] do not receive adequate attention” but are instead obscured by “a research climate marked by conflicts of interest; the misleading use of language to describe research goals; and a commercial push that may lead to the exploitation of young women” (Beeson 573). The “conflicts of interest” refer to the fact that “some physicians who harvest eggs are also involved in stem cell research,” a problem when “clinicians have an interest in obtaining their eggs” (Beeson 574). Some also feel that the emphasis in opposition to embryonic stem cell research should center less on “the moral status of the embryo” and more on “other important ethical issues raised by women’s health advocates,” such as egg harvesting. The fact of the matter is these women are going to make that exceedingly personal decision based on their own individual financial situations, beliefs, and wishes (Beeson 574). Those are variables for which no physician can account or alter independently of the woman willing to submit herself

to the procedure. For that reason, the risks of egg harvesting should not factor into the debate over stem cell research as long as women are receiving a full-disclosure risk-benefit analysis before undertaking such a commitment. These women are aiding in the development of therapies that may someday save their own lives. When much of the contentious work such as settling debates like this one is finished, scientists can continue progressing toward cures and treatments, uninterrupted.

However, scientists must first finish this litigious work before they can move forward with therapies, and government restrictions under President Bush’s plan are seriously inhibiting their progress. President Bush believes that embryonic stem cell research crosses a moral boundary, stating he “oppose[s] federal funding for stem cell research that involves destroying living human embryos” (“AASP”). In a feeble attempt at compromise, he announced his plan on August 9, 2001, limiting federal funding to 64 “genetically diverse” lines he claimed existed worldwide, created before the implementation of his policy (“AASP,” “Time” 11a). By 2004, many called for a reform of the President’s policy as reports concurred “the original number of embryonic stem cell lines deemed available for federal research in August 2001 had been overestimated and many of those cell lines were perhaps unsuitable for research,” all having been “tainted by animal products used to help them grow in the laboratory. They may be useless or even dangerous in treating humans, a study published in January’s *Nature Medicine* found” (“AASP,” “Time” 11a).

In addition, they are far from “genetically diverse,” most being from “people who tend to use in vitro clinics the white, the infertile, the affluent” (McManus 161). While the affluent may at first be the only ones with the means to afford stem cell research treatments and therapies (and therefore be unaffected by the limited number of therapies with the potential to develop now), one must take into consideration the fact that these are more than cosmetic issues. As with many types of cancer, as treatments are more common and better understood for the often life-and-death diseases embryonic stem cell research can address, insurance and individuals will be able to pay for them. They could at the minimum be an option, but the President, in his patchy comprehension of the subject matter on which

he unhesitatingly adjudicated a conclusive verdict, has built an impenetrable Great Wall for American scientists, needlessly handcuffing them with an absence of utilizable stem cell lines.

Fortunately, embryonic stem cell research is not the only type of collection method available today; adult stem cells are a second alternative. These more “traditional” cells “are collected from the bone marrow and peripheral or circulating blood” of the person needing the treatment or transplant “so as to avoid rejection” (Toh Keng Kiat 89; Cohen 240). The chief advantage of adult stem cell research is the “diminished or minor ethical concerns expressed by most individuals,” but this merely masks greater worries of decreased possibilities for both the research and the nation (Cohen 240). Adult stem cells are much less versatile than embryonic; therefore, scientists are certain that “embryonic stem cells will have broader therapeutic applications” (Madden 34). Moreover, adult stem cells are “difficult to maintain [...] in long term culture,” further tapering their potential, yet even the narrow applications of adult stem cell research have made it valuable (Cohen 240). Nonetheless, embryonic stem cell research clearly stands to benefit a significantly larger group of people.

A third and relatively new means of stem cell collection is umbilical cord (or placenta) blood. When the baby is born, the doctor extracts the blood still present in the umbilical cord and placenta (Toh Keng Kiat 90). The blood is then “cryogenically stored for future use” (Toh Keng Kiat 90). Like adult stem cells, however, umbilical cord blood stem cells are “multipotent,” i.e., incapable of “[generating] all cell types” (Toh Keng Kiat 89). In addition, “the cost would be phenomenal” and its justification questionable “considering the very small proportion of placentas that would be used ultimately” (Cohen 240). Another disadvantage of cord blood stem cells is because of their relative primitiveness, “the engraftment process takes longer, leaving the patient receiving the transplantation at risk of infection for a longer period of time” (Toh Keng Kiat 91). This could prove fatal in certain cases, thereby defeating the total purpose of such a treatment.

One final problem with umbilical cord blood collection is the limited sample size, “usually barely enough for just one

treatment” (Toh Keng Kiat 92). Scientists are therefore searching for a way to increase sample size without altering the cells at all. They may have found their answer in the technology of Boston-based Cyomatrix LLC, whose “core technology is a unique, patented, three-dimensional cell growth bimetallic matrix called Cyomatrix, a proven platform for cell growth” (Toh Keng Kiat 92). The Cyomatrix material “looks and feels like bone marrow,” in which stem cells “normally reside and expand” and may be useful for enhancing “production of human T-cells, a critical component of the immune system” (Toh Keng Kiat 92). The abilities of the material have “implications in treatments for cancers, immune disorders, viral or bacterial infections, and other conditions that are today proving drug resistant” (Toh Keng Kiat 92). Still, adult stem cell and umbilical cord blood stem cell transplantation each present problems, but even with their disadvantages, as of mid-2003, 72 diseases, including leukemia and Hodgkin’s disease, were deemed treatable with them, which when compared to 45 in 2002 is a promising statistic (Toh Keng Kiat 90). Nevertheless, treatments developed from umbilical cord blood and adult stem cells compose less than half of the number of diseases embryonic stem cell research would address, among them various forms of cancer, diabetes, cardiovascular disease, rheumatoid arthritis, spinal cord injuries, autoimmune disease, allergies, and neurodegenerative diseases such as Parkinson’s and ALS (Bruck 21; “Disease” 787; Passier 11). First, however, the debate must be settled before we can use these technologies to their fullest potential.

The United States should not be willing to let a controversy such as the one presently enshrouding embryonic stem cell research stall our scientific progress, regardless of the limited benefits we are reaping from the two unrestricted collection methods. In the past, “it was [...] against the law to examine dead bodies to help our understanding of ourselves” (Cohen 240). Another obstacle comes with the fact that many Americans are unaware of the various stem cell collection techniques and the ensuing research, which often leads to tenuous scorn or dismissal of this developing medical tool. The phrase “stem cell research” has, in fact, become a false substitute for embryonic stem cell research because of the

extensive publicity allotted that particular specialty of the much broader field. The blame for this fundamental misattribution falls primarily on the scientific community, with the media and uninformed individuals also sharing part of the responsibility.

Our population is constantly inundated with scientific claims. With advertisements ranging from scientific-sounding shampoo billboards to the assertion that Cheerios are “good for your heart” and “can help lower your cholesterol,” members of the general public, typically devoid of any scientific training beyond high school biology, are “easy prey to the pseudoscientific” (Speed Weed 271). Once a declaration such as this presents itself, we are all too eager to scramble for the “guaranteed” product for weight loss, silky hair, or wrinkle-free skin, albeit without any definite comprehension of its actual capabilities. Perhaps the hope for an increased quality of life drives us toward current fads, or perhaps the mere intrigue of the unknown propels us closer to this “miracle” merchandise. In a study by the National Science Foundation, “fewer than half of American adults polled (47 percent) knew that the earth takes one year to orbit the sun,” yet Americans claim to be “all ears about science: 90 percent of respondents were moderately or very interested in new scientific discoveries” in a 2002 National Science Board survey (Robinson 68; Speed Weed 272). This proves a frightening statistic when juxtaposed with our real understanding of an area that supposedly intrigues us.

Many Americans find themselves in a familiar situation regarding scientific issues with a solid opinion but little background or knowledge of the science regarding the subject yet we value the opinions of the citizens in this nation, and we consider those when formulating policies, especially on controversial issues. In a nation where celebrity pet pampering and reality television shows have overtaken actual newsworthy information, scientists still depend upon society for their privileges (Quimby 163). With a discovery as momentous as that of somatic cell nuclear transfer, one would believe that it would be “front-page news” in American media, yet the coverage has not been quite up to par. Human nature causes us to have a difficult time admitting when we have fallen behind. We know we should have made the breakthrough first or at least be well on our

way. Popular media, with all its scandalous exposés, is in a way sheltered. Celebrities’ newest cosmetic surgeries often trump science because it clears both the reporter’s and the average person’s head with a healthy margin. We tend to brush science off as “boring” or “unimportant” until it affects us personally. We sometimes take advantage of the opportunities afforded us and leave it to someone else to educate us instead of “home-schooling” ourselves. In all actuality, “a true democracy cannot exist without a fully and accurately informed voting public” (Missouri). This illustrates the ironic ignorance of Americans, though not all accountability lies with the media and the public.

In addition to these individuals who neglect to take a step beyond popular media and inform themselves about topics ranging from potentially useless or even detrimental health supplements they are currently taking to pressing scientific issues like stem cell research, a weighty portion of the blame descends on scientists themselves. Undoubtedly, much more is at stake than the size of one’s thighs or a flawless complexion with respect to stem cell research. The final step of the scientific method is to report and share results, yet the experts often express timidity at making their findings known. In the United States, “scientists are still doing groundbreaking work with mouse stem cells, [...] reluctant to move to human cells, where the real scientific and commercial payoff lies,” mostly because of “lack of funds and the constant threat that such an approach could be banned” (Carey, “Stem Cell Wars”). This hesitation might also be a result of the plausible belief that the citizens have no desire to hear about the latest discoveries, or knowledge that their “cult of men in white coats” is “tolerated only on its best behavior” (Quimby 162). A minority of fanatics’ noisy opposition fuels their apprehension.

To quell both the animosity and the anxiety, the blinkered public must learn to put its faith in the well-educated men and women of science in our country and allow them to “call the shots” they are perfectly capable of calling regarding stem cell research. The value of our currency is based on faith; surely, we can trust highly intelligent individuals educated in our own schools and universities to make only the best decisions for us. Using history as a guide, no one voted when George Washington crossed the

Delaware, yet the situation ended as well as we had hoped. On a more modern note, the Food and Drug Administration does not ask people for their opinions when considering approval of a new prescription medication. We, in turn, take the word of this panel of learned and skilled authorities, for they are experts in their area. Stem cell researchers are no different concerning their focus than FDA specialists with regard to their business, but we habitually accept the latter's often far-reaching judgment without question. We should begin to show the scientific community in the discipline of stem cell research the same respect and allow them to make important decisions such as which avenues to chase with research and how best to turn their findings into cures and therapies for diseases.

Since we cannot hope to educate everyone fully on the matter, the debate will undoubtedly persist for years, especially in the most conservative portions of the United States. As with the creation versus evolution debate currently plaguing our nation, we will never satisfy both sides. Instead, we should recognize the right of the scientific community to "do its job" and pursue stem cell research; likewise, the public may exercise its right to refuse treatment. One potential consequence, however, would certainly be hypocrisy. While "not all conservative Christians attack science and reason while gorging on their fruits, [...] the fanatical fringe surely does" (McManus 161). Invariably, those that vehemently contest the research now will be some of the first to "take a ticket" as cures and therapies develop for debilitating diseases, particularly those that typically affect the elderly, when they or their loved ones are forced to choose between a double standard and death. By 2040, "an increasing proportion of the population in developed countries will be more than 75 years old and thinking about how their lives will end" (Singer 41). We must act now to aid these individuals in the near future.

Though the United States House of Representatives passed the Stem Cell Research Enhancement Act, legislation calling for "increasing federal support of embryonic stem cell research" on May 24, 2005, President Bush eventually vetoed it, keeping "the stem cell landscape for now [...] at status quo" ("AASP," "House" 5). To avoid this controversy over federal public funding of research the entire public does not support, private

corporations with scientific experts in stem cell research leading the way should finance the endeavor (though federal funds would certainly be advantageous). Currently, individual states and private companies head the field in America. A prominent paradigm is California, where citizens "voted to spend \$3 billion over ten years" in state funds in November 2004 with the passage of Proposition 71 (Carey, "Stem-Cell Also"). Connecticut, Illinois, and Maryland were quick to follow "with funding initiatives of their own" ("AASP"). Similarly, "New Jersey has dedicated \$11.5 million for its own stem cell institute, with another \$380 million in the works" (Lehrman 41). Also, the aforementioned Missouri Stem Cell Research and Cures Initiative passed recently. Some states, however, are either unable or unwilling to fund stem cell research institutions in their respective jurisdictions. This is where private resources enter the scene.

Stem cell research advocates need not to worry about lack of funding should the industry go entirely private, for a plethora of informed philanthropists would earnestly pour funds into such a cause. They fear that "state and federal threats to ban much of the research are hindering the pace of research in America" (Carey, "Stem-Cell Also"). Robert Klein himself donated \$2.6 million to the California Institute for Regenerative Medicine (Lehrman 40). Another example is the Harvard Stem Cell Institute, which "has raised \$30 million from foundations and private donors, and is creating its own stem-cell lines" (Carey, "Stem-Cell Also"). Andy Grove, the chairperson of Intel, gave the University of California, San Francisco, a \$5 million grant for the establishment of a Developmental and Stem Cell Biology Program (Gershon 929). The resources are indeed available, even and particularly in the private sector, but this does not atone for President Bush's lack of support for American scientists.

The President's discouragement for our men and women of science, evident in his restriction on federal funding for stem cell research, has caused an inopportune paucity of both scientists and funding in the United States. In Korea, for example, the estimates of annual spending on embryonic stem cell work are "more than \$100 million" (Carey, "Stem Cell Wars"). The Juvenile Diabetes Research Foundation "now gives two thirds of its grant money for embryonic stem cell research

to foreign scientists” (Carey, “Stem-Cell Also”). Most progress today comes from other nations as the United States struggles to stay “in the game,” let alone “the unchallenged lead” (Carey, “Stem-Cell Also”). In 1998, “nearly 60% of the papers in the field were written by U.S. scientists” (Carey, “Stem Cell Wars”). As of July 2006, “the percentage [was] below 30%” (Carey, “Stem Cell Wars”). Cloning expert Jose Cibelli, professor of animal biotechnology at Michigan State University, testifies that the bill “is like getting a foot in the door and trying to open it a little, when other countries are building huge gates” (qtd. in Carey, “Stem-Cell Also”). Because additional cures to those already in existence will undoubtedly take much time to develop, we must begin exponential progress immediately. Apparently, we are the only powerful nation with the “hang-up” on saving lives.

The field of stem cell research was “pioneered in the U.S. and American researchers were the first to create long-lived cultures of stem cells, [...] in 1998, and the scientific community immediately saw vast potential,” yet people are now leaving the world’s scientific superpower for treatment in countries like Korea, Britain, and Japan (Carey, “Stem-Cell Also”). The divergence is due in part to different religious beliefs. For example, “in Jewish and Islamic law, a developing embryo [does not] become human for forty days – well within the time frame in which embryos would be used for therapeutic research” (McManus 170). Certainly, this eliminates the controversy over embryonic stem cell research for some nations.

Another important distinction is a generally “more liberal and favorable research [environment] for the field” in countries such as the United Kingdom, Australia, China, India, Israel, Singapore, and Sweden (Gershon 928). Countries like Korea and Britain “explicitly allow the creation of new human embryos as a source of stem cells,” but this does not make them any less “decent” or moral (Carey, “Stem Cell Wars”). The U.S. slips to the back of the pack as “foreign labs [announce] a series of major breakthroughs, developments that move scientists a step closer to cures for a range of illnesses,” and the U.S. “could lose out on the eventual commercial applications to companies in [...] other countries that are rushing ahead with the research (Carey, “Stem-Cell Also”). Cibelli states, “We’re

really in the Dark Ages” (qtd. in Carey, “Stem-Cell Also”). We have the potential to become an even more outstanding nation because of technological and scientific advances such as this; we are the only ones holding ourselves back.

The controversy over stem cell research – specifically embryonic – is nothing short of disastrous, its effects comparable to a successful protest of the automobile. We rely heavily on our vehicles (many of which come from outside the U.S.). A boycott would be not only outrageous but also counterproductive, yet we are doing exactly that to stem cell researchers. “American ignorance is driving public affairs,” with the scientific community, the media, and blasé individuals to blame (Robinson 71). We live in a nation where abortion is a perfectly legal option in some states, yet we do not give our embryonic stem cell researchers a solid foundation on which to build cures, treatments, and therapies for diseases from which millions of Americans suffer. We only stand to gain from stem cell research. By lifting its restrictions, the federal government could demonstrate support for our scientists in their efforts to “catch up” to the rest of the world, whether publicly or privately funded. We, as citizens, should also back the exceptional minds behind the research, but we must first take a serious interest. Stem cell research could give Humpty-Dumpty another chance. To an America sick with illiberality, get well soon.

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